Dark Peak Nature Improvement Area
Monitoring of native woodland restoration and creation: Woodland bird Surveys

Image: Tawny Owl at North Lees, courtesy of Graham Thorpe

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1. Executive Summary

The Dark Peak Nature Improvement Area (NIA) Partnership was established in 2012 with the objective of creating, enhancing or restoring blanket bog; upland heath; native broadleaf woodland; upland hay meadows and pastures and public access across the landscape of the Dark Peak. Woodland improvement objectives included the restoration and creation of native woodlands and successional scrub, in order to provide and improve habitats for woodland and woodland edge bird populations. In addition to completing woodland management works, bird surveys were conducted in 2013 and 2014 at five woodland sites, to generate baseline data describing the size and diversity of the woodland bird population at the initiation of this regeneration process.

58 species were observed during the bird surveys, and the number of species observed at each site increased by an average of 38% from 2013 to 2014. As woodland management works were not completed at the time of the 2014 surveys, results from both years should be treated as baseline data. Population change trends may also only be inferred from survey data where repeat surveys are separated by a minimum of three years (Natural England, 2014). Future monitoring will therefore be necessary to verify this early indication that woodland bird populations may already be responding positively to the woodland management works completed by the Dark Peak NIA.

2. Introduction

2.1. Context of the Dark Peak NIA

In 2010 the Government commissioned an independent review by Sir John Lawton titled 'Making Space for Nature'. This report identified the need to establish a strong and connected natural environment by:

- better protection and management of designated wildlife sites;
- establishing landscape-scale conservation; and
- better protection for our non-designated wildlife sites.

The report suggested that a landscape could be categorised into 'core areas' (such as designated sites), 'restoration areas' (such as degraded areas of habitat), 'corridors', 'buffer zones' and 'sustainable use areas' (such as farmland managed under Countryside Stewardship agreements).

In June 2011 the Government published a response to this review in their Natural Environment White Paper (2011) setting out a new direction of travel for managing and valuing the natural environment in England. This supported a landscape-scale approach to conservation and greater recognition of the value of the ecosystem services provided by our natural environment which underpin our economy, society and individual health and well-being.

Following greater recognition of the landscape-scale approach to conservation, the Government established 12 'Nature Improvement Areas' (NIAs) as a key mechanism for restoring the natural environment to benefit people and wildlife. These were established through a national competition and allocated £7.5 million funding

Each NIA focuses its policies, funding and delivery across their area to:

- improve the way land is used and managed;
- revitalise landscapes and reduce habitat fragmentation to re-establish wildlife and restore ecological networks; and
- improve the health of the environment to deliver ecosystem services such as food production, flood alleviation and access to nature

The above text is from the *Nature Improvement Areas 2012-15*: *Making Space for Nature on a Landscape Scale* publication.

The Dark Peak NIA is the only upland NIA. It covers 25,000 ha of the South Pennine Moors Special Area of Conservation, including the Peak District National Park. It is centred on the 'Dark Peak' area of the Park, so called because of its underlying 'gritstone' geology. Priority habitats inside the Dark Peak NIA include blanket bog, dry and wet heathland, woodland and upland hay meadows and pasture around which four of the five management objectives are focussed. The Dark Peak NIA includes 19 Sites of Special Scientific Interest. Despite the Area's conservation importance priority species continue to decline and degradation of habitats (including continuing erosion of moorland and peat bogs, poorly managed and declining woodland, and loss of wildflower meadows) has reduced the wildlife and other public benefits this landscape should deliver. At the same time, although a predominantly rural area, the National Park is surrounded by urban conurbations and receives over 22 million day visits annually. Improving access in order to inspire and engage the public in landscape scale conservation is the fifth management objective.

The Dark Peak NIA combines NGOs (RSPB (lead), National Trust and Sheffield Wildlife Trust), local government organisations (Sheffield City Council, Natural England and Peak District National Park Authority), private companies (United Utilities), access groups (British Mountaineering Council) and existing partnerships (Eastern Moors and Moors for the Future). It has provided a catalyst, sparking the sharing of knowledge, expertise, practical support, and pooling of resources. Our monitoring programme has provided a valuable baseline to evidence the benefits that our work will provide for biodiversity and human well-being in the future.

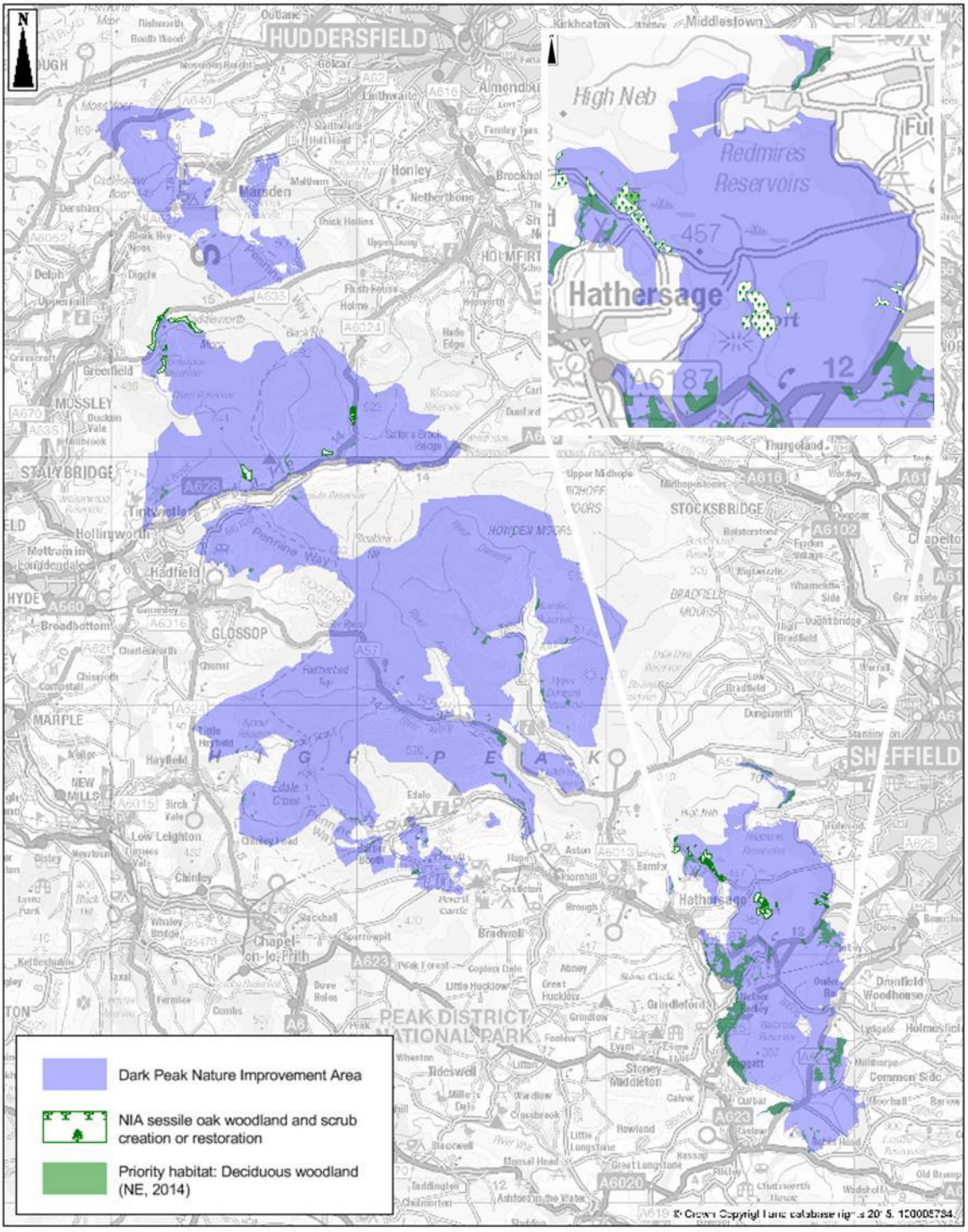

Figure 1: Deciduous woodland and scrub creation and improvement through by Dark Peak Nature Improvement Area Partnership. Insert shows woodlands surveyed.

2.2. Woodland Management Objectives

The aim of the Dark Peak NIA woodland management works was to improve the connectivity of priority habitats through restoration and creation of 210 hectares of sessile oak woodlands and scrub, involving new or existing woodlands, by 2015 through:

- Creation 80 ha of successional scrub on the moorland edge, on areas of species poor acidic grassland or dry heath, at Ashway Gap and Stanage Edge, by 2020 to:
  - Increase ring ouzel populations due to increased food availability.
  - Increase dwarf shrub communities, especially bilberry, within scrub areas.
  - Expand scrub cover, through natural regeneration, on lightly grazed moorland edges.
  - Increase both numbers and diversity of woodland edge birds such as cuckoo and tree pipit.

- To restore 83 ha of semi-natural woodland, through enhancing the species and structural diversity of existing mixed woodland on 8 sites, including Dennis Knoll, Stanage Plantation and Blacka Moor, by 2015 to:
  - Increase structural diversity of woodlands including canopy development, shrub and field layers.
  - Increase percentage of dead wood with corresponding increases in woodland invertebrates and cavity nesting birds.
  - Enhance tree and shrub species diversity as alien species are replaced with native deciduous trees.
  - Improve woodland interface between both moorland and grassland habitats.
  - Increase ability to function as ecological corridors linking moorland and grassland habitats.
  - Allow previously declining woodland bird populations to stabilise.

- To create 23 ha of new, sessile oak-birch woodland, through the clear felling of commercial, conifer plantations, at Crowden and Burbage Moor by 2015 to:
  - Increase populations of certain woodland birds, such as song thrush and bullfinch.
  - Increase connectivity and mosaics on the moorland-grassland interface.
  - Further increase woodland bird populations, as birds such as woodcock colonise.
  - Establish woodland corridors linking moorland and grassland habitats.

2.3. Woodland Management Works

In order to initiate the restoration and creation of woodlands to meet the woodland management objectives, a programme of works was undertaken, and is summarised below.

Blacka Moor

- Rhododendron removed to create space for the restoration of native woodland.
- Brambles cleared in 2014 to allow tree regeneration.

Burbage

- Removal of commercial conifer plantation through clear felling in 2014, to allow for the creation of sessile oak-birch woodland. This will be achieved through direct planting of oak, ash and birch saplings and encouraging natural regeneration.

North Lees

- More open ground created in 2012-13 by removing larch
- Glades created in 2012-13 by coppicing alder and halo thinning
- Successional scrub created in 2012 and 2014 by planting holly and rowan trees, providing habitat and for woodland edge species and ring ouzel.
- Stock-proof fencing installed in 2014 to allow woodland regeneration.

3. Woodland Bird Survey Methodology

3.1. Field Methods

Five woodland sites in the Dark Peak NIA were surveyed for birds in 2013 and again in 2014. These were at Burbage, Blacka Moor (for ease of surveying the woodland at Blacka Moor has been subdivided into Blacka Plantation and Strawberry Lee) and North Lees (comprising Dennis Knoll and Stanage Plantation).

The Common Birds Census (CBC) methodology was used to survey breeding birds (diversity, abundance and distribution, including territory mapping) within small woodland patches. Among NIA project partners this method was already being used by Sheffield City Council in their woodland bird surveys in support of applications for Environmental Impacts Assessments and Natural England SSSI consents and is the recommended survey methodology breeding birds by Natural England (2013)

The surveyor walked a pre-determined route around the site at a constant, methodical pace (approximately 45 minutes per kilometer) marking on a site map the locations of all birds identified by sight or sound, using standard BTO species abbreviations. Activity was noted using BTO codes, to indicate whether the individual was calling, singing, alarm calling, carrying food, carrying nest material or flying (see appendix II). Sex and age were noted where possible. Where multiple sightings of the same species definitely relate to different individuals, this was indicated by a dashed line between the locations of the sightings; where multiple sightings of the same species definitely relate to the same individual, this was indicated by a solid line between the locations of the sightings.

Each site was surveyed a minimum of six times between April and July each year, including morning and evening visits to enable identification of diurnal and crepuscular (e.g. woodcock or owl) species.

Woodland bird surveys are considered as baseline data, as opposed to proof of any positive impacts on woodland bird species as a result of the woodland management works conducted on these sites. Repeat surveys should be separated by a minimum of 3 years in order to demonstrate changes in populations of species in this context (Natural England, 2014). For this reason, no statistical tests have been performed on the data, although some general trends are observed and noted.

Woodland management works were ongoing in 2013 and 2014, and were completed at all sites after the 2014 surveys were conducted. While some of the works may have immediate positive impacts in terms of bird populations, others will take longer to come into full effect. For these reasons, the full potential positive impacts of these works on bird will not be observed by comparing 2013 and 2014 results.

3.2 Territory Mapping

Territory mapping was conducted following the BTO's Common Bird Census methodology. A map was produced for each site showing all sightings of one chosen species, from all visits during one year. Clusters of registrations (recorded sightings) within an area from multiple surveys indicate a territory held by a breeding pair. As a minimum, 2 sightings of a species within an area, separated by a minimum of 10 days, must be recorded in order to define a cluster. Where two distinct individuals singing at each other were recorded, this is taken as an indication of a territory boundary. Boundaries are drawn around these clusters, estimating the extent of each territory.

This analysis was performed for the following species, selected from the Defra's Woodland Bird Indicator species list (DEFRA, 2014), plus additional species of interest to the Dark Peak NIA Partnership.

4. Results

Surveys were conducted at all five woodland sites; however, data collected from Burbage in 2014 were never deposited with the Moors for the Future Partnership and so are not presented in this report.

4.1. Total Number of Species

A total of 58 species were observed across the five woodlands in the 2013-2014 surveys. Species richness recorded in each woodland are summarised in Table 1; presented in full in Appendix I**Error! Reference source not found.**.

At the sites where survey campaigns were conducted in both 2013 and 2014, the number of species observed increased from 2013 to 2014 by an average of 38%.

In addition to these results, a sparrowhawk and a goshawk were observed in 2013 and 2014 respectively. Woodcock, one of the target species woodland management outcomes were set out for, were detected at Blacka plantation, Dennis Knoll and Stanage Plantation in 2014 where at least two pairs bred successfully (see figure 2).

Figure 2: One of two woodcock nests found in 2014, for the first time in recent years, in woodlands previously thinned through the NIA in 2012. Photo courtesy of Bill Gordon & Frances Horsford.

Table 1: Species richness recorded at each site during the 2013 and 2014 CBC surveys of the five woodland sites.

Site	**Blacka Moor**				**Burbage**	**North Lees**			
Woodland	Blacka Plantation		Strawberry Lee		Burbage Plantation	Dennis Knoll		Stanage Plantation	
Survey yr.	2013	2014	2013	2014	2013	2013	2014	2013	2014
Species richness	35	43	19	31	30	17	25	25	30
Difference in species richness between years									
	+ 8		+12		n/a	+8		-5	
Total species richness									
	45		33		30	26		36	
Number of Priority Species*									
	13		11		9	7		13	

* Priority woodland bird species, in this context, are those which are included in DEFRA's Woodland Bird Indicator species list (DEFRA, 2014), plus additional species of interest to the NIA.

Table 2: Priority species detected during Dark Peak NIA woodland bird surveys.

	Blacka Moor				Burbage	North Lees			
	Blacka Plantation		Strawberry Lee		Burbage	Dennis Knoll		Stanage Plantation	
Priority Species	2013	2014	2013	2014	2013	2013	2014	2013	2014
Blackcap	●	●	●	●			●	●	●
Bullfinch	●	●		●					
Chiffchaff	●	●	●	●		●	●		
Coal Tit	●	●	●	●	●			●	●
Common Cuckoo	●	●		●				●	●
Dunnock	●	●	●	●					●
Goldcrest	●	●	●	●	●	●	●	●	●
Great Spotted Woodpecker	●	●	●		●	●	●		●
Nuthatch	●	●							●
Song Thrush	●	●	●	●	●	●	●	●	●
Spotted Flycatcher		●		●	●		●	●	●
Tree Pipit	●				●			●	
Marsh Tit				●					
Woodcock*		●			●		●		●
Reed Bunting*					●			●	
Ring Ouzel*					●			●	●

* Additional species targeted through Dark Peak NIA woodland and scrub restoration and creation outcomes.

4.2. Territory Mapping

Territory mapping was performed for the set of species of interest (see Table 3 and Appendix III). At least one territory was recorded for all species of interest. Net increases from 2013 to 2014 in the number of recorded territories across all sites were observed for the following species:

- Chiffchaff
- Coal Tit
- Great Spotted Woodpecker
- Nuthatch
- Spotted Flycatcher
- Woodcock

A decrease was observed in the number of territories held by Blackcap.

As mentioned previously, results from the 2013 and 2014 surveys should all be considered primarily as baseline data, as opposed to evidence of population change.

Table 3: Number of territories held by species of interest recorded at Blacka Plantation, Strawberry Lee, Burbage, Dennis Knoll and Stanage Plantation

	Blacka Moor				Burbage*	North Lees				Total		Early Indication of Change
	Blacka Plantation		Strawberry Lee		Burbage	Dennis Knoll		Stanage Plantation				
	2013	2014	2013	2014	2013	2013	2014	2013	2014	2013	2014	
Species												
Blackcap	5	5	3	2	0	0	1	1	0	9	8	-1
Chiffchaff	1	4	0	1	0	1	0	0	0	2	5	3
Coal Tit	3	3	2	2	5	1	1	1	2	7	8	1
Goldcrest	1	1	1	1	3	0	0	1	1	3	3	0
Great Spotted Woodpecker	1	1	0	0	1	0	0	0	1	1	2	1
Nuthatch	0	1	0	0	0	0	0	0	0	0	1	1
Spotted Flycatcher	0	1	0	0	0	0	1	1	0	1	2	1
Reed Bunting	0	0	0	0	2	0	0	0	0	0	0	0
Ring Ouzel**	0	0	0	0	1	0	0	0	0	0	0	0
Woodcock	0	1	0	0	1	0	1	0	1	0	3	3

*Burbage data are not included in the Early Indication of Change column, due to 2014 data being unavailable at the time of writing.

**Ring ouzel is included in this table despite not being a woodland bird as some territories overlap woodland sites at the base of crags.

5. Discussion

Woodland bird surveys conducted in 2013 and 2014 have provided baseline data giving an indication of the availability and quality of woodland habitats at five woodland sites in the Dark Peak NIA. 58 different species were observed over the two years, including several species included in DEFRA's Woodland Bird Indicator species list (DEFRA, 2014).

Territory mapping was performed for 10 species of interest. Results suggest that the populations of these species may be increasing, although these findings are not conclusive, as only one year had elapsed between the two survey campaigns.

Repeat surveys should be separated by a minimum of 3 years in order to infer population changes (Natural England, 2014) however annual surveys over the coming years may pick up an influx of previously unrecorded species at these sites as a direct response of management, for example the transition from conifer plantation to a recently felled site to growth of a native broadleaf woodland may attract successional woodland bird species.

It is hoped that the woodland management works completed will have a positive impact on the size and diversity of woodland bird populations in the Dark Peak NIA over the years to come. Initial findings are positive, but confirmation of these trends will rely on future monitoring.

As the young successional scrub planted during NIA projects (2012 – 2015) expands through natural regeneration, on lightly grazed moorland edges, increases in both the numbers and diversity of woodland edge birds such as cuckoo and tree pipit are expected outcomes by 2020. Further increases in woodland bird populations are also expected as woodland corridors linking moorland and grassland habitats become established and interfaces between these habitats improve, and birds such as song thrush, bullfinch and woodcock colonise.

6. Acknowledgements

The Dark Peak NIA gratefully acknowledges the work and support of the volunteers who conducted the woodland bird surveys, namely Graham Thorpe (Eastern Moors Partnership) and Paul Medforth (Sheffield City Council), generously offering their time and generating high quality and invaluable data, without which this report would not have been possible.

7. References

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8. Appendices

8.1. Appendix I: Full species list for all sites

		Blacka Moor				Burbage	North Lees			
		Blacka Plantation		Strawberry Lee		Burbage	Dennis Knoll		Stanage Plantation	
		2013	2014	2013	2014	2013	2013	2014	2013	2014
Species *(ticked if present)*										
Barn Owl									✓	
Blackbird	B.	✓	✓	✓	✓	✓	✓	✓	✓	✓
Blackcap	BC	✓	✓	✓	✓			✓	✓	✓
Blue Tit	BT	✓	✓	✓	✓	✓	✓	✓	✓	✓
Brambling	BL							✓		✓
Bullfinch	BF	✓	✓		✓					
Buzzard	BZ	✓	✓							
Carrion Crow	C.	✓	✓		✓	✓			✓	✓
Chaffinch	CH	✓	✓	✓	✓	✓	✓	✓	✓	✓
Chiffchaff	CC	✓	✓	✓	✓		✓	✓		
Coal Tit	CT	✓	✓	✓	✓	✓	✓	✓	✓	✓
Crossbill	CR					✓				
Cuckoo	CK	✓	✓		✓				✓	✓
Dunnock	D.	✓	✓	✓	✓					✓
Garden Warbler	GW	✓	✓		✓					✓
Goldcrest	GC	✓	✓	✓	✓	✓	✓	✓	✓	✓
Golden Pheasant	GF	✓	✓							
Goldfinch	GO	✓	✓	✓	✓		✓	✓		✓
Great Spotted Woodpecker	GS	✓	✓	✓		✓	✓	✓		✓
Great Tit	GT	✓	✓	✓	✓	✓	✓	✓	✓	✓
Green Woodpecker	G.		✓					✓		
Greenfinch	GR	✓	✓							
Grey Wagtail	GL					✓				
Heron	H.		✓							
Jackdaw	JD					✓				
Jay	J.	✓	✓							✓
Kestrel	K.	✓			✓				✓	
Linnet	LI	✓	✓		✓					

Long Tailed Tit	LT	✓	✓		✓					
Mallard	MA		✓			✓				✓
Marsh Tit	MT				✓					
Meadow Pipit	MP	✓	✓		✓	✓				
Mistle Thrush	M.		✓	✓	✓	✓		✓	✓	✓
Nuthatch	NH	✓	✓							✓
Pheasant	PH		✓	✓	✓	✓		✓		✓
Pied Wagtail	PW			✓						
Raven	RN					✓				
Redstart	RT	✓	✓		✓	✓		✓	✓	✓
Reed Bunting	RB					✓			✓	
Ring Ouzel*	RZ					✓			✓	✓
Robin	R.	✓	✓	✓	✓	✓	✓	✓	✓	✓
Siskin	SK		✓		✓	✓	✓	✓	✓	✓
Song Thrush	ST	✓	✓	✓	✓	✓	✓	✓	✓	✓
Spotted Flycatcher	SF		✓		✓	✓		✓	✓	✓
Stock Dove	SD		✓							
Swallow	SL						✓			
Swift	SI	✓	✓						✓	
Tawny Owl	TO	✓	✓		✓		✓	✓		✓
Tree Pipit	TP	✓				✓			✓	
Treecreeper	TC	✓	✓			✓			✓	
Whinchat	WC		✓							
Whitethroat	WH	✓	✓		✓					
Willow Warbler	WW	✓	✓	✓	✓	✓	✓	✓	✓	✓
Woodcock	WK		✓			✓		✓		✓
Woodpigeon	WP	✓	✓	✓	✓	✓	✓	✓	✓	✓
Wren	WR	✓	✓	✓	✓	✓	✓	✓	✓	✓
Species Count		**35**	**43**	**19**	**31**	**30**	**17**	**25**	**25**	**30**
Change			**8**		**12**	**N/A**		**8**		**5**
% Change			**22**		**63**	**N/A**		**47**		**20**

*Ring ouzel is included in this table despite not being a woodland bird as some territories overlap woodland sites at the base of crags.

8.2. Appendix II: BTO species and ECN activity codes

AC	Arctic Skua	GA	Gadwall	LE	Long-eared Owl	SM	Sand Martin
AE	Arctic Tern	GX	Gannet	LT	Long-tailed Tit	SS	Sanderling
AV	Avocet	GW	Garden Warbler	MG	Magpie	TE	Sandwich Tern
BO	Barn Owl	GY	Garganey	MA	Mallard	VI	Savi's Warbler
BY	Barnacle Goose	GC	Goldcrest	MN	Mandarin Duck	SQ	Scarlet Rosefinch
BA	Bar-tailed Godwit	EA	Golden Eagle	MX	Manx Shearwater	SP	Scaup
BR	Bearded Tit	OL	Golden Oriole	MR	Marsh Harrier	CY	Scottish Crossbill
BS	Berwick's Swan	GF	Golden Pheasant	MT	Marsh Tit	SW	Sedge Warbler
BI	Bittern	GP	Golden Plover	MW	Marsh Warbler	NS	Serin
BK	Black Grouse	GN	Goldeneye	MP	Meadow Pipit	SA	Shag
TY	Black Guillemot	GO	Goldfinch	MU	Mediterranean Gull	SU	Shelduck
BX	Black Redstart	GD	Goosander	ML	Merlin	SX	Shorelark
BJ	Black Tern	GI	Goshawk	M.	Mistle Thrush	SE	Short-eared Owl
B.	Blackbird	GH	Grasshopper Warbler	MO	Montagu's Harrier	SV	Shoveler
BC	Blackcap	GB	Great Black-backed Gull	MH	Moorhen	SK	Siskin
BH	Black-headed Gull	GG	Great Crested Grebe	MS	Mute Swan	S.	Skylark
BN	Black-necked Grebe	ND	Great Northern Diver	N.	Nightingale	SZ	Slavonian Grebe
BW	Black-tailed Godwit	NX	Great Skua	NJ	Nightjar	SN	Snipe
BV	Black-throated Diver	GS	Great Spotted	NH	Nuthatch	SB	Snow Bunting
BT	Blue Tit	GT	Great Tit	OP	Osprey	ST	Song Thrush
BU	Bluethroat	GE	Green Sandpiper	OC	Oystercatcher	SH	Sparrowhawk
BL	Brambling	G.	Green Woodpecker	PX	Peafowl/Peacock	AK	Spotted Crake
BG	Brent Goose	GR	Greenfinch	PE	Peregrine	SF	Spotted Flycatcher
BF	Bullfinch	GK	Greenshank	PH	Pheasant	DR	Spotted Redshank
BZ	Buzzard	H.	Grey Heron	PF	Pied Flycatcher	SG	Starling
CG	Canada Goose	P.	Grey Partridge	PW	Pied Wagtail	SD	Stock Dove
CP	Capercaillie	GV	Grey Plover	PG	Pink-footed Goose	SC	Stonechat
C.	Carrion Crow	GL	Grey Wagtail	PT	Pintail	TN	Stone-curlew
CW	Cetti's Warbler	GJ	Greylag Goose	PO	Pochard	TM	Storm Petrel
CH	Chaffinch	GU	Guillemot	PM	Ptarmigan	SL	Swallow
CC	Chiffchaff	FW	Guineafowl (Helmeted)	PU	Puffin	SI	Swift
CF	Chough	HF	Hawfinch	PS	Purple Sandpiper	TO	Tawny Owl
CL	Cirl Bunting	HH	Hen Harrier	Q.	Quail	T.	Teal
CT	Coal Tit	HG	Herring Gull	RN	Raven	TK	Temminck's Stint
CD	Collared Dove	HY	Hobby	RA	Razorbill	TP	Tree Pipit
CM	Common Gull	HZ	Honey Buzzard	RG	Red Grouse	TS	Tree Sparrow
CS	Common Sandpiper	HC	Hooded Crow	KT	Red Kite	TC	Treecreeper
CX	Common Scoter	HP	Hoopoe	ED	Red-backed Shrike	TU	Tufted Duck
CN	Common Tern	HM	House Martin	RM	Red-breasted	TT	Turnstone
CO	Coot	HS	House Sparrow	RQ	Red-crested Pochard	TD	Turtle Dove
CA	Cormorant	JD	Jackdaw	FV	Red-footed Falcon	TW	Twite
CB	Corn Bunting	J.	Jay	RL	Red-legged Partridge	WA	Water Rail
CE	Corncrake	K.	Kestrel	NK	Red-necked Phalarope	W.	Wheatear
CI	Crested Tit	KF	Kingfisher	LR	Redpoll (Lesser)	WM	Whimbrel
CR	Crossbill (Common)	KI	Kittiwake	RK	Redshank	WC	Whinchat
CK	Cuckoo	KN	Knot	RT	Redstart	WG	White-fronted Goose
CU	Curlew	LM	Lady Amherst's Pheasant	RH	Red-throated Diver	WH	Whitethroat
DW	Dartford Warbler	LA	Lapland Bunting	RE	Redwing	WS	Whooper Swan
DI	Dipper	L.	Lapwing	RB	Reed Bunting	WN	Wigeon
DO	Dotterel	TL	Leach's Petrel	RW	Reed Warbler	WT	Willow Tit
DN	Dunlin	LB	Lesser Black-backed Gull	RZ	Ring Ouzel	WW	Willow Warbler
D.	Dunnock	LS	Lesser Spotted	RP	Ringed Plover	OD	Wood Sandpiper
EG	Egyptian Goose	LW	Lesser Whitethroat	RI	Ring-necked Parakeet	WO	Wood Warbler
E.	Eider	LI	Linnet	R.	Robin	WK	Woodcock
FP	Feral Pigeon	ET	Little Egret	DV	Rock Dove (not feral)	WL	Woodlark
ZL	Feral/hybrid goose	LG	Little Grebe	RC	Rock Pipit	WP	Woodpigeon
ZF	Feral/hybrid mallard	LU	Little Gull	RO	Rook	WR	Wren
FF	Fieldfare	LO	Little Owl	RS	Roseate Tern	WY	Wryneck

FC	Firecrest	LP	Little Ringed Plover	RY	Ruddy Duck	YW	Yellow Wagtail
F.	Fulmar	AF	Little Tern	RU	Ruff	Y.	Yellowhammer

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ECN Protocols for Standard Measurements at Terrestrial Sites

BI (BB/BC/BM) Protocols

Note 3 BTO bird activity map symbols
(Sheet reproduced from BTO instructions for CBC recorders)

This standard list of conventions is designed for clear and unambiguous recording. Symbols can be combined where necessary. Additional activities of territorial significance, such as display or mating, should be noted using an appropriate clear abbreviation.

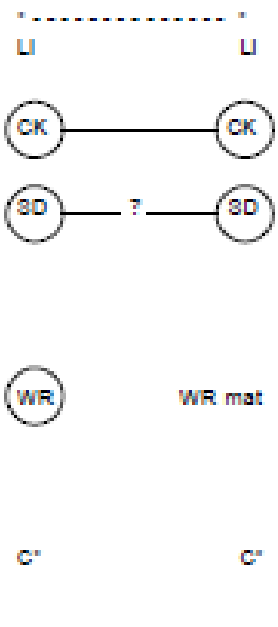
CH, CH ♂ CH ♀	Chaffinch sight records, with age, sex or number of birds if appropriate.
3Chjuve, CH2♀♂ 1 ♀	Use CH ♀♂ to indicate one pair of Chaffinches, so that: 2CH♀♂ means two pairs together.
R fam	Juvenile Robins with parent(s) in attendance
R	A calling Robin
R	A Robin repeatedly giving alarm calls or other vocalisations (not song) thought to have strong territorial significance
(R)	A Robin in song
\ | / – R – / | \	An aggressive encounter between two Robins
*R	An occupied nest of Robins. Do not mark unoccupied nests, which are not of territorial significance by themselves
* BT	Blue tits nesting in a specially provided site. Please remember to use this special symbol for a nest in a nestbox.
*PW on	Pied Wagtail nest with adult sitting
PW mat	Pied Wagtail carrying nest material
PW food	Pied Wagtail carrying food

Movements of birds can be indicated by an arrow using the following conventions:

GR →	A calling Greenfinch flying over (seen only in flight)
(D) →	A singing Dunnock, perched then flying away (not seen to land)
→ B.♂	A male blackbird flying in and landing (first seen in flight)
WR → WR	A Wren moving between two perches. The solid line indicates that it was **definitely the same bird.**

The following conventions indicate which registrations relate to different, and which to the same individual birds. Their proper use will be essential for the accurate assessment of clusters.

(WR) - - - - - - - - - - (WR)	Two Wrens in song at the same time, i.e. definitely different birds. The dotted line indicates a simultaneous registration (or contemporary contact) and is of very great value in separating territories.



Two Linnet nests occupied simultaneously, and thus belonging to different pairs. This is another example of the value of dotted lines. Only adjacent nests need to be marked in this way.

The solid line indicates that the registrations definitely refer to the same bird.

This question-marked solid line indicates that the registrations relate to probably the same bird. This convention is of particular use when your census route brings you back past an area already covered - it is possible to mark new positions of (probably the same) birds recorded before, without risk of double-recording. If you record birds without using the question-marked solid line, over-estimation of territories will result.

No line joining the registrations - it will be assumed that the birds are probably different, but depending on the pattern of other registrations they may be treated as if only one bird was involved. (You may if you wish use a question-marked dotted line, indicating that the registrations were almost certainly of different birds.)

Where adjacent nests are marked without a line, it will often be assumed that they were in first and second broods, or a replacement nest following an earlier failure.