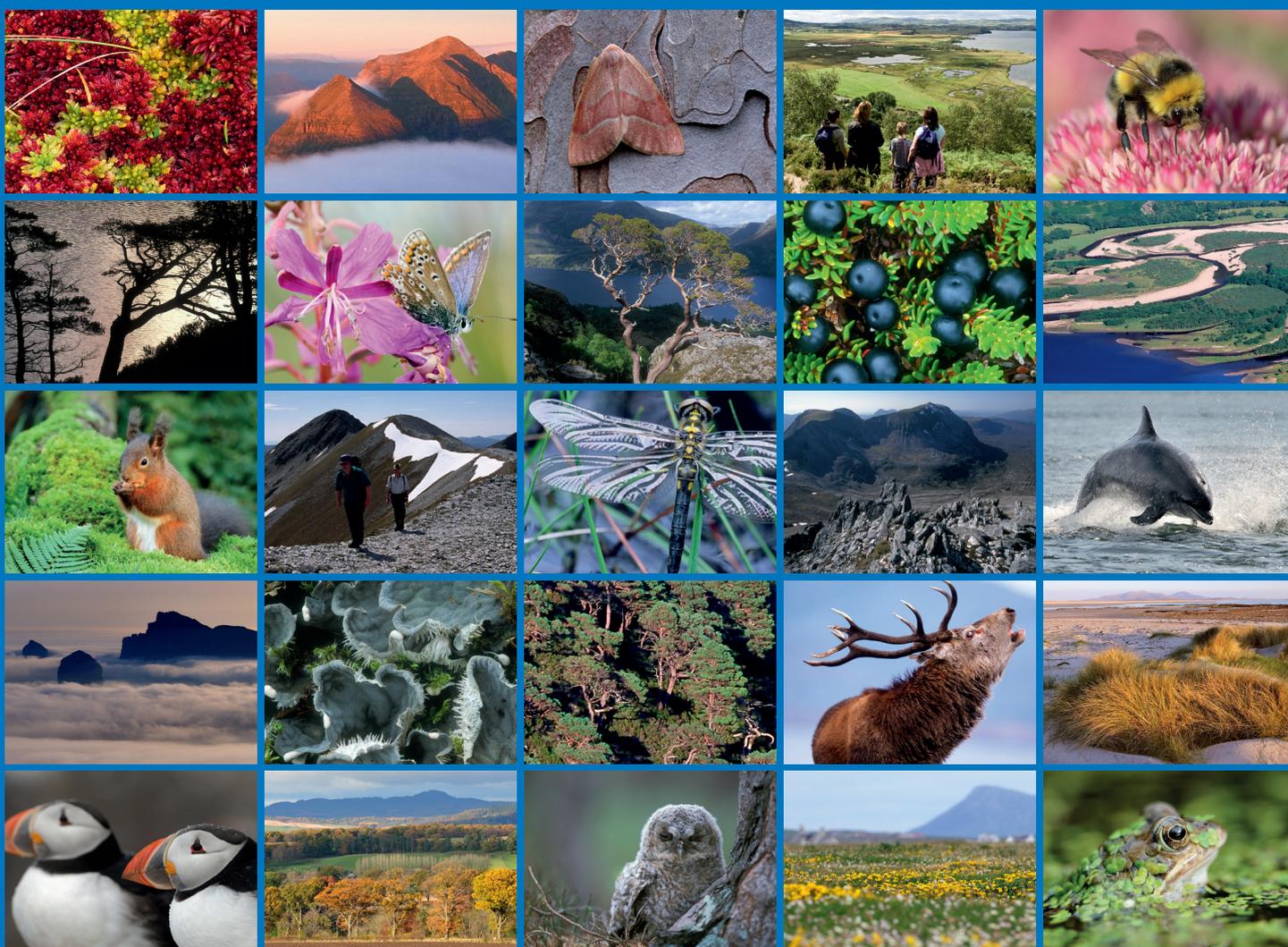


Site Condition Monitoring of breeding bird assemblage feature on Greenlaw Moor SSSI





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RESEARCH REPORT

Research Report No. 1117

Site Condition Monitoring of breeding bird assemblage feature on Greenlaw Moor SSSI

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SCM Reports

This report was commissioned by SNH as part of the Site Condition Monitoring (SCM) programme to assess the condition of special features (habitats, species populations or earth science interests) on protected areas in Scotland (Sites of Special Scientific Interest, Special Areas of Conservation, Special Protection Areas and Ramsar). Site Condition Monitoring is SNH's rolling programme to monitor the condition of special features on protected areas, their management and wider environmental factors which contribute to their condition.

The views expressed in the report are those of the contractor concerned and have been used by SNH staff to inform the condition assessment for the individual special features. Where the report recommends a particular condition for an individual feature, this is taken into account in the assessment process, but may not be the final condition assessment of the feature. Wider factors, which would not necessarily be known to the contractor at the time of the monitoring, are taken into consideration by SNH staff in making final condition assessments.



RESEARCH REPORT

Summary

Site Condition Monitoring of breeding bird assemblage feature on Greenlaw Moor SSSI

Research Report No. 1117

Project No: 113952

Contractor: Caledonian Conservation Ltd

Year of publication: 2020

Keywords

SCM; breeding bird assemblage; environmental pressures; Greenlaw Moor SSSI; short-eared owl; black grouse; waders

Background

This contract was for carrying out Site Condition Monitoring (SCM) of the breeding bird assemblage feature at Greenlaw Moor Site of Special Scientific Interest (SSSI) situated in the Scottish Borders. The 2017 SCM represented the third such monitoring cycle (following previous rounds in 2003 and 2009). It involved undertaking a two-visit upland breeding bird survey in April and June 2017. Evidence of environmental pressures on the SSSI that may affect the breeding bird assemblage feature was also recorded.

Main findings

- A total of 56 bird species were recorded during the 2017 SCM surveys, of which 34 were confirmed as or potentially breeding. Meadow pipit and skylark were the breeding species recorded most frequently, while snipe was the most common breeding wader.
- The total number and range of breeding bird species recorded in 2017 was similar to that recorded during the previous SCM round in 2009.
- Notably short-eared owl and whimbrel were recorded during both previous rounds of SCM surveys, but were absent in 2017. Another notable absence in 2017 was black grouse; a lek of three birds was recorded in 2009 but none were present in 2017.
- The absence of ground-nesting raptors and owls recorded during previous SCM rounds is of some concern as suitable foraging and/or nesting habitat is present for these species.
- The habitats present appeared to be heavily managed for red grouse shoots, with extensive muirburn in the east. Additional pressures associated with red grouse management included predator control. Other environmental pressures included herbivore impacts, access tracks, artificial drainage ditches, and stock fences.
- Positive habitat management measures designed to encourage black grouse and wader species included areas of broadleaved tree planting and pools/scrapes for waders.
- It is recommended that the programme of habitat improvement measures is continued and, where possible, extended. Existing habitat features for nesting birds currently present within the site should also be maintained. A further recommendation is that

future rounds of SCM include additional survey visits, as well as separate, targeted surveys for black grouse and short-eared owl, to collect more robust data.

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1. INTRODUCTION

This report describes the site condition monitoring (SCM) undertaken in 2017 for the breeding bird assemblage feature on Greenlaw Moor Site of Special Scientific Interest (SSSI). The SSSI is situated in the Scottish Borders, approximately 5.5 km to the south west of the town of Duns and approximately 2 km to the north of the village of Greenlaw. The location is shown in Figure 1.

The aim of SCM is to assess the state of notified features of interest on designated sites against quality standards. The 2017 SCM of the breeding bird assemblage on Greenlaw Moor SSSI represented the third such monitoring cycle (following previous rounds in 2003 and 2009), and will provide the necessary data to allow Scottish Natural Heritage (SNH) to report on the condition of the breeding bird interest at this site.

The 2017 SCM involved undertaking a two-visit upland breeding bird survey to record the species present, including evidence of breeding. Evidence of environmental pressures on the SSSI, such as evidence of heather management, evidence of grazing and presence of invasive species was also recorded during the surveys. Full details of the methods and results are provided in the sections below, followed by a discussion of the results and a brief summary of the main conclusions and recommendations.

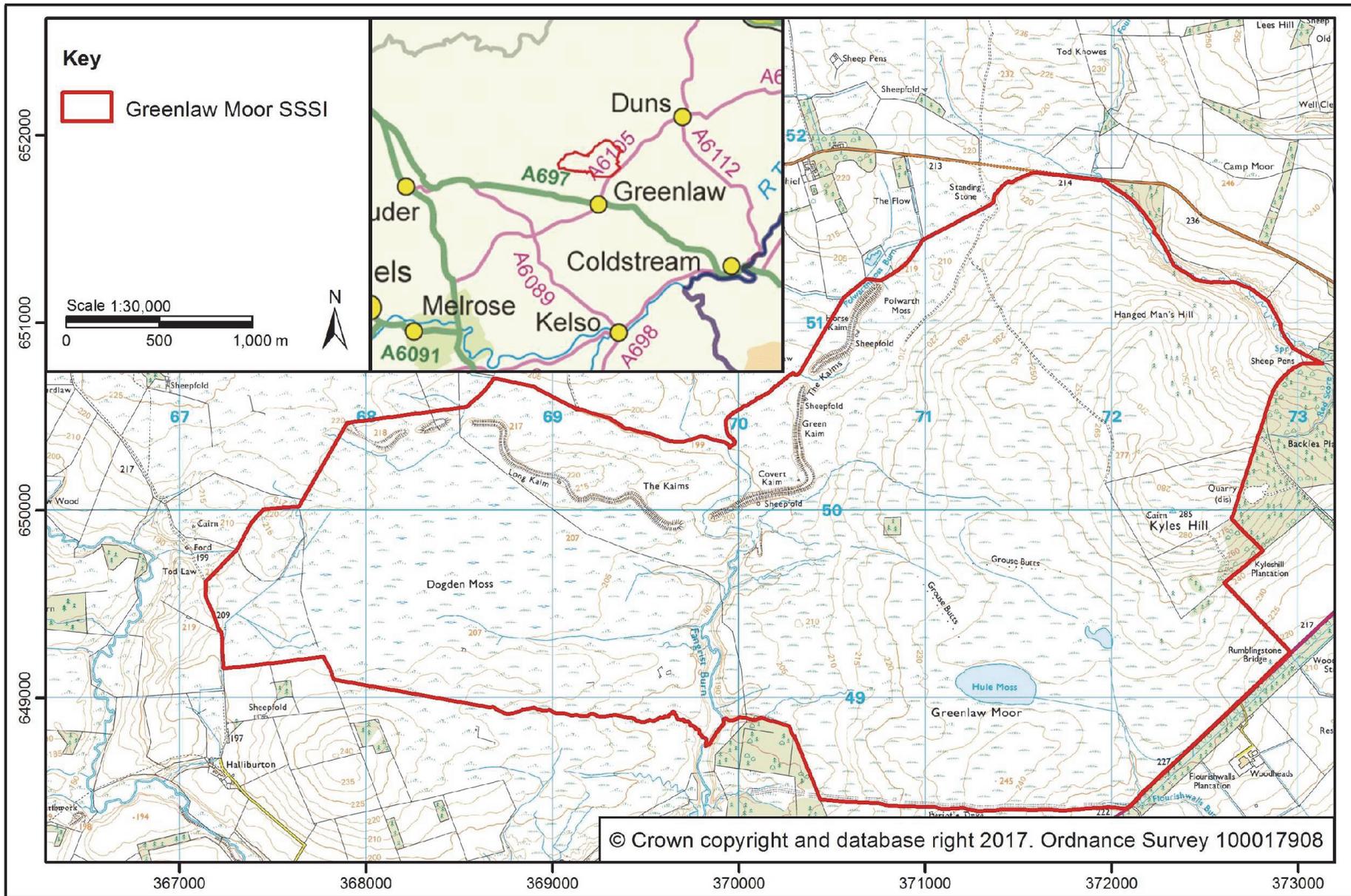


Figure 1. Location of Greenlaw Moor SSSI

2. METHODS

2.1 Field surveys

A survey for breeding birds was undertaken across Greenlaw Moor SSSI. The survey was based on the Brown & Shepherd (1993) method designed to target upland breeding waders, as this was considered to be the most suitable survey method for the majority of bird species likely to breed in the open habitats present within the SSSI.

In line with the Brown & Shepherd survey method, two survey visits were undertaken, one during the early part of the season (early April to mid-May) and one during the later part (mid-May to late June). However, the survey method was adapted such that, rather than focussing only on waders, all bird species observed were recorded. In addition, the standard survey times (08:30 to 18:00 British Summer Time (BST)) were extended to include the hours around dawn and dusk, so that species that are most active during these periods (e.g. black grouse (*Tetrao tetrix*), and short-eared owl (*Asio flammeus*)) could be detected if present.

The dates of the survey visits were as follows:

- Visit 1: 27 and 28 April 2017; and
- Visit 2: 19 and 20 June 2017.

2.1.1 Brown & Shepherd survey

The survey area covered the entire SSSI. During each survey visit, each 500 m x 500 m quadrat of open land was surveyed for approximately 20-25 minutes, with all parts of the survey area approached to within 100 m. The majority of the surveys were completed between the hours of 08:30 and 18:00 BST. However, due to time constraints during survey visit 1, a small area in the north-east of the SSSI was surveyed during the black grouse survey (which was completed before 08:30). This is discussed further in section 2.1.4.

With the exception of meadow pipits (*Anthus pratensis*), the locations of all birds seen or heard were recorded onto large scale (1:10,000) Ordnance Survey (OS) maps, using standard British Trust for Ornithology (BTO) species and activity recording codes (as detailed in Gilbert *et al.*, 1998) to identify the species and describe behaviour. In addition, signs of raptors and owls (e.g. pellets, pluck/kill sites, nests, egg fragments etc.) were searched for during the surveys. The locations of any notable records (e.g. nesting wader species) were recorded as 8-figure OS grid references using a handheld Global Positioning System (GPS) device.

As meadow pipit breeding densities are often too high to allow accurate recording and mapping of breeding territories during this type of multi-species survey, birds were tallied per 500 m x 500 m quadrat during each survey visit.

Survey timings and weather conditions were also recorded during each visit; full details are provided in Table A1.1, Appendix 1.

2.1.2 Additional survey effort at dawn and dusk

The adapted Brown & Shepherd (1993) survey method described above was further modified to include additional survey effort around the hours of dawn and dusk, to target black grouse and short-eared owl, as both species are listed in the SSSI citation as a component of the breeding bird assemblage feature.

During survey visit 1, the surveyors visited areas of suitable black grouse lekking habitat during the hours around sunrise, walking a pre-planned route, looking and listening for this species.

During survey visit 2, surveyors undertook 2-hour watches from vantage points offering good visibility of suitable breeding habitat for short-eared owl during the hours preceding sunset to target owls, and record any other notable bird species active at this time (such as black grouse).

2.1.3 Identification of environmental pressures

During each visit, the surveyors recorded any evidence of environmental pressures on the SSSI that may affect the breeding bird assemblage feature, such as presence of livestock, evidence of grazing (by livestock, deer or rabbits), evidence and extent of heather management (e.g. cutting or burning), and presence of invasive species (including bracken and scrub). This information was recorded as a series of 'Target Notes', including a description of the pressure (with notes on extent or numbers) and an 8-figure grid reference taken using a hand-held GPS device. Where appropriate, photographs were taken to provide representative examples.

2.1.4 Survey limitations

Both survey visits were carried out in good visibility and calm conditions (a wind speed of Beaufort force ≤ 4 ; or ≤ 3 for surveys targeting black grouse). As far as possible, the surveys were also timed to coincide with periods of dry weather, although some showers were experienced during the first survey visit; these were occasionally heavy. Full details of hourly weather conditions are provided in Table A1.1, Appendix 1.

In line with the Brown & Shepherd (1993) survey method, the majority of the breeding bird surveys were completed between the hours of 08:30 and 18:00 BST, with the exception of surveys around the hours of dawn and dusk to target black grouse and short-eared owl. However, during visit 1, a small area in the north east of the SSSI was surveyed for breeding waders and passerines during the black grouse survey due to time constraints. This is outside (i.e. earlier) than the recommended survey period for these species groups. However, as the area in question is small, and the second visit took place within optimal hours, this is not considered to represent a significant limitation.

Access was permitted across the entire SSSI and all parts of the site were accessible; no further survey limitations were encountered.

2.2 Assessment of breeding status

All birds observed were assigned to one of three categories: 'probable breeding', 'possible breeding' and 'seen only', based on behaviour and the habitats in which the birds were recorded. Following completion of both survey visits, for each species potentially breeding within the SSSI, all data were combined and the number of territories for each species recorded was estimated using a combination of the method described in Brown & Shepherd (1993) for breeding waders, and Common Birds Census (CBC) analysis methods for passerines as described in Gilbert *et al.* (1998).

With the exception of meadow pipit, breeding was assigned to one of three categories of certainty:

1. Confirmed breeding: nests, eggs or young observed;

2. Probable breeding: recorded in (or in close proximity to) an area of suitable breeding habitat and displaying breeding behaviour (as defined below) during both survey visits; and
3. Possible breeding: recorded in (or in close proximity to) an area of suitable breeding habitat and displaying breeding behaviour (as defined below) during a single survey visit only.

With the exception of the species discussed below (for which evidence of breeding may be less clearly defined), breeding behaviour was defined as one or more of the following:

- Displaying or singing;
- Adult birds repeatedly alarm-calling;
- Distraction displays;
- Territorial disputes;
- Adult birds carrying food; and
- The presence of a pair of birds in suitable breeding habitat.

The presence of red grouse (*Lagopus lagopus*), and pairs of pied wagtail (*Motacilla alba*) in or near areas of suitable breeding habitat were considered to be indicative of potential breeding.

Other species that were not displaying any signs of breeding behaviour were categorised as 'seen only', and the total number of registrations across the two survey visits was recorded.

For each species exhibiting breeding behaviour, separate territories were distinguished as follows:

- Two or more birds displaying breeding behaviour that were recorded simultaneously.
- Non-passerine birds (of the same species) displaying breeding behaviour in suitable habitat that were separated by less than 500 m during a single visit, or 1 km during different visits were considered to be from the same pair. Birds separated by greater distances were considered to be from different pairs.
- Passerines (of the same species) displaying breeding behaviour in suitable habitat that were separated by less than 100 m during a single visit, or 200 m during different visits were considered to be from the same pair. Birds separated by greater distances were considered to be from different pairs.

For meadow pipit, the maximum number of registrations recorded across the site during a single visit was assigned to the 'possible' breeding category. It is acknowledged that this is likely to represent an overestimate, because the species is sexually monomorphic and some of the registrations will represent females, and potentially newly fledged juvenile birds.

3. RESULTS

3.1 Breeding bird assemblage

A total of 56 bird species were recorded during the 2017 SCM surveys. Of these, breeding was confirmed in six species, the most notable of which was curlew (*Numenius arquata*). A further 28 species were assessed as potentially (i.e. probably and/or possibly) breeding. Meadow pipit and skylark (*Alauda arvensis*) were the breeding species recorded most frequently, while snipe (*Gallinago gallinago*) was the most common breeding wader species. In addition to curlew and snipe, four wader species were assessed as potentially breeding on the SSSI: oystercatcher (*Haematopus ostralegus*), golden plover (*Pluvialis apricaria*), lapwing (*Vanellus vanellus*) and redshank (*Tringa totanus*).

A small number of wildfowl species were confirmed to be breeding (shelduck (*Tadorna tadorna*)) or potentially breeding (greylag goose (*Anser anser*), mallard (*Anas platyrhynchos*), and shoveler (*Anas clypeata*)). No black grouse or short-eared owl were recorded during any of the survey visits. A single possible buzzard (*Buteo buteo*) territory was recorded. There were also single registrations of peregrine (*Falco peregrinus*) and kestrel (*Falco tinnunculus*), but no evidence of breeding was observed for either of these species. No sightings or signs of any other raptor species were recorded during either of the survey visits. In addition to skylark and meadow pipit, which are included on the UK Birds of Conservation Concern Red (BoCC) and Amber lists respectively (Eaton *et al.*, 2015), passerine species potentially breeding within the site included a further five that are Red- or Amber-listed: willow warbler (*Phylloscopus trochilus*), starling (*Sturnus vulgaris*), linnet (*Linaria cannabina*), lesser redpoll (*Acanthis cabaret*) and reed bunting (*Emberiza schoeniclus*). Another notable passerine record was of a single crossbill (*Loxia curvirostra*) in the Kyleshill Plantation in the east of the SSSI; crossbill is a Schedule 1 species, although there was no evidence that the species was breeding on the SSSI.

A summary of the results for each species recorded during the SCM survey is presented in Table 1. Species names (both vernacular and scientific) and ordering shown in Table 1 follow the British List maintained by the British Ornithologists' Union (British Ornithologists' Union, 2017). Locations of breeding territories are shown in Figures 2 to 7.

Table 1. Summary of breeding bird survey results for each species recorded, including number of confirmed and potential (probable and possible) territories of breeding species

Species		Number of breeding territories ¹			
Common name	Scientific name	Confirmed	Probable	Possible	Seen only
Pink-footed goose	<i>Anser brachyrhynchus</i>				E
Greylag goose	<i>Anser anser</i>			1	
Shelduck	<i>Tadorna tadorna</i>	1			
Wigeon	<i>Anas penelope</i>				E
Teal	<i>Anas crecca</i>				E
Mallard	<i>Anas platyrhynchos</i>	1			
Shoveler	<i>Anas clypeata</i>			1	
Tufted duck	<i>Aythya fuligula</i>				B
Red-legged partridge	<i>Alectoris rufa</i>			1	
Red grouse	<i>Lagopus lagopus</i>	4	10	7	
Pheasant	<i>Phasianus colchicus</i>			2	
Grey heron	<i>Ardea cinerea</i>				B
Buzzard	<i>Buteo buteo</i>			1	
Oystercatcher	<i>Haematopus ostralegus</i>			1	
Golden plover	<i>Pluvialis apricaria</i>		3	2	
Lapwing	<i>Vanellus vanellus</i>		3	4	
Curlew	<i>Numenius arquata</i>	1	7	3	
Redshank	<i>Tringa totanus</i>			1	
Snipe	<i>Gallinago gallinago</i>		12	13	
Black-headed gull	<i>Chroicocephalus ridibundus</i>				B
Common gull	<i>Larus canus</i>				L
Lesser black-backed gull	<i>Larus fuscus</i>				B
Herring gull	<i>Larus argentatus</i>				B
Great black-backed gull	<i>Larus marinus</i>				B
Woodpigeon	<i>Columba palumbus</i>			1	
Swift	<i>Apus apus</i>				L
Kestrel	<i>Falco tinnunculus</i>				L
Peregrine	<i>Falco peregrinus</i>				E
Jackdaw	<i>Corvus monedula</i>				L
Carrion crow	<i>Corvus corone</i>				B
Goldcrest	<i>Regulus regulus</i>			1	
Blue tit	<i>Cyanistes caeruleus</i>	1		2	
Great tit	<i>Parus major</i>			3	
Coal tit	<i>Parus ater</i>			3	
Skylark	<i>Alauda arvensis</i>		77	67	
Sand martin	<i>Riparia riparia</i>				L
Swallow	<i>Hirundo rustica</i>				B

Species		Number of breeding territories ¹			
Common name	Scientific name	Confirmed	Probable	Possible	Seen only
Chiffchaff	<i>Phylloscopus collybita</i>			1	
Willow warbler	<i>Phylloscopus trochilus</i>		1	5	
Wren	<i>Troglodytes troglodytes</i>		1	6	
Starling	<i>Sturnus vulgaris</i>			1	
Blackbird	<i>Turdus merula</i>		1		
Song thrush	<i>Turdus philomelos</i>				E
Mistle thrush	<i>Turdus viscivorus</i>				L
Robin	<i>Erithacus rubecula</i>			2	
Stonechat	<i>Saxicola rubicola</i>		1	3	
Wheatear	<i>Oenanthe oenanthe</i>	2	2	4	
Pied wagtail	<i>Motacilla alba</i>			1	
Meadow pipit	<i>Anthus pratensis</i>			471	
Chaffinch	<i>Fringilla coelebs</i>		1	4	
Linnet	<i>Linaria cannabina</i>			5	
Lesser redpoll	<i>Acanthis cabaret</i>			1	
Crossbill	<i>Loxia curvirostra</i>				E
Goldfinch	<i>Carduelis carduelis</i>				L
Siskin	<i>Spinus spinus</i>				L
Reed bunting	<i>Emberiza schoeniclus</i>		1	2	

Note: ¹Details of the breeding territory analysis method, including definitions of breeding status categories, are described in section 2.2; note that the number of breeding meadow pipit territories is the maximum tally recorded across the site during a single visit (in this case visit 1) and is likely to represent an overestimate (as described in section 2.2)

Key: E = observed during early survey visit (visit 1) only; L = observed during late survey visit (visit 2) only; B = observed during both survey visits (visits 1 and 2)

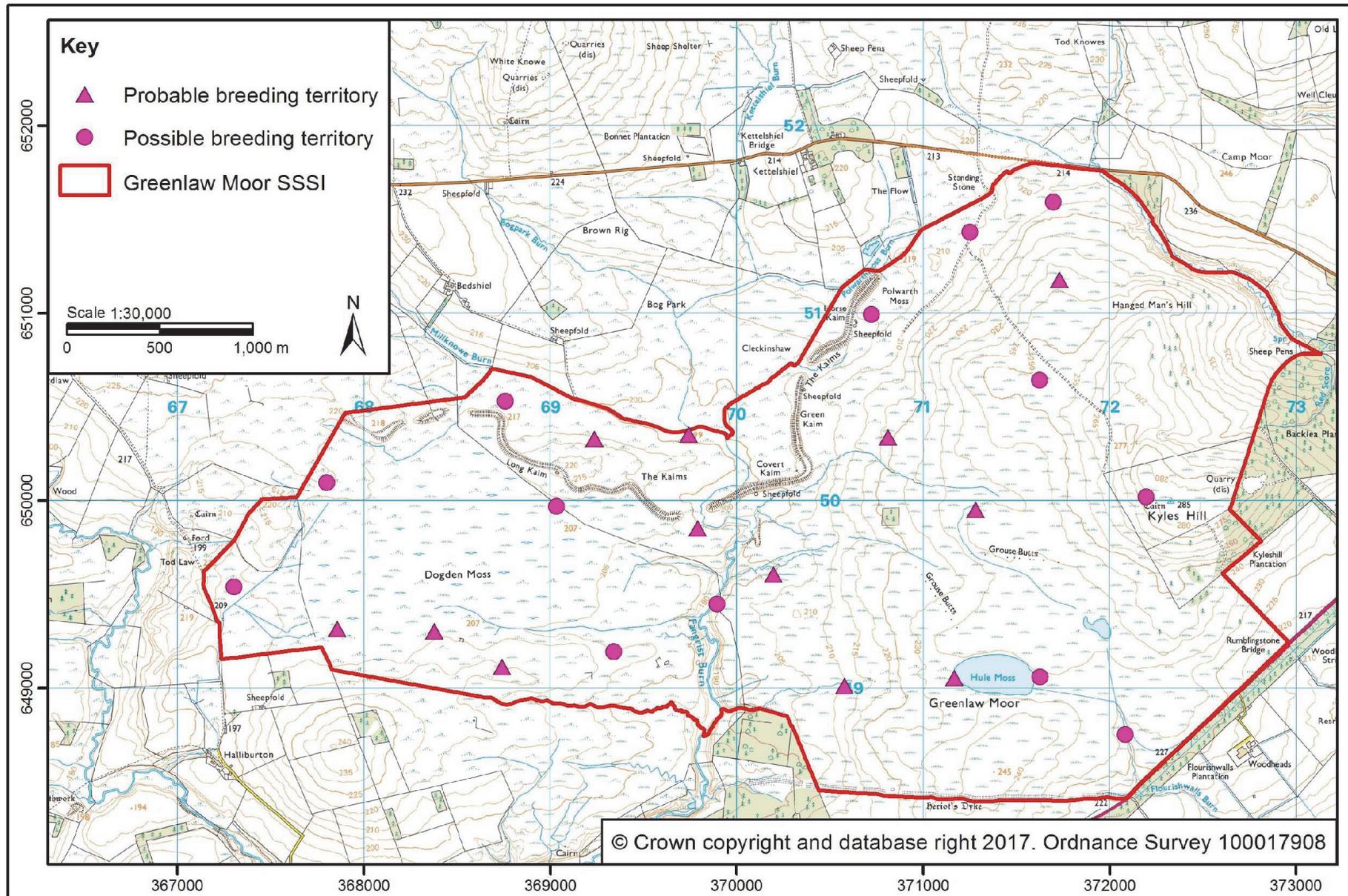


Figure 2. Breeding territories recorded during 2017 SCM: snipe

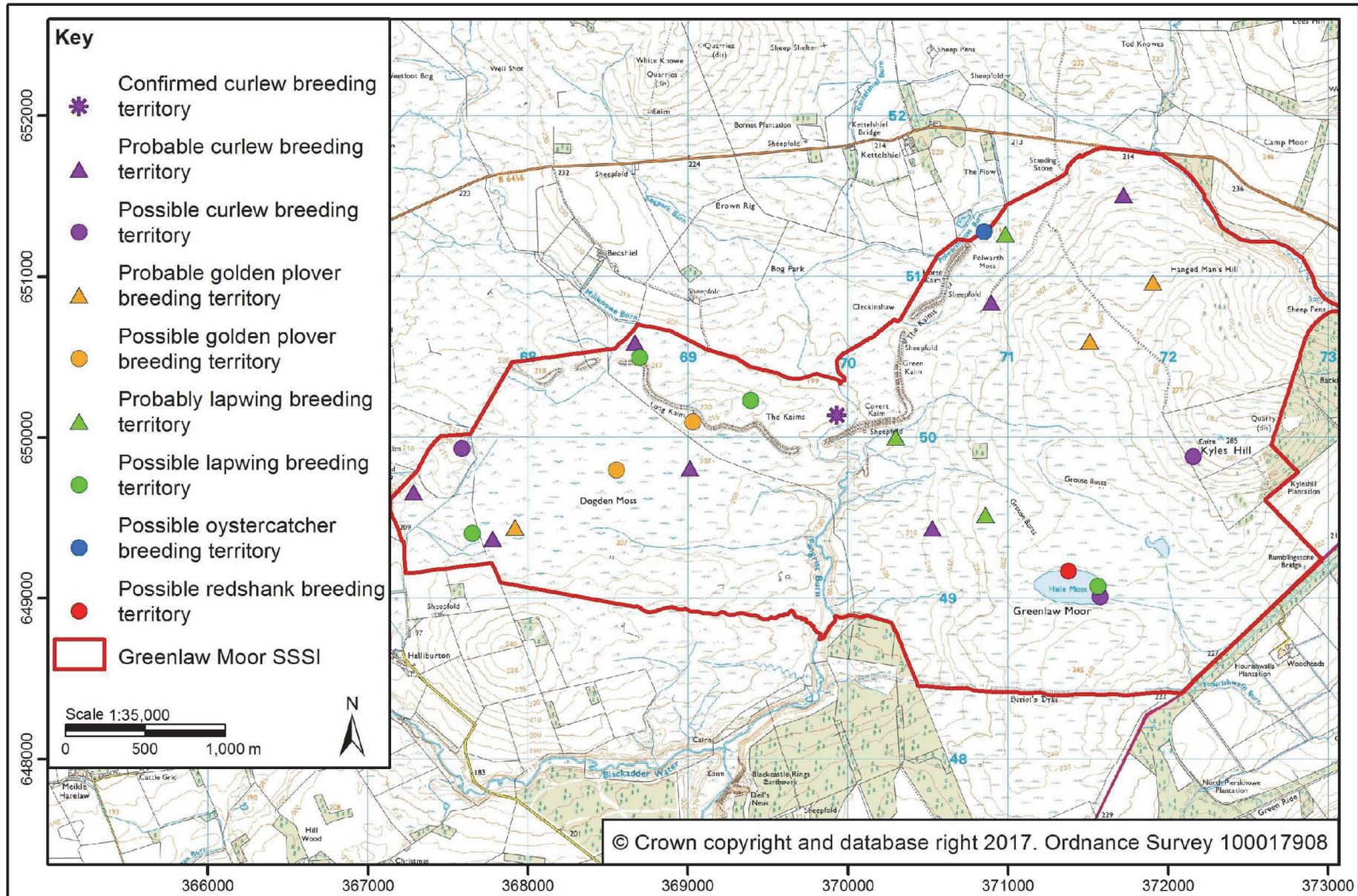


Figure 3. Breeding territories recorded during 2017 SCM: other waders

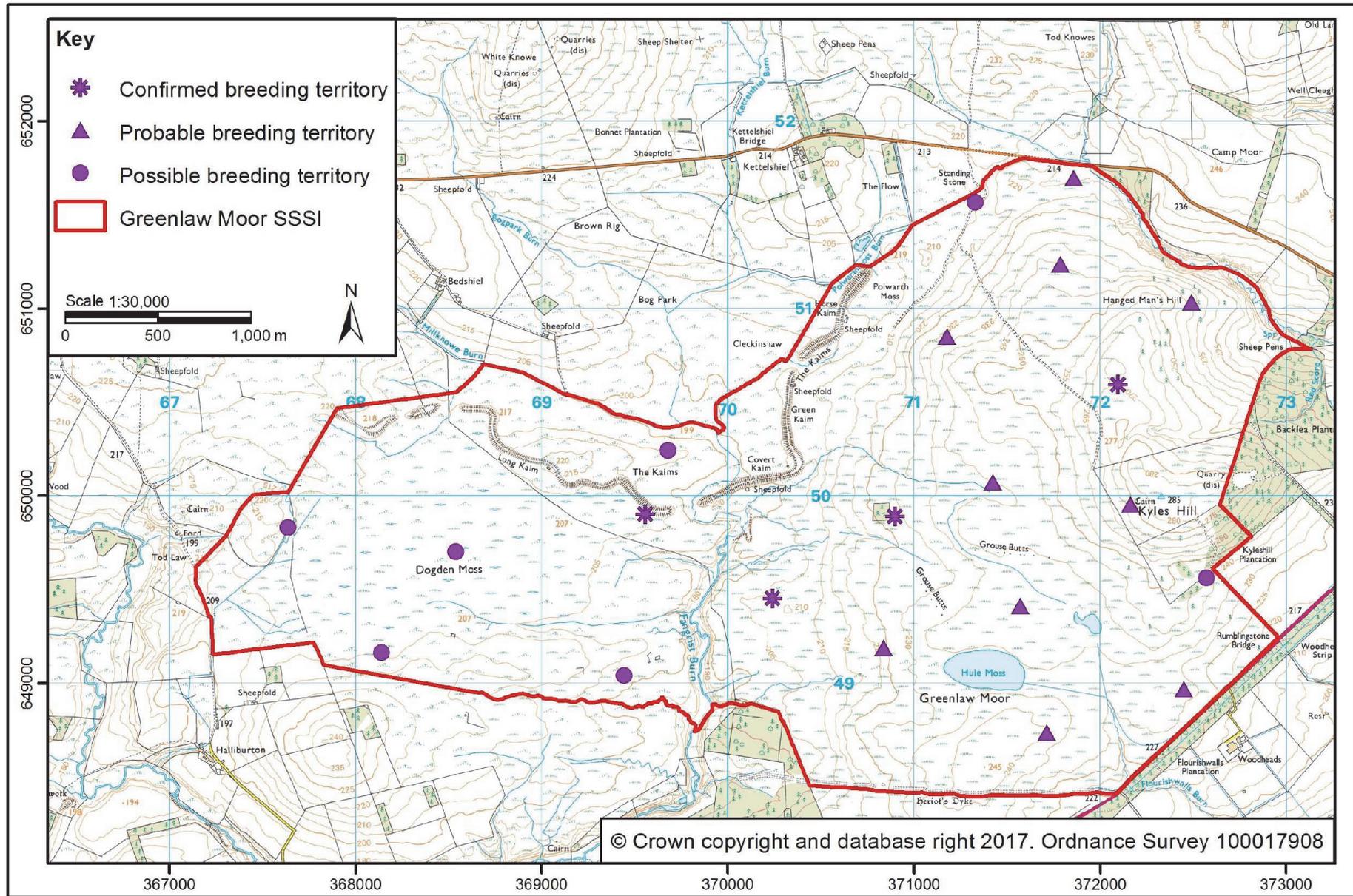


Figure 4. Breeding territories recorded during 2017 SCM: red grouse

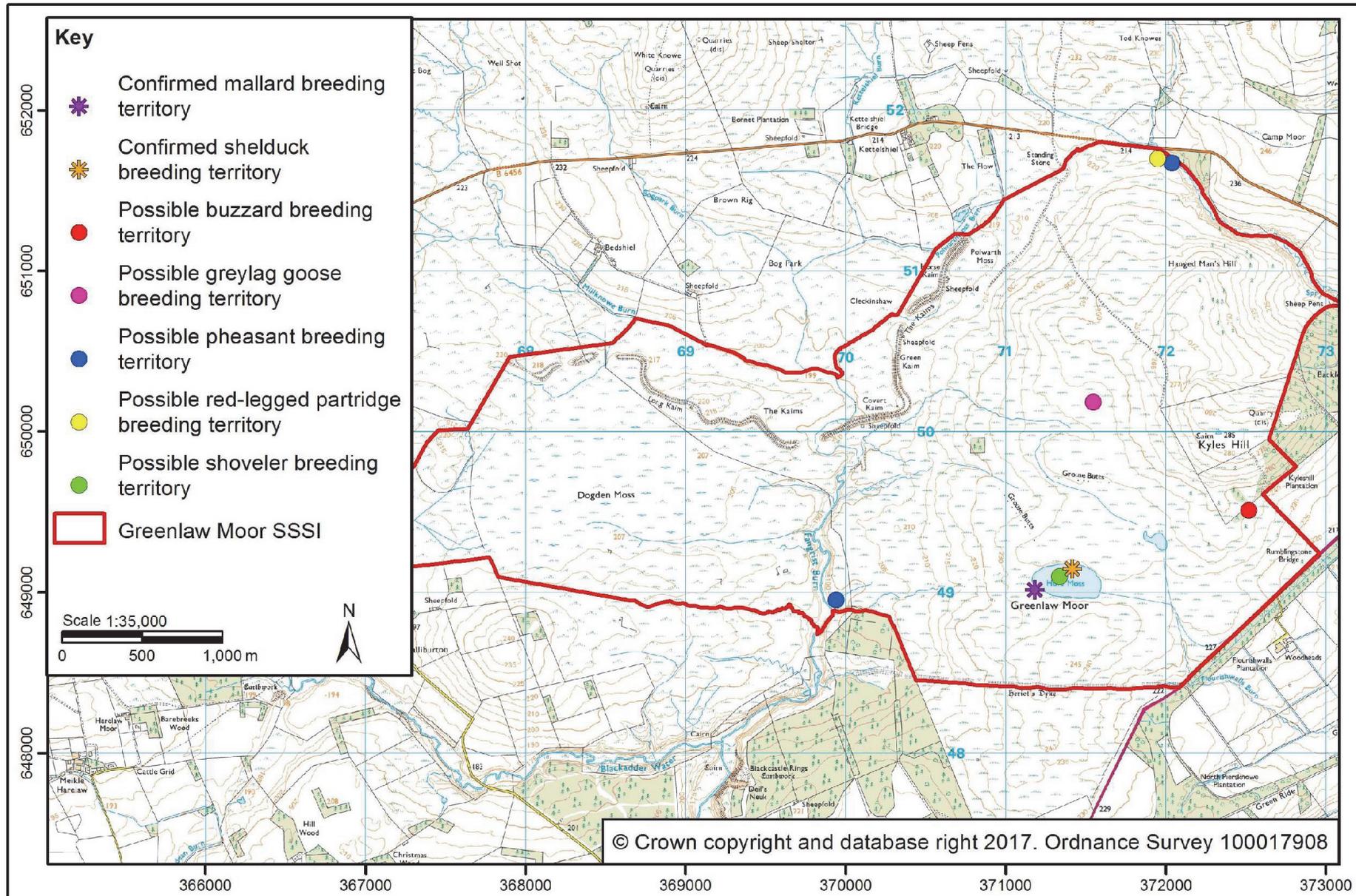


Figure 5. Breeding territories recorded during 2017 SCM: other non-passerines

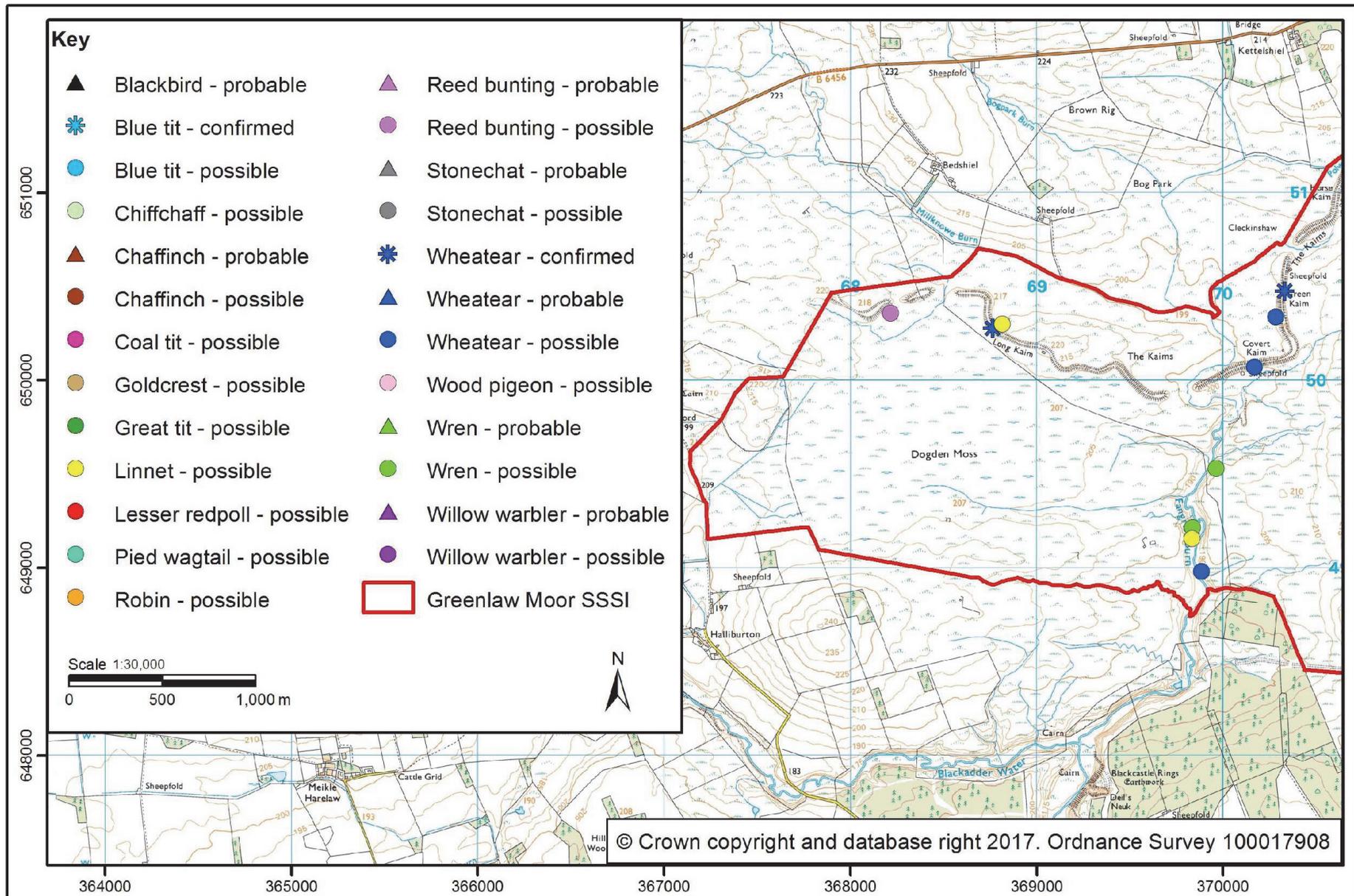


Figure 7a. Breeding territories recorded during 2017 SCM: other passerines (west)

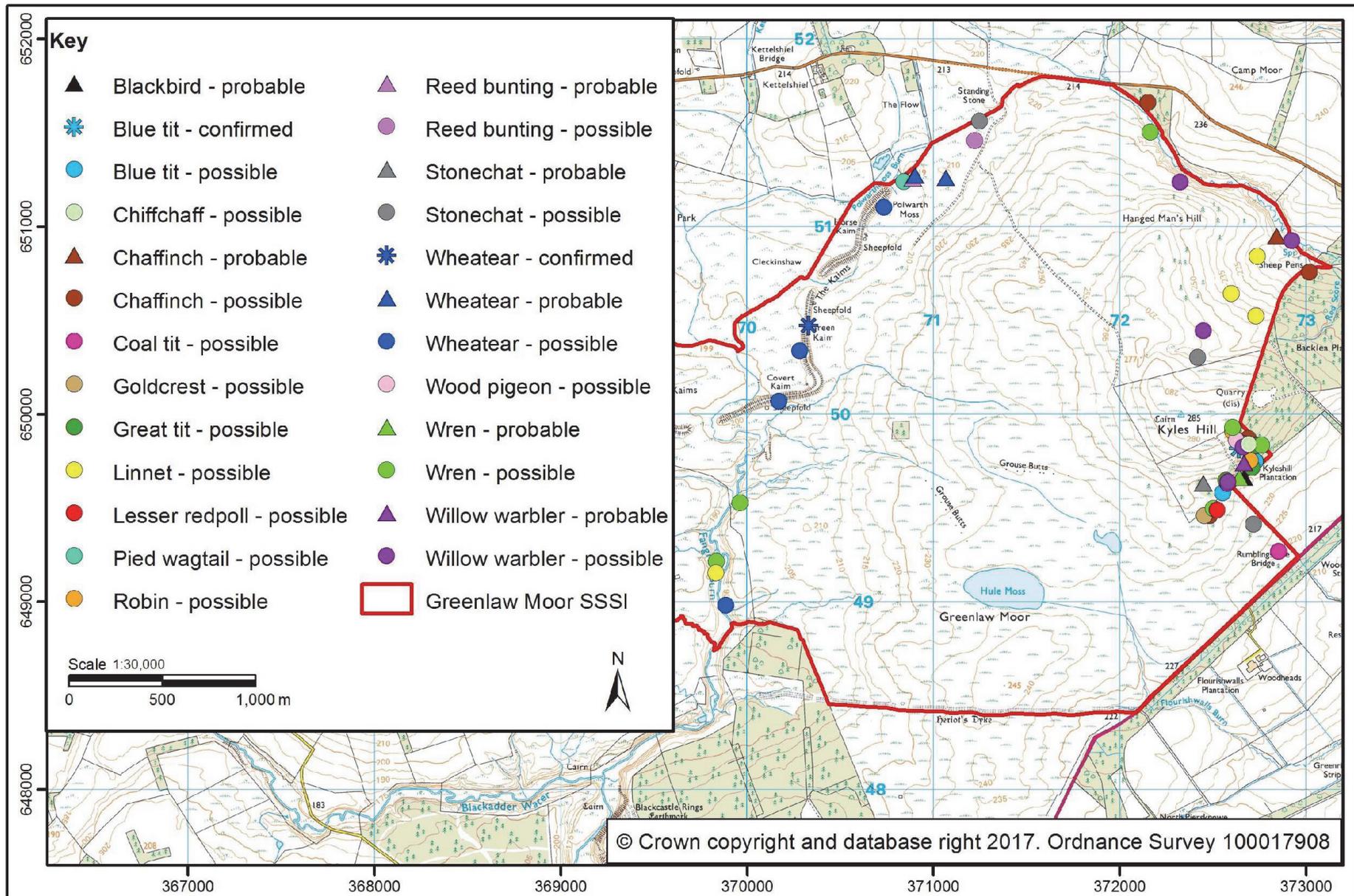


Figure 7b. Breeding territories recorded during 2017 SCM: other passerines (east)

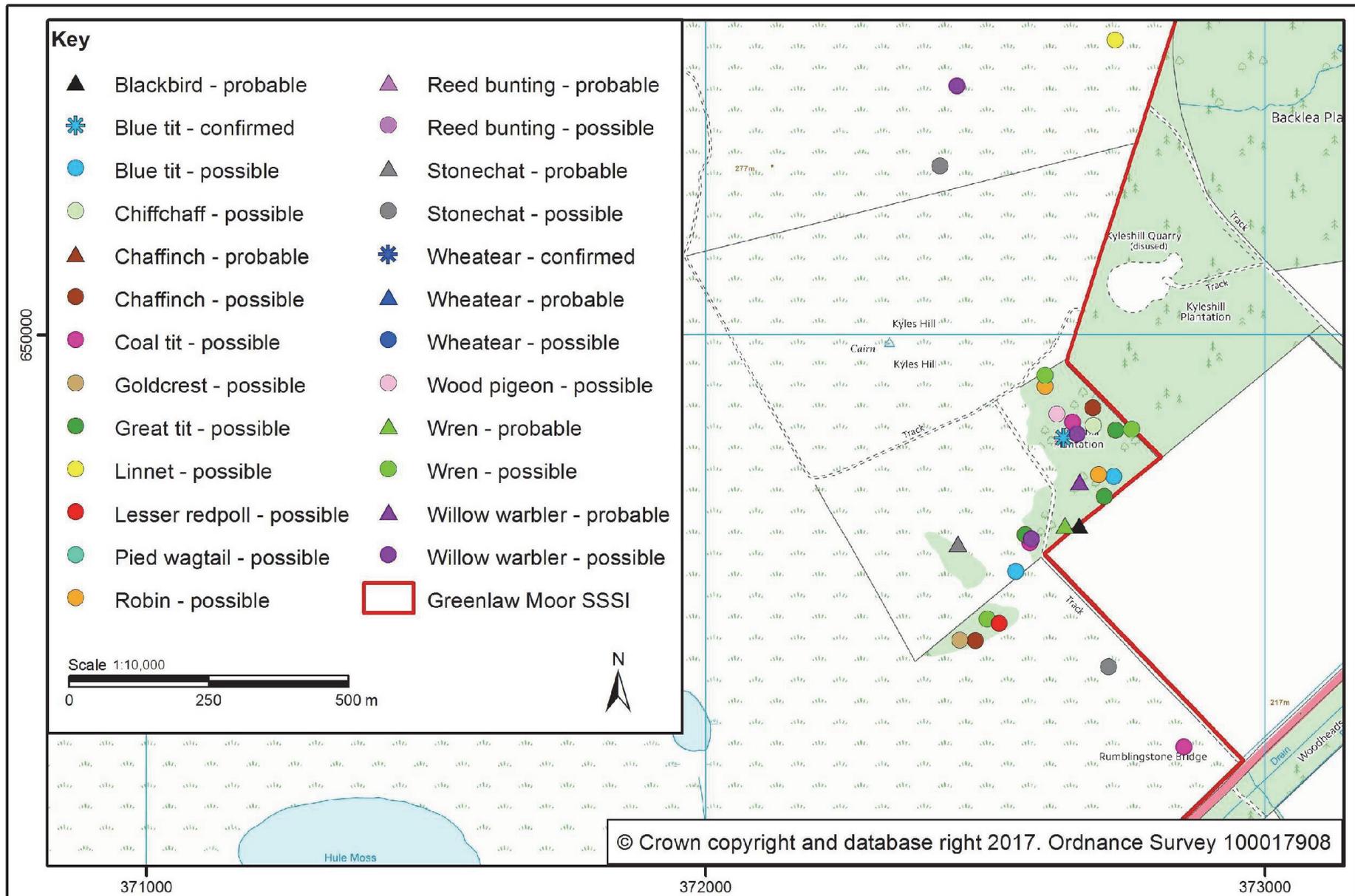


Figure 7c. Breeding territories recorded during 2017 SCM: other passerines (Kyles Hill)

3.2 Environmental pressures and habitat management

The habitats present within the SSSI appeared to be heavily managed; representative examples of the environmental pressures observed are shown in the Photographs in Appendix 2. There was evidence of extensive muirburn across the heather-dominated eastern section of the site, with a mosaic of patches of historic and recent burning. Examples are shown in Photographs 1 to 4. Additional evidence of site management activities and environmental pressures associated with grouse shooting included predator control (Larsen traps, spring traps, and occasional snares; Photographs 5 to 7), and provision of medicated grit for red grouse. There were also several lines of shooting butts (Photograph 8) across the eastern section of the site, including on Hanged Man's Hill and Kyles Hill.

Several access tracks, artificial drainage ditches, and stock fences were also noted in the eastern section of the site, some of which appeared to have been created/installed relatively recently and/or do not feature on OS maps of the site. Examples are shown in Photographs 9 to 11. It was noted that at least one of the fences (close to The Kaims) was fitted with reflective metal marker plates, presumably as a measure to make the fence more visible to black grouse and prevent birds from colliding with it (Photograph 12). A birdwatching hide is present near Hule Moss.

The habitat in the western section of the site was markedly different from the east, with grassland habitats around the periphery, and bog habitat dominating Dogden Moss towards the middle of this part of the SSSI. Herbivore impacts were clearly evident in the western section of the site, where the grassland habitats showed signs of grazing (as can be seen in Photograph 11). Sheep were observed in the surrounding area, and additional signs of sheep (droppings) were present on the site itself. Rabbit (*Oryctolagus cuniculus*) warrens were present on The Kaims, where the grass was particularly tightly grazed. Small numbers of roe deer (*Capreolus capreolus*) were also observed during survey visit 1 (a single animal at the north-eastern boundary of the site, and two animals on the western bank of the Fangrist Burn).

With the exception of the young plantations described below, scrub habitat was very scarce across the site, with occasional gorse (*Ulex europaeus*) bushes encountered on the open (i.e. unforested) habitats that comprise the main extent of the site. These were generally small in size and few in number (e.g. Photograph 13), with the largest patch recorded on the western bank of the Fangrist Burn. Extensive bracken (*Pteridium aquilinum*) was also observed in several areas during visit 2, including on The Kaims and in the north-eastern corner of the site near Langton Burn/Backlea Plantation (Photograph 14). No other invasive species were observed.

An area of tree planting/restocking was noted on an area of clearfell adjacent to the Backlea Plantation (Photograph 15). An area of broadleaved tree planting was also recorded at the western end of Long Kaim (Photograph 16), and there was a second area just outside the northern boundary of the SSSI at Polwarth Moss (Photograph 17). Additional habitat improvement measures noted during the surveys included several (artificially created) pools/wader scrapes at the eastern end of the site (e.g. Photograph 18).

Details of all environmental pressures and habitat management measures recorded during the 2017 SCM are presented in Table A3.1, Appendix 3, and locations are shown in Figure 8.

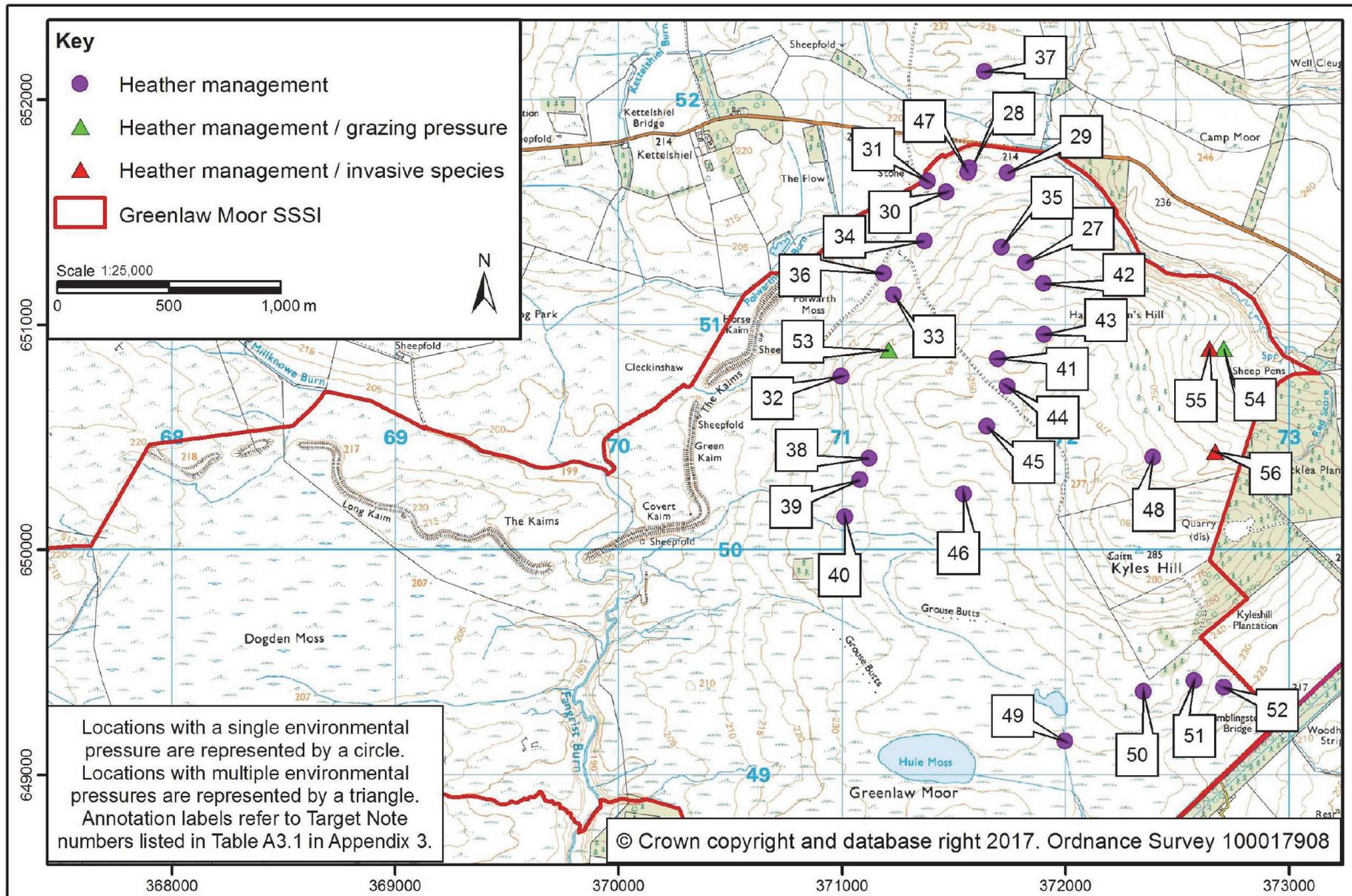


Figure 8a. Environmental pressures recorded during 2017 SCM: heather management

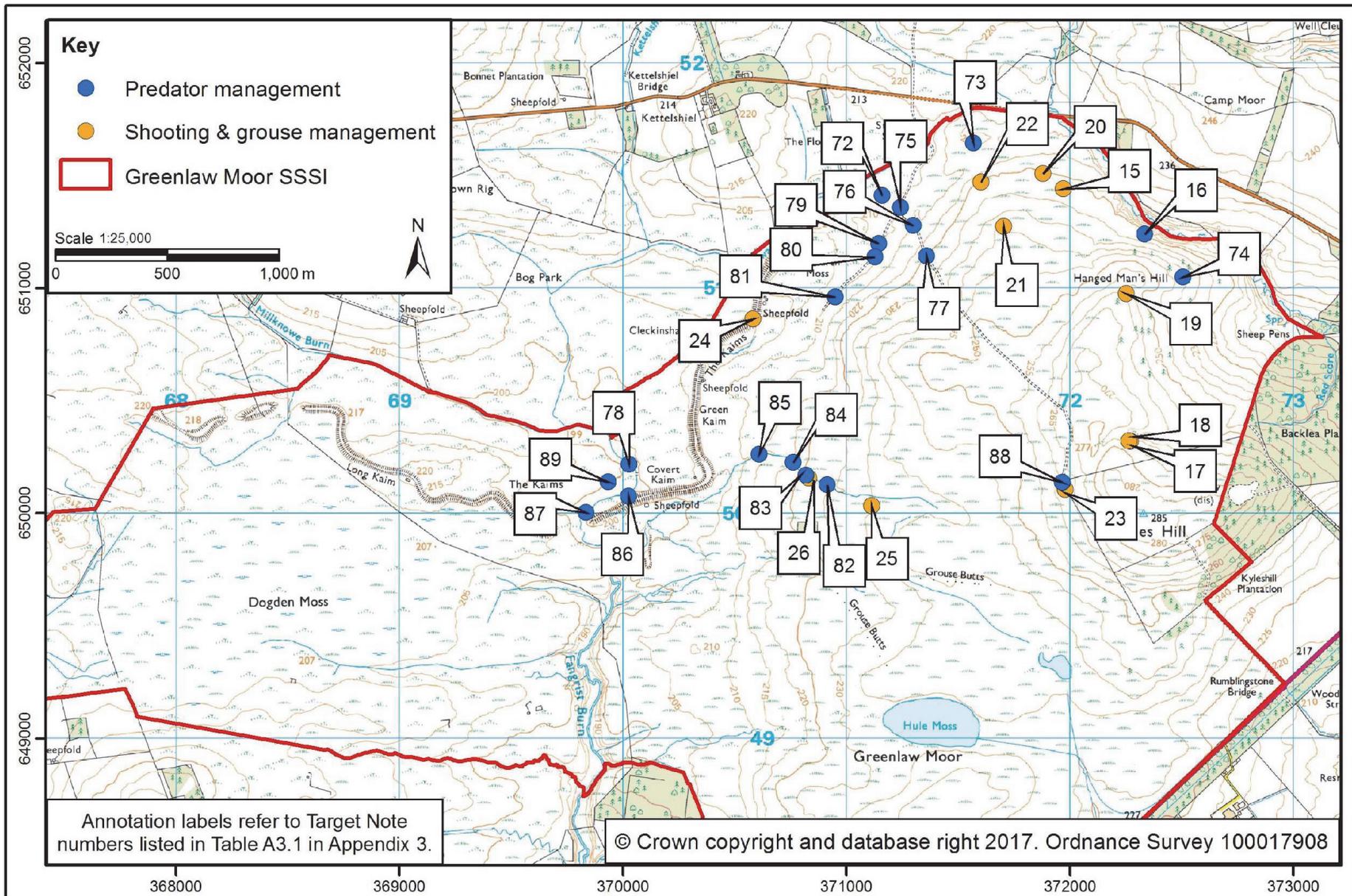


Figure 8b. Environmental pressures recorded during 2017 SCM: predator control, shooting, and grouse management

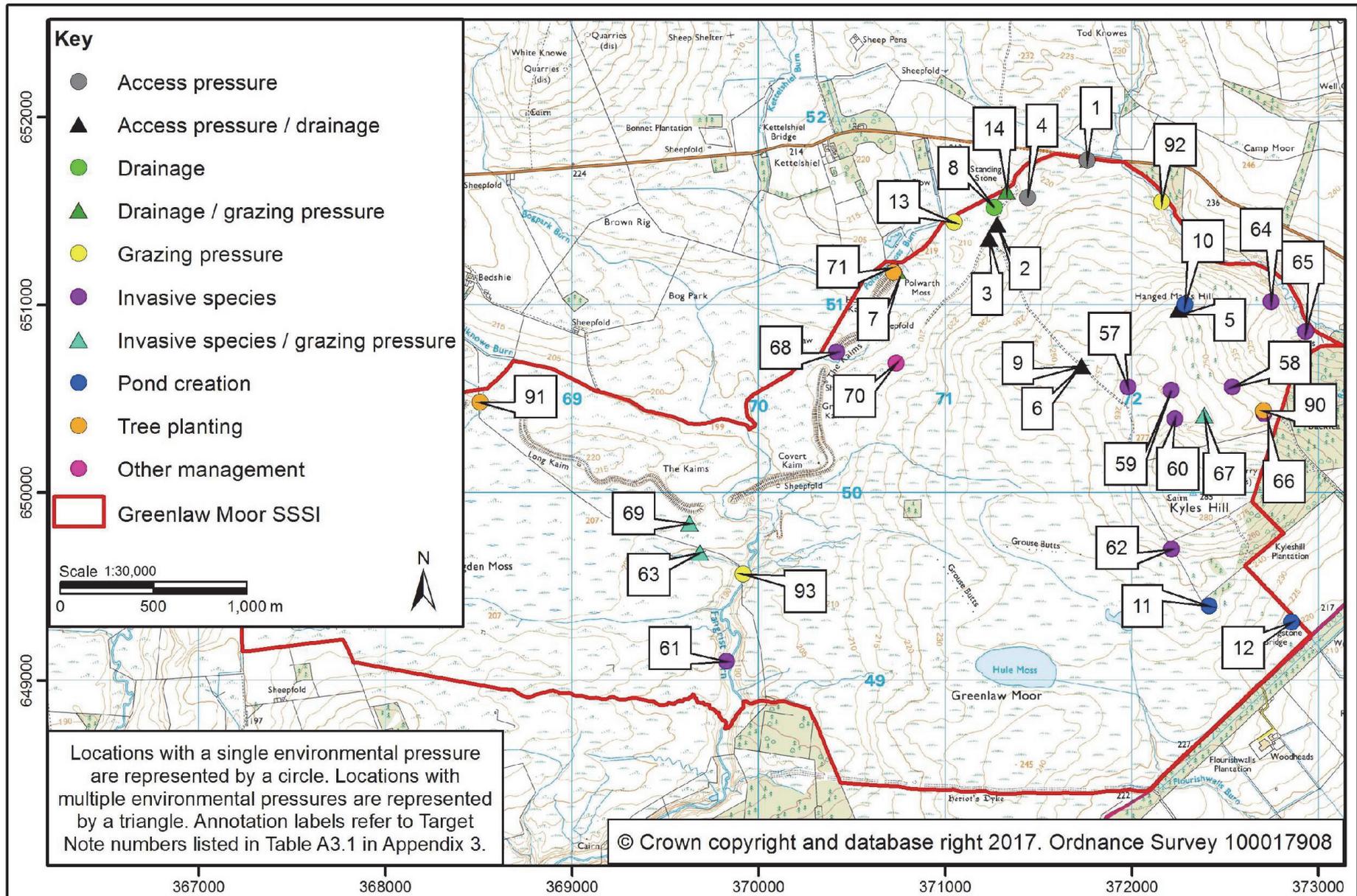


Figure 8c. Environmental pressures recorded during 2017 SCM: other pressures

3.3 Incidental records of protected non-avian species

There were incidental records of two non-avian protected species during the 2017 SCM surveys:

- During survey visit 1 there was an incidental record of an otter (*Lutra lutra*) spraint on a rock in the burn at the north-eastern tip of the site, beneath a culvert at NT7195451756.
- During survey visit 2 single common lizards (*Zootoca vivipara*) were observed at three locations:
 - Close to the western boundary of the SSSI at NT6771350054;
 - North of Long Kaim, close to the northern boundary of the SSSI at NT6959450296; and
 - To the east of Green Kaim in the eastern section of the SSSI at NT7117450453.

4. DISCUSSION

4.1 Breeding bird assemblage in 2017

Although details of the component species of the breeding bird assemblage feature of Greenlaw Moor SSSI were not provided, the citation for the site (SNH, 2011a) states that the breeding bird assemblage includes waders (e.g. golden plover) and other species such as red grouse, black grouse and short-eared owl. It further states that the habitats within the SSSI support a range of upland and woodland breeding bird species, including several Schedule 1 species. The Site Management Statement (SNH, 2011b) provides additional detail, stating that the assemblage of breeding birds includes teal, mallard, shoveler and tufted duck on Hule Moss in the south-east of the SSSI, and that ground-nesting birds and waders include golden plover, curlew, lapwing, snipe and redshank, wheatear, stonechat (*Saxicola rubicola*), buzzard, short-eared owl and black grouse (but notes that not all of these species breed every year). It further states that several Schedule 1 raptor species (both breeding and wintering) use the site.

The results of the 2017 SCM show that a number of wader species continue to breed within the SSSI at relatively high densities, particularly snipe and curlew. Red grouse, skylark and meadow pipit were also abundant across the site. Important habitat features within the SSSI include the Hule Moss and East Loch in the south east, which supported small numbers of a variety of wildfowl species during the 2017 breeding season, some of which were potentially breeding (greylag goose, shelduck, mallard and shoveler). The Kaims in the north and the Fangrist Burn which flows south across the central part of the site are also notable features, although a limited number of species were found to be using these habitats during the 2017 breeding season. The extent of woodland habitat within the SSSI itself is currently limited to occasional mature Scots pine (*Pinus sylvestris*) trees scattered across Kyles Hill towards the eastern edge of the site, and a small patch of the nearby Kyleshill Plantation where it overlaps the eastern border of the site. However, this habitat supports a range of woodland passerines, and increases the overall species diversity of the SSSI. Notably, a female crossbill was observed in the plantation, although there was no evidence of breeding, and the availability of suitable feeding and nesting habitat within the site itself is likely to be a constraint to breeding. Several ground-nesting upland breeding passerines such as stonechat and wren (*Troglodytes troglodytes*) were also recorded in small numbers. However, the extent of scrub habitat within the SSSI is currently limited and likely to be a constraint to breeding for some scrub-nesting species such as linnet.

4.2 Comparison with previous rounds of SCM

It is difficult to make a detailed comparison with previous rounds of SCM due to the limited level of detail included in those reports (SNH, 2005; undated) with regards to survey methods and results. However, the total number of breeding bird species recorded during the 2017 SCM surveys (34) appears to be very similar to that recorded during the previous SCM round in 2009 when 17 breeding species and a further 15 species that were “seen and likely breeding” were reported (SNH, undated). The range of species recorded also appears to be broadly similar to the SCM in 2009, with a similar suite of breeding waders, i.e. curlew, golden plover, lapwing and snipe, small numbers of wildfowl such as greylag goose, shelduck, wigeon, teal, mallard, shoveler and tufted duck (although not all of the wildfowl species were breeding in both years), red grouse, buzzard and a number of passerine species including skylark, meadow pipit, stonechat and wheatear present in both years. A list of 19 species was reported during the first SCM round in 2003 (SNH, 2005), only around half of which were also recorded in 2017. However, it seems likely that the list of species reported in 2003 is not comprehensive; for example, skylark and meadow pipit are notably absent from this list, and it is unlikely that these species were not present. Six species were recorded as breeding or making use of the SSSI in all three years: teal, red grouse, golden plover, curlew, redshank, stonechat and wheatear. In general, numbers of individuals

recorded in 2017 appears to be higher than in 2009, but it is not clear whether the values presented in the 2009 SCM report relate to the number of registrations, individuals or breeding territories. Numbers of breeding territories were not presented in the 2003 report.

Notably short-eared owl and whimbrel (*Numenius phaeopus*) were recorded during both previous rounds of SCM surveys, but were absent in 2017. However, whimbrel was presumably only present in previous years as a passage migrant, since the SSSI is located well outside the known breeding range for this species, which is restricted to the far north of Scotland (e.g. Forrester *et al.*, 2007; Balmer *et al.*, 2013). Short-eared owl is nomadic (Glue, 2002) and numbers breeding in a given area, as well as hunting territories, can change in response to prey density (e.g. Village, 1987; Korpimäki & Norrdahl 1991; Hardey *et al.*, 2013). Thus, short-eared owls may be present at a given site in one year but not in others. Short-eared owls are also difficult to survey; the adults may only be visible for a small proportion of daylight hours and nests are difficult to locate (Hardey *et al.*, 2013). Therefore, it is not possible to confirm absence of this species with any degree of certainty based on the results of just two survey visits.

Another notable absence in 2017 was black grouse; a lek of three birds was recorded during the previous round of SCM in 2009, but no black grouse were observed during any of the 2017 surveys, including effort targeted around the hours of dawn and dusk. The species was not present during the first round of SCM in 2003 and is known to have experienced a decline in recent years. The most recent national black grouse survey in 2005 (Sim *et al.*, 2008) found an estimated 3,344 lekking males in Scotland of which 257 were in south-east Scotland; this represents a 69% decline between 1995 and 2005 in this area. More recently, Warren *et al.* (2014) investigated long-term trends in black grouse numbers in southern Scotland, which involved a comparison of lek records from 1989-99 and 2006-12; study areas included ten black grouse lek sites in the Lammermuir Hills. The results revealed an overall decline of 64% between the two periods, with no black grouse recorded at any of the ten Lammermuir Hills lek sites in 2006-12, compared with 42 across the ten lek sites in 1989-99. It is therefore possible that the small local breeding population recorded in 2009 has undergone a significant decline in recent years such that the local lek site is no longer used by black grouse.

Additional species recorded in 2009 but not 2003 or 2017 were raven (*Corvus corax*), grey wagtail (*Motacilla cinerea*) and twite (*Linaria flavirostris*). Notable species present in 2003 but absent in the two subsequent rounds of SCM in 2009 and 2017 were hen harrier (*Circus cyaneus*), merlin (*Falco columbarius*), dunlin (*Calidris alpina*) and greenshank (*Tringa nebularia*), all of which are included on Schedule 1, and/or Appendix I of the Birds Directive¹, although it is not clear from the report which (if any) of these species were breeding in 2003. Additional species recorded in 2003 but not the two subsequent rounds of SCM are goosander (*Mergus merganser*), little grebe (*Tachybaptus ruficollis*) and common sandpiper (*Actitis hypoleucos*). Suitable nesting and/or foraging habitat for all of these species is present within the SSSI, and it is possible that some of these species were present on site in 2017, but were not detected during the two-visit survey. Although the survey followed the standard method and was agreed in advance with SNH, undertaking more than two survey visits would likely increase the robustness of the SCM breeding bird population estimates at Greenlaw Moor SSSI. For example, in their study of the influence of survey frequency on population estimates of moorland breeding birds, Calladine *et al.* (2009) found that population estimates of the seven study species (red grouse, golden plover, curlew, snipe, skylark, stonechat and wren) derived from single and two survey visits were significantly lower than those derived from a greater number of visits for all seven species. While three survey visits improved detection compared with only one or two visits (and produced robust population estimates for golden plover, curlew and stonechat), a minimum of four visits were

¹ Directive 2009/147/EC on the conservation of wild birds

found to be necessary to provide significantly more robust population estimates of the full suite of study species. The authors therefore recommend that a minimum of four survey visits are required to generate reliable population when undertaking multi-species surveys of moorland breeding birds, to reduce the risk of biases through uneven sampling in periods of differing detectability. As noted above, short-eared owl is also difficult to survey due to detectability and Hardey *et al.* (2013) therefore recommend that four survey visits are undertaken at particular stages of the species breeding cycle. Therefore, completing additional survey visits, particularly if undertaken as a separate survey targeting this species, would increase the likelihood that any short-eared owls present are detected. It is also possible that some of these species may breed on the SSSI in some years but not others.

Nonetheless, the limited number of raptors observed hunting over the site, and the absence of ground-nesting raptor and owl species such as short-eared owl, hen harrier and merlin, all of which have been recorded on the site during previous rounds of SCM monitoring (though it is not clear from the previous SCM reports which of these species were breeding on site), is of some concern. As suitable foraging and/or nesting habitat is present on site for all of these species, their absence is difficult to explain, even when taking into account annual variation, and the limitations of the survey approach.

A total of 29 species recorded during the 2017 SCM are not listed in either the 2003 or 2009 SCM monitoring reports (SNH, 2005; undated), of which 15 species were confirmed to be breeding or potentially breeding. However, as stated previously, the level of detail included in the previous SCM reports is limited and the results may not be comprehensive. Furthermore, the majority of species present in 2017 but not reported from the two previous rounds of SCM are generally common and widespread species – the majority were either non-breeding gulls or passerines recorded in the woodland habitats. The most notable species recorded in 2017 but not 2003 or 2009 are crossbill (as noted above) and linnet, which is included on the UK BoCC Red list, and was potentially breeding in small numbers on site.

4.3 Environmental pressures

Vigorous muirburn appeared to be taking place across the eastern section of the SSSI; this was too extensive to map effectively during the SCM surveys (since this would have compromised the accurate recording of the breeding bird assemblage feature), but a mosaic of burnt patches is clearly evident when inspecting aerial images of the site (e.g. Bing, 2017). Due to the limited information available in previous SCM reports, it is not possible to determine what impact the programme of muirburn may be having on upland breeding bird species.

Herbivore impacts were most obvious around the periphery of the western section of the site, particularly around The Kaims, where the grassland habitat was tightly grazed by sheep and rabbits. Without detailed information regarding stocking levels, it is not possible to comment on the grazing regime or to make any recommendations relating to grazing. It is likely that low levels of livestock grazing in restricted parts of the site will control scrub encroachment and rush domination in wetter areas, creating areas with a shorter sward height, which may benefit a range of breeding wader species. However, overgrazing and trampling are likely to be detrimental to nesting waders, and therefore grazing levels should be carefully managed.

Predator control may benefit some breeding birds, but only where this is effective. For example, the findings of a ten-year study of the effectiveness of a suite of moorland management prescriptions aimed at enhancing breeding bird populations (Calladine *et al.*, 2014) suggested that control of predation was ineffective and may have contributed to declines in some species. Predator control on Greenlaw Moor appeared to be rigorous in

2017, with a number of different trap types observed, particularly across the eastern section of the site, and very few signs or sightings of any mammalian or avian predators. This suggests that predator control on the site is effective, although quantitative data on predator control and bird populations over several years would be required to make an informed assessment.

It was noted that several of the access tracks, drainage ditches and stock fences appear to be relatively new, with some not featuring on OS maps of the site. While it is likely that additional access tracks will increase the level of disturbance to nesting birds, it is acknowledged that such tracks are required to maintain the sporting interests on site and use is likely to be relatively restricted. The majority of artificial drainage ditches ran alongside the access tracks and/or were located in drier habitats, and as such should not have a significant impact on the site. It was also noted that some of the stock fences were fitted with reflective metal plates, which is a technique used to make fences more visible to black grouse, thus reducing the risk of bird strikes.

The extent of invasive species across the site appeared to be relatively limited, with occasional bracken patches and scattered gorse the only invasive species recorded. Gorse bushes tended to be young/small and few in number. Although there were relatively few bracken patches, these were extensive in some areas, such as around The Kaims, and encroachment of this species may be exacerbated by grazing. However, in the east of the site the habitat was relatively heterogeneous and the presence of some scrub would likely benefit species such as linnets, increasing the overall diversity of the breeding bird assemblage.

A number of positive habitat improvement measures aimed at improving the habitats on site for black grouse and other component species of the breeding bird assemblage feature are reported in the Site Management Statement (SNH, 2011b). Many of these were apparent during the 2017 SCM surveys, particularly the areas of broadleaf tree planting and creation of pools/scrapes for waders. This approach is commendable, and should be extended where possible, e.g. through the creation of additional wader scrapes and maintenance/creation of areas of native scrub.

5. CONCLUSIONS AND RECOMMENDATIONS

The results indicate that the breeding bird community is similar to that recorded during the previous round of SCM in 2009. However, the absence of key species such as black grouse, short-eared owl, hen harrier and merlin, which have been recorded on the site during previous rounds of SCM monitoring is of some concern (although it is not clear from the previous SCM reports which of these species were breeding on site). While the absence of some of these species may be explained by regional declines (e.g. black grouse) or annual variation (e.g. short-eared owl), the number of raptor observations during the 2017 monitoring surveys was surprisingly low given the availability of suitable prey species and nesting habitat.

Moorland birds vary in their preferences for particular vegetation features, and in their study of the relationship between breeding bird abundance and moorland vegetation, Pearce-Higgins & Grant (2006) found that variations in the composition, structure and heterogeneity of vegetation affected the abundance of eight of the nine study species: curlew, golden plover, snipe, red grouse, skylark, meadow pipit, whinchat (*Saxicola rubetra*) and stonechat. Based on these results, the authors suggest that management promoting heterogeneity and wetland vegetation is likely to support a diverse bird community and benefit certain key species. As such, it is recommended that the programme of habitat improvement measures aimed at improving habitat diversity and wetland habitat quality is continued and, where possible, extended (e.g. through maintaining/increasing the extent of native scrub and broadleaved woodland, maintaining/improving the bog habitat on Dogden Moss and creation of additional wader scrapes in drier habitats), with the overall aim of increasing the breeding bird assemblage diversity, and encouraging species such as black grouse to return to the site as a breeding species.

Existing habitat features for nesting birds currently present within the site should also be maintained. For example, as can be seen from Photograph 3 (Appendix 2), recent burning appeared to have taken place directly beneath the mature Scots pines on Kyles Hill. As the woodland habitat on site is relatively limited, it is recommended that a buffer is implemented around the trees during future burns, in order to protect the trees and preserve this important woodland habitat.

A further recommendation is that future rounds of SCM include additional survey visits to improve the robustness of the data collected. In addition, it is recommended that separate, targeted surveys for black grouse and short-eared owl are undertaken in future, based on the species-specific survey methods for these species (Gilbert *et al.*, 1998 for black grouse and Hardey *et al.*, 2013 for short-eared owl). Although it is acknowledged that this would result in differences in the survey methods between years, limited data are currently available to allow detailed comparisons (although a basic comparison with the results of the initial rounds of SCM is, and still would be, possible), and increasing the number of survey visits, as well as undertaking targeted surveys for black grouse and short-eared owl, would allow more accurate assessments and comparisons of the breeding bird assemblage feature during future rounds of SCM.

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APPENDIX 1: BREEDING BIRD SURVEY DETAILS

Table A1.1. Summary of 2017 breeding bird SCM survey details, including dates, timings, surveyor names and hourly weather conditions

Survey type / visit number	Date	Surveyor	Start time	Hour	Wind speed	Wind direction	Precipitation	Cloud cover	Cloud height	Visibility	Frost	Snow
B&S visit 1	27/04/2017	LC	09:50	1	3	WNW	0	8	2	2	0	0
				2	3	NNW	0	6	2	2	0	0
				3	4	NW	0	6	2	2	0	0
				4	4	NW	0	6	2	2	0	0
				5	4	N	3	8	2	2	0	0
				6	4	NW	4	8	2	2	0	0
				7	3	NW	0	6	2	2	0	0
				8	2	NW	0	7	2	2	0	0
B&S visit 1	27/04/2017	SJ	10:15	1	3	SSW	0	6	2	2	0	0
				2	4	SSW	0	7	2	2	0	0
				3	3	SSW	0	7	2	2	0	0
				4	3	W	0	8	2	2	0	0
				5	3	NW	2	8	2	2	0	0
				6	3	NW	2	8	1	2	0	0
				7	3	NW	0	8	2	2	0	0
BK	28/04/2017	SJ	05:30	1	2	NE	0	7	2	2	0	0
				2	1	NE	0	6	2	2	0	0
				3	2	NE	0	7	2	2	0	0
BK and B&S visit 1	28/04/2017	LC	05:35	1	1	N	0	6	2	2	0	0
				2	1	N	0	6	2	2	0	0
				3	2	N	0	6	2	2	0	0
BK and B&S visit 1	28/04/2017	SJ	10:45	1	2	NE	0	7	2	2	0	0
				2	1	E	0	8	2	2	0	0
				3	2	SE	0	8	2	2	0	0
				4	2	SE	0	7	2	2	0	0
				5	2	SE	0	8	2	2	0	0
B&S visit 1	28/04/2017	LC	10:45	6	2	SE	0	7	2	2	0	0
				1	2	N	0	6	2	2	0	0
				2	2	N	0	6	2	2	0	0
				3	2	SE	0	7	2	2	0	0
				4	1	SE	0	7	2	2	0	0
				5	3	SE	0	7	2	2	0	0
B&S visit 2	19/06/2017	NC	11:50	6	2	SE	0	7	2	2	0	0
				1	3	NNW	0	7	2	2	0	0
				2	3	NNW	0	5	2	2	0	0
				3	3	NW	0	7	2	2	0	0
				4	3	W	0	8	2	2	0	0
				5	3	W	0	5	2	2	0	0
B&S visit 2	19/06/2017	SJ, JS	12:00	6	3	W	0	5	2	2	0	0
				1	4	NW	0	6	2	2	0	0
				2	3	NW	0	5	2	2	0	0
				3	4	NW	0	4	2	2	0	0
				4	3	NW	0	4	2	2	0	0
5	3	NW	0	4	2	2	0	0				

Survey type / visit number	Date	Surveyor	Start time	Hour	Wind speed	Wind direction	Precipitation	Cloud cover	Cloud height	Visibility	Frost	Snow
B&S visit 2	20/06/2017	SJ, JS	10:10	6	3	NW	0	5	2	2	0	0
				1	3	NE	0	7	2	2	0	0
				2	4	NE	0	6	2	2	0	0
				3	3	NE	0	4	2	2	0	0
				4	3	NE	0	3	2	2	0	0
				5	3	ENE	0	5	2	2	0	0
				6	2	ENE	0	2	2	2	0	0
B&S visit 2	20/06/2017	NC	10:30	7	2	ENE	0	1	2	2	0	0
				1	3	NNE	0	8	2	2	0	0
				2	4	NNE	0	8	2	2	0	0
				3	4	NE	0	6	2	2	0	0
				4	4	NE	0	7	2	2	0	0
				5	3	NE	0	5	2	2	0	0
				6	3	NE	0	4	2	2	0	0
SE	19/06/2017	SJ	20:30	7	3	NE	0	4	2	2	0	0
				1	1	NE	0	6	2	2	0	0
SE	19/06/2017	NC	20:30	2	0	-	0	7	2	2	0	0
				1	2	NNE	0	8	2	2	0	0
				2	2	NNE	0	8	2	2	0	0

Key:

- Visibility: 0 = <1 km; 1 = 1-2 km; 2 = ≥2 km
- Wind direction: according to 16-point compass
- Wind strength: according to the Beaufort scale
- Cloud cover: in eighths of sky
- Cloud height: 0 = <150 m; 1 = 150-500 m; 2 = >500 m
- Precipitation: 0 = None; 1 = Drizzle/mist; 2 = Light showers; 3 = Light; 4 = Heavy showers; 5 = Heavy
- Frost: 0 = No; 1 = Yes
- Snow: 0 = None; 1 = On high ground only; 2 = All ground
- Surveyor: LC = Lisette Coiffait; NC = Niall Currie; SJ = Steven Johnston

APPENDIX 2: PHOTOGRAPHS OF ENVIRONMENTAL PRESSURES



Photograph 1. Example of relatively large area of recent muirburn (NT7171451343 facing north north east). Photo: Lisette Coiffait.



Photograph 2. Example of recent muirburn (NT7169850849 facing west). Photo: Lisette Coiffait.



Photograph 3. Example of recent muirburn under mature Scots pines on Kyles Hill (NT7235049368). Photo: Steven Johnston.



Photograph 4. Example of older patch of muirburn, with sparse heather regeneration (NT71638 52125 facing south). Photo: Lisette Coiffait.



Photograph 5. Example of predator control – Larson trap in the north east of the site to the north of Hanged Man’s Hill, amongst a patch of bracken (NT7233651238 facing west). Photo: Niall Currie.



Photograph 6. Example of predator control – spring trap over a ditch (NT7199749148). Photo: Steven Johnston.



Photograph 7. Example of predator control – snare close to the north eastern boundary of the site (NT7250851047). Photo: Niall Currie.



Photograph 8. Grouse shooting butt in the north east of the site between Kyles Hill and Hanged Man's Hill, at the edge of a patch of bracken (NT7227250317). Photo: Niall Currie.



Photograph 9. Example of access track across the site (not featured on OS map) (NT7144251569 facing east). Photo: Niall Currie.



Photograph 10. Example of ditch cut beside an access track to the west of Hanged Man's Hill in the north east of the site, showing erosion at the edges (NT7173350673 facing east south east). Photo: Niall Currie.



Photograph 11. Old field drains across low-lying ground to south east and north east of The Kaims in the north of the site; semi-improved grassland here tightly grazed (NT7074451178 facing south east). Photo: Lisette Coiffait.



Photograph 12. Stock fence (not featured on OS map) fitted with reflective metal marker plates (a technique used to make the fence more visible to black grouse, thus reducing the risk of bird strikes) (NT7073950688 facing south south west). Photo: Lisette Coiffait.



Photograph 13. Example of small gorse bushes, which were occasional across the site and generally small (NT7254050560 facing south west). Photo: Lisette Coiffait.



Photograph 14. Extensive patch of bracken (possibly exacerbated by grazing) in the north-eastern corner of the site near Langton Burn/Backlea Plantation (NT7293350855 facing north west). Photo: Niall Currie.



Photograph 15. Area of tree planting/restocking on clearfell area in the north east of the site adjacent to Backlea Plantation (NT7270750435 facing south). Photo: Niall Currie.



Photograph 16. Area of broadleaved tree planting in in the north west of the site at the western end of Long Kaim (NT6850850480 facing south south east). Photo: Niall Currie.



Photograph 17. Area of broadleaved tree planting just beside the northern boundary of the SSSI at Polwarth Moss; a fenced off pond is also visible to the left of the plantation, and a patch of bracken is visible in the lower right-hand corner (NT7072451171 facing north). Photo: Niall Currie.



Photograph 18. Small, artificially created wader scrape to the south of Kyles Hill; recent muirburn is also visible in the surrounding area (NT7241549395). Photo: Steven Johnston.

APPENDIX 3: DETAILS OF ENVIRONMENTAL PRESSURES

Table A3.1. Details of environmental pressures recorded during 2017 SCM surveys

Target note no.	Pressure type	Grid reference	Description
1	Access pressure	NT7176251767	Access tracks (not on OS map) from B6456 road across moor; one forking south and the other southwest
2	Access pressure / drainage	NT7128051428	Drainage ditch running NE to SW beside track
3	Access pressure / drainage	NT7123851351	Access track and ditch running SSE to NNW
4	Access pressure	NT7144251569	Access track (not on OS map; Photograph 9, Appendix 2)
5	Access pressure / drainage	NT7225350974	Drainage ditch running north-west; old, overgrown with heather
6	Access pressure / drainage	NT7173350673	Access track
7	Drainage / grazing pressure	NT7074451178	Old field drains across low-lying ground to SE and NE of The Kaims; semi-improved grassland here tightly grazed (Photograph 11, Appendix 2)
8	Drainage	NT7126451517	Relatively new drainage ditch running NNW to SSE
9	Access pressure / drainage	NT7173350673	Drainage ditches running along track edge and into moorland, with erosion at ditch edges (Photograph 10, Appendix 2)
10	Pond creation	NT7228551001	Artificial pond/scrape created to provide wader foraging habitat
11	Pond creation	NT7241549395	Small artificial pond/scrape (Photograph 18, Appendix 2)
12	Pond creation	NT7285849309	Small artificial pond/scrape
13	Grazing pressure	NT7105051437	Species-poor acid grassland along site boundary indicating grazing pressure
14	Drainage / grazing pressure	NT7133251602	Artificial drainage ditch along site boundary with evidence of grazing (including rabbit droppings and mammal path)
15	Shooting & grouse management	NT7197151440	Example of medicated grit feeder for red grouse (these were frequent throughout site)
16	Predator management	NT7233651238	Larson trap amongst a patch of bracken (Photograph 5, Appendix 2)
17	Shooting & grouse management	NT7227250317	Example of a grouse butt beside a bracken-dominated area (Photograph 8, Appendix 2)
18	Shooting & grouse management	NT7226650320	Start of line of grouse butts on Hanged Man's Hill
19	Shooting & grouse management	NT7225350974	End of line of grouse butts on Hanged Man's Hill

Target note no.	Pressure type	Grid reference	Description
20	Shooting & grouse management	NT7188151507	Butt number 1 in line of 9 grouse butts ('Neil Stane')
21	Shooting & grouse management	NT7170451272	Butt number 3 in line of 9 grouse butts ('Neil Stane')
22	Shooting & grouse management	NT7160451470	Butt number 9 in line of 9 grouse butts ('Neil Stane')
23	Shooting & grouse management	NT7197950104	Kyles Hill line of 9 grouse butts intersects track
24	Shooting & grouse management	NT7058350861	Line of 9 grouse butts, 8 of which are outside SSSI boundary
25	Shooting & grouse management	NT7111550031	Goatswood' line of grouse butts, butt number 1
26	Shooting & grouse management	NT7083350155	Goatswood' line of grouse butts, butt number 9
27	Heather management	NT7182251726	Small area of old muirburn at northern edge of site with pioneer phase heather regrowth
28	Heather management	NT7157151697	Area of historic heather management (cutting or burning); sward with no heather regeneration
29	Heather management	NT7174051673	Small patches of old muirburn with pioneer phase heather regrowth
30	Heather management	NT7146751588	Small area of old muirburn beside track, with early building phase heather regrowth
31	Heather management	NT7138451637	Small area of old muirburn beside track and field boundary, with low levels of heather regeneration
32	Heather management	NT7099750769	Mosaic of old and recent muirburn across landscape
33	Heather management	NT7123251132	Patches of old muirburn
34	Heather management	NT7136951370	Evidence of past heather management (different sward heights)
35	Heather management	NT7171451343	Relatively large area of recent muirburn (Photograph 1, Appendix 2)
36	Heather management	NT7118751227	Area of relatively recent muirburn, with low levels of heather regeneration
37	Heather management	NT7163852125	Two small patches of relatively recent muirburn, with low levels of heather regeneration (Photograph 4, Appendix 2)
38	Heather management	NT7112250405	Area of muirburn with pioneer phase heather regeneration
39	Heather management	NT7108250311	Area of muirburn with limited pioneer phase heather regeneration
40	Heather management	NT7101350145	Large area of species-poor acid grassland indicating past management

Target note no.	Pressure type	Grid reference	Description
41	Heather management	NT7169850849	Relatively large area of recent muirburn (Photograph 2, Appendix 2)
42	Heather management	NT7190351183	Area of relatively recent muirburn
43	Heather management	NT7190550957	Significant area of muirburn, with mosaic of mixed age muirburn in surrounding area
44	Heather management	NT7174050725	Mosaic of mixed age muirburn; generally with low heather sward heights
45	Heather management	NT7164950548	Area of old muirburn, with low heather sward height
46	Heather management	NT7154550247	Mosaic of old and new muirburn, with markedly different heather sward heights Taller heather appears to be in poor condition
47	Heather management	NT7156351675	Example of recent muirburn
48	Heather management	NT7239150410	Recent muirburn
49	Heather management	NT7199749148	Patch of muirburn
50	Heather management	NT7235049368	Patch of muirburn (Photograph 3, Appendix 2)
51	Heather management	NT7257549418	Patch of muirburn
52	Heather management	NT7271049387	Patch of old muirburn
53	Heather management / grazing pressure	NT7121150887	Area of muirburn with low levels of pioneer phase heather regeneration and evidence of grazing pressure (deer pellets)
54	Heather management / grazing pressure	NT7270950892	Two grassy areas - possible evidence of previous heather management coupled with grazing pressure
55	Heather management / invasive species	NT7264550892	Two patches of recent muirburn with one small gorse bush nearby
56	Heather management / invasive species	NT7267150435	Patches of recent muirburn with small number of scattered gorse bushes nearby
57	Invasive species	NT7198050560	Small gorse bushes (isolated)
58	Invasive species	NT7254050560	Small number of scattered gorse bushes along a drain (Photograph 13, Appendix 2)
59	Invasive species	NT7221250542	Two small gorse bushes (isolated)
60	Invasive species	NT7223250391	Single gorse bush (isolated)
61	Invasive species	NT6983049101	Two gorse bushes (isolated)
62	Invasive species	NT7221549697	Small gorse bush
63	Invasive species / grazing pressure	NT6968649680	Stand of gorse bushes on grassy valley side above burn, with evidence of grazing pressure
64	Invasive species	NT7274951015	Bracken stands on side of valley; stock-fenced enclosure also present - probably designed to protect livestock from saturated ground
65	Invasive species	NT7293350855	Extensive bracken - possibly exacerbated by grazing (Photograph 14, Appendix 2)

Target note no.	Pressure type	Grid reference	Description
66	Invasive species	NT7271150419	Gorse encroachment - 6 small shrubs
67	Invasive species / grazing pressure	NT7239150410	Young gorse growth
68	Invasive species	NT7041950746	Extensive bracken on The Kaims (in shortly-grazed area)
69	Invasive species / grazing pressure	NT6963149834	Extensive bracken on The Kaims
70	Other management	NT7073950688	Recent stock fence (not on OS map) with reflective metal plates (black grouse mitigation), running W to E between Horse Kaim and Green Kaim (Photograph 12, Appendix 2)
71	Tree planting	NT7072451171	Native broadleaved woodland, recently planted around a pond (at NT707513, just outside SSSI boundary); shooting butts present on south and east sides of pond, indicating likely use for wildfowling (Photograph 17, Appendix 2)
72	Predator management	NT7116051409	Active Larson trap near area of old muirburn
73	Predator management	NT7156951642	Spring trap
74	Predator management	NT7250851047	Snare (Photograph 7, Appendix 2)
75	Predator management	NT7124451356	Spring trap
76	Predator management	NT7130051277	Spring trap
77	Predator management	NT7135951142	Spring trap
78	Predator management	NT7002950216	Spring trap
79	Predator management	NT7114651197	Spring trap
80	Predator management	NT7112951137	Spring trap
81	Predator management	NT7095250960	Spring trap
82	Predator management	NT7091550125	Spring trap
83	Predator management	NT70820501685	Spring trap
84	Predator management	NT7076350224	Spring trap
85	Predator management	NT7061150261	Spring trap
86	Predator management	NT7002650075	Spring trap
87	Predator management	NT6983650003	Spring trap
88	Predator management	NT7196750135	Spring trap
89	Predator management	NT6993450138	Spring trap (Photograph 6, Appendix 2)
90	Tree planting	NT7270750435	Tree planting/restocking on former clearfell site (Photograph 16, Appendix 2; taken about 100 m to north)

Target note no.	Pressure type	Grid reference	Description
91	Tree planting	NT6850850480	Native broadleaved tree planting (Photograph 15, Appendix 2)
92	Grazing pressure	NT7216151546	Roe deer sighting (single animal)
93	Grazing pressure	NT6991949563	Roe deer sighting (2 animals)

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