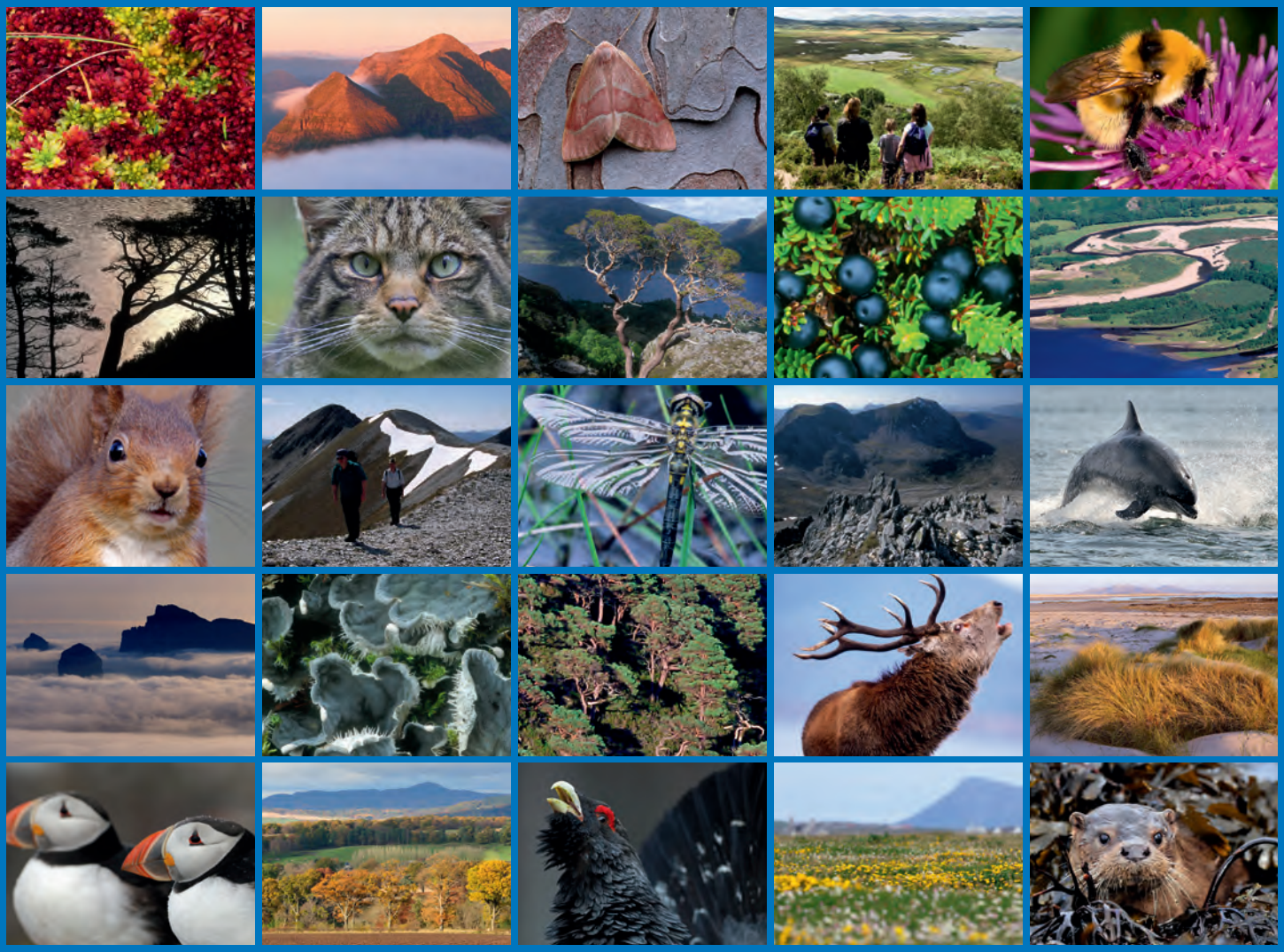
Scottish Natural Heritage
Commissioned Report No. 711

Report on the collation of field use data relating to wintering bean geese on the Slamannan Plateau



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COMMISSIONED REPORT

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Report on the collation of field use data relating to wintering bean geese on the Slamannan Plateau

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COMMISSIONED REPORT

Summary

Report on the collation of field use data relating to wintering bean geese on the Slamannan Plateau

Commissioned Report No.: 711
Project no: 14248
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Background

This report describes the results of a programme of work which was carried out to assemble all readily available data relating to the wintering flock of taiga bean goose, (*Anser fabalis fabalis)*, on the Slamannan Plateau into one database resource and to make these data more widely available through the provision of a website.

Main activities and outputs

In addition to this report, the main activities and outputs of the project were the:

- Creation of a database that incorporates most of the existing bean goose count data into one place which will facilitate the carrying out of simple analyses; examples of such analyses are described in section 3. This work is ongoing as data from earlier winters may yet be added;
- Incorporation of location data now available from recent telemetry work into this database, (this is described in section 4). Again, similar data may be available in the future;
- Preparation of a database incorporating the details of the field characteristics of all of the fields on the Slamannan Plateau which will facilitate the carrying out of simple analyses; examples of initial analyses are described in section 5; and,
- Creation of a website to provide information about the Slamannan Plateau bean geese, (this is described in section 6). Again, this website will progressively be developed and improved.

Conclusions and recommendations

The report indicates how the aims of the project were approached, and also describes how additional outputs were also achieved. It also provides a series of recommendations for future work now that the database and website are in place.

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Acknowledgements

Thanks are due to Neville Makan for his help supporting and encouraging this work. In addition, although the contract for this project was awarded to BCM Environmental Services Limited, and as a consequence this report is identified as such, this was largely a logistical arrangement; the work involved in delivering this project has very much been a collaborative effort involving several people already actively involved with furthering the conservation and scientific investigation of the Slamannan Plateau bean geese. Finally, thanks are also due to the Bean Goose Action Group, who were also involved in supporting this work. For example, the members of the group assisted with reviewing the draft report, as did Richard Hearn of the Wildfowl & Wetlands Trust (WWT).

Frontispiece, Rainbow over Fannyside Muir, showing the pools area where the Slamannan Plateau Bean Geese frequently roost

This photograph provides an indication of the nature of the roost site at Fannyside Muir, which is an area of pools within a wide open expanse of raised bog covered by heathery vegetation, with distant views to stunted and planted coniferous trees. It is considered that this is of significance as the area looks and 'feels' very similar to taiga, the habitat with which taiga bean geese (*Anser fabalis fabalis*), are associated on the breeding grounds at the boreal latitudes of Scandinavia and Russia.

Although recent work on the Slamannan Plateau bean geese, including that described herein, is shedding new light on this important population of wintering geese, there is undoubtedly much more to be discovered.

1. INTRODUCTION

1.1 Introduction

Since at least the winter of 1989/1990 the population of taiga bean goose that winters on the Slamannan Plateau in Central Scotland has been the subject of a programme of routine monitoring each winter.

This monitoring has produced a wealth of data regarding the wintering ecology of the population.

This data has frequently proved very invaluable for the many purposes for which it has been used. For example, the monitoring data have been used to appraise discussions on threats to the bean geese on the Slamannan Plateau and advise the planning authorities and developers in relation to development proposals and to facilitate the preparation and implementation of the Bean Goose Action Plan, an important part of the Local Biodiversity Action Plans of both Falkirk and North Lanarkshire Councils, which can be accessed and reviewed at the following link:

http://www.northlanarkshire.gov.uk/CHttpHandler.ashx?id=4872&p=0

Most notably, however, these data were used as the scientific basis for the notification of parts of the Plateau as a Site of Special Scientific Interest (SSSI) and Special Protection Area (SPA); the boundaries of the designated site were devised on the basis of patterns of field usage by bean geese recorded during the period 2000/2001 – 2004/2005.

As a result, it has become increasingly important that all of these data should be made available in one comprehensive database rather than, for example, being solely available in tables in the appendices of a series of reports prepared for the Bean Goose Action Group (BGAG) dating back to 1994.

In turn, it was also realised that a database would provide a powerful tool which would enable any number of analyses of the data to be carried out.

This report describes how this work has now been achieved and gives examples of analyses that can be carried out. It also indicates how this database can be allied to the findings of the telemetry work involving the geese. The report also references the website that has been created to provide information about the Slamannan Plateau bean geese. Finally, it also provides an indication of some of the future work that could now be carried out.

1.2 Projection conception

The BGAG meets three times a year, and both formally during these meetings and informally on other occasions, members of the BGAG frequently discuss the ongoing purposes and uses of the monitoring work. Much of this discussion centres on the dynamic nature of the wintering bean goose population in terms of preferred feeding and roosting areas, possibly in relation to changes in land use and other issues on the Plateau.

Such discussions occurred during the BGAG meetings in January and June 2012 and as a consequence a proposal was prepared for SNH by Brian Minshull and Angus Maciver at the suggestion of Neville Makan. Concurrently, Carl Mitchell had been conducting some preliminary analysis of monitoring data from the past few winters which included preparing maps of the same. In addition, Carl Mitchell and Angus Maciver had been discussing re-launching the website the latter used to host regarding the Slamannan Plateau bean geese. Thus, all of these ideas came together at a similar time.
For the purposes of continuity some of the proposal which was prepared is replicated here.

1.2.1 Original proposal

The following sub-section is largely based on the scope for the work which was outlined in the original proposal to SNH.

This noted that since the designation of the SSSI on the 9 March 2006 and the SPA on 9 October 2008, the patterns of field usage by bean geese appear to have, in part at least, changed.

It also noted that as more recent field count data were available, and as SNH regularly review nationally and internationally designated sites, it was considered that it might be appropriate to use more recent data sets to investigate and characterise this change. Further, it was envisaged that this would best be achieved using a Geographical Information System, (GIS), approach.

As part of this exercise, it was envisaged that a web-based application using the existing field numbering system,[1] would allow users to be able to call up pertinent data relating to bean goose usage of that field, but also other relevant data, (for example, field number, land use category and other sources of information relating to that field, (*e.g.*, where appropriate, Phase II Habitat Survey data)) should be devised and created (Figure 1.1).

Figure 1.1. An example of a web-based resource offering basic field information by clicking within individual field boundaries, as prepared in support of the proposal for this work.

Further, it was envisaged that the analysis would utilise all available data, *i.e.*:

1. Data gathered since designation of the SPA in 2008; and,

[1] The adoption and evolution of the field numbering system is described in Section B.1.1 of Appendix B: Notes on the survey of the Slamannan Plateau bean goose fields in late winter 2012/2013.

2. Data gathered between the period 2000/2001 – 2004/2005 and designation of the SPA in 2008.

In addition, it was recognised that there was also the possibility of using count data for winters preceding winter 2000/2001.

It was also considered important that the data would be processed and stored in such a way that facilitates analysis winter by winter, for any given series of winters, or indeed, for parts of individual winters.

It was anticipated that such an approach would create the means to:

- Provide a scientific basis for an informed debate on how both the current designated site and also the wider Slamannan Plateau should, as appropriate, reflect any significant changes in field usage by the birds to ensure the ongoing conservation of bean geese using a combination of:

    1. Areas protected by national and international designations, (involving, in particular, semi-natural habitats used for loafing and roosting); and,

    2. Areas managed by farmers for their domestic stock but also for bean geese, encouraged by suitable management incentives.

It was also anticipated that it could also provide a means to:

- Appraise the analysis of data that may be available in the near future as a result of tracking individual bean geese using telemetry;

- Compare the designated site with patterns of preferred field usage in the most recent winters;

- Demonstrate changes from winter-to-winter and over periods of winters;

- Investigate any changes in field usage in hard winters such as those of 2009/2010 and 2010/2011;

- Illustrate areas on the Plateau where there may be a deficit of survey information;

- Investigate land use change / improve the recording of non-usage (as only use is currently recorded, resulting in fields not being used being 'ignored' / not characterised);

- Investigate the effect of intentional and unintentional disturbance / and land use change on distribution;

- Provide evidence relating to possible changes in roosting behaviour, *e.g.*, the use of Darnrig Moss SSSI in winter 2011/2012 with a view to strengthening protection of such areas, (for example, inclusion of bean geese as a qualifying feature within the SSSI citation);

- Investigate patterns of field usage by other geese species;

- Encourage better understanding of bean goose feeding requirements;

- Facilitate the photographic recording of land use and in particular, 'optimal' feeding and roosting areas; and,

- Facilitate the use of other technological aids for recording bean goose activity, (*e.g.*, palm held computers to record field usage, neck-collared birds, *etc*.).

1.3 Definition of objectives

The preceding sub-section outlined the potential purposes and uses of the proposed work. In order to achieve this, at the conceptual stage, various objectives for the proposed work were defined in the proposal. In principle, these were as follows (note, the precise wording of these has been slightly amended from that used in the original proposal, to better reflect the way in which the project evolved during implementation).

Objective 1: Collate existing bean goose field count data from 2000/2001 to 20012/13, and other field data and develop a database to hold collated field data.

1. Collate existing bean goose field count data from the annual reports describing the monitoring work prepared for the BGAG;

2. Collate other field data (ownership, habitat, *etc*);

3. Clean data set and store in MS EXCEL; and,

4. Create a storage structure which allows interrogation of patterns of field usage by the Slamannan Plateau bean geese to be analysed in space and time.

Objective 2: Undertake a survey of the fields on the Slamannan Plateau to determine their physical and agricultural characteristics.

1. Undertake a survey of the fields on the Slamannan Plateau to determine their physical (boundary type, extent of flooding, *etc*.) and agricultural (current crop types, extent of rushes, sward height, *etc*.) characteristics; and,

2. Incorporate the results of the field survey into the database.

Objective 3: Develop an online web application that allows basic field data to be accessed.

1. Develop a web resource allowing online viewing of basic count and field data.

Objective 4: Produce a written report giving details of data treatment and storage

1. Produce a written report detailing data treatment and storage.

1.4 Project evolution

As suggested, the situation regarding the wintering bean goose population on the Plateau is a dynamic one. Further, in the past two years or so, there has been an increase in the monitoring and other work being undertaken on the bean geese, most notably involving the capture of bean geese and marking individuals with telemetry devices.

Therefore, in response to this dynamic situation, during the current work, the scope of the project evolved somewhat. That said, what has been delivered meets the original plan of work; in summary, it is now considered that the work undertaken involved the following five elements:

1. Collating all the existing bean goose count data into one database which will facilitate the carrying out of simple analyses, (*n.b.*, it is considered that this element of the work is ongoing as some of the data from the earlier winters may yet be added if it becomes available in a usable format);

2. Incorporating data now available from the telemetry work, so that this can, for example, be used to illustrate more about current distribution patterns at a very fine scale;

3. Recording and collating field characteristics into one database which will facilitate the carrying out of simple analyses, including correlations to elucidate the distribution of the geese;

4. Developing a website to provide information about the Slamannan Plateau bean geese, including summary information about counts, movements, *etc*., and making available all reports as PDFs, *etc*.; and,

5. Providing a written report detailing the same.

1.5 Project implementation

Although the contract for this work was formally awarded to BCM Environmental Services Limited, the work was jointly carried out by a team involving Carl Mitchell and Larry Griffin of WWT, Angus Maciver, the Bean Goose Monitoring Officer, and Brian Minshull, of BCM Environmental Services Limited. The initials CM, LG, AM and BM are used from here onwards to denote these individuals.

2. AIMS OF THE PROJECT

In addition to the aims outlined in the preceding section, it is important to note that this project was more about unlocking and sharing the potential of the wealth of data generated over the years, as opposed to, at this stage, necessarily 'exploiting' this wealth. As such the outputs only give examples of what it is now possible to explore.

As such, the project deliverables may seem somewhat intangible, but, in summary, they are an invaluable asset for future research into this important wintering population of geese.

That said, it should also be noted that this report does include some of the findings of some initial analysis, both of the existing count data, but also of the newly available telemetry data.

The following sections of this report describe each of the aims outlined above, as follows:

- Section 3 describes collating existing bean goose count data into one database and gives examples of simple analyses;

- Section 4 outlines work done incorporating data now available from the telemetry work;

- Section 5 indicates what work was done recording and collating field characteristics into one database and gives examples of simple analyses; and,

- Section 6 discusses the creating of a website to provide information about the Slamannan Plateau bean geese, including summary information about counts, movements, *etc*., and making available all reports as PDFs, *etc*..

As appropriate, each section provides an outline of both methods and results.

3. COUNTS OF BEAN GEESE ON THE SLAMANNAN PLATEAU

3.1 Methods

Details of the goose count methodology and results have been obtained from summary data published in BGAG annual reports (*e.g.*, Maciver and Wilson 2013) and supplementary information provided by AM. Unless otherwise indicated, the data used for all analyses, as presented in the tables and figures below, are based on data presented in the BGAG annual reports for seasons 1997/1998 to 2012/2013 inclusive. As described more fully in Appendix B, since such monitoring commenced, a standard field numbering system has been used to identify the locations at which birds were recorded; Figures 3.1a and 3.1b illustrate the field numbering system.

3.1.1 Standardised route count

A standardised route count was undertaken by four teams of observers in the winters of 1995/1996, 1996/1997 and 1997/1998 (one count each month, September to March). In the winter of 1998/1999 the route counts were undertaken by two or three teams (one count each month, October to February).

It was subsequently decided that monthly route counts should be discontinued as it was considered that the data gathered during field counts (see below) was sufficient to give a clear picture of the field usage by bean geese within the study area.

From the winter of 1999/2000 onwards, it was considered that the areas likely to hold geese could be monitored through the experience of the observers (as the geese tended to use similar areas year after year) and through direct observations of the geese leaving the roost at dawn.

Counts of geese recorded during the standardised route counts in 1995/1996 and 1996/1997 have not been included in this analysis. However, the date, count and location of bean geese recorded during the standardised route counts carried out in 1997/1998 and 1998/1999 have been included as field counts, (see field counts, below).

3.1.2 Roost counts

Since the late 1980s, when the bean geese moved from the Carron Valley to the Slamannan Plateau area, the geese have primarily roosted on Loch Ellrig (NS8874), East and West Fannyside Lochs (NS8073) and Fannyside Muir (NS8074). Since the early 2000s, roosting has mostly occurred on the Fannyside Lochs and the nearby Fannyside Muir. However, during periods of frost and snow, the flock will often remain out in their feeding areas and may not return to roost.

Similarly, during periods when there is localised flooding, birds will sometimes choose to move from feeding areas to adjacent pools to roost rather than fly to the normal roost sites.

Roost counts have been carried out both in the morning as birds are leaving the roost sites and in the evening as birds are arriving back at the roost sites. The roost counts are often undertaken before or after field counts take place. At dusk, geese can sometimes arrive after dark, posing problems of identification and estimating numbers in flight. Arriving geese can do so in a series of flocks, and arriving birds may use different roost sites, for example, one flock may use one of the Fannyside Lochs, and another may use Fannnyside Muir. As the arrival of geese can be staggered the counter may not be sure if all the geese have arrived to roost at any given time. During darkness movements can occur between the lochs and the muir (see also Smith *et al.* 1994).

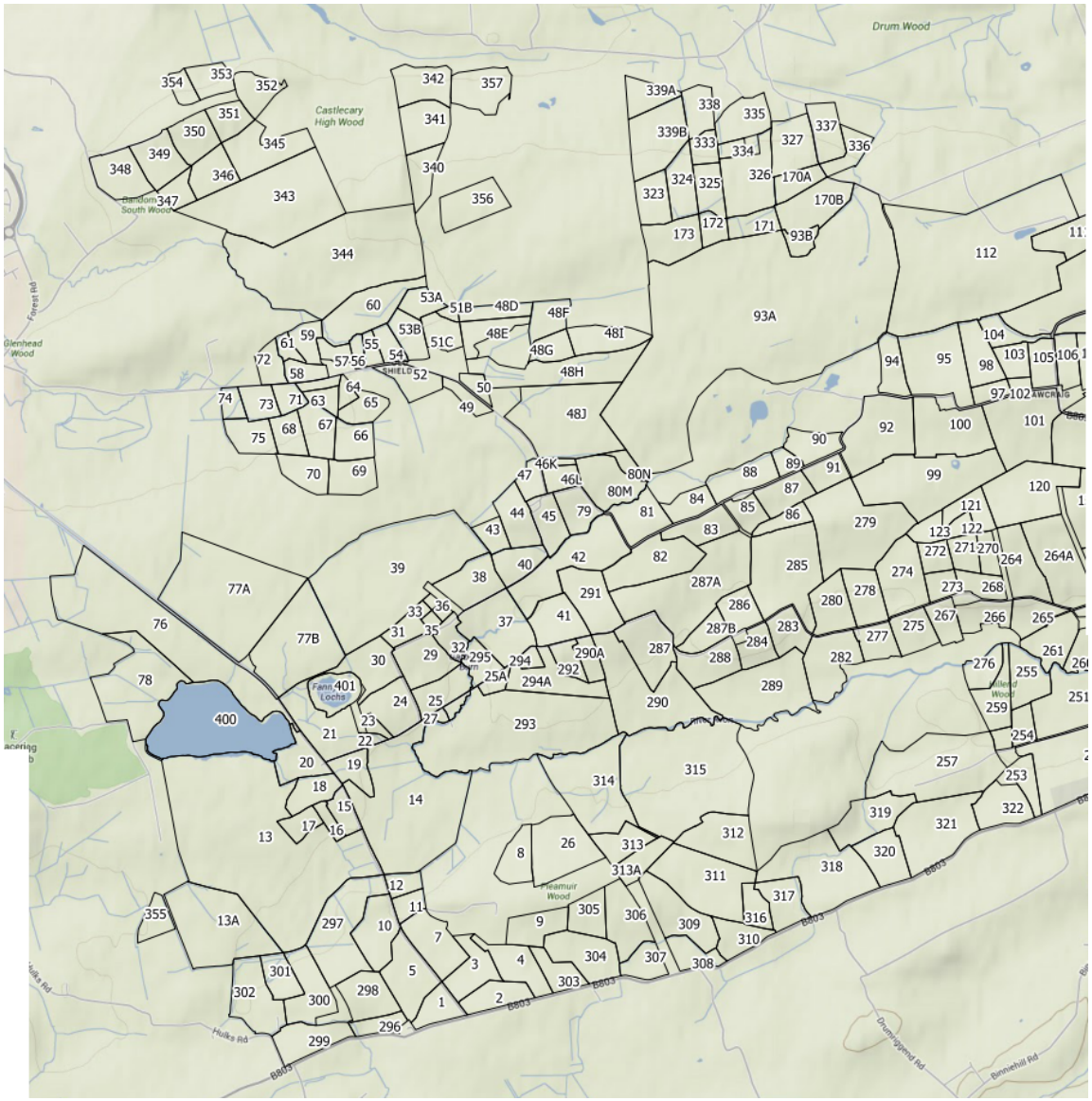

Figure 3.1a. Field numbering system showing fields in the western part of the Slamannan Plateau study area.

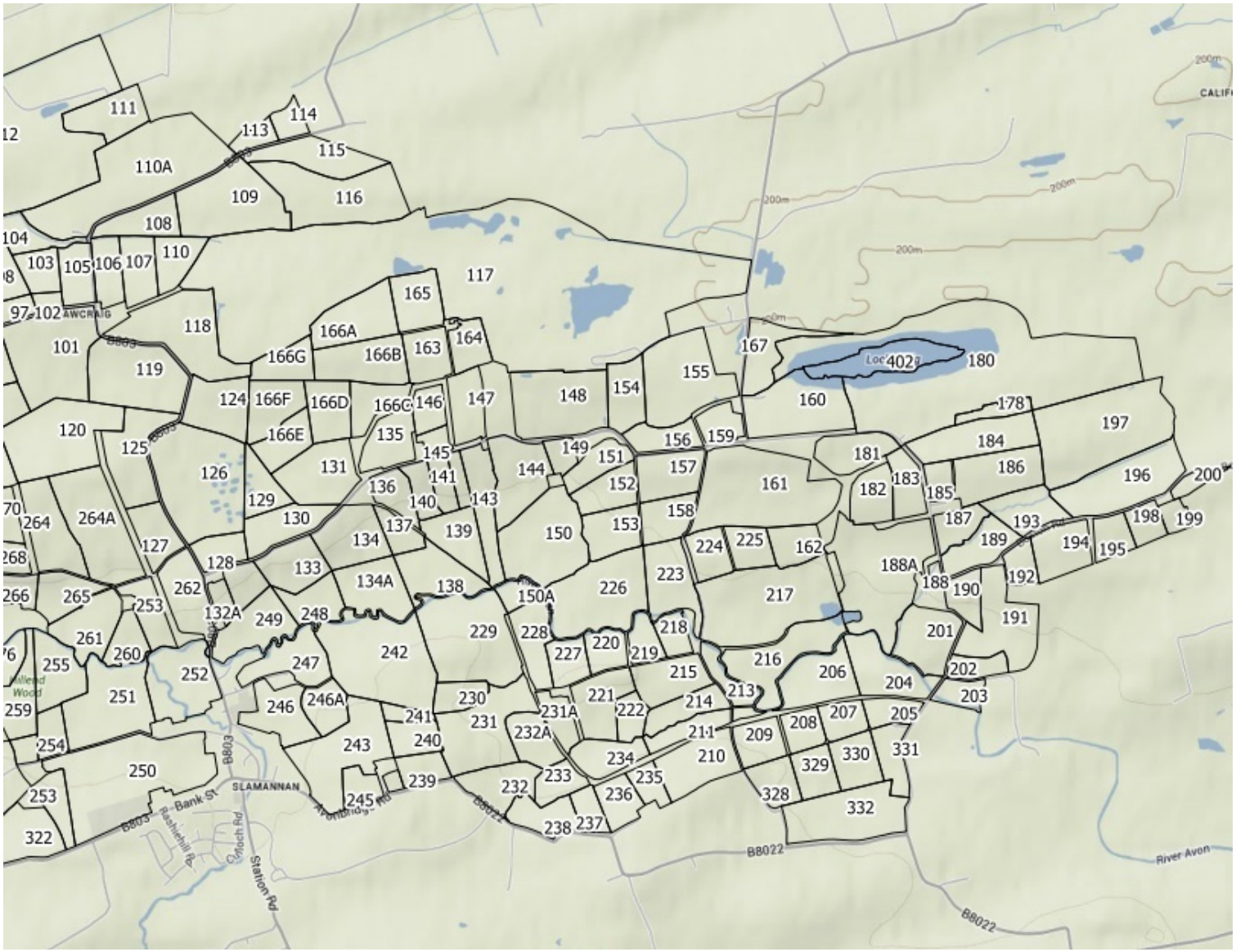

Figure 3.1b. Field numbering system showing fields in the eastern part of the Slamannan Plateau study area.

Roost counts can also be complicated by the presence of other geese at, or over, the roost sites, namely, pink-footed geese *Anser brachyrhynchus* and greylag geese *A. anser*.

3.1.3 Field counts

From winter 1997/1998 onwards, non-standardised monitoring of field use has provided information on the distribution and abundance of bean geese in the Slamannan Plateau area. The route driven has varied from time to time (the entire plateau was not visited during every visit) depending on what time the counter had available and where the geese were thought to be. Field counts tended to take between four and six hours. Observations were made at different times of the day; the time at the start of each count was always recorded. Often, morning field counts were made after watching (and counting) birds leaving the roost sites. Alternatively, field counts were made in the afternoon, before checking (and counting) geese flighting into roost at dusk. Duplicate counts could occur during field counting. The flock size and the field number were recorded. Whilst the field counts can be considered non-systematic (the same route was not followed and the same fields were not checked each day) many fields in the Slamannan Plateau were inevitably checked for geese, either whilst driving between flocks or during scans from vantage points to locate the feeding flocks. Whilst the positive records of flocks were always recorded, checked fields that contained no geese were not.

Fields / land units have been coded, the field codes largely following those used by Smith *et al.* (1994), (as described in Appendix B), although there have been recent modifications.

Since 1997/1998, any disturbance events that occurred during the time that the observer was counting the geese were recorded and, since 2005/2006, the habitat type of the field was recorded, as well as the number and type of any domestic stock in the fields.

The date, count and location of flocks recorded during the ten standardised route counts carried out in 1997/1998 and 1998/1999 have been included as field counts (see above).

A summary of the monitoring activities, as well as all raw data, have been provided in annual reports since winter 1997/1998 (*e.g.*, Maciver & Wilson 2013).

3.1.4 Mapping the distribution of bean geese

Each of the 384 fields / land units was digitised and mapped using QGIS (QGIS 2013). The area of each field / land unit was determined (in ha). Count data for each field (see below) and field characteristics (see below) were then linked to the digitised fields / land units.

3.2 Results

Between seasons 1997/1998 and 2012/2013, roost counts were undertaken on 312 days, standardised route counts on ten days and field counts on 1,050 days. On many occasions, field, standardised route and roost counts were carried out on the same day.

3.2.1 Roost counts

Since winter 1997/1998, 470 roost counts were made on 312 days (including days when no geese were counted coming to roost); a mean of 29 counts each season (range: three in 1997/1998 to 111 in 2005/2006) (Figure 3.2).

Season 2005/2006 was exceptional due to extra roost counts being undertaken by ornithologists on behalf of Scotts UK Ltd., the company that had recently purchased Fannyside Muir (Maciver 2006).

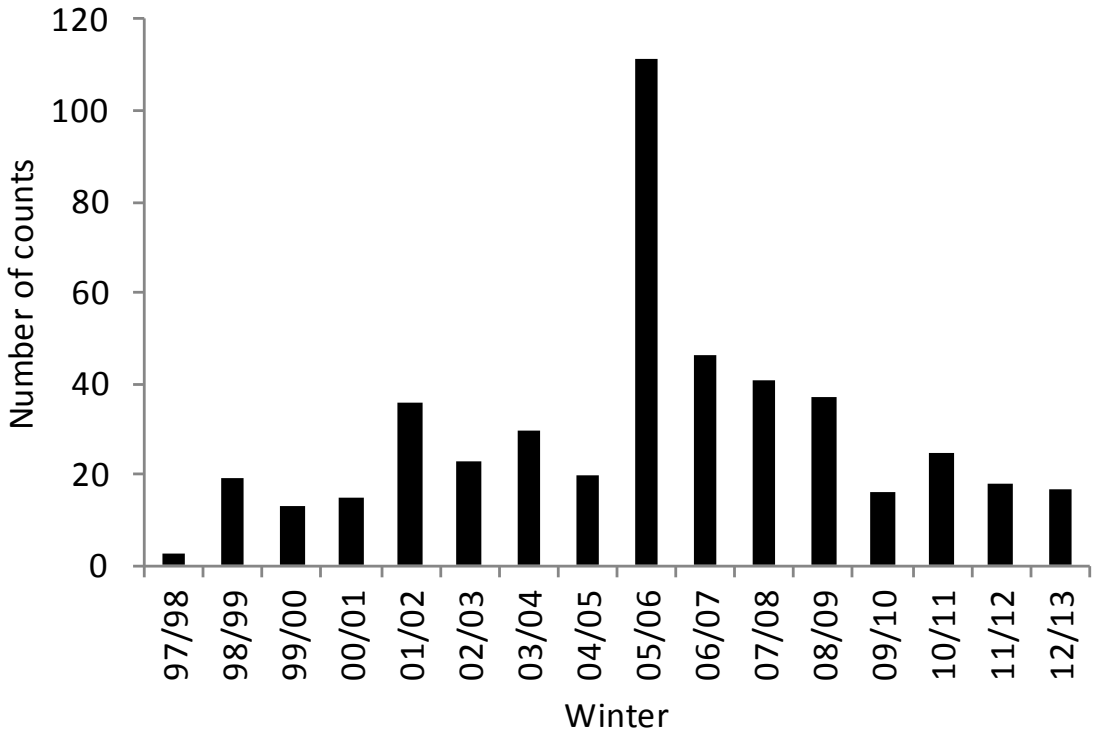

Figure 3.2. Number of roost counts of bean geese at the Slamannan Plateau, 1997/1998 to 2012/2013.

3.2.2 Field counts

Since winter 1997/1998, 1,739 field counts (separate flocks of bean geese) were made; a mean of 109 counts each season (range: 56 in 2012/2013 to 190 in 2005/2006, Figure 3.3).

Field counts were made on 1,059 days; a mean of 66 days each winter (range: 40 in 2012/2013 to 99 in 2005/2006).

The geese habitually use the Luckenburn fields for the first few weeks after arrival each autumn. Subsequently, for the rest of the wintering period (approximately from November to February), the geese begin to use more fields and, in addition, due to the nature of the landscape, and the way in which the birds utilise it, the geese often disappear over contour lines and can therefore be hard to locate. The landscape of the Slamannan Plateau is one of rolling land mixed with forestry and woodland blocks. Locating the geese can prove time-consuming. Even compared to other goose species, the Slamannan Plateau bean geese are relatively shy, which often creates difficulties in locating feeding flocks.

During the 2000s, the birds were fairly consistent with their autumn arrival on the plateau and their association with the Luckenburn fields. The highest count of feeding birds, thought to represent the season maximum, was normally achieved early in the wintering period at this location, before the flock split up and started to use new areas. The number of new fields in which geese were seen increased from the start of the season to the end. The geese had been recorded in a mean of 16.9 fields in early December, but had been recorded in a mean of 32.5 fields by the end of February (see Mitchell 2010).

The main feeding areas of the bean geese have moved from east to west over the past ten years, however, eastern areas were still periodically checked when the observer counted pink-footed geese using this part of the plateau. Whilst no record was kept of the fields

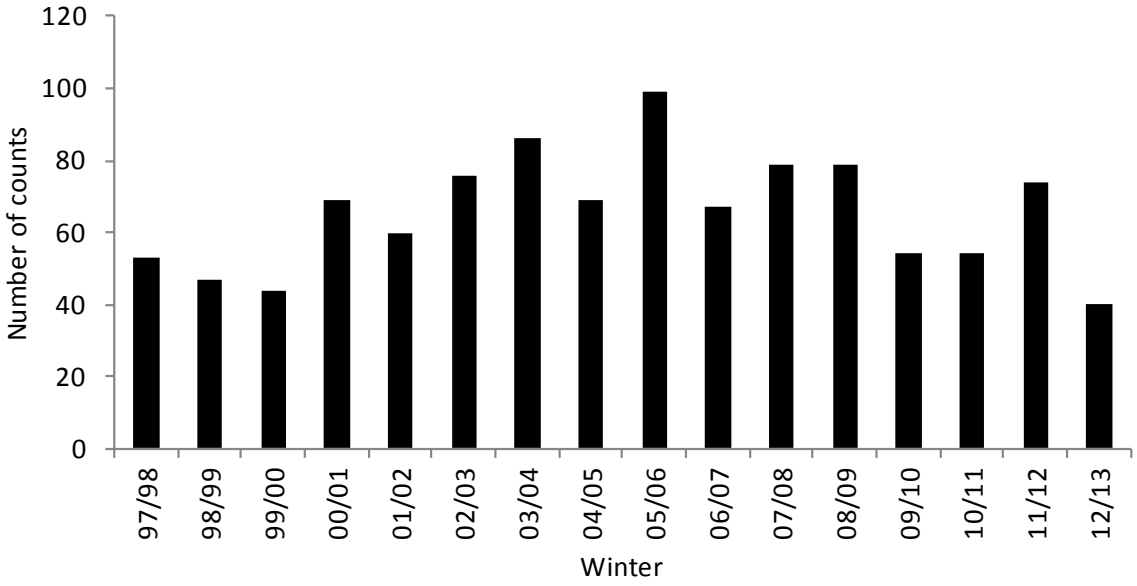

Figure 3.3. The number of days on which field counts of bean geese at the Slamannan Plateau were undertaken, 1997/1998 to 2012/2013.

checked that contained no bean geese, large parts of the Slamannan Plateau area were checked for feeding geese.

The mean number of fields in which the geese were recorded during the season was 23 (range 15 in 2010/2011 to 32 in 2007/2008, Figure 3.4).

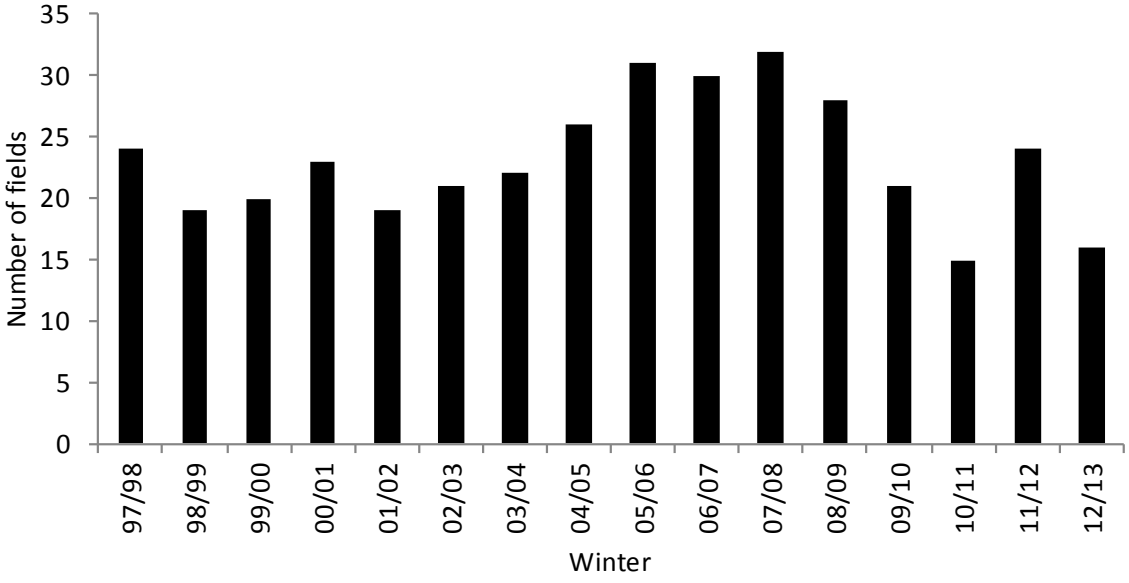

Figure 3.4. The number of different fields in which bean geese were recorded at the Slamannan Plateau, 1997/1998 to 2012/2013.

Overall, bean geese were recorded in 102 different fields (or approximately one quarter of the 384 coded fields / units). Certain fields were more important for bean geese than others (Table 3.1).

Thus, ten fields accounted for 63.9% of all goose use and 20 fields accounted for 78.7% of all goose use.

Table 3.1. The ten fields in which bean geese were recorded most often on the Slamannan Plateau (expressed as a percent of overall goose use, measured in goose days).

Field number	Percent of overall goose use, measured in goose days (%)
9	13.4
170	12.0
26	10.2
305	9.0
306	4.7
326	3.7
251	3.2
29	2.7
38	2.5
285B	2.5

3.2.3 Mapping the distribution of bean geese

The generalised distribution of bean geese on the Slamannan Plateau can be mapped either for the whole time period (1997/1998 to 2012/2013, Figure 3.5) or for different time periods, as required, for example for the five year period 1997/1998 to 2001/2002 (Figure 3.6) and 2008/2009 to 2012/2013 (Figure 3.7). In each instance distribution is expressed as the mean goose count for the time period involved. The boundary of the SPA is indicated in red.

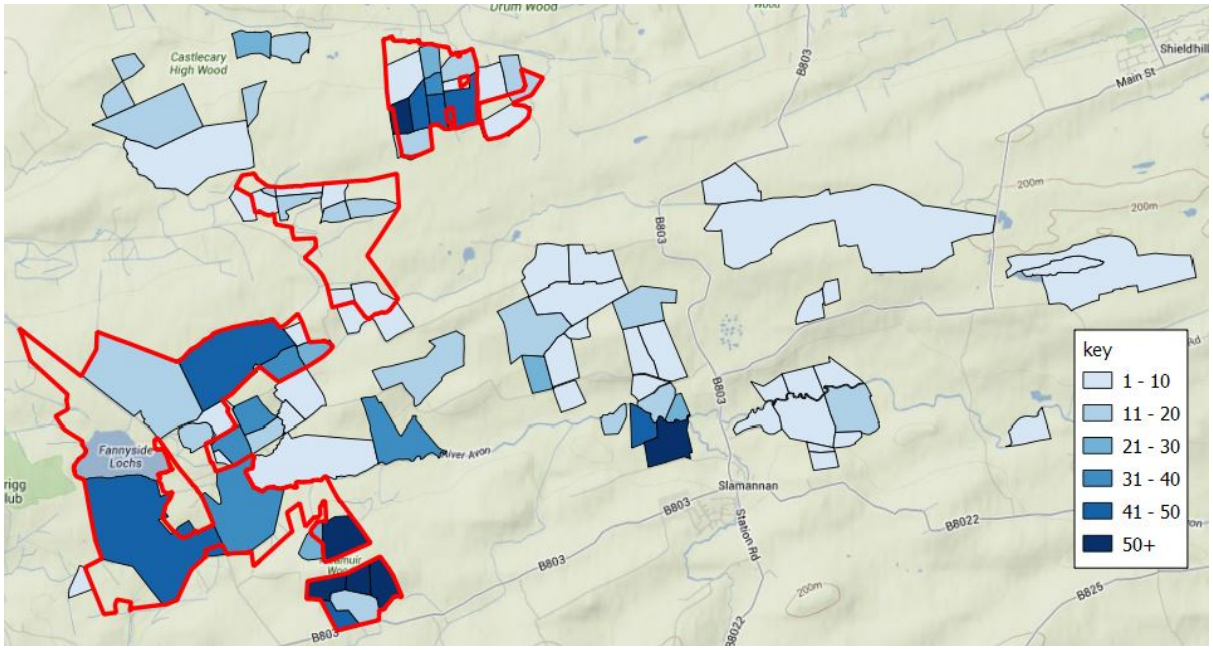

Figure 3.5. The distribution of bean geese on the Slamannan Plateau, 1997/1998 to 2012/2013.

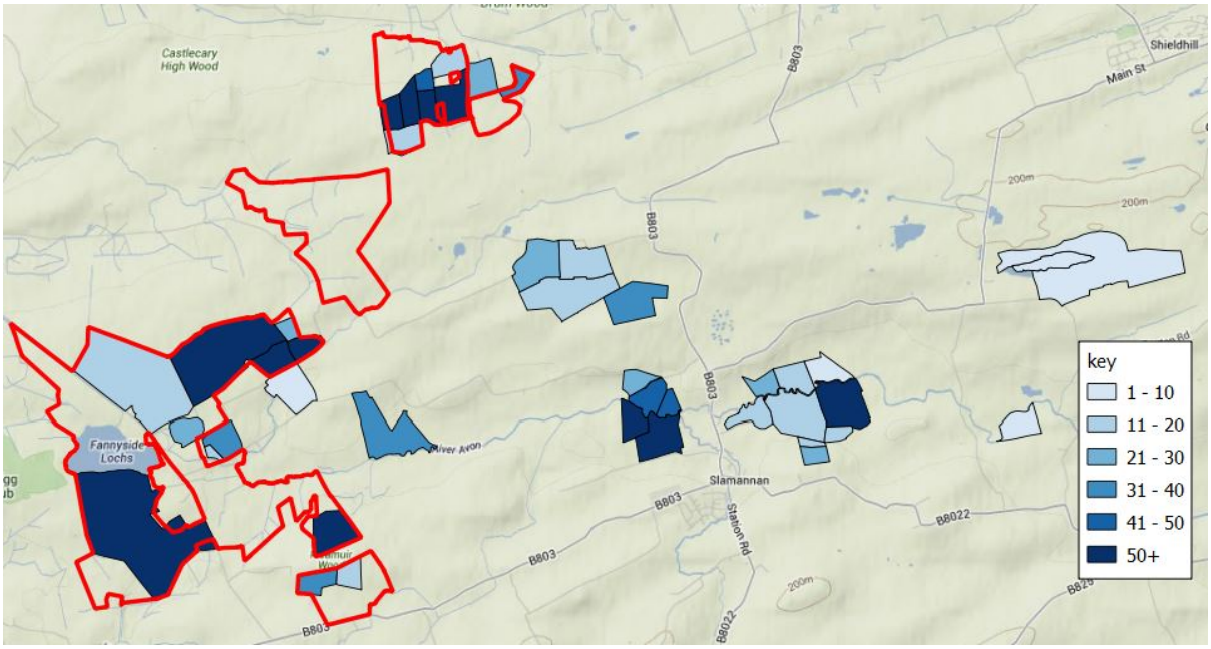

Figure 3.6. The distribution of bean geese on the Slamannan Plateau, 1997/1998 to 2001/2002.

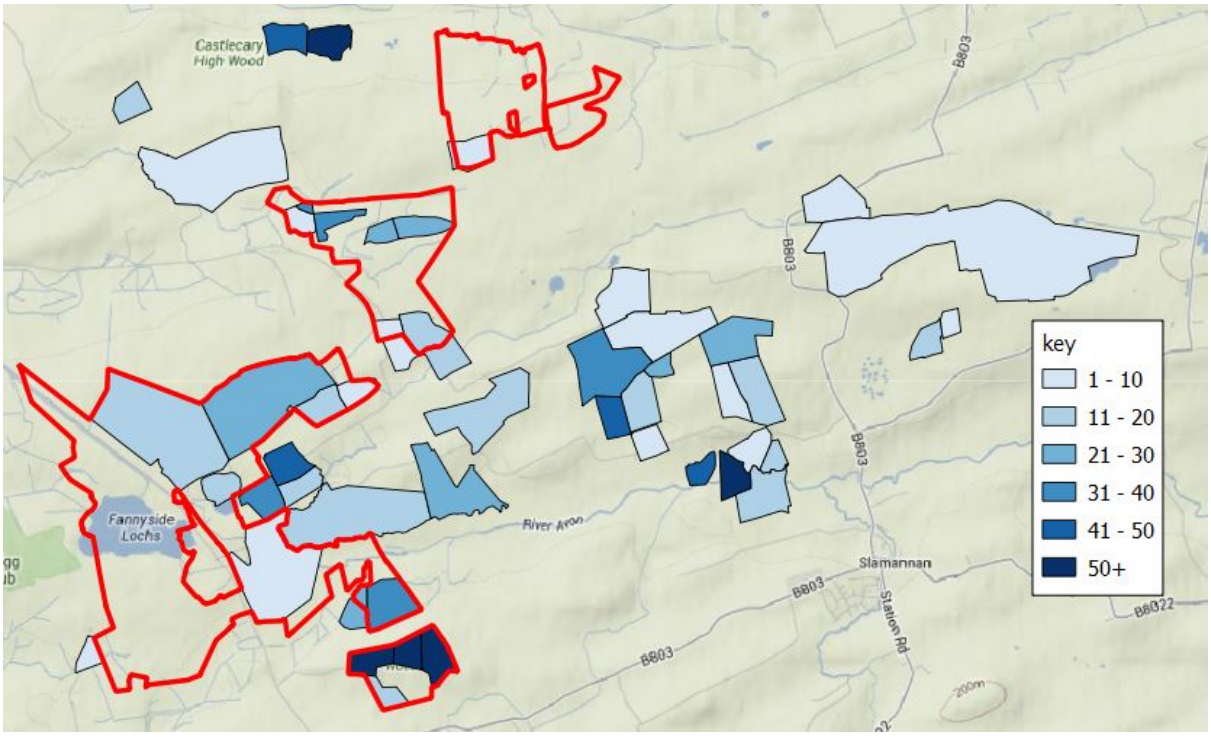

Figure 3.7. The distribution of bean geese on the Slamannan Plateau, 2008/2009 to 2012/2013.

4. TELEMETRY DATA OF BEAN GEESE MARKED ON THE SLAMANNAN PLATEAU

4.1 Methods

Six bean geese were caught at Luckenburn Farm, Slamannan on 14 October 2012. Three adult males and one first-winter male were fitted with Global Positioning System (GPS) - Global System for Mobile communications (GSM) units attached to neck collars and two first winter birds were fitted with GPS-radio units attached to neck collars. After capture, sightings of collared birds were undertaken by AM, CM and LG and members of the public.

After capture, all six collared birds were seen on several occasions during the winter (mean six sightings, range three to ten). Two attempts to download data from the GPS-radio units were successful and captured full location data since fitting.

GPS / GSM tags send location data via the mobile phone network and these data are available a few hours after being sent. GPS / radio tags collect location data and store them. They can then transmit the data to a hand held receiver (yagi) periodically. All tags are solar powered but the GPS-GSM tags use more power communicating with the mobile phone masts than the GPS-radio loggers, hence the GPS-radio loggers can generally collect more GPS fixes under the same light conditions than the GSM enabled tags. Thus the GSM tags can generally collect 2-6 GPS fixes per day and sometimes less in mid-winter whereas the GPS-radio tags can collect 7-14 fixes per day and sometimes more. This trade-off needs to be balanced against the benefit of the GSM tags in tracking migration remotely.

Observation of the geese after the catch revealed that a family had been caught. An adult male (Tag 07) with three goslings: male gosling (Tag 16), female gosling (Tag 02) and male gosling (Tag 08). Two of these were fitted with GPS/GSM tags (Tag 07 and Tag 08) and two were fitted with a GPS / radio tags (Tag 02 and Tag 16). The family were expected to stay close to each other throughout the first winter, so it was expected locations would be similar for these four birds.

In late February 2013, all the bean geese, including the marked geese, left the Slamannan Plateau and the four birds marked with GPS-GSM units were recorded in Denmark.

Location data were collated in an EXCEL spreadsheet. It is impossible to determine from the location data of the four GPS-GSM units if the bird was feeding on the ground or in flight as the tags do not collect a speed or altitude measure whereas the GPS-radio tags do collect a speed measure and so it is possible to assess whether or not a bird is likely to have been in flight.

Before any analysis of field use is undertaken, the treatment of location data needs to be carefully considered. For example:

a. The geese were caught on 14 October 2012, however, in order to allow the geese to settle down to a normal feeding pattern after marking, it is suggested that location data from 16 October onwards are used;

b. When analysing field use, if two or more location points are gathered from the same field on the same day, only one registration for that field needs to be included in any analysis. That is, multiple locations points from the same field on the same day can be ignored;

c. It was not possible to determine if location data from the GPS-GSM units related to geese on the ground or in flight. However, anecdotal evidence based on hundreds of hours of observation by AM and others, plus analysis of data from the GPS / radio tag (which did allow separation of ground versus flight data through accelerator

measurements) suggested that the bean geese spend the majority of the daytime feeding in fields. GPS / radio tag data from the two tagged bean geese suggested that a mean of 2.3% of the location records were of birds in flight. Thus, all location data from the GPS-GSM units can be included in the analyses, but it must be borne in mind that a very small fraction of the data refer to bird flying over fields; and,

d. When using data from the four tagged members of the family of bean geese (one adult male and three first winter birds), to avoid duplication, the location of only one individual needs to be included in any analysis, since the family unit stayed together throughout the winter.

4.2 Results

Between marking the six bean geese (on 14 October 2012) and departure for the staging area in Denmark at the end of February 2013, the six birds did not leave the Slamannan Plateau. The mean number of telemetry locations for the bean geese marked with GPS-GSM units on the Slamannan Plateau was 450 (Table 4.1). The GPS/radio tags were set to gather location data at different rates and accumulated 1,659 and 646 location points (Table 4.2).

Table 4.1. The number of geographic locations gathered by the six GPS tags fitted to bean geese during winter 2012/2013.

Tag	Age and sex	Tag type	Number of locations
07	Adult male	GPS-GSM	439
06	Adult male	GPS-GSM	609
03	Adult male	GPS-GSM	330
08	1st winter male	GPS-GSM	420
02	1st winter female	GPS/radio tag	1,659
16	1st winter male	GPS/radio tag	646

As an example, the fields in which the tagged birds were recorded during the day (06h00 to 18h00) was mapped, and this is shown in Figure 4.1. Again, this data is expressed as the total number of field visits by three independent tagged bean geese during winter 2012/2013 and the SPA boundary is shown in red.

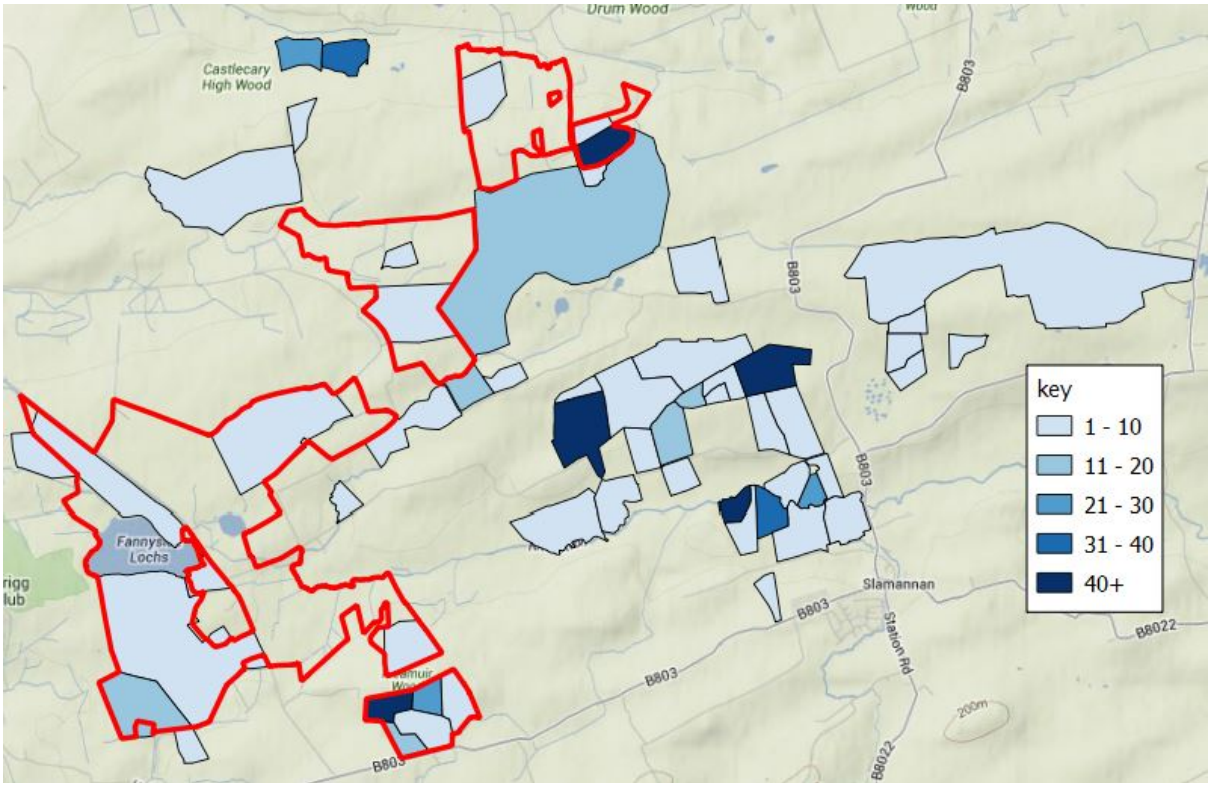

Figure 4.1. The daytime distribution of three tagged bean geese on the Slamannan Plateau (expressed as the total number of field visits by three independent tagged bean geese during winter 2012/2013). Daytime records from the main roosts, Fannyside Muir (Field 77) and the two Fannyside Lochs ('Fields' 400 and 401) are not shown.

5. FIELD CHARACTERISTICS OF THE SLAMANNAN PLATEAU

5.1 Methods

The following information was recorded or assessed for each of the 384 fields / land units during winter 2012/2013 (more details are given in Appendix B):

- Date of visit / field assessment;
- Observers involved;
- Field type (*e.g.*, bog / moor; old improved pasture (OIP); rough grassland (RG); recently improved pasture (RIP), *etc*.);
- Main grass colour (as a proxy for degree of improvement; *e.g.*, Brown, Yellow, Yellowy-Green, Greeny-Yellow, Green, Very Green);
- Sward length (Short (<5cm), Medium (5-15cm), Long (>15cm);
- *Juncus* rush cover (as a percentage of field);
- Temporary and permanent flooding / water-logging (as a percentage of field);
- Type of domestic grazing animal if present (type and number); and,
- Field boundary type (*e.g.*, post and wire fence, hedge, drystone dyke, *etc*.).

In addition, the grid reference of the centre of each field / land unit was subsequently confirmed. Central grid references can be used to source the Field Identifier Number and presence of agri-environment options. The distances in kilometres from the centre of the field to the middle of Fannyside Muir (the principal roost site) and to the nearest roads and buildings were then calculated (based on the central grid reference), using the GIS.

5.2 Results

As a result of the data collected in winter 2012/2013 field characteristics can now also be mapped (Figure 5.1). Again the SPA boundary is shown in red.

The main reason for assessing the fields was to provide a picture of field characteristics (and other environmental correlates) and goose use. This study collated the information allowing future analyses to be carried out.

The type of fields in the study area comprised mostly old improved pasture (65.0%) followed by smaller percentages of other field types (Table 5.1). The preferences of bean geese to certain field types can be investigated by comparing the proportion of bean geese observed foraging in particular field types with the proportion of a given field type in the study area (Jacobs 1974). In each of the analyses presented here the field type was assessed in winter 2012/2013 and the number of geese in each field was based on mean winter peak count for the period 1997/1998 to 2012/2013. The index used in each instance ranges from -1 (complete avoidance) to +1 (exclusive use).

The bean geese showed a preference for boggy fields (although these formed a very small proportion of the field type available, Table 5.1) and tended to avoid certain rough grassland fields (Figure 5.2).

Table 5.1. Summary results of the field characteristics assessments carried out for fields in the Slamannan Plateau study area.

Field characteristic	Field characteristic	Habitat available in study area	Use of fields by bean geese[1]
Field type	Old improved pasture (OIP)	65.0%	60.9%
	Recently improved pasture (RIP)	17.3%	21.9%
	Rough grassland (RG)	7.9%	2.8%
	Rough grassland/Old improved pasture (RG/OIP)	3.9%	5.5%
	Other combination	3.6%	5.4%
	Bog	2.1%	3.5%
Sward length	Long	17.1%	19.6%
	Medium	12.3%	9.7%
	Short	70.6%	70.7%
Sward colour	Brown	3.3%	3.3%
	Yellow	11.5%	37.1%
	Yellow/Green	73.8%	54.1%
	Green	11.5%	5.5%

[1] Calculated as the mean number of geese counted in a particular field based on counts conducted between 1997/1998 and 2012/2013

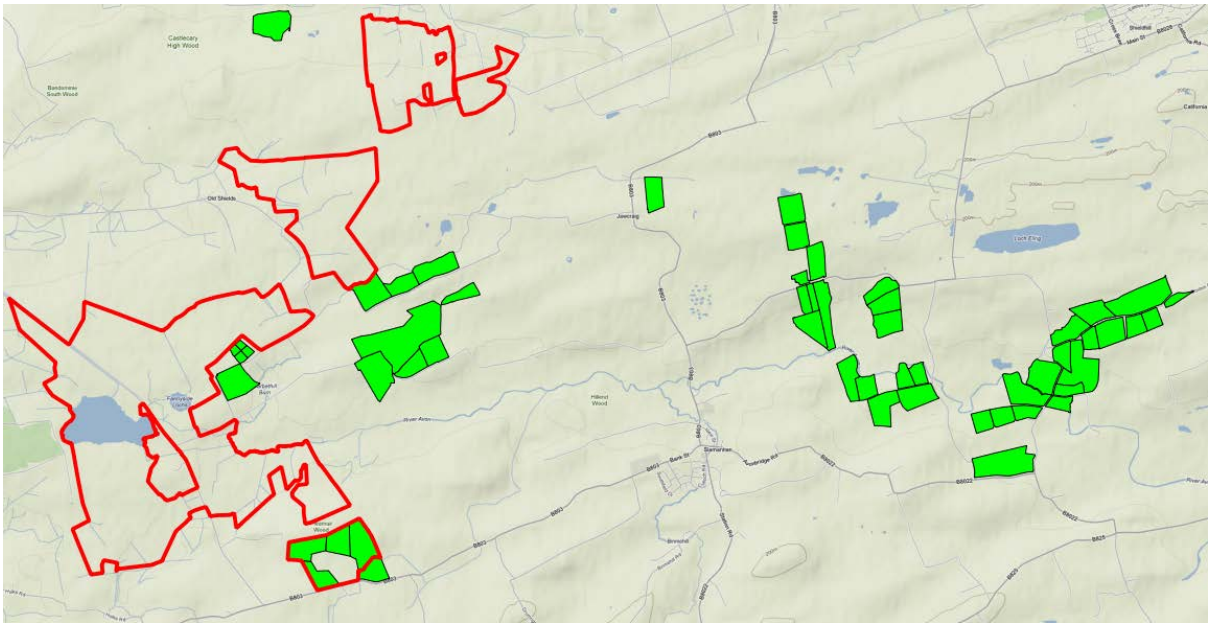

Figure 5.1. The distribution of recently improved grassland fields on the Slamannan Plateau during winter 2012/2013.

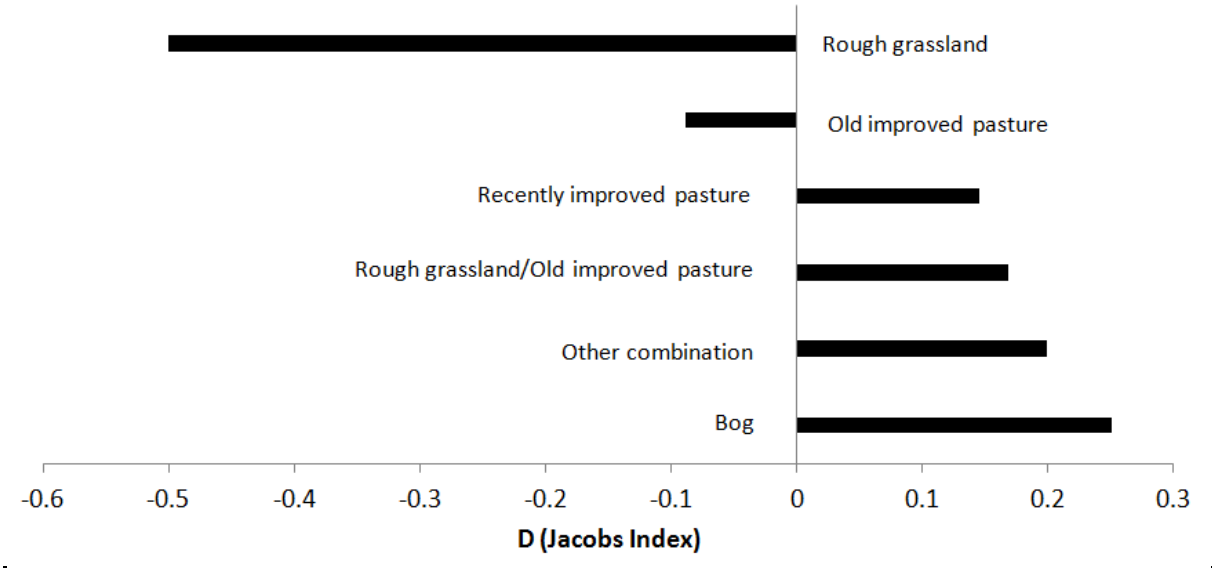

Figure 5.2. Field type preferences of bean geese on the Slamannan Plateau expressed by Jacobs Index (D).

Bean geese tended to prefer fields with a yellow sward and avoided those with a green sward (Figure 5.3) and they also preferred long swards to medium length swards (Figure 5.4).

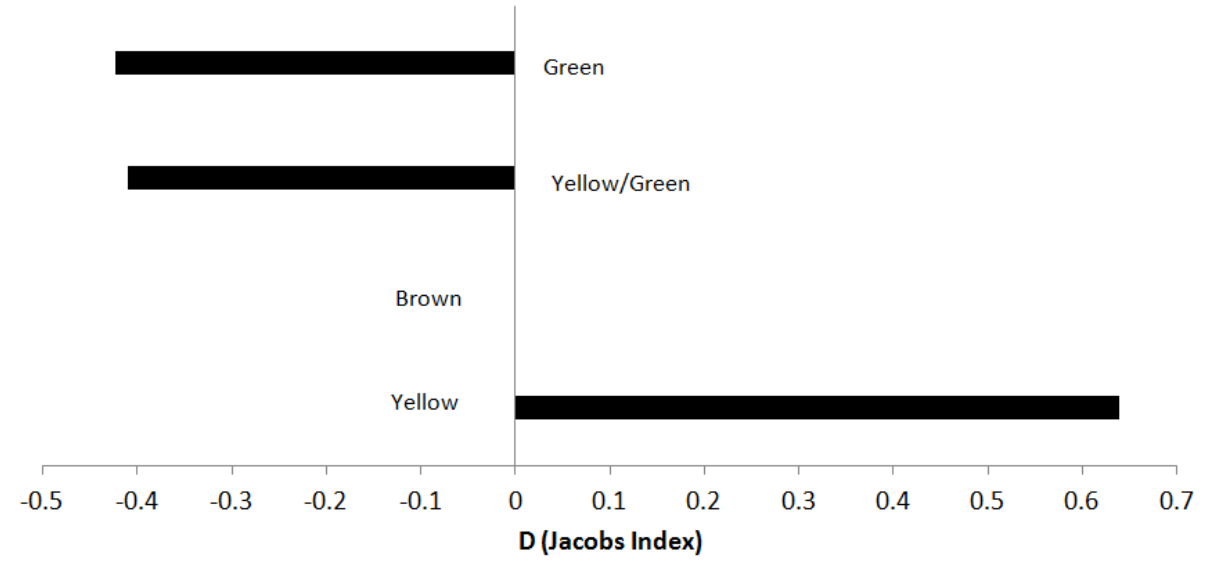

Figure 5.3. Field sward colour preferences of bean geese on the Slamannan Plateau expressed by Jacobs Index (D).

It was also possible to compare the field boundary types of those fields that held geese (at any time) with those fields that never held geese. The geese tended to choose fields with a post and wire fence or water course boundary more often than those with a road, farm buildings or drystone dyke field boundary (Figure 5.5).

Care should be taken when interpreting these early results; geographical features, such as proximity to the night time roost, proximity of fields to roads, buildings, woodlands, *etc*., need to be taken into account before any conclusions about the habitat preferences of bean

geese on the Slamannan Plateau can be made. However, the data has been collected and collated and detailed GIS analysis now can be carried out.

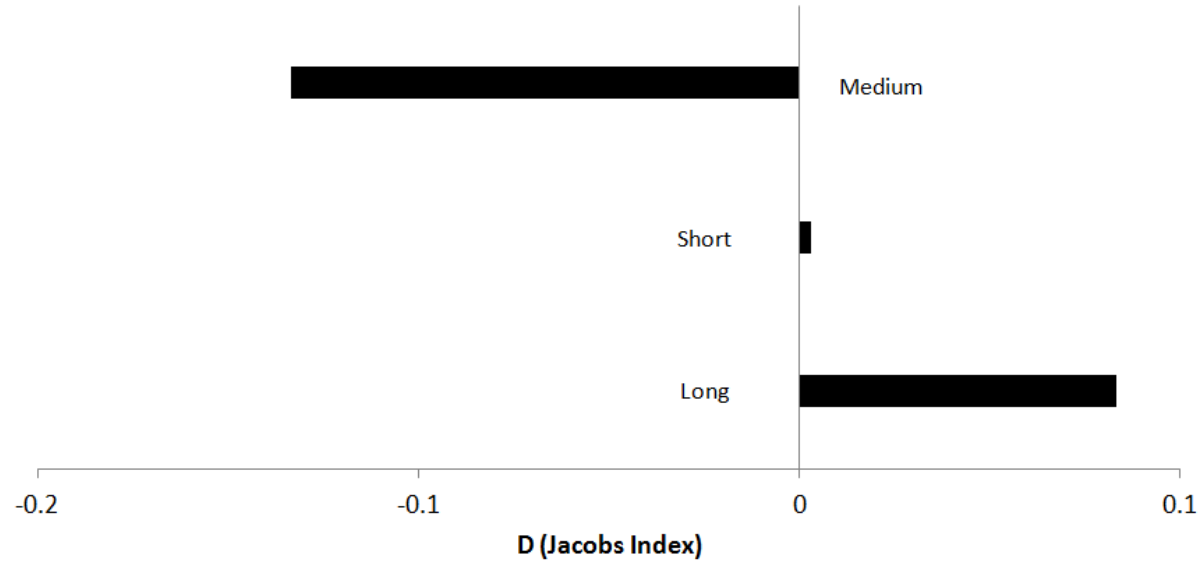

Figure 5.4. Field sward length preferences of bean geese on the Slamannan Plateau expressed by Jacobs Index (D).

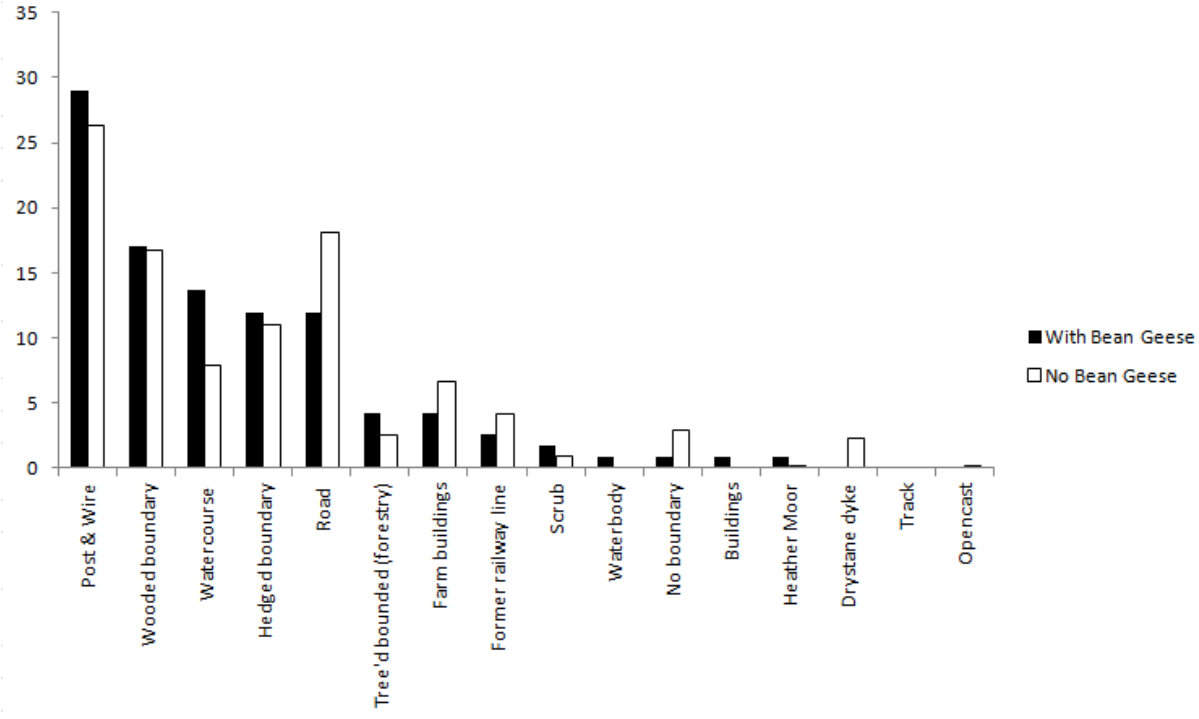

Figure 5.5. Proportion of field boundary types of fields that either held bean geese or held no bean geese.

6. DEVELOPMENT OF A WEBSITE TO PROVIDE INFORMATION ABOUT THE SLAMANNAN BEAN GEESE AND THE COLLATION OF INFORMATION FOR THIS PROJECT

A website was developed and has been made publically available. It currently includes information about the Slamannan bean geese under the following topic headings:

- Introduction;
- Winter ecology;
- Winter counts and phenology (which includes summary information on all the bean goose counts mentioned above);
- Feeding distribution (which includes access to a web-based map showing the current core feeding areas);
- Migration and breeding quarters;
- Ringing and sightings; and,
- Downloads (which includes links to downloadable versions of all of the annual reports on the bean goose prepared on behalf of the BGAG).

The website can be viewed at:

http://scotlandsbeangeese.wikispaces.com/

The website is a 'live' facility which will continue to develop over time; many ideas for further improvements are currently in preparation or under consideration.

7. CONCLUSIONS AND RECOMMENDATIONS

7.1 Conclusions

This report constitutes the 'written report' element of a wide ranging project aimed at unlocking and sharing the potential of the wealth of data generated by ongoing monitoring of the Slamannan Plateau bean geese that has been undertaken each winter since at least 1989/1990.

In recent years there has been a spate of activity involving work on the Slamannan Plateau bean geese, and this has resulted in this project evolving to reflect some of the data that have recently become available as a result, most notably those which were available as a result of the initial findings of the telemetry work.

Further, the creation of the databases involved, and the dissemination of this work using website facilities has created the potential for many of the wider aims outlined in Section 1 of this report to now be investigated. Equally, it has afforded the prospect for as yet undefined aims to also be examined; as noted, the situation is a dynamic one and it may well be that in the near future new questions are raised that haven't even been considered at the time of writing. For example, it may be that the continuing amelioration of the climate may cause a gradual retreat of the bean geese to other wintering areas away from the Slamannan Plateau.

Considering each of the aims of this project in turn, it can be stated that:

1. A database has now been created which incorporates virtually all of the existing bean goose count data into one place, rather than in many separate reports, which will facilitate the carrying out of simple analyses; examples of such initial analyses are described in Section 3. As has been noted however, it is considered that this element of the work is ongoing as some of the data from the earlier winters may yet be added if it becomes available in a usable format;

2. Data now available from the telemetry work has also been incorporated into this database, so that this can, for example, be used to illustrate more about current distribution patterns at a very fine scale (this is described in Section 4). Again, dependant on the ongoing success of the telemetry work, both in terms of the continuing functionality of the tags already deployed, and resulting from the successful use of further such tags, more and more such data should be available;

3. A database incorporating the details of the field characteristics of all of the fields on the Slamannan Plateau has been assembled which will facilitate the carrying out of simple analyses, including correlations to help determine the distribution of the geese; again, examples of such initial analysis are described in Section 5; and,

4. A website has been created to highlight information about the Slamannan Plateau bean geese, including summary information about counts, movements, *etc*. and making available all reports as PDFs, *etc*. (this is described in Section 6). This website is updatable and will progressively be added to and improved.

As suggested, the initial analyses that were conducted as part of this project give examples of the potential for future research that has now been unlocked by the creation of the database and website. As such, the following sub-section re-assesses the initial ideas about what could be achieved with such a resource and provides a series of recommendations in relation to this.

7.2 Recommendations

Certainly, some of these uses could now readily be further explored as a result of the creation of the database and website.

The creation of a database of counts, telemetry data and field information will allow the scientific basis for assessing past and current field use of bean geese on the Slamannan Plateau and explore the areas of interest outlined in Section 1.

For example, each winter new monitoring data will become available, and this should be added to the database as soon as it is available so that the database is always up-to-date. Similarly, after each winter, new monitoring reports will be produced, and again, these should be made available on the website as soon as possible.

In addition, the website could become a repository for BGAG meeting notes, *etc*., and could include links to the North Lanarkshire / Falkirk LBAP for Bean Geese, *etc*..

More specifically, it is recommended that the BGAG decide which of the preceding list of uses are priorities, (and also identify any other such priorities) and produce a list of intended actions utilising the new resources described herein.

Further, other recommendations include:

1. Adding details of all designations with the database, *i.e*., in addition to the Slamannan Plateau SSSI / SPA, West Fannyside Moss SSSI / Special Area of Conservation and Darnrigg Moss SSSI;

2. Conducting investigations of grass species composition of favoured fields;

3. Adding all areas involved in agricultural / environmental payment schemes such as the Natural Care Scheme, *etc*., aimed at improving these areas for bean geese and researching the success of these schemes in terms of usage patterns whilst funding for management was in place, and when not. For example, the agri-environmental scheme at Garbethill Muir could be audited; and,

4. Devising all future monitoring efforts, including any roost counts and ageing assessments conducted on behalf of SNH, as well as the field and roost counts conducted on behalf of the BGAG, so that it is more precisely targeted at specific 'gaps' in the knowledge base or the purposes of, for example, Site Condition Monitoring.

Finally, such work inevitably has costs associated with it; as such it is recommended that SNH make appropriate funding available to undertake these tasks, as necessary. That said, as indicated, this project will undoubtedly allow the careful targeting of scarce resources to ensure what is delivered maximises what is achieved in terms of successful nature conservation.

8. REFERENCES

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APPENDIX A: TABLES OF SUMMARY RAW DATA

Table A.1. Maximum winter counts for the 102 fields on the Slamannan Plateau in which bean geese were recorded between 1997/1998 and 2012/2013. Sorted on five year mean (2008/2009 to 2012/2013).

Field No.	97/98	98/99	99/00	00/01	01/02	02/03	03/04	04/05	05/06	06/07	07/08	08/09	09/10	10/11	11/12	12/13	5 Year Mean	Max (ever)
9	0	0	0	0	188	229	235	262	262	231	300	207	260	267	233	215	236	300
305	0	0	0	0	90	232	235	262	178	213	248	265	248	171	156	208	210	265
306	0	0	0	0	0	232	224	196	268	195	0	94	133	109	109	89	107	268
285B	0	0	0	0	0	0	0	0	0	0	0	0	0	239	162	120	104	239
255	155	168	180	0	22	3	0	4	0	100	0	77	38	23	174	140	90	180
29	0	0	0	0	0	80	0	0	62	76	130	186	157	10	0	0	71	186
357	0	0	0	0	0	0	0	0	0	0	0	0	93	29	130	91	69	130
48E	0	0	0	0	0	0	0	0	0	0	131	200	140	0	0	0	68	200
276	0	0	0	0	0	0	0	0	0	0	0	0	0	0	174	146	64	174
278	0	0	0	0	0	0	12	7	15	152	0	0	68	0	160	80	62	160
279	0	0	0	0	0	0	0	0	0	54	0	0	68	208	0	0	55	208
8	0	0	0	0	0	231	203	6	70	113	90	200	50	0	0	0	50	231
342	0	0	0	0	0	0	0	0	111	40	80	18	60	0	46	115	48	115
26	0	73	180	181	192	231	235	262	160	255	160	66	30	118	0	0	43	262
51B	0	0	0	0	0	0	0	0	0	0	0	200	0	0	0	0	40	200
123	0	0	0	0	0	0	0	0	0	0	0	0	0	0	44	150	39	150
287A	0	0	0	0	0	0	0	0	10	100	0	0	0	0	192	0	38	192
25	0	0	0	0	0	0	0	0	0	0	146	180	0	0	0	0	36	180
24	150	0	0	60	0	0	0	0	0	160	170	170	0	0	0	0	34	170
39	150	80	182	170	0	0	0	0	0	0	0	170	0	0	0	0	34	182
80M	0	0	0	0	0	0	0	0	0	0	116	167	0	0	0	0	33	167
274	0	0	0	0	0	0	0	0	0	0	0	0	0	0	153	0	31	153
120	62	108	0	0	0	0	0	0	0	0	0	0	49	0	0	103	30	108
166	0	0	0	0	0	0	0	0	0	0	0	0	0	0	78	70	30	78

Field No.	97/98	98/99	99/00	00/01	01/02	02/03	03/04	04/05	05/06	06/07	07/08	08/09	09/10	10/11	11/12	12/13	5 Year Mean	Max (ever)
290	0	0	96	76	0	80	0	200	0	0	0	0	62	34	51	0	29	200
92	147	0	0	0	0	0	0	0	0	0	0	0	0	0	144	0	29	147
81	0	0	0	0	0	0	0	0	0	0	0	0	0	136	0	0	27	136
93	32	0	103	0	0	0	0	0	200	180	7	0	80	50	0	0	26	200
48G	0	0	0	0	0	0	0	0	0	0	174	26	90	0	14	0	26	174
293	0	0	0	0	0	0	0	0	0	0	0	86	0	0	43	0	26	86
251	100	168	167	182	77	95	59	0	9	163	0	0	21	0	107	0	26	182
48I	0	0	0	0	0	0	0	0	0	0	120	0	0	120	0	0	24	120
38	152	168	188	183	0	0	0	0	130	77	100	89	25	0	0	0	23	188
264A	0	0	0	0	0	0	0	0	0	0	0	0	112	0	0	0	22	112
77	0	0	0	170	0	0	0	0	0	0	0	0	0	0	100	0	20	170
401	0	0	103	0	20	0	0	0	0	0	0	0	90	0	0	0	18	103
303	0	0	0	0	0	0	235	197	178	0	196	84	0	0	0	0	17	235
260	113	116	0	0	20	0	37	0	0	0	0	32	0	0	51	0	17	116
135	0	0	0	0	0	0	0	0	0	0	0	0	0	0	28	54	16	54
51C	0	0	0	0	0	0	0	0	0	0	80	71	0	0	0	0	14	80
346	0	0	0	0	0	0	0	0	112	31	67	60	0	0	0	0	12	112
46L	0	0	0	0	0	0	0	0	0	0	0	48	0	0	0	0	10	48
261	112	168	0	16	12	4	0	6	0	0	0	39	0	0	0	7	9	168
117	0	0	0	0	0	0	0	0	0	0	0	0	0	0	45	0	9	45
275	0	0	0	0	0	0	0	0	0	0	0	43	0	0	0	0	9	43
40	120	168	182	98	0	0	0	0	0	0	0	40	0	0	0	0	8	182
173	0	0	0	0	102	18	40	109	0	0	0	0	0	0	0	40	8	109
14	0	0	0	0	0	0	210	196	0	210	189	0	0	38	0	0	8	210
99	152	0	0	0	0	0	0	0	0	0	0	0	0	12	26	0	8	152
355	0	0	0	0	0	0	0	0	19	0	0	33	0	0	0	0	7	33
264	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	26	5	26
344	0	0	0	0	0	0	0	0	37	101	62	23	0	0	0	0	5	101

Field No.	97/98	98/99	99/00	00/01	01/02	02/03	03/04	04/05	05/06	06/07	07/08	08/09	09/10	10/11	11/12	12/13	5 Year Mean	Max (ever)
79	0	0	0	0	0	0	0	0	15	0	0	0	18	0	0	0	4	18
146	0	0	0	0	0	0	0	0	0	0	0	0	0	0	17	0	3	17
109	0	0	0	0	0	0	0	0	0	8	6	8	0	0	0	0	2	8
13	100	0	0	169	190	0	230	94	0	0	24	0	0	0	0	0	0	230
23	51	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	51
30	0	0	0	0	0	0	0	0	0	0	19	0	0	0	0	0	0	19
37	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
43	0	0	0	86	64	0	0	0	0	0	0	0	0	0	0	0	0	86
46	0	0	0	0	0	0	0	0	100	0	0	0	0	0	0	0	0	100
48	150	168	160	182	77	231	235	180	71	150	0	0	0	0	0	0	0	235
51	0	0	0	182	0	231	0	0	0	98	0	0	0	0	0	0	0	231
53	0	0	0	0	0	63	0	0	0	0	0	0	0	0	0	0	0	63
80	0	0	0	0	0	0	0	47	170	105	169	0	0	0	0	0	0	170
100	112	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	112
138	0	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7
170	152	168	188	183	192	232	235	100	268	116	0	0	0	0	0	0	0	268
180	6	0	0	43	0	0	0	0	0	0	0	0	0	0	0	0	0	43
206	0	0	33	0	0	0	0	0	0	0	0	0	0	0	0	0	0	33
229	91	76	10	183	19	0	0	0	0	0	0	0	0	0	0	0	0	183
230	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100
240	153	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	153
241	0	0	64	0	14	0	0	0	0	0	0	0	0	0	0	0	0	64
242	79	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	79
247	120	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	120
248	0	105	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	105
265	0	0	139	0	0	0	0	0	0	0	0	0	0	0	0	0	0	139
295	0	0	0	0	0	0	0	0	0	0	8	0	0	0	0	0	0	8
304	0	0	0	0	0	0	231	8	0	0	0	0	0	0	0	0	0	231

Field No.	97/98	98/99	99/00	00/01	01/02	02/03	03/04	04/05	05/06	06/07	07/08	08/09	09/10	10/11	11/12	12/13	5 Year Mean	Max (ever)
323	0	168	160	182	192	0	0	262	50	0	0	0	0	0	0	0	0	262
324	0	161	150	182	0	231	64	18	110	0	0	0	0	0	0	0	0	231
325	0	70	48	180	126	231	74	60	110	0	0	0	0	0	0	0	0	231
326	0	30	31	182	180	232	235	130	0	0	0	0	0	0	0	0	0	235
327	0	138	0	8	0	0	5	0	0	0	0	0	0	0	0	0	0	138
333	0	0	36	183	0	0	0	200	100	70	0	0	0	0	0	0	0	200
334	0	0	0	0	0	0	235	30	0	0	0	0	0	0	0	0	0	235
335	0	0	0	0	80	0	100	2	30	15	0	0	0	0	0	0	0	100
336	0	0	0	180	0	200	0	0	0	0	0	0	0	0	0	0	0	200
337	0	0	0	0	0	231	0	0	0	0	0	0	0	0	0	0	0	231
338	0	0	0	0	0	180	0	200	140	55	0	0	0	0	0	0	0	200
339	0	0	0	0	0	0	150	150	160	101	0	0	0	0	0	0	0	160
340	0	0	0	0	0	0	0	0	120	52	62	0	0	0	0	0	0	120
343	0	0	0	0	0	0	0	0	120	73	160	0	0	0	0	0	0	160
351	0	0	0	0	0	0	0	0	106	170	0	0	0	0	0	0	0	170
402	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
134A	69	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	69
170B	0	0	0	0	0	0	0	0	0	0	138	0	0	0	0	0	0	138
339B	0	0	0	0	0	0	0	0	0	0	170	0	0	0	0	0	0	170
48D	0	0	0	0	0	0	0	0	0	0	130	0	0	0	0	0	0	130
48F	0	0	0	0	0	0	0	0	0	0	15	0	0	0	0	0	0	15
53B	0	0	0	0	0	0	0	0	0	0	64	0	0	0	0	0	0	64

Table A.2. Field characteristics of the fields surveyed on the Slamannan Plateau.

			[Boundary type																										]
Field number	Grid reference	Distance to Fannyside Muir	Bog	Recently improved pasture	Rough grassland	Old improved pasture	Main grass colour	Sward length	*Juncus* cover (%)	Flooding (temporary water)	Flooding (permanent water)	Stock (Sheep)	Stock (Horses and ponies)	Post & Wire	Hedged boundary	Tree'd bounded (forestry)	Wooded boundary	Drystane dyke	Watercourse	Waterbody	Former railway line	Road	Track	No boundary	Scrub	Farm buildings	Buildings	Heather Moor	Opencast
48J	NS821752	2140	1	0	1	0	B	Long	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
83	NS829745	2570	0	0	0	1	B	Long	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
77	NS802741	0	1	0	0	0	B	Long	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
39	NS810743	721	1	0	0	0	B	Long	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
76	NS797740	707	1	0	0	0	B	Long	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
294A	NS820736	1627	1	0	0	0	B	Long	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
60	NS810758	1992	0	0	0	0	B	Long	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
78	NS795736	948	0	0	1	0	Y	Long	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
347	NS798765	2668	0	0	1	0	Y	Long	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
356	NS816764	2773	0	0	0	1	YG	Long	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
53A	NS813758	2102	0	0	1	0	Y	Long	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
40	NS818743	1456	0	0	0	1	Y	Medium	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
48G	NS820756	2334	0	0	0	1	YG	Medium	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
123	NS842744	3832	0	0	0	1	G	Short	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
58	NS806755	1612	0	0	0	1	YG	Short	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
240A	NS863730	5968	0	0	0	1	YG	Short	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
272	NS842743	3820	0	0	0	1	YG	Short	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
273	NS843741	3905	0	0	0	1	YG	Short	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
277	NS841739	3700	0	0	0	1	YG	Short	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
280	NS836740	3201	0	0	0	1	YG	Short	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
283	NS834739	3000	0	0	0	1	YG	Short	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
292	NS821737	1711	0	0	0	1	YG	Short	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
329	NS882730	7851	0	0	0	1	YG	Short	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
330	NS884731	8039	0	0	0	1	YG	Short	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
33	NS812740	806	0	1	0	0	YG	Short	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
34	NS813741	921	0	1	0	0	YG	Short	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
35	NS813740	905	0	1	0	0	YG	Short	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

										[Boundary type]																			
Field number	Grid reference	Distance to Fannyside Muir	Bog	Recently improved pasture	Rough grassland	Old improved pasture	Main grass colour	Sward length	*Juncus* cover (%)	Flooding (temporary water)	Flooding (permanent water)	Stock (Sheep)	Stock (Horses and ponies)	Post & Wire	Hedged boundary	Tree'd bounded (forestry)	Wooded boundary	Drystane dyke	Watercourse	Waterbody	Former railway line	Road	Track	No boundary	Scrub	Farm buildings	Buildings	Heather Moor	Opencast
36	NS813740	905	0	1	0	0	YG	Short	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
84	NS828746	2500	0	1	0	0	YG	Short	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
88	NS832748	2941	0	1	0	0	YG	Short	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
139	NS866741	6203	0	1	0	0	YG	Short	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
342	NS813771	3324	0	0	0	1	G	Short	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
275	NS841738	3701	0	0	0	1	YG	Short	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
62	NS807754	1529	0	0	0	1	YG	Short	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
51B	NS814758	2147	0	0	1	0	Y	Long	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24	NS810735	721	0	0	0	1	YG	Medium	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
146	NS865747	6152	0	0	0	1	YG	Medium	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
278	NS838741	3405	0	0	0	1	YG	Short	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
56	NS809756	1772	0	0	0	1	YG	Short	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
57	NS808756	1746	0	0	0	1	YG	Short	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
48I	NS823756	2549	0	0	1	1	Y	Long	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
294	NS818737	1414	0	0	0	1	YG	Short	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
312	NS829727	2773	1	0	1	0	B	Long	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
48F	NS820758	2483	0	0	1	0	Y	Long	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
149	NS871745	6726	0	0	0	1	YG	Medium	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
150	NS870741	6603	0	0	0	1	YG	Medium	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
295	NS815738	1104	0	0	0	1	YG	Short	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
25A	NS816736	1236	0	0	0	1	YG	Short	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
28	NS814735	1077	0	0	0	1	YG	Short	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
268	NS845741	4104	0	0	0	1	YG	Short	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
270	NS845743	4119	0	0	0	1	YG	Short	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
93A	NS832757	3328	0	0	1	0	B	Long	30	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
355	NS800723	1649	0	0	1	0	Y	Long	30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
86	NS834745	3059	0	1	0	0	G	Short	30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
274	NS840742	3612	0	0	0	1	YG	Short	30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18	NS805730	905	0	0	0	1	YG	Short	30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
185	NS889744	8514	0	0	0	1	YG	Short	30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

			[Boundary type																										]
Field number	Grid reference	Distance to Fannyside Muir	Bog	Recently improved pasture	Rough grassland	Old improved pasture	Main grass colour	Sward length	*Juncus* cover (%)	Flooding (temporary water)	Flooding (permanent water)	Stock (Sheep)	Stock (Horses and ponies)	Post & Wire	Hedged boundary	Tree'd bounded (forestry)	Wooded boundary	Drystane dyke	Watercourse	Waterbody	Former railway line	Road	Track	No boundary	Scrub	Farm buildings	Buildings	Heather Moor	Opencast
271	NS844743	4019	0	0	0	1	YG	Short	30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
288	NS829737	2507	0	0	0	1	YG	Short	30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81	NS825746	2213	0	1	0	0	YG	Short	30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
282	NS836737	3206	0	0	0	1	YG	Medium	40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
284	NS832738	2801	0	0	0	1	YG	Medium	40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
293	NS817734	1392	0	0	1	0	YG	Medium	40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
291	NS822741	1811	1	0	0	1	YG	Short	40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
265	NS848739	4400	0	0	0	1	YG	Short	40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
290	NS825735	2137	0	0	0	1	YG	Short	40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17	NS805728	1104	0	0	0	1	YG	Short	40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
85	NS831746	2789	0	0	0	1	YG	Long	50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
32	NS814738	1004	0	0	0	1	Y	Medium	50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
267	NS843739	3900	0	0	0	1	YG	Medium	50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
213	NS878735	7410	0	0	0	1	YG	Medium	50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
48E	NS817756	2140	0	0	1	1	YG	Short	50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
31	NS811739	700	0	0	1	1	YG	Short	50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
49	NS815753	1780	0	0	0	1	YG	Short	50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
89	NS834749	3162	0	0	0	1	YG	Short	50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
343	NS804765	2600	0	0	1	1	YG	Long	60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
353	NS801772	3313	0	0	0	1	YG	Long	60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
344	NS807761	2220	0	0	1	1	YG	Medium	60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
351	NS802770	3106	0	0	0	1	YG	Short	60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
54	NS811756	1838	0	0	0	1	YG	Short	60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
55	NS810756	1802	0	0	0	1	YG	Short	60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
290A	NS822737	1811	0	0	0	1	YG	Short	60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
348	NS795766	2846	0	0	0	1	YG	Short	60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
350	NS798768	2961	0	0	0	1	YG	Short	60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
352	NS803771	3201	0	0	0	1	YG	Short	60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
346	NS800766	2729	0	0	1	0	YG	Short	60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
289	NS832735	2828	0	0	1	0	YG	Long	70	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

			[Boundary type]																										
Field number	Grid reference	Distance to Fannyside Muir	Bog	Recently improved pasture	Rough grassland	Old improved pasture	Main grass colour	Sward length	*Juncus* cover (%)	Flooding (temporary water)	Flooding (permanent water)	Stock (Sheep)	Stock (Horses and ponies)	Post & Wire	Hedged boundary	Tree'd bounded (forestry)	Wooded boundary	Drystane dyke	Watercourse	Waterbody	Former railway line	Road	Track	No boundary	Scrub	Farm buildings	Buildings	Heather Moor	Opencast
37	NS816739	1200	0	0	0	1	YG	Medium	70	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23	NS809734	707	0	0	0	1	YG	Medium	70	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
43	NS816745	1341	0	0	0	1	YG	Medium	70	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
38	NS815742	1140	0	0	0	1	YG	Medium	70	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22	NS809733	781	0	0	0	1	YG	Medium	70	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
266	NS845739	4100	0	0	0	1	YG	Medium	70	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
48H north	NS824758	2758	0	0	1	1	YG	Short	70	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
48H south	NS821754	2267	0	0	1	1	YG	Short	70	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
80M	NS823748	2102	0	0	0	1	YG	Short	70	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
340	NS813766	2846	0	0	0	1	YG	Short	70	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
44	NS818746	1565	0	0	0	1	YG	Short	70	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
349	NS797767	2886	0	0	0	1	YG	Short	70	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
341	NS813769	3132	0	0	1	1	Y	Long	80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
90	NS836749	3352	0	0	1	0	Y	Long	80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
30	NS809737	538	0	0	1	1	YG	Long	80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
52	NS812754	1700	0	0	0	1	Y	Long	80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
121	NS848746	4455	0	0	0	1	G	Short	80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
122	NS844745	4044	0	0	0	1	G	Short	80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
46L	NS821748	1923	0	0	0	1	YG	Short	80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
47	NS819748	1749	0	0	0	1	YG	Short	80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
296	NS809716	2353	0	0	0	1	YG	Short	80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
26	NS820727	2000	0	0	0	1	Y	Long	90	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
82	NS825743	2137	1	0	1	0	Y	Long	90	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19	NS808731	894	0	0	1	0	Y	Long	90	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
27	NS813734	1029	0	0	1	0	Y	Long	90	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
80N	NS824749	2236	0	0	1	1	YG	Long	90	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21	NS806734	538	0	0	1	1	YG	Medium	90	0	25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
279	NS837745	3354	0	0	0	1	YG	Medium	90	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
51C	NS814757	2059	0	0	0	1	Y	Medium	90	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
79	NS821746	1838	0	0	0	1	YG	Short	90	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

										[Boundary type]																			
Field number	Grid reference	Distance to Fannyside Muir	Bog	Recently improved pasture	Rough grassland	Old improved pasture	Main grass colour	Sward length	*Juncus* cover (%)	Flooding (temporary water)	Flooding (permanent water)	Stock (Sheep)	Stock (Horses and ponies)	Post & Wire	Hedged boundary	Tree'd bounded (forestry)	Wooded boundary	Drystane dyke	Watercourse	Waterbody	Former railway line	Road	Track	No boundary	Scrub	Farm buildings	Buildings	Heather Moor	Opencast
41	NS820740	1603	0	0	0	1	YG	Short	90	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
53B	NS812757	1969	0	0	0	1	YG	Short	90	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
29	NS812737	824	0	1	0	0	YG	Short	95	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
48D	NS817758	2302	0	0	1	0	Y	Long	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
46K	NS820749	1886	0	0	1	0	Y	Long	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
25	NS813736	948	0	0	0	1	YG	Short	50	0	0	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
87	NS834747	3104	0	0	0	1	YG	Short	20	0	0	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
357	NS817771	3453	0	1	0	0	YG	Short	0	0	0	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
354	NS799771	3238	0	0	0	1	YG	Medium	70	0	0	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
91	NS840751	3794	0	0	0	1	YG	Short	1	0	0	19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
45	NS820745	1708	0	0	0	1	YG	Short	80	0	0	50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
42	NS822744	1868	1	0	0	1	Y	Short	90	0	0	62	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
339B	NS827768	3701	0	0	0	1	Y	Short	20	0	0			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
334	NS831767	3889	0	0	0	1	Y		60	0	0			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
335	NS832769	4103	0	0	0	1	Y		60	0	0			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
333	NS829767	3753	0	0	0	1	Y		60	0	0			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
336	NS838767	4404	0	0	0	1	Y		70	0	0			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
171	NS832763	3687	0	0	0	1	Y	Long		0	0			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
93B	NS835761	3801	1	0	1	0	Y	Long		0	0			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
173	NS828762	3324	0	0	0	1	Y			0	0			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
325	NS830765	3676	0	0	0	1	Y			0	0			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
326	NS832765	3820	0	0	0	1	Y			0	0			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
324	NS828765	3538	0	0	0	1	Y			0	0			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
323	NS827764	3397	0	0	0	1	Y			0	0			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
172	NS830762	3471	0	0	0	1	Y			0	0			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
339A	NS826770	3801	0	0	0	1	Y			0	0			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
337	NS836768	4318	0	0	0	1	G	Short		0	0			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
327	NS835768	4244	0	0	0	1	Y	Short		0	0			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
338	NS830770	4045	0	0	0	1	Y	Short		0	0			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
170B	NS836764	4060	0	0	0	1	YG	Short		0	0			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

										[Boundary type]																			
Field number	Grid reference	Distance to Fannyside Muir	Bog	Recently improved pasture	Rough grassland	Old improved pasture	Main grass colour	Sward length	*Juncus* cover (%)	Flooding (temporary water)	Flooding (permanent water)	Stock (Sheep)	Stock (Horses and ponies)	Post & Wire	Hedged boundary	Tree'd bounded (forestry)	Wooded boundary	Drystane dyke	Watercourse	Waterbody	Former railway line	Road	Track	No boundary	Scrub	Farm buildings	Buildings	Heather Moor	Opencast
170A	NS835765	4045	0	0	0	1	YG	Short		0	0			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
202	NS890735	8609	0	1	0	0	G	Short	0	0	0	10	0	0	0	0	1	0	0	0	0	1	0	0	0	1	0	0	0
98	NS845754	4365	0	0	0	1	YG	Short	0	0	0	0	0	1	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0
276	NS845736	4110	0	0	0	1	YG	Short	30	0	0	0	0	1	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0
223	NS876739	7200	0	1	0	0			0	0	0	0	0	1	1	0	1	0	1	0	0	0	0	0	0	0	0	0	0
143	NS868742	6407	0	1	0	0	YG	Short	0	0	0	70	0	1	1	0	1	0	1	0	0	0	0	0	0	0	0	0	0
226	NS873738	6900	0	0	1	0	Y	Long	0	0	0	0	0	1	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0
134A	NS862739	5800	0	0	0	1	YG	Short	40	1	0	0	0	1	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0
306	NS823722	2549	0	1	0	0	YG	Short	50	0	0	0	0	1	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0
13A	NS800723	1649	0	0	1	0	Y	Long	90	0	0	0	0	1	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0
248	NS859738	5500	0	0	0	1	YG	Short	90	40	0	0	0	1	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0
232	NS868730	6462	0	0	0	1	YG	Short	95	0	0	0	0	1	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0
255	NS847736	4310	0	0	0	1	YG	Short	0	0	0	22	0	1	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0
152	NS873743	6911	0	1	0	0	YG	Short	0	0	0	28	0	1	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0
242	NS863736	5907	0	1	1	0	Y	Long		10	0	30	0	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0
159	NS878746	7433	0	0	0	1	YG	Short	0	0	0	0	0	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0
190	NS889738	8500	0	1	0	0	G	Short	0	1	0	60	0	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0
345	NS804768	2900	0	0	1	0	YG	Long	0	0	0	0	0	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0
154	NS874748	7057	0	0	1	0	Y	Long	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0
9	NS818722	2202	0	1	0	0	YG	Short	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0
259	NS846734	4229	0	0	1	0	Y	Long	90	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0
264A	NS850743	4617	0	0	0	1	YG	Short	0	0	0	0	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0
240	NS864732	6040	0	0	0	1	YG	Short	0	0	0	0	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0
166D	NS860747	5656	0	0	0	1	YG	Short	40	0	0	0	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0
166G	NS858750	5510	0	0	0	1	YG	Short	60	0	0	0	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0
182	NS885743	8109	0	0	0	1	G	Short	40	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
166C	NS862748	5869	0	0	0	1	YG	Short	40	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
166A	NS862752	5943	0	0	0	1	YG	Short	50	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
166E	NS859746	5544	0	0	0	1	YG	Short	50	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
241	NS864733	6029	0	0	0	1	YG	Long	90	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0

																	[Boundary type]												
Field number	Grid reference	Distance to Fannyside Muir	Bog	Recently improved pasture	Rough grassland	Old improved pasture	Main grass colour	Sward length	*Juncus* cover (%)	Flooding (temporary water)	Flooding (permanent water)	Stock (Sheep)	Stock (Horses and ponies)	Post & Wire	Hedged boundary	Tree'd bounded (forestry)	Wooded boundary	Drystane dyke	Watercourse	Waterbody	Former railway line	Road	Track	No boundary	Scrub	Farm buildings	Buildings	Heather Moor	Opencast
166B	NS862750	5903	0	0	0	1	YG	Short	0	0	0	30	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
305	NS821722	2404	0	1	0	0	YG	Short	0	0	0	50	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
285A	NS834743	3026	0	0	0	1	YG	Short	50	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
230	NS866734	6220	0	0	0	1	YG	Short	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
166F	NS858748	5474	0	0	0	1	YG	Short	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
129	NS858744	5423	0	0	0	1	YG	Short	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
222	NS874733	7025	0	0	1	0	Y	Long	40	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
197	NS896746	9226	0	0	0	1	G	Short	90	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
163	NS865750	6198	0	1	0	0	YG	Short	0	0	0	54	0	1	1	0	1	0	1	0	0	1	0	0	0	0	0	0	0
153	NS873741	6902	0	1	0	0	YG	Short	0	0	0	0	0	1	0	0	1	0	1	0	0	1	0	0	0	0	0	0	0
188	NS888739	8400	0	0	0	1	YG	Short	1	0	0	0	0	1	0	0	1	0	1	0	0	1	0	0	0	0	0	0	0
321	NS842727	3984	1	0	0	1	YG	Short	60	0	0	0	0	1	0	0	1	0	1	0	0	1	0	0	0	0	0	0	0
328	NS881730	7752	0	0	0	1	YG	Short	1	0	0	21	0	1	0	0	1	0	1	0	0	1	0	0	0	0	0	0	0
304	NS821720	2549	0	0	1	1	Y	Long	90	0	0	0	0	1	1	0	0	0	1	0	0	1	0	0	0	0	0	0	0
307	NS825720	2831	0	1	0	0	YG	Short	50	0	0	21	0	1	1	0	0	0	1	0	0	1	0	0	0	0	0	0	0
251	NS850734	4627	0	0	0	1	YG	Short	0	5	0	24	0	1	1	0	0	0	1	0	0	1	0	0	0	0	0	0	0
263	NS847730	4393	0	0	0	1	G	Short	0	0	0	0	0	1	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0
214	NS867733	6328	0	0	0	1	YG	Medium	50	0	0	0	0	1	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0
14	NS811729	1220	1	0	1	0	Y	Long	90	0	0	0	0	1	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0
249	NS857737	5303	0	0	0	1	YG	Short	90	0	0	30	0	1	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0
94	NS840754	3900	0	0	0	1	YG	Short	0	0	0	0	0	1	0	1	1	0	0	0	0	1	0	0	0	0	0	0	0
183	NS887743	8309	0	0	0	1	G	Short	30	0	0	0	0	1	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0
156	NS876746	7233	0	0	0	1	Y	Medium	0	0	0	0	0	1	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0
157	NS876744	7217	0	0	0	1	G	Short	0	0	0	0	0	1	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0
141	NS866744	6220	0	1	0	0	YG	Short	0	0	0	0	0	1	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0
147	NS867748	6363	0	1	0	0	YG	Short	0	0	0	0	0	1	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0
165	NS865752	6236	0	1	0	0	YG	Short	0	0	0	0	0	1	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0
140	NS865743	6113	0	0	0	1	YG	Short	2	0	0	0	0	1	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0
198	NS898741	9402	0	1	0	0	G	Short	5	0	0	0	0	1	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0
196	NS897743	9308	0	1	0	0	YG	Short	5	0	5	0	0	1	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0

			[Boundary type]																										
Field number	Grid reference	Distance to Fannyside Muir	Bog	Recently improved pasture	Rough grassland	Old improved pasture	Main grass colour	Sward length	*Juncus* cover (%)	Flooding (temporary water)	Flooding (permanent water)	Stock (Sheep)	Stock (Horses and ponies)	Post & Wire	Hedged boundary	Tree'd bounded (forestry)	Wooded boundary	Drystane dyke	Watercourse	Waterbody	Former railway line	Road	Track	No boundary	Scrub	Farm buildings	Buildings	Heather Moor	Opencast
15	NS807729	1044	0	0	1	0	Y	Long	50	0	0	0	0	1	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0
245	NS861730	5770	0	0	0	1	YG	Medium	70	0	0	0	0	1	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0
92	NS836748	3324	0	0	0	1	YG	Short	70	0	0	0	0	1	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0
239	NS864731	6053	0	0	0	1	YG	Short	90	0	0	0	0	1	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0
161	NS880743	7610	0	0	0	1	Y	Short	100	0	0	0	0	1	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0
264	NS847742	4310	0	0	0	1	YG	Short	0	0	0	10	0	1	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0
133	NS859740	5500	0	0	0	1	YG	Short	0	0	0	30	0	1	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0
120	NS847746	4356	0	0	1	1	YG	Short	40	0	0	40	0	1	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0
119	NS852749	4903	0	0	0	1	YG	Short	0	0	0	100	0	1	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0
194	NS894740	9000	0	1	0	0	G	Short	0	0	0	0	0	1	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0
215	NS876735	7211	0	1	0	0	YG	Short	0	0	0	0	0	1	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0
181	NS885745	8122	0	0	0	1	G	Short	40	0	0	0	0	1	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0
95	NS844754	4272	0	0	0	1	YG	Short	10	0	0	0	0	1	1	1	0	0	0	0	0	1	0	0	0	0	0	0	0
285B	NS834741	3006	1	0	0	1	YG	Short	70	0	0	0	0	1	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0
110A	NS852759	5200	1	0	0	0				0	0	0	0	1	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0
117	NS866755	6403	1	0	0	0				0	15	6	6	1	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0
184	NS890745	8620	0	0	0	1	G	Short	30	0	0	7	0	1	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0
189	NS890740	8600	0	1	0	0	G	Short	0	0	0	0	0	1	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0
193	NS893740	8900	0	1	0	0	G	Short	0	0	0	0	0	1	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0
195	NS896741	9202	0	1	0	0	G	Short	0	0	0	0	0	1	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0
97	NS846753	4427	0	0	0	1	YG	Short	0	0	0	0	0	1	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0
101	NS848750	4535	0	0	0	1	YG	Short	40	0	0	0	0	1	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0
124	NS855748	5178	0	1	0	1	YG	Short	50	0	0	0	0	1	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0
287	NS825738	2102	0	1	0	0	YG	Short	50	0	0	16	0	1	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0
254	NS847733	4341	0	0	0	1	YG	Short	0	0	0	24	0	1	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0
130	NS858742	5408	0	0	0	1	YG	Short	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
131	NS860744	5622	0	0	0	1	YG	Short	1	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
287B	NS829739	2500	0	1	0	0	YG	Short	10	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
246A	NS860734	5622	0	0	0	1	YG	Short	20	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
287A	NS828741	2408	0	1	0	0	YG	Short	20	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0

										[Boundary type]																			
Field number	Grid reference	Distance to Fannyside Muir	Bog	Recently improved pasture	Rough grassland	Old improved pasture	Main grass colour	Sward length	*Juncus* cover (%)	Flooding (temporary water)	Flooding (permanent water)	Stock (Sheep)	Stock (Horses and ponies)	Post & Wire	Hedged boundary	Tree'd bounded (forestry)	Wooded boundary	Drystane dyke	Watercourse	Waterbody	Former railway line	Road	Track	No boundary	Scrub	Farm buildings	Buildings	Heather Moor	Opencast
99	NS842747	3883	0	0	0	1	YG	Short	70	0	1	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
126	NS855745	5135	0	0	0	1	YG	Short	80	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
178	NS891746	8728	0	0	0	1	Y	Long	100	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
206	NS883734	7915	0	0	0	1	YG	Short	2	0	0	0	0	1	0	0	1	0	1	0	1	0	0	0	0	0	0	0	0
234	NS873731	6946	0	0	0	1	YG	Medium	60	0	0	0	0	1	0	0	1	0	1	0	1	0	0	0	0	0	0	0	0
229	NS867737	6303	0	0	0	1	YG	Short	60	0	0	0	0	1	0	0	1	0	1	0	1	0	0	0	0	0	0	0	0
150A	NS869739	6500	0	0	1	0	YG	Medium	90	0	0	0	0	1	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0
138	NS865740	6100	0	0	0	1	YG	Short	95	0	0	0	0	1	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0
208	NS882732	7831	0	1	0	0	G	Short	0	0	0	25	0	1	1	0	1	0	0	0	1	0	0	0	0	0	0	0	0
231	NS871733	6726	0	0	0	1	YG	Short	0	0	0	0	0	1	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0
233	NS870730	6661	0	0	0	1	YG	Short	5	0	0	0	0	1	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0
137	NS864742	6007	0	0	0	1	YG	Short	10	0	0	0	0	1	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0
207	NS884732	8030	0	1	0	0	G	Short	0	0	0	25	0	1	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0
232A	NS869732	6537	0	0	0	1	YG	Short	5	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
167	NS881750	7778	0	0	0	1	YG	Medium	40	0	50	0	0	1	1	0	0	0	1	0	0	1	0	0	1	0	0	1	0
180	NS888748	8448	0	0	0	1	YG	Medium	100	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	1	0	0	1	0
13	NS802727	1216	1	0	1	0	Y	Long	80	0	0	0	0	1	1	0	1	0	1	1	0	0	0	0	0	0	1	0	0
228	NS870736	6606	0	1	0	0	YG	Short	0	0	0	0	0	1	0	0	0	1	1	0	1	1	0	1	0	1	0	0	0
235	NS875730	7156	0	0	0	1	YG	Short	0	0	0	0	0	1	0	0	1	0	0	0	1	0	0	1	0	1	0	0	0
203	NS889733	8521	0	1	0	0	G	Short	0	0	0	9	0	1	1	0	0	0	1	0	1	1	0	0	0	1	0	0	0
136	NS863743	5913	0	0	0	1	YG	Short	0	0	0	0	0	1	1	0	1	0	0	0	1	1	0	0	0	1	0	0	0
231A	NS871733	6726	0	0	0	1	G	Short	5	0	0	0	0	1	0	0	1	0	0	0	1	1	0	0	0	1	0	0	0
205	NS886733	8221	0	1	0	0	YG	Short	0	1	0	0	0	1	1	0	0	0	0	0	1	1	0	0	0	1	0	0	0
257	NS842731	3883	0	0	0	1	YG	Short		0	0	0	0	1	0	1	1	0	1	0	0	1	0	0	0	1	0	0	0
332	NS884728	8075	0	1	0	0	YG	Short	0	0	0	34	0	1	1	0	1	0	1	0	0	1	0	0	0	1	0	0	0
105	NS849754	4743	0	0	0	1	YG	Short	20	0	0	0	0	1	0	0	1	0	1	0	0	1	0	0	0	1	0	0	0
252	NS853735	4916	0	0	0	1	YG	Short	40	0	0	0	0	1	0	0	0	0	1	0	0	1	0	0	0	1	0	0	0
247	NS859736	5508	0	0	0	1	YG	Short	90	1	0	0	0	1	0	0	0	0	1	0	0	1	0	0	0	1	0	0	0
331	NS886731	8238	0	0	0	1	YG	Short	2	0	0	14	0	1	0	0	0	0	1	0	0	1	0	0	0	1	0	0	0
106	NS850754	4838	0	0	0	1	YG	Short	0	0	0	0	0	1	1	1	1	0	0	0	0	1	0	0	0	1	0	0	0

			[Boundary type																										]
Field number	Grid reference	Distance to Fannyside Muir	Bog	Recently improved pasture	Rough grassland	Old improved pasture	Main grass colour	Sward length	*Juncus* cover (%)	Flooding (temporary water)	Flooding (permanent water)	Stock (Sheep)	Stock (Horses and ponies)	Post & Wire	Hedged boundary	Tree'd bounded (forestry)	Wooded boundary	Drystane dyke	Watercourse	Waterbody	Former railway line	Road	Track	No boundary	Scrub	Farm buildings	Buildings	Heather Moor	Opencast
322	NS846728	4341	0	0	0	1	YG	Short	40	0	0	0	0	1	1	0	1	0	0	0	0	1	0	0	0	1	0	0	0
132A	NS855739	5100	0	0	0	1	YG	Short	0	0	0	0	0	1	0	0	1	0	0	0	0	1	0	0	0	1	0	0	0
145	NS865746	6140	0	1	0	0	YG	Short	0	0	0	0	0	1	0	0	1	0	0	0	0	1	0	0	0	1	0	0	0
199	NS900742	9604	0	0	0	1	Y	Medium	5	0	0	0	0	1	0	0	1	0	0	0	0	1	0	0	0	1	0	0	0
250	NS852731	4866	0	0	0	1	YG	Short	40	0	0	0	0	1	0	0	1	0	0	0	0	1	0	0	0	1	0	0	0
164	NS867750	6395	0	0	1	0	Y	Long	60	0	0	0	0	1	0	0	1	0	0	0	0	1	0	0	0	1	0	0	0
221	NS873734	6918	0	1	0	0	G	Short	0	0	0	32	0	1	0	0	1	0	0	0	0	1	0	0	0	1	0	0	0
135	NS863746	5941	0	0	0	1	YG	Short	20	0	0	50	0	1	0	0	1	0	0	0	0	1	0	0	0	1	0	0	0
107	NS852754	5028	0	1	0	0	YG	Short	50	0	0	27	0	1	1	1	0	0	0	0	0	1	0	0	0	1	0	0	0
200	NS900743	9608	0	1	0	0	YG	Medium	0	0	0	0	0	1	1	0	0	0	0	0	0	1	0	0	0	1	0	0	0
192	NS892739	8800	0	1	0	0	G	Short	0	0	0	0	0	1	1	0	0	0	0	0	0	1	0	0	0	1	0	0	0
134	NS861742	5707	0	0	0	1	YG	Short	0	0	0	0	0	1	1	0	0	0	0	0	0	1	0	0	0	1	0	0	0
187	NS889741	8502	0	0	0	1	YG	Short	20	0	0	0	0	1	1	0	0	0	0	0	0	1	0	0	0	1	0	0	0
118	NS854751	5141	0	0	1	0	Y	Long	90	0	0	0	0	1	1	0	0	0	0	0	0	1	0	0	0	1	0	0	0
102	NS848753	4617	0	0	0	1	YG	Short	90	0	0	0	0	1	1	0	0	0	0	0	0	1	0	0	0	1	0	0	0
100	NS843750	4052	0	0	0	1	YG	Short	70	0	0	18	0	1	1	0	0	0	0	0	0	1	0	0	0	1	0	0	0
132	NS856740	5200	0	0	0	1	YG	Short	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0
286	NS831740	2701	0	1	0	0	G	Short	30	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0
128	NS855741	5103	0	0	0	1	YG	Short	40	0	0	40	0	1	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0
260	NS851737	4704	0	0	0	1	G	Short	0	0	0	15	0	1	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0
253	NS852738	4801	0	0	0	1	G	Short	30	0	0	0	0	1	1	0	1	0	0	0	0	0	0	0	0	1	0	0	0
191	NS891737	8702	0	1	0	0	YG	Short	0	0	0	8	0	1	1	0	1	0	0	0	0	0	0	0	0	1	0	0	0
256	NS846732	4257	0	0	0	1	YG	Short	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0
261	NS849738	4501	0	0	0	1	G	Short	10	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0
16	NS806728	1118	0	0	0	1	Y	Short	60	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0
246	NS858734	5423	0	0	0	1	YG	Short	60	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0
243	NS861732	5742	0	0	0	1	YG	Short	90	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0
186	NS891744	8714	0	0	0	1	G	Short	30	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
114	NS859761	5923	0	0	0	1	YG	Short	40	0	0	0	0	1	0	0	1	0	0	0	0	1	0	1	1	0	0	0	0
113	NS857760	5700	0	0	0	1	YG	Short	40	0	0	0	0	1	1	0	1	0	0	0	0	1	0	0	1	0	0	0	0

																	[Boundary type]												
Field number	Grid reference	Distance to Fannyside Muir	Bog	Recently improved pasture	Rough grassland	Old improved pasture	Main grass colour	Sward length	*Juncus* cover (%)	Flooding (temporary water)	Flooding (permanent water)	Stock (Sheep)	Stock (Horses and ponies)	Post & Wire	Hedged boundary	Tree'd bounded (forestry)	Wooded boundary	Drystane dyke	Watercourse	Waterbody	Former railway line	Road	Track	No boundary	Scrub	Farm buildings	Buildings	Heather Moor	Opencast
155	NS876748	7256	0	0	1	0	Y	Long	0	0	0	0	0	1	0	0	1	0	0	0	0	1	0	0	1	0	0	0	0
109	NS856757	5502	0	0	0	1	YG	Short	70	1	0	35	0	1	1	1	0	0	0	0	0	1	0	0	1	0	0	0	0
110	NS853754	5124	0	0	0	1	YG	Short	20	0	0	9	0	1	1	0	0	0	0	0	0	1	0	0	1	0	0	0	0
201	NS888736	8405	0	1	0	0	G	Short	0	0	0	40	0	1	1	0	1	0	1	0	0	1	0	0	0	0	0	0	1
210	NS877731	7343	0	0	0	1	YG	Short	10	0	0	0	0	1	1	0	1	0	0	0	1	1	0	1	0	0	0	0	0
219	NS875736	7106	0	1	0	0	YG	Short	0	0	0	0	0	1	0	0	1	1	1	0	0	1	0	1	0	0	0	0	0
218	NS876737	7202	0	1	0	0	YG	Short	0	0	0	0	0	1	0	0	0	1	1	0	0	1	0	1	0	0	0	0	0
144	NS869744	6519	0	0	0	1	YG	Medium	60	0	0	26	0	1	0	0	1	1	0	0	0	1	0	1	0	0	0	0	0
142	NS866744	6220	0	1	0	0	YG	Short	1	0	0	0	0	1	1	0	1	0	0	0	0	1	0	1	0	0	0	0	0
225	NS880741	7602	0	0	0	1	YG	Medium	90	0	0	100	0	1	0	0	1	0	0	0	0	1	0	1	0	0	0	0	0
104	NS846756	4531	0	0	0	1	YG	Short	0	0	0	0	0	1	0	0	1	1	1	0	0	0	0	1	0	0	0	0	0
227	NS871736	6706	0	1	0	0	YG	Short	0	0	0	0	0	1	0	0	1	1	1	0	0	0	0	1	0	0	0	0	0
103	NS847754	4554	0	0	0	1	YG	Short	0	0	0	0	0	1	0	0	0	1	1	0	0	0	0	1	0	0	0	0	0
217	NS881738	7700	0	0	0	1	YG	Medium	80	0	0	0	0	1	0	0	1	0	1	0	0	0	0	1	0	0	0	0	0
162	NS882741	7802	0	0	0	1	YG	Long	80	0	0	100	0	1	0	0	1	0	1	0	0	0	0	1	0	0	0	0	0
216	NS881736	7705	0	0	0	1	YG	Medium	80	0	5	0	0	1	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0
224	NS878740	7400	0	0	0	1	YG	Medium	70	0	0	100	0	1	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0
8	NS817725	1910	0	0	0	0	Y	Long	70	0	0	0	0	1	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0
204	NS886735	8209	0	1	0	0	YG	Short	1	1	0	0	0	1	1	0	1	0	1	0	1	1	0	0	0	0	0	0	0
238	NS868727	6511	0	0	0	1	YG	Short	0	0	0	0	4	1	0	0	1	0	1	0	1	1	0	0	0	0	0	0	0
212	NS879733	7523	0	0	0	1	Y	Long	10	0	0	0	0	1	0	0	1	0	1	0	1	1	0	0	0	0	0	0	0
211	NS876732	7233	0	0	0	1	YG	Short	50	0	0	0	0	1	0	0	1	0	1	0	1	1	0	0	0	0	0	0	0
1	NS812717	2340	0	0	0	1	Y	Short	0	0	0	16	0	1	1	1	1	0	0	0	1	1	0	0	0	0	0	0	0
236	NS873729	6972	0	0	0	1	YG	Medium	0	0	0	0	5	1	0	0	1	0	0	0	1	1	0	0	0	0	0	0	0
237	NS872729	6873	0	0	0	1	YG	Short	0	0	0	0	0	1	0	0	1	0	0	0	1	1	0	0	0	0	0	0	0
209	NS880732	7632	0	0	0	1	YG	Short	15	0	0	0	0	1	0	0	1	0	0	0	1	1	0	0	0	0	0	0	0
220	NS873736	6906	0	0	0	1	YG	Medium	0	0	0	0	0	1	0	0	1	1	1	0	0	1	0	0	0	0	0	0	0
151	NS873745	6926	0	1	0	0	YG	Short	0	0	0	40	0	1	0	0	1	1	1	0	0	1	0	0	0	0	0	0	0
303	NS820719	2561	0	1	0	0	YG	Short	0	0	0	25	0	1	1	1	1	0	1	0	0	1	0	0	0	0	0	0	0
320	NS839725	3769	0	0	0	1	G	Short	0	0	0	40	0	1	0	1	1	0	1	0	0	1	0	0	0	0	0	0	0

														[Boundary type														]	
Field number	Grid reference	Distance to Fannyside Muir	Bog	Recently improved pasture	Rough grassland	Old improved pasture	Main grass colour	Sward length	*Juncus* cover (%)	Flooding (temporary water)	Flooding (permanent water)	Stock (Sheep)	Stock (Horses and ponies)	Post & Wire	Hedged boundary	Tree'd bounded (forestry)	Wooded boundary	Drystane dyke	Watercourse	Waterbody	Former railway line	Road	Track	No boundary	Scrub	Farm buildings	Buildings	Heather Moor	Opencast
319	NS838728	3573	0	0	0	1	G	Short	80	0	0	50	0	1	0	1	1	0	1	0	0	1	0	0	0	0	0	0	0
158	NS876742	7206	0	1	0	0	G	Short	0	0	0	0	0	1	1	0	1	0	1	0	0	1	0	0	0	0	0	0	0
125	NS851745	4825	0	1	0	0	YG	Short	0	0	0	0	0	1	1	1	1	0	0	0	0	1	0	0	0	0	0	0	1
127	NS852742	4955	0	1	0	0	YG	Short	90	0	0	0	0	1	1	1	1	0	1	0	0	1	0	0	0	0	0	0	1
160	NS882747	8010	1	1	1	0	B	Short	0	0	0	0	0	1	0	0	0	0	0	1	0	1	0	0	1	0	0	1	0
188A	NS888739	8380	0	0	1	0	G	Short	30	0	0	10	0	1	0	1	0	0	1	0	0	1	0	0	0	0	0	0	0
262	NS854739	5150	0	1	0	0	YG	Short	40	0	0	0	0	1	0	1	1	0	1	0	0	1	0	0	0	0	0	0	1

Notes: The total number of fields detailed in this table is less than the overall number of 384 as those fields which are now in forestry, or have otherwise been, in effect, lost to the geese because of development, *etc*., have been discounted from the analysis. Some 44 fields are now in forestry and, further, fields 8 and 59 are now partially in forestry, (although included herein). 'Fields' 400 (West Fannyside Loch), 401 (East Fannyside Loch), 402 (Loch Elrig), 403 (Carron Valley), are actually water-bodies and as such aren't included here.

APPENDIX B: NOTES ON THE SURVEY OF THE SLAMANNAN PLATEAU BEAN GOOSE FIELDS IN LATE WINTER 2012-2013

These notes describe the approach used during the survey of the Slamannan Plateau bean goose fields that was completed during late winter 2012/2013.

They include an outline of the ways in which different field characteristics were defined and described, including, in particular, those of field boundaries.

B.1 Survey approach

Between 10 January and 20 March 2013 all 384 fields on the Slamannan Plateau which had previously been allocated a field-code as part of the ongoing monitoring of the bean geese flock were visited or viewed so that a set series of criteria could be visually assessed.

B.1.1 Field numbering system

For purposes of continuity, as it is the basis for all monitoring of the bean geese, the adoption and evolution of the field code system is initially described here, (for example, there are large similarities between the field survey exercise that was completed in January to March 2103 and that conducted in November 1993).

In addition, it is important for reasons of posterity that the work conducted in the early years is properly reported and credited.

In the winters immediately after the wintering population of bean geese was first discovered on the Slamannan Plateau in the late 1980s monitoring work conducted by John Simpson aimed to define the range of the birds by identifying the areas that they were using, as at this time this was unknown. In addition, this work was given further impetus by proposed developments on the Plateau, which included the opencast workings and a shooting school. In this context it was vital that data relating to the fields that were important to the birds was assembled so that potential conflicts could be highlighted; for example, this level of detail was required in relation to a public inquiry that was held at this time. This initial work is described more fully in the reports prepared by Simpson, (1990, 1991, 1992 and 1993)[2]. On occasions this work was supported by members of the Cumbernauld Bird Club, and subsequently AM also became an integral part of the overall effort.

As such, this vital initial work conducted between the winters of 1989/1990 and 1992/1993 accurately defined the range the birds were using at this time. In doing so, necessarily, the field numbering system was instigated. As suggested, field numbers were only allocated to those fields within which bean geese were recorded, so that at this time only 40 or so fields were numbered. These fields were accurately defined; field work was conducted to ensure that the current field boundaries were identified.

This initial work also highlighted the conservation status of the birds, and as a result, in 1993, the RSPB commissioned a study which was conducted by Trevor Smith. Before this study commenced a meeting was held at which John Simpson and AM briefed Ian Bainbridge, Mark O'Brien and Trevor Smith in relation to what was then known about the bean geese.

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[2] Simpson, J. G., 1993, *Bean Geese* (Anser fabalis fabalis) *in Scotland 1992-1993,* Simpson, J. G., 1992, *Bean Goose* (Anser fabalis fabalis) *records season 1991-1992*, Simpson, J. G., 1991, *Bean Geese. Winter Report 1990*-91, and Simpson, J. G., 1990, *Bean Geese. A population and distribution study, Winter 1989-90.* Unpublished reports.

As such, although the study conducted by Smith had different aims to the initial work which had been conducted by Simpson, necessarily it was strongly influenced by it, and as such the field numbering system was retained, (despite having been established for different reasons).

Further, although the existing field numbering system was adopted by the study conducted by Smith, it was obviously also developed as this progressed, (and extended to include all fields within what had became defined as the study area, whether these had previously been recorded as being used by the geese or not).

This is described in Smith, *et al*., (1994 and 1995)[3]. For example, in November 1993 the entire study area was carefully checked in the field for any changes in field boundaries relative to those indicated on the 1:25,000 Ordnance Survey Pathfinder maps for the area, and also for changes such as forestry felling or planting. Any amendments that were considered necessary were made to the maps and all open fields in the study area were then numbered. In addition to all fields, numbers were also allocated to all areas of muir, *etc*., and the three lochs. Built-up areas and forestry, woodland and shelterbelts, *etc*., were excluded.

This resulted in 324 individually numbered fields being created, (although four of these fields were subsequently excluded from the fieldwork in 1994/1995 as they were subject to opencast activities).

In addition, two other measures were used to enable the continuity and comparability of the various survey efforts. These were the allocation of six figure grid references for the centre of each field, and the inclusion of the comparable field number as allocated by Simpson, (although field boundaries changes did not always achieve a direct match between the two).

This numbering system was then used as the basis for all subsequent fieldwork, (both the work completed and described by Smith, *et al*., and by Simpson and Maciver and Maciver ever since). In principle, it remains the same, although there have been two ongoing developments. These involve additions and sub-divisions, as follows:

- Additions: as bean geese were progressively recorded using 'new' fields, the next number in the numerical sequence was allocated to this field; and,

- Sub-divisions: in some instances, such as large partially unenclosed muirs, *etc*., it proved useful to sub-divide the area involved. For example, the Garbethill Muir area, which was originally allocated the numbers 46, 48, 51, 53 and 80, was sub-divided into many smaller areas, (*e.g*., 46K, 48H, 51C and 80M), partly because the area was subject to an agri-environmental scheme aimed at improving the area for bean geese. As such, management prescriptions were devised for each agricultural unit, and the numbering system was revised accordingly.

Note, in terms of sub-divisions, different forms of suffix have been used at various times, (*e.g*., 13A, 13.1, 13a, *etc*.). As part of the current work it was decided that the correct format for all suffixes should be 287A (field-code plus capital letter) and not 287a (lower case) or 287.a or 287.A (dots); as such any historical anomalies were rationalised accordingly, with for example, 287.1 being changed to 287A, *etc*..

[3] Smith, T., Bainbridge, I., & O'Brien, M., 1995. *Distribution and Habitat Use by Bean Geese in the Slamannan Area. Second Year 1994/95.* Report to the Bean Goose Working Group / SNH. RSPB. 51pp and Smith, T., Bainbridge, I. & O'Brien, M., 1994. *Distribution and Habitat Use by Bean Geese in the Slamannan Area.* Report to SNH. RSPB. (Not entitled as such but relates to the first year, *i.e*. 1993/1994). 71pp

B.1.2 The 2013 Fieldwork

Site visits and / or vantage points were used to record a set series of characteristics for each individually numbered field unit.

Most of this field work was completed by AM, although a significant proportion of the visits were completed by both AM and BM.

The survey was completed during a ten week period during the same season by the same two observers.

During the later winter period in 2013, the conditions were reasonably consistent; for example, levels of wintering flooding were broadly similar on each survey visit. Further, for instance, BM accompanied AM on, amongst others, the first and last survey visits, and as such, during the survey visits efforts were made to ensure that some of the more subjective characteristics were recorded in reasonably consistent ways.

Before the survey commenced, survey criteria were established and both a survey field-sheet and a checklist of survey criteria were prepared. For the purposes of continuity, copies of these documents are included at the end of this appendix.

During the initial survey visits it became apparent that many fields on the Slamannan Plateau had complex boundaries. To facilitate recording of such details, it was decided that such boundaries should be noted in a systematic way. All boundaries were recorded, (and were then listed in the 'neat copy' documentation), in a set north-east-south-west sequence.

Subsequent to each survey visit, completed field-sheets were progressively converted into electronic versions in date identified WORD files. As part of this process, details were checked against the mapping detailing the field numbering system and remote imagery available on the Google website.

In some instances, the details of field characteristics were not just confirmed using this approach, rather, they were established. Such instances included areas of extensive open habitat such as Garbethill Muir and Darnrig Moss, recent extensive areas of forestry and 19 fields in the Beam Farm and Tippetcraig areas which could not be accessed.

Ultimately some 20 individual WORD files relating to each individual site visit were assembled into one overall WORD file incorporating all of the details recorded for each of the 384 fields during the field visits.

This WORD file was then used as the basis for creating a comprehensive EXCEL spreadsheet file containing the same information.

These notes are intended to facilitate the use of this data-base, and to ensure any further recording can be carried out to similar standards.

B.2 Details recorded and provided in the EXCEL spreadsheet

B.2.1 Field number

As suggested, the long-established field numbering system was used to ensure continuity of effort; the field numbers established as part of the ongoing bean goose monitoring work were used to identify each 'field' using reference maps.

Further, larger areas have often been sub-divided using a number / letter combination.

As this system has been used throughout the ~30 year period that monitoring of bean geese has been conducted this continuity was considered important.

However, the numbering system is not without its idiosyncrasies, and several minor corrections were necessary.

The current work, in effect, involved an 'audit' of the numbering system, and it was established that although numbers between 1 and 403 have been used, this includes sequences such as 48D – 48J, (but not 48A, 48B and 48C).

Further, it has been established that some 62 numbers between 1 and 403 have not been used, although 384 'fields' have been allocated a number or number-letter.

Table B.1 defines the details of all fields for which details were recorded during the fieldwork.

As can be seen, some 46, (12%), of these fields have been lost to forestry, (and some others have been lost for other reasons). Field / land units, 400, 401, 402 and 403 are all actually water-bodies and, further, 403 (Carron Valley) is not on the Slamannan Plateau, but is included for the sake of completion.

Despite these anomalies, the numbering system 'is what it is' and for the reasons of continuity already mentioned has to be persisted with, rather than rationalised or re-invented.

Finally, and again as has already been mentioned, certain 'fields' have been sub-divided during the monitoring programme to facilitate recording.

B.2.2 Grid reference

AM had previously manually allocated grid references to most of the fields. These grid references relate to the nominal centre of each field, and were established to facilitate the monitoring of field usage by the bean geese. However, this list wasn't comprehensive and also had become somewhat complicated because of sub-divisions, *etc*.. Therefore, BM used the automatic grid reference generating tool on the Multi Agency Geographic Information for the Countryside, (MAGIC), website[4] to determine a comprehensive series of grid references for all 384 fields.

Again, the nominal centre of each field was used as the basis for this.

Frequently these grid references corresponded with those contained in the list provided by AM. However, in some instances they differed. For reasons of continuity, Table B.2 includes details of both the new and the old grid references of all fields; where these are the same, just one grid reference is shown.

B.2.3 Notes

In many instances additional information was evident at the time of the survey which it was considered worthy of recording. This included past or current use of the field, signs of former runrig, any presence of geese at the time of the survey visit, *etc*.. Details of the amalgamation of fields were also recorded in the Notes section.

[4] http://magic.defra.gov.uk/MagicMap.aspx

Table B.1, Details of the fields for which details were verified during the fieldwork

No. range	Fields recorded	Field numbers which haven't been allocated / used
1 - 9	1, 9, ~~2, 3, 4, 5, 7 – all forestry~~, 8 - partially forestry	6
10 - 19	13, 13A, 14, 15, 16, 17, 18, 19, ~~10, 11, 12 – all forestry~~,	
20 - 29	20 - now farm buildings, *etc*., 21, 22, 23, 24, 25, 25A, 26, 27, 28, 29	
30 - 39	30, 31, 32, 33, 34, 35, 36, 37, 38, 39	
40 - 49	40, 41, 42, 43, 44, 45, 46K, 46L, 47, 48D, 48E, 48F, 48G, 48H, (north and south), 48I, 48J, 49	
50 - 59	50 - now farm buildings, *etc*., 51B, 51C, 52, 53A, 53B, 54, 55, 56, 57, 58, 59 - partially forestry	51
60 - 69	60, 62, ~~61, 63, 64, 65, 66, 67, 68, 69 – all forestry~~	
70 - 79	76, 77, 78, 79, ~~70, 71, 72, 73, 74, 75 – all forestry~~	
80 - 89	80M, 80N, 81, 82, 83, 84, 85, 86, 87, 88, 89	
90 - 99	90, 91, 92, 93A, *93B - Beam Farm*, 94, 95, 97, 98, 99	93, 96
100 - 109	100, 101, 102, 103, 104, 105, 106, 107, 109, ~~108 – forestry~~	
110 - 119	110, 110A, 113, 114, 117, 118, 119, ~~111, 112, 115, 116 – forestry~~	
120 - 129	120, 121, 122, 123, 124, 125, 126, 127, 128, 129	
130 - 139	130, 131, 132, 132A, 133, 134, 134A, 135, 136, 137, 138, 139	
140 - 149	140, 141, 142, 143, 144, 145, 146, 147, 149, ~~148 – forestry~~	
150 - 159	150, 150A, 151, 152, 153, 154, 155, 156, 157, 158, 159	
160 - 169	160, 161, 162, 163, 164, 165, 166A, 166B, 166C, 166D, 166E, 166F, 166G, 167	168, 169
170 - 179	*170A, 170B, 171, 172, 173 - all Beam Farm or Tippetcraig*, 178	170, 174, 175, 176, 177, 179
180 - 189	180, 181, 182, 183, 184, 185, 186, 187, 188, 188A, 189	
190 - 199	190, 191, 192, 193, 194, 195, 196, 197, 198, 199	
200 - 209	200, 201, 202, 203, 204, 205, 206, 207, 208, 209	
210 - 219	210, 211, 212, 213, 214, 215, 216, 217, 218, 219	
220 - 229	220, 221, 222, 223, 224, 225, 226, 227, 228, 229	
230 - 239	230, 231, 231A, 232, 232A, 233, 234, 235, 236, 237, 238, 239	
240 - 249	240, 240A, 241, 242, 243, 245, 246, 246A, 247, 248, 249	244
250 - 259	250, 251, 252, 253, 254, 255, 256, 257, 259	258
260 - 269	260, 261, 262, 263, 264, 264A, 265, 266, 267, 268	269
270 - 279	270, 271, 272, 273, 274, 275, 276, 277, 278, 279	
280 - 289	280, 282, 283, 284, 285A, 285B, 286, 287, 287A, 287B, 288, 289	281, 285, 287
290 - 299	290, 290A, 291, 292, 293, 294, 294A, 295, 296, ~~297, 298, 299 – all forestry~~	
300 - 309	303, 304, 305, 306, 307, ~~300, 301, 302, 308, 309 – all forestry~~	
310 - 319	312, 319, ~~310, 311, 313, 313A, 314, 315, 316, 317, 318 – all forestry~~	
320 - 329	320, 321, 322, *323, 324, 325, 326, 327 - all Beam Farm or Tippetcraig*, 328, 329	
330 - 339	331, 332, *333, 334, 335, 336, 337, 338, 339A, 339B - all Beam Farm or Tippetcraig*	330, 339
340 - 349	340, 341, 342, 343, 344, 345, 346, 347, 348, 349	
350 - 359	350, 351, 352, 353, 354, 355, 356, 357	358, 359
360 - 369		360, 361, 362, 363, 364, 365, 366, 367, 368, 369
370 - 379		370, 371, 372, 373, 374, 375, 376, 377, 378, 379
380 - 389		380, 381, 382, 383, 384, 385, 386, 387, 388, 389
390 - 399		390, 391, 392, 393, 394, 395, 396, 397, 398, 399
400 - 403	400 (West Fannyside Loch), 401 (East Fannyside Loch), 402 (Loch Elrig), 403 (Carron Valley)	
Totals	384	62

Notes

Fields struck through thus - ~~66~~ - became forestry during study period
Fields in italics thus - *173* - fields not visited as they are at Beam Farm / Tippetcraig

B.2.4 Date

The date on which the data relating to each field was recorded. All of the field work was completed between 10 January and 20 March 2013 but it was still considered appropriate to record the date.

B.2.5 Observers

All of the field work was completed by AM, or by AM and BM and was denoted as such.

B.2.6 Field details

The following categories were used; indeed these were included on the checklist of survey criteria. However, in many instances these categories were refined or some of the defined categories were not used. Where appropriate, this is noted.

B.2.6.1 Field type

- *Arable cereal; arable root crop; bog/moor; old improved pasture (OIP); recently improved pasture (RIP), rough grassland (RG).*

It was intended that 'recently' should relate to fields that have been ploughed and re-seeded, *etc*., within last 5 years or so, whereas 'old' relates to fields that have been ploughed and re-seeded, *etc*., prior to this, and 'rough grassland' relates to fields that have apparently not been ploughed, *etc*., during the period the BGAG have been undertaking work on the Plateau.

In the event, the vast majority of fields were categorised into either RIP or OIP, and recent was perhaps during the past 10 or 15 years.

B.2.6.2 Main grass colour

- *Brown (B); Yellow (Y); yellowy-green (Y-G); greeny-yellow (G-Y); green (G); very green (VG) e.g., bright highly-improved silage fields.*

As had been indicated prior to the survey, this, in particular, is subjective.

Therefore it was considered to be important to, if possible, be consistent when recording this feature, by, for example, using two observers, undertaking all assessments in broadly the same timeframe, *etc*.. This was generally achieved. Brown, yellow, yellowy-green and green were the only categories used.

B.2.6.3 Sward length

- *Short (<5cm) Medium (5-15cm) and Long (>15cm).*

This assessment of sward length was rather subjective and was based on visual estimation rather than any direct measurements. Sward length also varied within the same field unit especially in instances where the 'field' involved more than one habitat type, *e.g*., part improved pasture and part rough grassland.

Further, all assessments were done visually from nearby; closer examination was invariably not conducted. Also, and obviously, sward length will change with time of year and stocking levels; this was particularly noticeable in the instance of the Luckenburn fields where the

cannon netting was conducted in October 2012 and the sward length was long (>15cm) but by March 2013, after grazing by sheep, the sward height was much shorter.

B.2.6.4 *Juncus* cover (%)

An estimate of percentage *Juncus* cover for each field was provided, although again this was rather subjective and based on visual estimation rather than any direct measurements.

B.2.6.5 Flooding (Temporary water) and Flooding (Permanent water)

An assessment of evidence of temporary or permanent flooding within each field unit was undertaken and provided as a percentage of temporary water cover, or as a percentage of temporary water cover.

During the field work there was a tendency to concentrate on the presence of any flooding rather than the evidence of any flooding. For example, when Field 13A was visited, AM was able to identify that there had been a significant area of flooding within this field unit alongside the Upper River Avon, (which had been used by roosting bean geese), although the field was recorded as not being flooded at the time.

B.2.6.6 Domestic grazing animals

Details of the number and type of farm animals were recorded in most instances, although stocking levels were generally low, and only sheep and horses / ponies were recorded.

B.2.6.7 Boundary type

- *Post and Wire fence; Hedge; Treeline/Shelter Belt; Wall; Woodland (use this if more of a visual boundary than the Shelter Belt category); Open.*

In this instance it was intended to be as specific as possible, whilst not necessarily noting every individual boundary feature. For example, it was intended that if there were significant amounts of hedge along a boundary to provide a percentage for it, and, excepting for combinations of fences and hedges, to indicate if more than one type is present. In addition, it was intended to note that instances of where a woodland bordered a field and there was no fence present to record those as Woodland+Open as it is known that bean geese do venture into open woodland areas.

During the fieldwork and accompanying desktop study, the following types of boundary were recognised and used; in effect, the following are the definitions of the various boundary types adhered to.

Most boundaries involved some sort of fence.

1. **Post and wire** – was used in a generic sense to denote any fence comprised of post and wire not solely, but invariably agricultural ones. This was abbreviated as P & W, (and was used rather than Rylock).

As far as practicable, boundaries demarcated by trees and shrubs were differentiated from boundaries beyond which there are trees and shrubs.

The premise for this was that field boundaries which were demarcated by hedgerow shrub species, or along which trees have been incorporated or planted, were generally **boundaries that can be seen over or through.** Therefore, they were defined as either hedged or tree'd boundaries.

Table B.2. Details of both the old and new grid reference, etc., of the fields for which details were verified during the fieldwork

Field number	New grid reference	Old grid reference	Notes
1	NS812717	NS 813717	
2	NS816718		Now forestry
3	NS815719		Now forestry
4	NS817720		Now forestry
5	NS811719		Now forestry
7	NS812721		Now forestry
8	NS817725	NS817728	Now forestry
9	NS818722	NS819722	n.b. field area to west of tree-line boundary on west side not allocated a number
10	NS809722		Now forestry
11	NS811723		Now forestry / merged with 12 NS811724
12	NS811724	NS811725	Now forestry / merged with 11 NS811723
13	NS802727	NS803726	
13A	NS800723		
14	NS811729	NS811730	merged with 19 NS808731
15	NS807729		
16	NS806728		
17	NS805728	NS805729	
18	NS805730	NS806730	
19	NS808731		merged with 14 NS811729
20	NS805732		
21	NS806734		
22	NS809733		Includes Fannyside Mill farm buildings
23	NS809734		
24	NS810735		
25	NS813736		
25A	NS816736		
26	NS820727	NS821727	
27	NS813734		
28	NS814735		
29	NS812737	NS812738	
30	NS809737	NS810737	
31	NS811739	NS810739	
32	NS814738	NS814739	

Table B.2. Details of both the old and new grid reference, etc., of the fields for which details were verified during the fieldwork

Field number	New grid reference	Old grid reference	Notes
33		NS812740	East Fannyside Farm fields re-configured
34		NS813741	East Fannyside Farm fields re-configured
35		NS813740	East Fannyside Farm fields re-configured
36		NS813740	East Fannyside Farm fields re-configured
37	NS816739	NS816760	
38		NS815742	
39	NS810743	NS811743	
40		NS818743	
41		NS820740	
42		NS822744	Sewage sludge
43	NS816745	NS817745	
44		NS818746	
45	NS820745	NS820746	
46K		NS820749	merged with 46L NS821748
46L	NS821748	NS820748	merged with 46K NS820749
47		NS819748	
48D	NS817758	NS817756	
48E		NS817756	Runrig
48F	NS820758	NS820757	
48G		NS820756	
48H north		NS824758	n.b. separated from 48H south by 48I
48H south		NS821754	n.b. separated from 48H north by 48I
48I		NS823756	
48J	NS821752	NS820751	
49		NS815753	
50		NS816754	Now largely occupied by Garbethill House farm buildings
51B	NS814758	NS813757	merged with 51C NS814757 and with 53A NS813758
51C	NS814757	NS813757	merged with 51B NS814758 and with 53A NS813758
52		NS812754	
53A	NS813758	NS813757	merged with 51C NS814757 and with 51C NS814758
53B		NS812757	
54		NS811756	
55		NS810756	

Table B.2. Details of both the old and new grid reference, etc., of the fields for which details were verified during the fieldwork

Field number	New grid reference	Old grid reference	Notes
56	NS809756	NS807756	merged with 57 NS808756
57	NS808756		merged with 56 NS809756
58	NS806755		
59	NS806756		
60	NS810758		
61	NS805756		Now forestry
62	NS807754		
63	NS807753		Now forestry
64	NS808753		Now forestry
65	NS809752		Now forestry
66	NS808750		Now forestry
67	NS806751		Now forestry
68	NS805751		Now forestry
69	NS808748		Now forestry
70	NS806749		Now forestry
71	NS805753		Now forestry
72	NS804755		Now forestry
73	NS803753		Now forestry
74	NS801753		Now forestry
75	NS802751		Now forestry
76	NS797740	NS803741	
77	NS802741	NS804740	
78	NS795736	NS799737	
79	NS821746		
80M	NS823748		
80N	NS824749	NS823749	
81	NS825746		Reinstated opencast Sewage sludge
82	NS825743	NS826743	
83	NS829745		
84	NS828746		Reinstated opencast Sewage sludge
85	NS831746	NS832746	
86	NS834745	NS833765	
87	NS834747		

Table B.2. Details of both the old and new grid reference, etc., of the fields for which details were verified during the fieldwork

Field number	New grid reference	Old grid reference	Notes
88	NS832748	NS831748	
89	NS834749		
90	NS836749	NS835750	
91	NS840751	NS836748	
92	NS836748	NS840751	
93A	NS832757	NS834758	Garbethill Muir: Note: This is a very extensive site which complex and multi-various boundaries, many of which are
93B	NS835761	NS834762	
94	NS840754		
95	NS844754	NS843754	
97	NS846753		
98	NS845754	NS845755	
99	NS842747	NS843747	
100	NS843750	NS844750	
101	NS848750		
102	NS848753		
103	NS847754		merged with 104 NS846756
104	NS846756	NS847756	merged with 103 NS847754
105	NS849754		
106	NS850754		
107	NS852754		
108	NS852756		Now forestry
109	NS856757		
110	NS853754	NS854755	
110A	NS852759	NS853759	
111	NS851761		
112	NS845762		Now forestry
113	NS857760		merged with 114 NS859761 – mature trees on another former boundary within merged fields
114	NS859761		merged with 113 NS857760 – mature trees on another former boundary within merged fields
115	NS860759		
116	NS861757		
117	NS866755	NS865754	Darnrigg Moss: Note: This is a very extensive site which complex and multi-various boundaries, many of which are
118	NS854751	NS854752	
119	NS852749		

Table B.2. Details of both the old and new grid reference, etc., of the fields for which details were verified during the fieldwork

Field number	New grid reference	Old grid reference	Notes
120	NS847746		
121	NS848746	NS845765	
122	NS844745		
123	NS842744	NS842745	
124	NS855748		
125	NS851745		
126	NS855745		
127	NS852742		
128	NS855741		
129	NS858744		
130	NS858742		
131	NS860744	NS860745	
132	NS856740		
132A	NS855739		
133	NS859740		
134	NS861742		
134A	NS862739		
135	NS863746	NS863766	
136	NS863743		
137	NS864742		
138	NS865740		
139	NS866741	NS866743	merged with 142 NS866744
140	NS865743	NS865744	
141	NS866744		
142	NS866744		merged with 139 NS866741
143	NS868742	NS868743	
144	NS869744	NS870745	merged with 150 NS870741
145	NS865746		
146	NS865747	NS865767	
147	NS867748	NS867747	
148	NS871748		Now forestry
149	NS871745		
150	NS870741	NS871742	merged with 144 NS869744

Table B.2. Details of both the old and new grid reference, etc., of the fields for which details were verified during the fieldwork

Field number	New grid reference	Old grid reference	Notes
150A	NS869739		
151	NS873745		
152	NS873743		
153	NS873741	NS874742	
154	NS874748		
155	NS876748	NS877749	
156	NS876746		Used for grazing horses
157	NS876744		
158	NS876742	NS876743	
159	NS878746	NS879746	Used for grazing horses
160	NS882747		
161	NS880743	NS880744	Sewage sludge
162	NS882741		merged with 224 NS878740 and with 225 NS880741
163	NS865750		
164	NS867750		
165	NS865752	NS865753	
166A	NS862752		
166B	NS862750		
166C	NS862748		
166D	NS860747	NS861747	Trees in field itself
166E	NS859746		Runrig
166F	NS858748		Runrig
166G	NS858750	NS859750	Runrig
167	NS881750		
170A	NS835765	NS835763	
170B	NS836764	NS836763	
171	NS832763	NS833763	Runrig
172	NS830762	NS830763	Runrig
173	NS828762		Reinstated opencast
178	NS891746	NS892746	
180	NS888748	NS887747	
181	NS885745		
182	NS885743	NS886744	

Table B.2. Details of both the old and new grid reference, etc., of the fields for which details were verified during the fieldwork

Field number	New grid reference	Old grid reference	Notes
183	NS887743	NS887744	
184	NS890745	NS891745	
185	NS889744		
186	NS891744	NS829744	
187	NS889741	NS890742	
188	NS888739	NS885740	
188A	NS888739		
189	NS890740		merged with 193 NS893742 – mature trees on another former boundary within merged fields
190	NS889738	NS890738	merged with 191?
191	NS891737	NS892735	merged with190?
192	NS892739	NS893740	
193	NS893740	NS893742	merged with 189 NS890740 – mature trees on another former boundary within merged fields
194	NS894740	NS894741	
195	NS896741	NS896742	merged with 198 NS898741
196	NS897743		
197	NS896746	NS897746	
198	NS898741	NS899742	merged with 195 NS896741
199	NS900742	NS900743	
200	NS900743	NS901744	
201	NS888736		
202	NS890735	NS891735	
203	NS889733	NS890734	
204	NS886735		
205	NS886733		
206	NS883734	NS883735	
207	NS884732	NS884733	merged with 208 NS882732
208	NS882732		merged with 207 NS884732
209	NS880732		5 GJ at time of survey
210	NS877731		merged with 235?
211	NS876732	NS877732	
212	NS879733		
213	NS878735		merged with 216 NS881736 and with 217 NS881738
214	NS867733	NS876733	

Table B.2. Details of both the old and new grid reference, etc., of the fields for which details were verified during the fieldwork

Field number	New grid reference	Old grid reference	Notes
215		NS876735	Field boundaries at SW end have been altered
216		NS881736	merged with 213 NS878735 and with 217 NS881738
217		NS881738	merged with216 NS881736
218		NS876937	merged with 219 NS875736
219		NS875736	merged with 218 NS876937
220		NS873736	
221		NS873734	
222		NS874733	
223		NS876739	
224		NS878740	merged with 162 NS882741 and with 225 NS880741
225		NS880741	merged with 162 NS882741 and with 224 NS878740
226	NS873738	NS873739	
227		NS871736	merged with 228 NS870736
228	NS870736	NS870737	merged with 227 NS871736
229		NS867737	
230		NS866734	
231	NS871733	NS867732	
231A		NS871733	
232		NS868730	
232A		NS869732	
233	NS870730	NS871730	
234		NS873731	
235		NS875730	merged with 210?
236		NS873729	
237		NS872729	
238	NS868727	NS870728	
239	NS864731	NS865731	
240		NS864732	
240A		NS863730	
241		NS864733	
242	NS863736	NS863737	Runrig
243		NS861732	
245	NS861730	NS862730	

Table B.2. Details of both the old and new grid reference, etc., of the fields for which details were verified during the fieldwork

Field number	New grid reference	Old grid reference	Notes
246	NS858734	NS858733	
246A	NS860734	NS849743	
247	NS859736	NS858736	
248	NS859738	NS860739	
249	NS857737	NS857738	
250	NS852731	NS851731	
251		NS850734	
252		NS853735	
253	NS852738	NS847730	
254		NS847733	
255		NS847736	
256		NS846732	
257	NS842731	NS843731	
259		NS846734	
260		NS851737	
261	NS849738	NS850738	
262	NS854739	NS854740	
263	NS847730	NS852738	
264	NS847742	NS847762	
264A	NS850743	NS849744	
265		NS848739	
266	NS845739	NS847740	
267		NS843739	
268	NS845741	NS845741	
270	NS845743	NS846743	
271		NS844743	
272		NS842743	
273		NS843741	
274		NS840742	
275	NS841738	NS842738	
276		NS845736	
277	NS841739	NS843741	
278		NS838741	

Table B.2. Details of both the old and new grid reference, etc., of the fields for which details were verified during the fieldwork

Field number	New grid reference	Old grid reference	Notes
279	NS837745	NS838745	
280	NS836740		
282	NS836737		
283	NS834739		
284	NS832738	NS832338	
285A	NS833744	NS834763	
285B	NS833741	NS834763	
286	NS831740		
287	NS825738	NS826738	
287A	NS828741		
287B	NS829739		
288	NS829737		Runrig
289	NS832735	NS832736	
290	NS825735	NS826734	
290A	NS822737	NS822738	
291	NS822741		
292	NS821737		
293	NS817734	NS818734	
294	NS818737	NS819738	
294A	NS820736	NS819737	
295	NS815738	NS816738	
296	NS809716	NS809717	
297	NS807722		Now forestry
298	NS808718		Now forestry
299	NS805716		Now forestry
300	NS805719		Now forestry
301	NS803719		Now forestry
302	NS801718		Now forestry
303	NS820719		
304	NS821720	NS822721	
305	NS821722		
306	NS823722		
307	NS825720		

Table B.2. Details of both the old and new grid reference, etc., of the fields for which details were verified during the fieldwork

Field number	New grid reference	Old grid reference	Notes
308		NS827720	Now forestry
309		NS827722	Now forestry
310		NS830721	Now forestry
311		NS828724	Now forestry
312		NS829727	Now forestry
313		NS824727	Now forestry
313A		NS825726	Now forestry
314		NS822729	Now forestry
315		NS827731	Now forestry
316		NS831723	Now forestry
317		NS833723	Now forestry
318		NS835725	Now forestry
319		NS838728	
320	NS839725	NS839726	
321		NS842727	
322	NS846728	NS846729	
323		NS827764	Runrig?
324		NS828765	Runrig?
325		NS830765	
326		NS832765	Runrig?
327	NS835768	NS8935767	
328		NS881730	
329	NS882730	NS883731	
330		NS884731	
331		NS886731	
332		NS884728	
333	NS829767	NS830767	
334		NS831767	
335		NS832769	Runrig
336		NS838767	
337		NS836768	
338	NS830770	NS829769	Runrig
339A	NS826770	NS826771	

Table B.2. Details of both the old and new grid reference, etc., of the fields for which details were verified during the fieldwork

Field number	New grid reference	Old grid reference	Notes
339B	NS827768		
340	NS813766	NS814766	
341	NS813769		
342	NS813771		
343	NS804765		
344	NS807761		
345	NS804768	NS803768	
346	NS800766	NS801767	
347	NS798765	NS799766	
348	NS795766	NS795767	
349	NS797767	NS798768	
350	NS798768	NS800769	
351	NS802770		
352	NS803771	NS804771	
353	NS801772		merged with 354 NS799771
354	NS799771	NS799772	merged with 353 NS801772
355	NS800723	NS797723	
356	NS816764	NS817771	
357	NS817771	NS816772	
400	NS800734	NS800735	W. Fannyside Loch
401	NS807736		E. Fannyside Loch
402	NS887749	NS885749	Loch Elrig
403	NS693838		Carron Valley

Note: Field / land unit 403 [Carron Valley] is not on the Slamannan Plateau, but is included here for the sake of completion

Conversely, various types of 'woodland' frequently lie beyond field boundaries, and were **generally features that can't be seen over or through.** Therefore, they were defined as wooded boundaries. This was a generic term which included all wooded or forested features beyond field boundaries, including, but not limited to, woodlands, plantations, shelter-belts, *etc*..

These sorts of boundaries were then sub-divided and defined as follows:

2. **Hedged boundary** – was used to describe any boundary along which there was a hedge. An indication of the length of that boundary that was comprised of hedge is provided by the % figure. Additional details were included in brackets in some instances, *e.g*., (Tall) was used to denote a hedge that has not been maintained for many years, (Remnant) was used to denote a former field boundary were some hedge is still present. Hedged boundaries typically also included a post and wire fence. Further, some hedged boundaries were also tree'd boundaries.

3. **Tree'd boundary** – was used to indicate a boundary along which there were trees; typically this involved a single line of mature deciduous trees, although in a few instances this term was also used to indicate more recently planted trees. Generally, if the boundary feature involved, (or was considered to involve), more than a single line of trees it was considered to be a wooded boundary.

4. **Wooded boundar**y – this term was used to describe all areas of trees beyond field boundaries, from relatively insignificant deciduous copses, to more significant areas of deciduous woodland, to very significant coniferous plantations. As far as possible, the type of trees involved was categorised as either deciduous or coniferous. As such features are beyond, rather than on, boundaries they are shown in brackets as follows, '(Wooded – area of deciduous and coniferous woodland)'.

Further, the term **Forestry** was used to refer to any numbered field that has been lost to 'recently' planted forestry. It should be noted that in some instances, such as field 318, the field was apparently assigned to forestry but was never planted, although it is now rank grassland of no use to the geese. By definition, 'recently' relates to the past 20 or 30 years, *i.e*., during the period in which fieldwork on the bean geese has been conducted. The boundary details provided in the instances of former fields that are now in forestry are indicative only as they generally weren't physically checked and may well have been partly or completely altered as part of the forestry operations.

An attempt to differentiate these more recent areas of tree-planting from older areas of forestry planting was made, but this wasn't necessarily comprehensive. Specifically the term **Plantation** was used to indicate areas of coniferous planting which pre-date the bean goose study period. Similarly the term Woodland was used to indicate areas of deciduous woodland, *etc*., that pre-date the same period, although again this differentiation wasn't necessarily comprehensive.

5. **Drystane dyke** – this term was used to indicate any type of wall, although typically it includes drystane dykes which were often no longer very well maintained, and as such drystane dyke boundaries typically also included a post and wire fence. Many such dykes were now 'tumbledown' dykes.

6. **Watercourses** – this term was used for all ditches, burns, *etc*., except the larger River Avon. In many instances the details given were indicative only, as ditches, *etc*., can be less than easy to see either in the field or in aerial imagery.

7. **Waterbody** – this term was used to indicate a pond or loch, such as West Fannyside Loch.

8. **Former railway line** – this term was used to define any feature relating to former railway lines, including cuttings, embankments and bounding fences, dykes, *etc*., and included all types of railway line, including mineral railway lines.

9. **Road** – this term was used for public highways.

10. **Track** – this term was used for all tracks, including surfaced and un-surfaced farm and forestry track.

11. **No boundary** – over the years field boundaries have progressively been altered and rationalised. Often this has involved removing former field boundaries to create larger fields. In such instances the term no boundary was used. Further, where possible it was attempted to indicate which fields have been merged with which fields.

12. **Scrub** – in some instances field margins include often extensive areas of scrub. This might be birch scrub, or gorse scrub. As such, in some instances, this was detailed.

B.2.7 Additional comments

1. Zeros, *e.g.*, 0 stock or 0% were used as this was considered to be valid data and also indicated that the data was recorded rather than not recorded or inadvertently omitted.

2. The exercise was undertaken for as many fields as possible as even if they have never recorded as being used by bean geese it was considered that it would be useful to see if there are any differences in these no use or low use fields compared to the fields bean geese use more regularly.

3. The details recorded relate to observations made on the date indicated; obviously circumstances can change – both in the time period preceding the survey visit date, and also in the time period following the same.

4. Details recorded relating to a boundary between two numbered fields may not have been recorded identically if this was recorded for one side and then the other on two visits, and as such the detailed provided for the same boundary feature may vary.

5. In many instances the fields involved complex boundaries with other fields; as far as possible this was recorded and characterised.

B.2.8 Recording sheets

A copy of the field recording sheet proforma which was used during the field work is included here. In addition, a copy of the explanatory guidance notes, codes, etc., which were used is also included. However, it is stressed that the notes, codes, *etc*., might need to be slightly modified if it was to be used again, such that it reflects both what was actually recorded in early 2013 (rather than what it was originally intended to record), and also better reflects any new aims for any future such survey.

Site: **Date:** **Observers:**

Parameter / Field number (and any notes)	Field type	Main grass colour	Sward length	*Juncus* cover	Flooding	Boundary details	Stock
e.g. Field x	RIP	Y-G	Short	0%	TW <1% PW 0%	305 - P & W 304 – P & W 303 – P & W West - P & W 90% + Treeline 10% North - Woodland	Sheep 55
Field							
Field							
Field							
Field							
Field							
Field							
Field							

Notes, codes, *etc*.

Use vantage points and site visits to record the following for each individually numbered field unit:

Field type categories, ("recently" relates to fields that have been ploughed and re-seeded, *etc*., within last 5 years or so, whereas 'old' relates to fields that have been ploughed and re-seeded, *etc*., prior to this, and 'permanent' relates to fields that have apparently not been ploughed, *etc*., during the period the BGAG have been undertaking work on the Plateau);

Arable cereal; arable root crop; bog/moor; old improved pasture (OIP); permanent pasture (PP); recently improved pasture (RIP).

Main grass colour, (this, in particular, is subjective, so it is important to, if possible, be consistent by using two observers, undertaking all assessments in broadly the same timeframe, *etc*.);

Yellow (Y); yellowy-green (Y-G); greeny-yellow (G-Y); green (G); very green (VG) e.g., bright highly-improved silage fields.

Sward length, (this may necessitate closer examination and, obviously, will change with time of year and stocking levels);

Short (<5cm) Medium (5-15cm) and Long (>15cm).

***Juncus* cover**

% cover estimate for each field.

Flooding within the field:

Temporary water cover (%TW cover); Permanent waterbody evidence (%PW cover); No waterbody as such.

Boundary: (be as specific as possible, whilst not necessarily noting every individual boundary feature, *e.g*., if there were significant amounts of hedge along a boundary give a percentage for it, and, excepting for combinations of fences and hedges, indicate if more than one type is present. If a woodland bordered a field and there is no fence present to record as Woodland+Open; geese do venture into open woodland areas);

P & W; Hedge; Treeline/Shelter Belt; Wall; Woodland (use this if more of a visual boundary than the Shelter Belt category); Open.

Stock

Type and number of stock, (and also details of any fields being run with adjacent ones).

Additional comments

1. Use zeros, *e.g*., 0 stock or TW 0% as this is valid data and also indicates that the data was recorded rather than not recorded or omitted.
2. Undertake for as many fields as possible; even if they have never recorded as being used by bean geese it was considered that it would be useful to see if there are any differences in these no use or low use fields compared to the fields bean geese use more regularly.
3. Also annotate a good base map with any boundary changes, and, as necessary, devise new field numbers for sub-divided, larger, field units, such as 166.

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