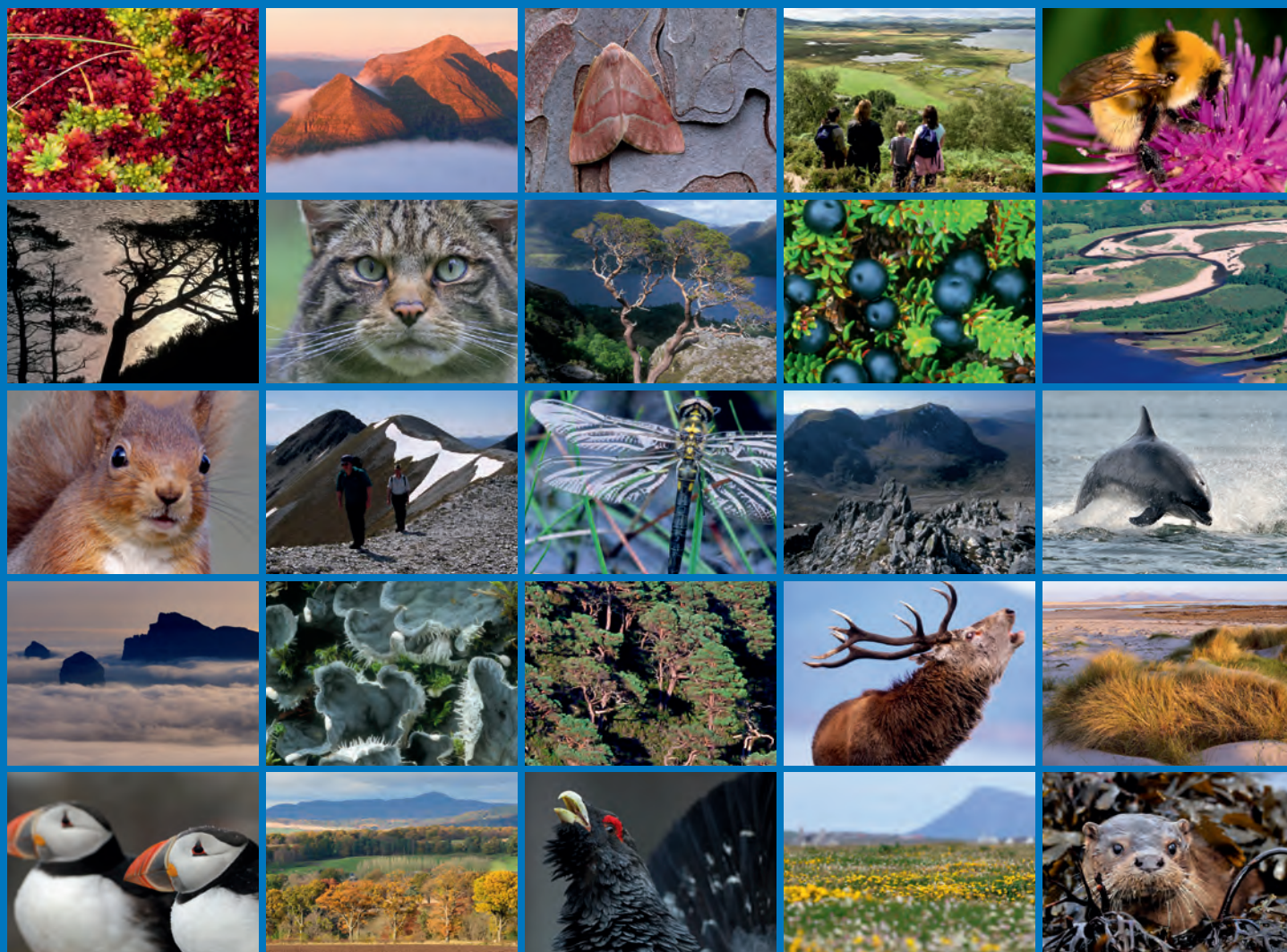


Scottish Natural Heritage
Commissioned Report No. 889

Bean geese on the Slamannan Plateau: Monitoring report for 2013/2014





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COMMISSIONED REPORT

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Bean geese on the Slamannan Plateau: Monitoring report for 2013/2014

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COMMISSIONED REPORT

Summary

Bean geese on the Slamannan Plateau: Monitoring report for 2013/2014

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Keywords

Bean geese; Site Condition Monitoring; Slamannan Plateau SSSI.

Background

This report describes the results of the SNH monitoring, (*i.e.*, an ageing assessment and five roost counts), of the wintering flock of bean geese, (*Anser fabalis fabalis*), on the Slamannan Plateau area in Central Scotland undertaken between October 2013 and February 2014.

Main findings (figures in brackets relate to the comparable figures for 2012/2013):

- The SNH monitoring concentrated on providing an age assessment, which confirmed that c.34.5% of the geese that were aged were juveniles – 30 of 87 birds, (18.0%). The five roost counts produced a mean roost count total of 82.5 geese, (88); the maximum roost count was c.200, (175) but no geese were recorded on one visit;
- A proportion of the bean goose population was roosting at Darnrig Moss at times. The Fannyside area, whilst still important, is no longer the only roost area used by some of the birds for at least part of the winter, perhaps explaining declining roost count totals. The maximum roost count was lower than the peak count for the winter of 237 (233), and as many as 90 were recorded during a concurrent roost count at Darnrig Moss;
- This work was complemented by other monitoring activities; the findings were successfully substantiated and added to by those of the BGAG monitoring and the telemetry data. The SNH monitoring provided some good representative data regarding the age structure of the flock, and its ongoing use of the Fannyside part of the SSSI/SPA for roosting purposes. However, only the BGAG monitoring currently provides substantive data regarding which parts of the SSSI / SPA and the wider plateau are used by feeding/loafing bean geese; and,

This report relates to the last winter of the current SNH-funded monitoring programme, and as well as conclusions relating to winter 2013/2014 and to the entire four winter period, it includes a series of recommendations regarding any future work.

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As ever, thanks are due to Angus Maciver for all his help. Thanks are also due to Carl Mitchell of The Wildfowl & Wetlands Trust, (WWT), for his helpful comments on the draft version of this report. Also special thanks to both Carl Mitchell and Larry Griffin, also of WWT, who supplied tracking data mapping relating to the movements of the satellite- and radio-tagged bean geese during the winter. Larry Griffin also contributed one of the ageing assessment counts. Finally, thanks are due to the members of the BGAG for their ongoing support of the work described in this report.



Frontispiece, View over one of the roost site pools at Darnrig Moss

This photograph illustrates the nature of one of the main pools on Darnrig Moss that is currently used as a roost site by the Slamannan Plateau wintering population of taiga bean geese (*Anser fabalis fabalis*). The pool itself has a relatively small area, but it has extensive flooded margins; it is assumed that the geese roost amongst the flooded vegetation. This particular pool is on the edge of the moss, although there are also several other larger pools which are also used as roost sites by geese.

As with Fannyside Muir, Darnrig Moss is a large wide open expanse of raised bog dominated by heathery vegetation, with distant views to stunted and planted coniferous trees and also birch and willow scrub. As has previously been suggested in relation to the Fannyside Muir pools roost site, it is considered that the appearance of this area is of significance, as the Moss looks and 'feels' very similar to taiga, the habitat with which taiga bean geese is associated on its breeding grounds in boreal latitudes of Scandinavia and Russia.

Darnrig Moss is a Site of Special Scientific Interest, (SSSI), and is currently owned and managed by a farmer who is sympathetic with the conservation of the taiga bean geese. However, it is proposed that roosting taiga bean geese is added to the citation of the SSSI.

1. INTRODUCTION

1.1 Introduction

This report has been prepared by BCM Environmental Services Limited, (BCMESL), and describes the findings of the taiga bean goose, (*Anser fabalis fabalis*), monitoring work conducted during the 2013/2014 wintering period by Angus Maciver, (AM), and Brian Minshull, (BCM).

It represents the fourth report, following those prepared for the preceding winters, (2010/2011, 2011/2012 and 2012/2013).¹ As described more fully in the report for 2010/2011, this work is part of a long-term programme of monitoring of the wintering population of bean geese associated with the Slamannan Plateau.

The report for 2010/2011 provided background material relating to the basis for commissioning this component of the overall monitoring effort, *i.e.*, the monthly roost counts and an ageing assessment count. This is referred to as the SNH monitoring hereafter.

The SNH monitoring is complemented by other monitoring work which is part of the ongoing long-term programme of monitoring of the Slamannan Plateau bean goose population. Primarily, the other monitoring work is supplementary roost counts and field counts. This element of the monitoring is referred to as the Bean Goose Action Group (BGAG)² monitoring.³ This work is largely conducted on behalf of the BGAG by the same individual who undertakes much of the SNH monitoring, namely AM, to the same standards. There is often considerable overlap between the two; and where necessary, this report makes reference to this.

The SNH monitoring was undertaken between 29 September 2013, when the Slamannan Plateau population of bean geese first began to arrive on their wintering grounds, and c. 22 February 2014, the estimated date of the final departure of the majority of the birds. These dates were determined on the basis of evidence provided by the BGAG monitoring visits and, in the instance of the departure date, by a combination of satellite tracking data and the subsequent sightings of neck-collared birds in North Jutland, Denmark on the 23 February 2014.⁴ Coincidentally, the 22 February was also estimated to be the departure date of the final group of birds in winter 2012/2013.

Further information on the wider monitoring effort, (from the winters preceding 2010/2011, and as completed concurrently with the SNH monitoring described in this report and the

¹ BCM Environmental Services Limited. 2011. Report on the delivery of a monitoring programme for bean goose on the Slamannan Plateau 2010/2011. *Scottish Natural Heritage Commissioned Report No. 487*,

BCM Environmental Services Limited. 2013. Report on the delivery of a monitoring programme for bean goose on the Slamannan Plateau 2011/2012. *Scottish Natural Heritage Commissioned Report No. 607*, and,

BCM Environmental Services Limited. 2013. Report on the delivery of a monitoring programme for bean goose on the Slamannan Plateau 2012/2013. *Scottish Natural Heritage Commissioned Report No. 608*.

² The Bean Goose Action Group is described more fully in the report for winter 2010/2011.

³ In the report for winter 2010/2011 the SNH monitoring work was referred to as the formal monitoring effort, and the BGAG monitoring effort was referred to as the informal monitoring effort; these terms have been replaced as they were considered ambiguous.

⁴ As with last winter, the date of departure of birds in early spring in winter 2013/2014 was very much informed by the data available from the satellite tracking of two of the birds within the flock. One of these remained on the Plateau, seemingly on its own, after the rest of the wintering population had apparently all departed. However, it too departed for Scandinavia very soon afterwards, although it went to south-western Norway rather than northern Denmark.

reports for winter 2010/2011, 2011/2012 and 2012/2013), can be found in the preceding reports.

1.2 SNH Monitoring Effort – Winter 2010/2011 onwards

The SNH monitoring effort comprises:

- monitoring abundance through five monthly roost counts; and,
- ageing assessments of the flock through one field observation.

SNH commissioned BCMESL to undertake this monitoring in winter 2010/2011. Subsequently, BCMESL was again commissioned to undertake the same monitoring in the following three winters, (those of 2011/2012 to 2013/2014 inclusive).

1.3 BGAG Monitoring Effort – 2013/2014

The monitoring programme implemented on behalf of BGAG continues, albeit on a slightly curtailed basis. The same approaches are still used and therefore this monitoring produces broadly comparable data to that obtained prior to 2010/2011, (*i.e.*, when the SNH monitoring commenced).

The BGAG monitoring complements and supplements the SNH monitoring, and *vice versa*, as described in this and the preceding reports. For example, the BGAG counts, (whether field or roost counts), made on broadly consecutive days will often substantiate the overall number of birds present.

The importance of cross-referencing the BGAG monitoring report, (and if possible relevant data), in the SNH monitoring report, and *vice versa*, was emphasised in the report for winter 2010/2011 and again, this will be applied here.

1.4 Tracking Data

A significant number of the wintering population of bean geese has now been successfully captured, ringed, colour-ringed and fitted with numbered neck-collars as part of the ongoing scientific studies of these birds; in autumn 2013, a further 14 birds were captured and marked. The neck-collars incorporate either a satellite or a radio-tracking device which use data-logging and transmitting technology to enable geographic and other data to be recorded on a regular basis, and then remotely received or downloaded.

This technology can only locate individual birds, (and not provide accurate counts or estimates of the numbers of bean geese involved, or undertake ageing assessments). It provides good data on the frequency at which alternative roost sites are used throughout the winter, and potentially for all nights throughout the winter, (rather than just a very small sample of the same). It also gives accurate 'fixes' for these birds at intervals throughout the winter. During the work described in this report these data were available and, in several instances, informed the ongoing monitoring activities.

1.5 Relevant BCMESL Experience

BCMESWL undertook this work in each of the winters since 2010/2011, and has relevant experience in relation to the monitoring work required. This is fully described in the report covering winter 2010/2011. Further, AM has a wealth of highly relevant experience, having monitored the Slamannan Plateau bean goose population for many years.

2. EXPLANATION OF SURVEY VISIT APPROACHES

As detailed in the report for 2010/2011, (and in Section 1.2 of this report), the work involved requires:

1. One ageing assessment count of the flock through field observation; and,
2. Five monthly roost counts aimed at monitoring abundance, as follows:
 - 1st visit during October;
 - 2nd visit during November;
 - 3rd visit during December;
 - 4th visit during January; and,
 - 5th visit during February.

As before, the actual visit days were planned, (and changed), so that they were undertaken when weather conditions and other factors were considered to be suitable for the visit.

The following provides cross-references to the relevant sections of the corresponding report for winter 2010/2011, which fully describes the intended approaches to the ageing assessment count and the roost counts as proposed and used for the SNH monitoring:

- Ageing Assessment Count – refer to Section 2.2 of the 2010/2011 report; and,
- Roost Counts – refer to Section 2.3 of the 2010/2011 report.

The approaches used in the preceding winters when similar monitoring work was undertaken, (2010/2011, 2011/2012 and 2012/2013), were maintained during winter 2013/2014.

3. SUMMARY OF RESULTS OF 2013/14 SURVEY VISITS

The findings of the ageing assessment count and the roost counts completed in 2013/2014 are summarised in Tables 3.1 and 3.2. These visits are described in full in Appendix A. Where the approaches used in 2013/2014 differed slightly from those described in the 2010/2011 report this is described in the tables provided in Appendix A.

Table 3.1. provides summary details of the ageing assessment count, and Table 3.2 provides summary details of the five roost counts.

Table 3.1. Summary of bean goose observations – ageing assessment count

Date	Number of birds aged and number of juveniles aged (%)
11 October 2013	Number of birds aged – 87, of which 30, (c.34.5%), were juveniles

Table 3.2. Summary of bean goose observations – roost counts

Date	Roost count totals recorded (estimated number of birds)
23 October 2013	Birds counted c.200
18 November 2013	Birds counted c.75 ⁵
23 December 2013	Birds counted 0
22 January 2014	Birds counted c.115 ⁶
19 February 2014	Birds counted 23 ⁷
	Average of roost count totals recorded (rounded up) 82.5

Appendix A, provides more details of the bean goose counts undertaken in winter 2013/2014. These tables include, (where applicable):

1. Date and time of observations;
2. Details of any counts made shortly before the actual count;
3. Details of the actual count;
4. Any additional information, (observers, *etc.*); and,
5. Details of the weather preceding and during the survey visit, *etc.*

Subsequent sections of this report examine what these data indicate and provide conclusions and recommendations regarding the same.

⁵ Concurrently, a further c. 90 birds roosted at Darnrig Moss on the night of the November count visit.

⁶ Concurrently, a further c. 40 birds roosted at Darnrig Moss on the night of the January count visit.

⁷ Concurrently, a further c. 60 birds roosted at Darnrig Moss on the night of the February count visit.

4. DISCUSSION OF RESULTS OF 2013/2014 SURVEY VISITS

4.1 Introduction

This section discusses the findings of the 2013/2014 SNH monitoring, summarised in the preceding section and detailed in Appendix A. Where appropriate, this section compares the data obtained with those available from other sources, notably that provided by the BGAG monitoring also conducted by AM.

4.2 Ageing Assessment Count

On 11 October 2013, 87 bean geese were aged by AM at around 09.50 in the morning in Field 101 at Easter Jawcraig. The prevailing weather conditions were very suitable for an ageing count, as it was both sunny and calm. In addition, the flock was at a range of within 250 m and in an improved field, meaning that birds were easily seen. Of the 87 birds involved, 30 were aged as juveniles. Therefore, c.34.5% were aged as juveniles, (compared to 31% in autumn 2010, which was previously the highest ever recorded on the Slamannan Plateau).⁸ Therefore, this ageing count provided a comparatively high figure for the proportion of the flock that was comprised of juveniles.

Larry Griffin – Principal Species Research Officer at Caerlaverock Wetland Centre, was also able to count the numbers of juveniles with pairs of adults around this time.

This brood count was completed at around 16.00 in the afternoon on the 29 October when there was a flock of 190 birds in Field 9 at Luckenburn Farm. Family parties which involved 5, 3, 3, 2, 2, 1 and 1 juvenile respectively were noted. Weather conditions were again favourable for this count.

17 juveniles in 7 broods results in a mean number of juveniles with adults of 2.42, which compares very favourably to that recorded in winter 2012/2013, when the same figure for young per successful pair or mean brood size, (mbs), was 2.0.

Both of these counts are included here to indicate that the 2013 breeding season may well have been a relatively productive one on the basis of the evidence obtained as a result of two separate exercises.

Undertaking and obtaining representative ageing assessments from just a proportion of the flock can be fraught with difficulty, (due to the difficulty of ageing at least some birds but also due to differing breeding success rates of different pairs / different parts of the flock), but in this instance two samples and two measures are at least indicative of a very good breeding season.

If this is the case it might be expected that the overall number of birds involved in the wintering population would be higher in 2013/2014. However, the winter maxima for 2013/2014 of 237 was broadly similar to that recorded in 2012/2013, when the same figure was 233.

Currently, it is not known why the population does not significantly change, (increase), over time despite apparently healthy productivity. Mortality rates are not believed to be very high, (for example, very few birds have been ever found dead on the Slamannan Plateau). It is thought that the flock is particularly exposed to, (for example, hunting or shooting pressures that suppress the overall population levels, (*i.e.*, whilst migrating or on the breeding

⁸ Goose News - The newsletter of the Goose & Swan Monitoring Programme Issue no. 10, Autumn 2011 WWT, JNCC and SNH
<http://monitoring.wwt.org.uk/wp-content/uploads/2013/07/GooseNews10.pdf>

grounds). There may be some other 'leakage' from the population, which, for example, involves some birds opting not to migrate to Central Scotland.

Finally, it is hoped that as the birds marked with neck-collars in autumns 2011, 2012 and 2013 included several pairs / family groups. Ongoing monitoring will continue to reveal more details relating to productivity and breeding biology.

4.3 Roost Counts

As detailed in Section 3, five roost counts were completed during the winter 2013/2014. Each count was carried out at dusk. An attempt was made by AM and BCM to undertake simultaneous roost counts at both Fannyside and Darnrig Moss. Three of the five counts were completed simultaneously. Each of the counts is discussed individually and then collectively below.

Where relevant, BGAG monitoring counts are referenced to provide further background. The roost counts were also, to some extent, informed by the satellite or radio-tracking data which was available for certain birds, and referred to, as appropriate.

4.3.1 October Roost Count

At this stage in the wintering period the flock is typically associated with the Luckenburn fields. Before the October count, AM observed c.100 bean geese in Field 9 at Luckenburn Farm.

Partly for this reason, it was decided to observe birds arriving at the Fannyside roost sites from just north-west of the bend in the Garbethill road.

Subsequently, at 19.00 c.100 birds were seen arriving from the south or south-east, (*i.e.*, from the direction of Luckenburn), and concurrently a further c.100 birds were seen arriving from the north-east. The two separate skeins quickly merged and all c.200 geese were seen alighting in the area of the Fannyside Muir pools.

No other goose species were observed.

Sunset locally was estimated to be at 17.56. So the birds came in between about 60 and 65 minutes after sunset.

As suggested, the bean geese flock is frequently associated with the Luckenburn fields at this stage of the winter. BGAG monitoring work also recorded the geese at Luckenburn around this time. AM recorded 53 bean geese in Field 305 on the 21 October 2013 and 145 in Field 9 on the 25 October 2013. AM, Larry Griffin and John Simpson counted 190 bean geese in Field 9 on the morning of the 29 October 2013, (when Larry Griffin also located 40 birds in Field 173 at Garbethill, although this may have involved the same birds).

Thus, a roost count of 200 is representative of the numbers of birds recorded elsewhere on the Plateau at that time.

Finally, on the evening of the 25 October 2013, AM completed a further roost count at Fannyside as part of the BGAG monitoring work, soon after seeing 145 bean geese at Luckenburn. However, on this occasion only 50 bean geese were subsequently seen arriving at the Fannyside Muir pools.

4.3.2 November Roost Count

On-going BGAG monitoring work and telemetry data helped to decide when and where to undertake the November roost count, (which was completed on the 18 November 2013), which was carried out at both Fannyside and Darnrig Moss.

At 16.55 AM observed c.90 bean geese flying east towards Darnrig Moss where they were suspected to have roosted on the largest of the pools within Field 117, (that north of the former mine-workings and west of Darnrigg Farm).

BCM recorded a series of arrivals to the Fannyside roosts. At 17.02 8 bean geese were observed flying on to East Fannyside Loch from the south-east. Shortly afterwards 17 bean geese were watched flying on to Fannyside Muir from the east. Finally, at 17.23 a flock of bean geese estimated as c.50 was recorded as they were flying on to Fannyside Muir from the north-east. Observations here ceased soon afterwards, by which time it was some 90 minutes after sunset.

Sunset at Slamannan was estimated to be at 16.03, and at the time of the count the conditions were ideal; although it was cold there was very little wind and cloud, and there was a full moon, cloud cover was non-existent or minimal and the wind was a very light north-westerly. The birds that came into roost did so around about an hour after sunset.

Therefore, the November roost count established that c.75 birds were using the Fannyside roosts and that a further c.90 birds were using an alternative site on one of the pools within Darnrig Moss. The birds roosting at Darnrig Moss could have been the birds recorded feeding in fields at Strathavon Farm, to the east of the B803, earlier in the day. Telemetry data shows tagged birds roosting at both roosts on the night of the 18 November.

4.3.3 December Roost Count

The December roost count was carried out on the 23 December 2013 at the Fannyside roost only. AM arrived on site at 16.15, well before dusk, and stayed on site until 17.10, (according to the BBC Weather sunset at Slamannan was 15.43), but no bean geese arrived on any of the usual Fannyside roost sites.

It is assumed that the birds had roosted elsewhere on this occasion as opposed to being missed by the observer at Fannyside. Further, it is assumed that any flocks which had been feeding at various locations on the plateau earlier in the day had opted to remain there overnight.

Evidence relating to the whereabouts of the tracked birds at this time was limited, although it was suspected that these and other birds were possibly using fields in the Tippetcraig / Beam Farm area at this time.

As in previous winters, the December roost count presents potential difficulties in recording representative counts, as the flock tends to break up into a series of smaller sub-flocks, and it was suspected that these flocks roosted in other locations.

Therefore the count total given is not representative of the numbers of bean geese present on the plateau at this time.

4.3.4 January Roost Count

This roost count was completed on the 22 January 2014. Given knowledge from BGAG monitoring and telemetry data on bean goose usage of the plateau at this time, it was again decided to undertake the roost count at both Fannyside and Darnrig Moss.

AM observed c.40 bean geese flying east towards Darnrig Moss at dusk. BCM observed c.80 bean geese flying on to East Fannyside Loch from the north-east and soon afterwards, a further c.35 bean geese were recorded flying on to Fannyside Muir, again from the north-east.

Therefore, a combined total of c.155 birds was achieved at both sites, which is perhaps reasonably representative for this stage of the winter when the flock has divided into various sub-flocks which are feeding in several different parts of the plateau, and as such may well have been roosting at different sites too.

4.3.5 February Roost Count

On the 19 February 2014 simultaneous roost counts at both Fannyside and Darnrig Moss were again completed by AM and BCM.

23 bean geese arrived from the north east and alighted on East Fannyside Loch at 18.00. Meanwhile, at Darnrig Moss c.30 bean geese arrived from the south at 18.16. They were followed by c.30 more bean geese which arrived from the north or north-east at 18.18.

Thus a combined total of c.83 birds were recorded at both sites. Although a low number, this count was considered to be representative of what was perhaps the total number of birds remaining on the plateau at this stage of the winter. When neither AM or BCM had located any bean geese on the plateau they both surmised that this might have been because the birds had already departed. Tracking data later indicated that Tag 07 moved across the North Sea to North Jutland, Denmark on the 21 / 22 February 2014 and a flock of 98 bean geese, which included ten of the birds with neck-collars, was reported there by a local ornithologist on the 23 February 2014.

As such, the birds seen during the roost count at Darnrig Moss constituted the last records of the 2013/2014 winter.

4.3.6 All Roost Counts

It was indicated in preceding reports the programme of five roost counts completed each winter was, in broad terms, of representative quality, (*i.e.* similar to that produced by the BGAG monitoring effort, and the monitoring that was undertaken in previous years), despite some visits producing null counts. As with winter 2013/2014, in both 2010/2011 and 2011/2012, only four of the five counts were successful in terms of producing an estimate of the numbers of birds roosting in the Fannyside area on the night the roost count visit occurred, whereas in 2012/2013 only three of the five counts were successful.

As described in the 2010/2011 SNH monitoring report, this scenario was anticipated; although the visit dates / times were broadly selected in advance and fine-tuned to take into account factors such as weather, *etc.*, it was realised, on the basis of prior experience, some visits could coincide with nights when the birds opted not to use the Fannyside, (or the Darnrig Moss) roosts.

As previous reports suggested this re-emphasises the importance of carefully recording the prevailing weather conditions and other extenuating circumstances on each and every monitoring visit. Such data is essential in terms of improving the understanding of when and why the geese chose to use the Fannyside roost area or specific parts of it, (*i.e.*, why they chose not to use the roost area at all on some occasions, and why they chose to use each or any combination of West Fannyside Loch, East Fannyside Loch or Fannyside Muir is only partially understood). Further, the need for improving the understanding of when and why

the geese chose to use the Darnrig Moss roost area, (relative to the Fannyside one), can also be added to this equation.

Table 4.1 compares the roost count totals obtained during winter 2013/2014 with those obtained in 2010/2011, 2011/2012 and 2012/2013. As suggested, the factors influencing the numbers of birds attending the roost sites each night, (as well as those affecting the recording of the same), are very complex. For example, winter 2013/2014 proved to be very different to the preceding ones, (each of which was briefly characterised in the report for 2012/2013); in comparison it was very wet and windy.

In terms of birds counted at the Fannyside roosts, the five roost counts produced a mean count of 82.6 geese, (*i.e.*, $200 + 75 + 0 + 115 + 23 = 413/5$). The standard deviation for all 5 roost count visits completed here was 71.08, which reflects the skewed sample caused by the null count. Conversely, if the null count is disregarded, the successful roost count visits produced a mean count of 103.25 geese, for which the standard deviation was 64.86.

In terms of birds counted at the Darnrig Moss roosts, the three roost counts produced a mean count of 63.3 geese, (*i.e.*, $90 + 40 + 60 = 190/3$). The standard deviation for all 3 roost count visits completed here was 20.59.

Table 4.1. Comparison of 2010/2011, 2011/2012, 2012/2013 and 2013/2014 Roost Counts

2010/2011 dates	Roost count totals	2011/2012 dates	Roost count totals	2012/2013 dates	Roost count totals	2013/2014 dates	Roost count totals*
28 October 2010	225	26 October 2011	c.220	24 October 2012	c.175	23 October 2013	c.200 (n/a)
24 November 2010	236	23 November 2011	c.78	22 November 2012	u/k	18 November 2013	c.75 (+ c.90)
22 December 2010	0	21 December 2011	160	26 December 2012	c.125	23 December 2013	0 (n/a)
20 January 2011	200	25 January 2012	0	24 January 2013	0	22 January 2014	c.115 (+ c.40)
16 February 2011	245	15 February 2012	c.170	15 February 2013	c.140	19 February 2014	23 (+ c.60)
Average (rounded up)	181	Average (rounded up)	126	Average (rounded up)	88	Average (rounded up)	83 (+ 63)

* In 2013/2014, (first time as part of the SNH monitoring work) a concerted effort was made to undertake roost counts at both Fannyside and Darnrig Moss concurrently. The counts obtained at Darnrig Moss are indicated in brackets. If these figures are included in the analysis, the overall average roost count total for both roost sites during the winter is 121.

Finally, when birds counted at both roost sites are considered, the eight individual roost counts completed produced a mean count of 75.37 geese, (*i.e.*, $200 + 75 + 0 + 115 + 23 + 90 + 40 + 60 = 603/8$). The standard deviation for all 8 roost count visits was 58.34, whilst if the null count is disregarded, the successful roost count visits produced a mean count of 86.1 geese, for which the standard deviation was 54.42.

As noted in the report for 2010/2011, this demonstrates, if nothing else, the importance, in terms of any subsequent statistical analysis, of achieving successful roost count visits.

The preceding reports indicated that any, (direct), comparison of roost count totals between one winter and the next is not valid, despite the broad similarity of dates involved, (obviously, it cannot be assumed that a very similar total will be recorded from year-to-year on similar dates).

However, with the exception of the October count, the roost count totals recorded in winter 2013/2014 were generally lower than those recorded in the preceding winters, especially if the supplementary counts at Darnrig Moss are not included.

No dawn roost counts were completed as part of the SNH monitoring during winter 2013/2014. It was generally confirmed that geese arriving at the roost sites did so approximately 45 minutes after sunset.

As was detailed in the SNH monitoring report for winter 2010/2011, it is useful to consider the roost counts made during the SNH monitoring in the context of the field counts and roost counts made as part of the BGAG monitoring, (and also in the context of any field counts made before the roost counts made as part of the SNH monitoring). For example, as suggested in the 2010/2011 report, for the reasons outlined, if visits such as the December roost count was conducted and reported in isolation, (without the knowledge gained during other, previous and concurrent, BGAG visits to the plateau), this report could potentially include a null count, (or even a series of null counts), without any explanation.

Therefore, the following section discusses in more detail how the findings of the SNH monitoring effort relate to those of the BGAG one, and *vice versa*, and discusses what the findings of the SNH monitoring programme can be used to indicate, and, perhaps even more importantly, what they cannot.

During the 2013/2014 winter period, updated tracking data records were again frequently made available, and informed both the undertaking of the roost count visits, and the interpreting of the circumstances recorded. As such, this data both complemented and supplemented that available from the BGAG monitoring. It is not proposed to provide more detail about this here, nor is it considered appropriate to do so. As has already been indicated the findings of the tracking data will be reported separately elsewhere. However, it should be reiterated here that this new innovation has been a benefit to monitoring the Slamannan Plateau bean geese population, in ways that have been both confirmatory, in terms of what was already known due to the monitoring efforts of AM and others, but also revelatory, in terms of significantly adding to this knowledge. For example, in terms of roosting behaviour alone it has again revealed more about use of alternative roosts such as Darnrig Moss.

4.4 Findings in the Context of the BGAG Monitoring Data

Figure 4.1, provides a graph illustrating data gathered during SNH roost counts, (red columns), compared to that gathered from all BGAG monitoring, (*i.e.*, field and roost), counts, (blue columns).

All five SNH roost counts can be seen, (although that for December is evident only as a small red dot denoted 0). The BGAG counts, (whether relating to feeding flocks located during the day, or to roosting flocks recorded in the Fannyside roost area close to dawn or dusk, *etc.*), are obviously much more numerous, but are, broadly, in a similar range. This takes into consideration that not all of the birds might be recorded during the day. Once the flock begins to break up after feeding, almost exclusively in the Luckenburn fields for the first few weeks of the wintering period, not all sub-flocks, (or indeed no birds at all), might be located on some visits, especially when birds are using feeding areas that are not accessible / viewable. Conversely, and certainly before the birds started using alternative roost sites on a more frequent basis, a good roost count might involve counting or estimating 'all' of the bean geese present on the plateau as they arrive or leave the roost area, (hence the October roost counts completing as part of the SNH monitoring during winter 2013/2014 producing totals in excess of the BGAG monitoring counts conducted at a similar time; at this stage of the winter most, if not all, of the birds were feeding at Luckenburn and / or Tippetcraig / Beam Farm and so were roosting at the Fannyside sites).

In addition to showing the variation in count totals achieved on the many BGAG and the few SNH visits to the roost and / or plateau that were completed throughout the winter, (both in terms of variation of the number of birds successfully located and counted and / or estimated, and also, possibly, in terms of actual changes in the number of birds present of the Plateau), the graph also demonstrates the:

- Large difference in survey effort deployed in terms of the BGAG survey effort compared to the SNH one, both overall, and indeed, each month;
- Roost counts in October, November, January and February, (*i.e.*, each of the successful roost counts), which were comparable with field counts at this time but decreased during the winter, possibly reflecting the fact that some of the flock was roosting, and indeed feeding, elsewhere, (and as such was often not located / counted during the field and roost counts);
- Series of good counts achieved, (at Luckenburn), in mid-October, reflecting not just the relative ease of obtaining counts at this time and at this place, but also the increased field effort during the work aimed at catching and marking bean geese involving the WWT;
- Relative paucity of any counts during parts of the winter, including parts of November and January, when, in part, the birds could not be readily located on the plateau; and,
- That the peak count of c.237 obtained in November is evident in the graph as it involved one individual field count. However, it should be noted that in other instances high day totals may not be evident as the BGAG monitoring concentrates on providing counts for readily identifiable geographical features, (mainly individual 'fields', but also various muirs and the Fannyside lochs, for instance), and as such each individual count is represented by one column as these are not summed. This peak count is broadly similar to the highest count totals achieved in both 2011/2012 and 2012/2013 of c.238 and c.233 respectively.

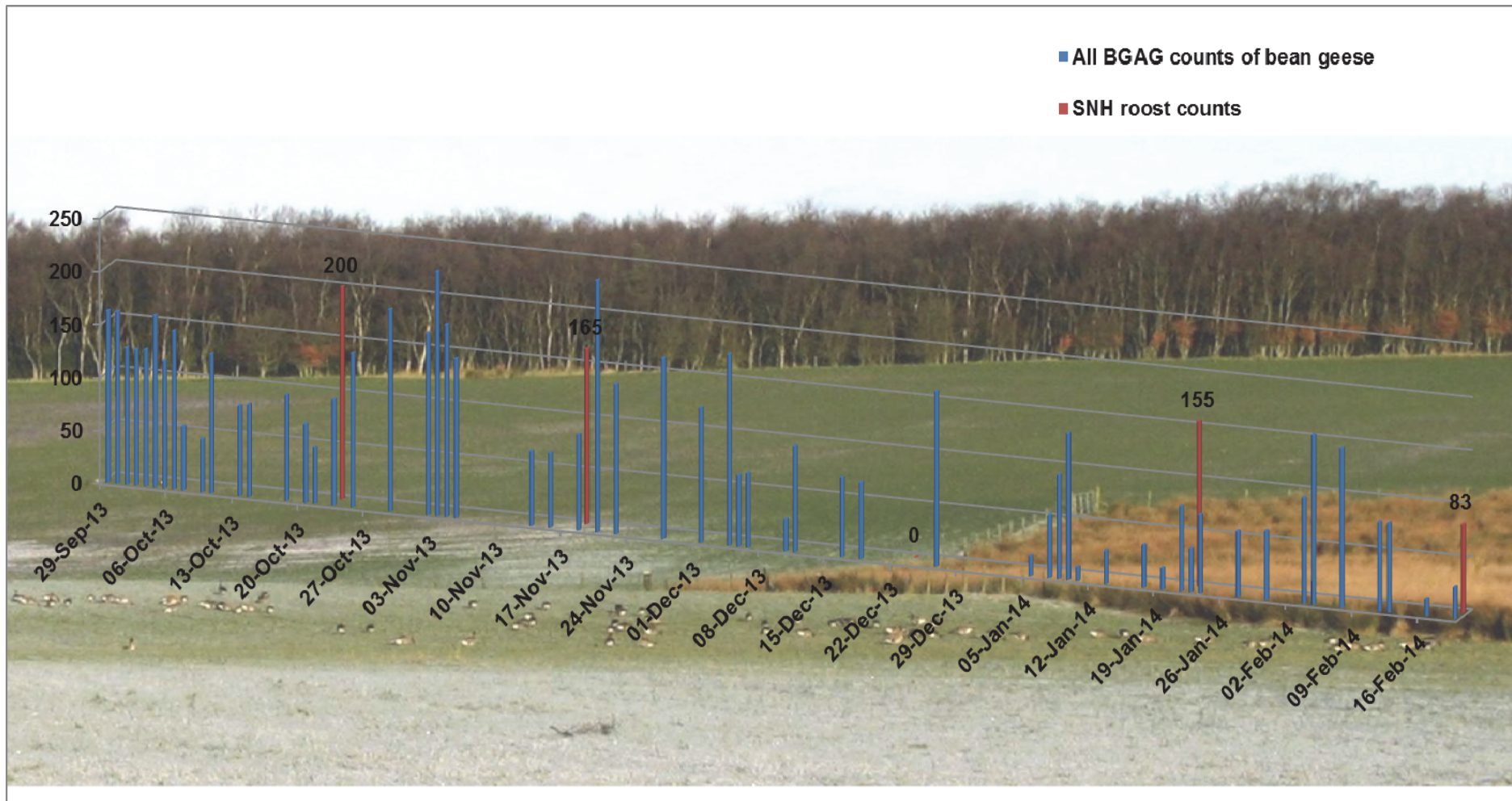


Figure 4.1. Graph illustrating data gathered during SNH roost counts compared to that gathered from all BGAG counts

Note: the December roost count, in effect, returned a null count and as such does not appear as a red column.

The SNH monitoring does provide useful data relating to an ageing assessment count and five roost counts. However, it does not provide any information relating to the wider use of the plateau, (and therefore for much of the Slamannan Plateau SSSI / SPA), beyond the localised roosts within the designated site. This issue is discussed more fully in the 2010/2011 report, but is re-emphasised here, not least because in winter 2013/2014 there was again very good evidence that at least parts of the Slamannan Plateau bean goose population were using alternative roost sites in particular Darnrig Moss.

As a result, (as was stressed in the 2010/2011 report), where the birds are when not roosting and when they are feeding is only known due to the BGAG monitoring effort and, also, nowadays, the tracking data. These components of the overall monitoring effort are therefore crucial in terms of understanding which fields on the plateau, (and within the areas designated as the Slamannan Plateau SSSI / SPA), are being used each winter, (and therefore, potentially, how this may change in the future). Indeed, in winter 2013/2014 there was some strong evidence of how dynamic this situation is.

The 2011/2012 SNH monitoring report noted that it has been apparent in the past few winters that there has been a shift in favoured feeding areas of the bean geese since the establishment of the SSSI / SPA. This was devised on the basis of good evidence of preferred feeding areas in the 2000/2001 – 2004/2005 period.

The same report also noted that for the first time since the 1990s, at least some of the population of bean geese wintering on the Slamannan Plateau was regularly feeding in fields to the east of the B803 during part of the winter, and further, this sub-flock was probably roosting at Darnrig Moss at this time. These areas are at least 3 km beyond the boundaries of the Slamannan Plateau SSSI / SPA. This pattern of activity has both continued and increased in subsequent winters, including the one considered in this report. This pattern of field usage – and use of the alternative roost site – continued during winter 2013/2014. It is not intended to describe such changes here, but in winter 2013/2014 the bean geese were recorded feeding in a whole series of new fields to the north and east of the study area. Ongoing BGAG and other monitoring work illustrates that the situation is very dynamic.

The 2010/2011 SNH monitoring report also indicated that the BGAG monitoring effort provides other important information relating to the status of bean geese on the plateau. For example, the dates the wintering population arrive and leave, any records of other goose species such as greylag geese and pink-footed geese on the plateau, (unless such records were made during the SNH roost counts), and disturbance.

Finally, the 2012/2013 SNH monitoring report also referenced both the data which is now available as a result of the tracking of some of the geese and also the work which was being undertaken to provide a comprehensive database of monitoring data. It commented that each of these approaches contribute to the overall understanding of the Slamannan Plateau bean goose population, and each complements the others, and also indicated that it may be appropriate to re-appraise the efficacy of the SNH monitoring effort in future years given the findings of recent winters, and in light of the data available from the other sources and approaches.

4.5 Summary of Trends during the Past Four Winters

This report mainly concentrates on describing and discussing the findings of the monitoring that was completed in winter 2013/2014. However, it would also seem appropriate to provide some commentary of the findings of the monitoring work completed in the past four winters.

Figure 4.2 illustrates the trends indicated by the data gathered by the SNH monitoring work during the past four winters.

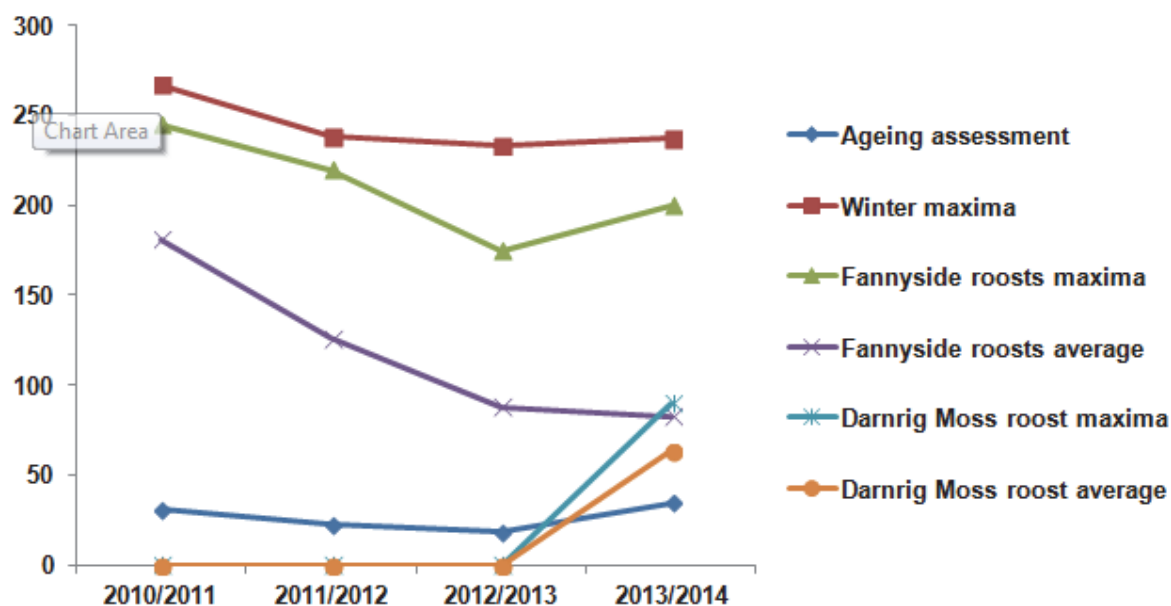


Figure 4.2. Trends over the period of four years

Throughout the programme of work undertaken over the past four winters it has always been stressed that the data obtained only provides snapshots of the phenomena being surveyed.

For example, five roost counts, particularly under the circumstances involved, (often involving bean geese and other species of geese arriving well after sunset and therefore in very poor light in what are less than ideal weather conditions), can only ever provide an indication of what is actually happening over the course of the entire wintering period, which involves some 150 nights. This is particularly the case when sometimes no birds are recorded coming in to Fannyside, or resources do not allow for Darnrig Moss (and / or other alternative roost sites) to be concurrently covered.

As such, any conclusions reached on the basis of the data assembled over the past four winters can only be indicative. Whilst every effort has been made to ensure that the ageing assessment counts and roost counts produce data which is representative, these can only ever be indicative of trends and should not be regarded as definitive.

Nonetheless, within the context of this caveat, it is still valid to discuss the apparent trends indicated by the data gathered over the past four winters. Each of the parameters detailed in Figure 4.2 is therefore discussed in the following sub-sections.

4.5.1 Ageing Assessments

At 34.5%, the proportion of juvenile birds counted in the sample part of the wintering flock examined in winter 2013/2014 was high, as the previous winter the comparable figure was 18%. Winter 2010/2011 was also comparatively high (31%), whereas that for 2011/2012 was 22.6%. Whilst breeding success and survival of juveniles obviously varies each year, the evidence obtained from typically just one ageing assessment, of what is necessarily only ever a sample of the overall wintering population can only ever be indicative. However, there is apparently no reason to have any concerns about the productivity of the Slamannan Plateau bean geese population. Although the ageing assessments involved can only ever be regarded as indicative, there does not appear to be any adverse trends.

4.5.2 Winter Maxima

As has always been stressed winter maxima are invariably derived as a result on the efforts of AM during the BGAG monitoring work, (rather than as a result of the roost counts completed as part of the SNH monitoring work). However, it is still considered valid to compare the winter maxima for each of the four winters involved here.

During this period, the highest winter maxima recorded was 267 in winter 2010/2011, and subsequently, although the winter maxima recorded have decreased, they have been remarkably consistent, *i.e.* within the range of 233 (2012/2013) to 238 (2011/2012). Again, therefore, there doesn't appear to be any adverse trend. The reduction from 267 to 238 is unexplained, and the overall reasonably constant size of wintering population does not appear to tally with the apparently good productivity.

4.5.3 Fannyside Roosts Maxima

During the past four winters of SNH monitoring work, the highest roost count at the Fannyside roosts was achieved in winter 2010/2011 when 245 birds were recorded in January 2011, which is just 22 birds less than the winter maxima for the same period. Conversely, the lowest count at the Fannyside roosts was obtained in winter 2012/2013 when 175 birds were recorded in October 2012, which is 58 birds less than the winter maxima for the same period. Although the numbers involved in terms of the recorded Fannyside roost maxima range from 175 to 245 are somewhat lower than the overall winter maxima, they are generally in the same sort of order, (*i.e.*, 200+). As such, there is apparently no adverse trend, although this is not the full picture, as is explained in the following sub-sections.

4.5.4 Fannyside Roosts Average

Some of the more recent reports in this series have suggested that it is too early to say whether the declining roost count totals at Fannyside, which have been recorded over the past few winters, are part of a real trend. They have indicated that certainly the SNH monitoring involves too few counts and produces too few instances of successful counts for it to be a representative sample of what is known to be a complex and dynamic situation. Furthermore, it has also been commented that a range of other roosting strategies and sites are increasingly being used.

The trend of the graphed average counts obtained at the Fannyside roosts over the past four winters is a downwards one. That is, over the past four winters the average number of birds recorded each winter has decreased from 181 (winter 2010/2011) to 82.5 (winter 2013/2014).

Whilst this relates to four winters, it also includes the results of 20 individual roost counts, (successful or not), and as such indicates what is probably an undeniable trend. Further, in addition to a decline in birds using the Fannyside roosts year on year, an examination of the data obtained each month within each winter indicates that whilst the Fannyside roosts continue to be the main roost area used in the earlier parts of the winter, its importance declines later in the winter, (and especially so in the past few winters).

It should be stressed that the apparent decline in use of the Fannyside Muir pools by roosting bean geese is not necessarily as a result of these pools becoming less suitable for roosting, but rather is most likely to be due to changes in preferred feeding areas, meaning that other roost sites have become preferable for at least part of the overall flock for at least part of each of the recent winters.

4.5.5 Darnrig Moss Roost Maxima and Average

As has been described, it has been apparent from both the BGAG monitoring work and the tracking data that birds have been using the Darnrig Moss roost site in the past few winters. Therefore, during roost counts undertaken in winter 2013/2014 it was attempted to cover both the Fannyside and the Darnrig Moss sites on the same night. Whilst some roost count visits were made to the Darnrig Moss area as part of the BGAG monitoring work in winter 2012/2013, no such visits were made until winter 2013/2014 as part as the SNH monitoring work, and as such, the available data only relates to the most recent winter.

Therefore, the trends of the Darnrig Moss roost maxima and average indicate an apparent increase in the past winter. However, it must be stressed that it is not known how many birds may have used the Darnrig Moss roost in previous winters, (either in general, or on the specific nights involved when counts were undertaken at Fannyside).

4.6 Other Data

As was described in the 2010/2011 SNH monitoring report, in addition to the data available as a result of the BGAG monitoring effort, data relating to the Slamannan Plateau bean goose population is available from readily available resources such as specialist e-groups and websites. Such information must be used with caution, (for the reasons described in the 2010/2011 report), but nonetheless this information is potentially useful.

As such, information from the Rare Bird Alert, (RBA), website was provided in the Appendices of the preceding reports, and Appendix B: *Other Data - Rare Bird Alert Reports of Taiga Bean Geese on the Slamannan Plateau during Winter 2013/2014*, provides the same information for winter 2013/2014.

During winter 2010/2011 there was a relative abundance of reports of bean geese on the plateau made to RBA when compared to the number of such reports in the subsequent winters. It is suggested that the relative paucity of records detailed on RBA during the winters after 2010/2011 possibly relates to a reduction in reporting of bean geese by birders engaged on surveys being undertaken on the plateau in relation to various development proposals.

AM and BCM rarely, if ever, report the sightings made during the BGAG and SNH monitoring to the likes of RBA. However, in autumn 2013 BCM liaised with RBA regarding ways in which RBA messages could be better worded to minimise local landowners concerns, and, as is indicated in Appendix B, one consequence of this is that details relating to recent sightings are now taken from the blog which is hosted and updated by AM and relayed as RBA messages.

However, and as in the preceding winters, most of the records on the RBA website for winter 2013/2014 are again largely confirmatory of the details recorded both during both the SNH monitoring and the BGAG monitoring.

5. CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

In autumn 2011 BCMESL was awarded a contract by SNH to undertake monitoring of the wintering population of taiga bean geese associated with the Slamannan Plateau SPA during winters 2011/2012, 2012/2013 and 2013/2014. This contract was preceded by a similar one which was also awarded to BCMESL to undertake the same work in winter 2010/2011.

In summary, there were two components to the SNH monitoring work, which has now been completed on the same basis each winter since winter 2010/2011. These were:

1. Conducting an ageing assessment of a proportion of the wintering population each winter through one field observation; and,
2. Providing an indication of abundance by undertaking five monthly roost counts.

This report describes the findings of this work during winter 2013/2014.

As with the preceding reports, (*c.f.* SNH Commissioned Reports Nos. 487, 607 and 608; see References and Bibliography for full details), which described the SNH monitoring work that occurred during the winter involved, (and referred to other such work as appropriate), indicated the actual approaches used during the survey visits and provided details of the results obtained during the counts involved, (including some discussion relating to these), this report has provided the same.

This section of the report attempts to summarise the key conclusions and recommendations relating to the results obtained during the current winter. It is also considered appropriate to provide conclusions and recommendations which relate to all four winters during which this monitoring has been conducted.

Therefore, it is intended that this section of the report will provide:

- Conclusions relating to the monitoring completed in winter 2013/2014;
- Conclusions relating to the entire programme of monitoring over the past four winters (including winter 2013/2014); and,
- Recommendations regarding any future monitoring, *etc.*

Each of these is addressed in the following sub-sections.

5.2 Conclusions relating to the monitoring completed in winter 2013/2014

This report provides details of the findings of the 2013/2014 SNH monitoring, which was conducted in conjunction with the BGAG monitoring. One ageing assessment count of the flock through field observation and five monthly roost counts were made. In effect, the SNH monitoring described in this report is, in part, a continuation of field research which started in January 1990, as presented in a series of annual reports, (see the corresponding report for 2010/2011 for full details of these reports).

Each of the preceding reports in this series has intimated that, despite shortcomings relating to, in particular, the efficacy of the roost counts for the reasons outlined, the two counts involved do, in general, provide representative data in relation to the parameters being measured. Specifically, these reports have increasingly emphasised that the SNH monitoring provides limited information relating to what are two very specific aspects of the Slamannan Plateau bean goose population each winter, that is:

- What proportion of the newly arrived wintering flock is comprised of juveniles; and,
- An indication of how many bean geese are roosting at the main roost sites on five nights.

Although made on the basis of a limited sample, it is considered that the efficacy of the ageing assessment count is high. However, in terms of the efficacy of the roost counts, the situation is somewhat less straightforward, as was commented in the preceding reports. As in previous winters, the number of birds counted, (or estimated), during some of the roost counts was in part informed by reports from the tracking and / or sightings of bean geese earlier that month / day, (e.g., as with the January roost count). Therefore, in winter 2013/2014, (as with the previous three winters), if roost counts alone were relied on this could potentially only provide less than five counts each winter, some of which might only be rough estimates, as the circumstances on each roost count visit varies in terms of weather, etc., and with it the accuracy of the count obtained, if indeed birds are recorded.

As an example of this, the peak count obtained during the roost counts undertaken in winter 2013/2014 *per se* was c.200. However, the overall peak BGAG count during the same period was c.237.

In isolation, then, if the SNH monitoring was the only such work being undertaken, the assumed peak count in winter 2013/2014 would be c.200, which is c.37 birds less than the peak count recorded during all monitoring work, (or only 84.39% of the 'actual' total). It has previously been suggested that this discrepancy between the peak count derived as a result of the SNH monitoring and the BGAG recorded winter maxima is the most significant 'finding' of these reports.

Despite the concerns expressed about the roost counts, it is again considered that the data generated by the counts completed in winter 2013/2014, (using the same approaches as used previously, etc.), are just as representative in terms of the data provided in relation to the wintering population size and structure of bean geese on the Slamannan Plateau as the ones obtained in previous winters.

However, it is again reiterated that these findings were very much complemented and informed by those of the BGAG monitoring work, and also by the data generated by the satellite and radio-tracking of some individual bean geese which has been available since winter 2012/2013. As was suggested in earlier reports, in isolation, the SNH monitoring has somewhat limited value, but this value is greatly increased if the findings of both the SNH monitoring and these other sources and techniques are used in close conjunction.

As such, it is again emphasised that, used in conjunction, the two different monitoring programmes provide a wealth of information about the Slamannan Plateau bean goose population, although the BGAG monitoring remains crucial to any understanding of how the bean geese are currently utilising the plateau, which is (as any natural phenomena) a dynamic situation.

This is especially so when also allied to the recent initiatives which have resulted in the individual marking with neck-collars of a total of 33 individual bean geese, and the successful fitting with telemetry devices of several of these birds, during the past three autumns. The marking and / or tracking studies, which commenced in October 2011, continue and have already provided much additional information about the Slamannan Plateau population of bean geese, including invaluable data about their movements in the area during the wintering period, and also information about the origins and movements of these geese when they are not on the plateau.

5.3 Conclusions Relating to the Entire Programme of Monitoring Over the Past Four Winters

As described in the preceding sections the current SNH monitoring work has been completed for each of the winters 2010/2011 to 2013/2014 inclusive.

As detailed in the report for 2010/2011, at the initial meeting regarding the implementing and reporting of the SNH monitoring it was agreed that it would be sensible to include some discussion in the relevant report about how successful the new approaches had been, (partly by comparing results with other data generated at the same time by the BGAG monitoring completed concurrently).

This context was indeed provided in the 2010/2011 report which concluded that the SNH monitoring effort provided reasonably representative data in relation to the wintering population size and structure.

Each of the subsequent reports reached similar conclusions. Although, it was increasingly noted that the winter maxima was invariably not provided by the roost counts, but by field counts conducted as part of the BGAG monitoring.

Section 4.5 of this report provides some basic analysis of trends over this period. In summary, these indicate that breeding success predictably varies from one year to the next; that the overall winter maxima for the period is generally in the order of 235; and that the use of the Fannyside roost sites over the period has declined, especially after the first part of each winter, as part of the wintering population increasingly uses feeding areas closer to an alternative roost site at Darnrig Moss for at least part of each winter.

It is also noted that the SNH monitoring provides little or no data in relation to the distribution of this population during the daytime, and what they are doing is largely unknown, (or is only known as a result of the BGAG monitoring, and nowadays, the tracking data). Indeed, it was previously commented that whether this situation was appropriate given the significance of the Slamannan Plateau bean goose population, and the importance of understanding how the designated site is performing, was for others to decide.

Whilst it is believed that the ageing assessment observations that have been conducted have produced representative, (and indeed, often the only), data relating to the proportion of juvenile birds in the wintering flock each winter, the previous reports have increasingly expressed increasing doubt regarding the efficacy of the roost counts.

Nonetheless, the roost counts which have been completed during the past four winters have provided good evidence that the taiga bean geese continue to use the Fannyside roost site complex within the designated site.

However, at least one roost count each winter has provided a null count, and the majority of positive results have involved count totals significantly below the winter BGAG monitoring maxima.

There has been increasing evidence during recent winters that alternative roost sites are now used by a proportion of the wintering population on at least some nights during the winter. Whilst efforts have been made to undertake roost counts at known alternate roost sites concurrently with the roost counts completed at Fannyside, it has not been possible to cover all potential roost sites on all monitoring visits.

Whilst the SNH monitoring work has produced good data relating to the age structure of the wintering population of taiga bean geese on the Slamannan Plateau each winter, it has

proved to be not the best means of obtaining evidence of the size of the wintering population.

Also, although the ageing assessment counts and the roost counts typically take place at locations which are within the SPA, (*i.e.*, at Luckenburn and Fannyside respectively), the SNH monitoring provides little or no evidence of how the bean geese use the SPA beyond these locations, which is the type of data provided by the BGAG monitoring).

The BGAG monitoring provides invaluable information relating to where at least some of the geese are on the plateau, (and in what numbers). In 2013/2014 for example, such data was gathered on c.130 days, (whether these areas are inside or outside the SSSI / SPA). In addition, the BGAG monitoring also provides a range of other useful information relating to the dates the wintering population arrive and leave, any records of other goose species and disturbance.

Since the SNH monitoring work commenced in winter 2010/2011, there have been some significant advances in our understanding of the Slamannan Plateau bean geese population.

These relate to data generated by:

1. Satellite and radio-tracking of certain individuals within the wintering population which has revealed much about the movements of certain birds within the population, (both whilst they are wintering on the Slamannan Plateau and also during migration between Central Scotland and Scandinavia and *vice versa* and breeding in Scandinavia);
2. Neck-collaring and colour-ringing certain individuals within the wintering population, (including the satellite and radio-tracked birds), which is beginning to provide information relating to population dynamics, including family relationships, *etc.*; and,
3. The data generated for the past 20 or so years by the BGAG monitoring effort, which has been assembled into a database containing all field and roost counts obtained since the early 1990s. In addition, data relating to the field units used by the geese has also been recently surveyed and is included within the same database resource.⁹

Thus, the context within which the SNH monitoring has occurred has been radically transformed since it commenced in winter 2010/2011.

As such, it is appropriate to consider here the aims of future monitoring work.

5.4 Recommendations Regarding any Future Monitoring, etc.

As has been explained, winter 2013/2014 was the last one during which the current programme of SNH monitoring was undertaken. Therefore, in January 2014, a briefing note entitled 'Site Condition Monitoring of the Slamannan Plateau SPA wintering population of taiga bean geese' was prepared for SNH by BCM to summarise the status of this work and appraise decisions regarding any future such work. This sub-section is therefore largely based on this note, together with some subsequent additions which, for example, emerged during discussions at BGAG meetings and between the various parties involved.

Monitoring of the wintering population of taiga bean geese associated with the Slamannan Plateau SPA is a requirement of the European and UK legislation which applies to the designated site. In summary, SNH are required to undertake such monitoring work to

⁹ Minshull, B.C., Mitchell, C., Maciver, A. & Griffin, L. 2014. Report on the collation of field use data relating to wintering bean geese on the Slamannan Plateau. *Scottish Natural Heritage Commissioned Report No. 711*.

validate the existence of the designated site.¹⁰ Requirements for site condition monitoring vary with the qualifying interest involved, but discussions with SNH have indicated that in the instance of the Slamannan Plateau SPA, any future monitoring should provide monthly counts and winter maxima.

Obviously, in the context of increasingly scarce resources this work must be as cost-effective as possible. Indeed, it was previously recommended that, (given what has been demonstrated to be the restricted utility of the SNH monitoring without reference to the BGAG monitoring, and given the significant advances in available data relating to the movements of the bean goose population as a result of the satellite- and radio-tracking), the scope of the SNH monitoring work should be re-appraised in the near future in the light of this fluid situation so that scarce resources can be better targeted in order to produce more useful data regarding the qualifying species of the SSSI / SPA.

Therefore, it is considered pertinent to re-consider the aims of this monitoring work here.

Ideally, (and in the context of the current monitoring), in terms of the aims of any future monitoring of the qualifying species of the SPA, (*i.e.*, taiga bean geese), it would be pertinent to continue:

1. Undertaking monitoring surveys to establish the wintering population maxima each winter, (involving monthly counts);
2. Investigating the population dynamics within this population each winter, (including productivity, familial relationships, *etc.*); and,
3. Completing monitoring surveys, (and undertake other work), to establish the distribution of the wintering population relative to the designated area of the SPA, (including preferred feeding and roosting areas).

The SNH monitoring conducted over the past four winters worked in conjunction with the BGAG monitoring, and was also increasingly influenced by data available from the tracking, (*e.g.*, for example, WWT often supplied evidence of the whereabouts of tagged birds on nights preceding the roost count visits).

As such, the SNH monitoring completed over the past four winters was very much a component of the overall monitoring and researching effort that is now successfully in place regarding this very important population of taiga bean geese which has been wintering in central Scotland since at least the late 1980s.

This work has proved to be invaluable, and indeed, having attended a workshop on taiga bean geese, it was recently remarked that the Slamannan Plateau sub-population of taiga bean geese was the best known one in the entire range of the species, (Carl Mitchell, *pers comm.*).¹¹ This is, in no small part, due to the population being an extremely small one compared to that of the rest of the range, which winters in a very closely defined area of a relatively populous country.

¹⁰ <http://www.snh.gov.uk/protecting-scotlands-nature/protected-areas/site-condition-monitoring/>

¹¹ An African-Eurasian Waterbird Agreement, (AEWA), International Single Species Action Planning Workshop for the Taiga Bean Goose (*Anser f. fabalis*) took place on the 12 – 14 of November 2013 in Tuusula, Finland. The meeting was hosted by the Finnish Ministry of Agriculture and Forestry and the Finnish Wildlife Agency and was attended by representatives from 11 of the 14 principal range states for the species as well as representatives from the international conservation and hunting communities and the United Nations Environment Programme (UNEP)/AEWA Secretariat. This action-planning process is the first of its kind under AEWA as it deals with a declining population for which an adaptive harvest framework is foreseen to be developed.

Nonetheless, the data generated by the recent tracking has revealed invaluable new evidence about the geese, it has also demonstrated that the, 'more we know, the less we know'.

It is therefore advocated that, as far as practicable, all elements of this excellent work are continued. However, it is also suggested that efforts are made to ensure that the various elements are more closely integrated and more carefully targeted.

For example, the key parameter in terms of site condition monitoring, the winter maxima of the population of bean geese, has invariably provided by the BGAG monitoring, (and similarly, ageing assessment counts have often been jointly provided by both AM and WWT), rather than by the SNH monitoring.

Further, the SNH monitoring has been jointly carried out by BM and AM, (who also undertakes the BGAG monitoring effort), and, as has been indicated, is very much informed by both the findings of the tracking undertaken by WWT, (and largely funded by SNH), and the monitoring undertaken of behalf of BGAG.

Given that the wintering population of taiga bean geese is very important and behaves in a dynamic way and continues to be impacted by developments on the plateau, it is vital that this monitoring work is continued.

The monitoring also needs to be both flexible and responsive in relation to the changing usage patterns of the available feeding and roosting habitats on the Plateau, and to be responsive to the new sources of data available from the innovative tracking work.

The key aims of any future monitoring could be:

1. Investigating all preferred feeding areas throughout the winter, whether within the SPA or not, to establish how the wintering population utilises these areas;
2. Determining what happens to a component of the wintering population each winter, (although the winter maxima is reasonably closely defined early each winter, a large proportion of the wintering population then goes 'missing');
3. Investigating the use of alternative roost sites, (and, as necessary, ensuring these are protected, for example at Darnrig Moss SSSI); and,
4. Continuing to determine the productivity of the wintering population, using the same approaches used successfully for the past few winters, (and investigating why the population doesn't increase substantially despite reasonably high productivity and apparently low mortality).

In addition, the previously mentioned work reported by Minshull, *et al.* (2013), involves the creation of a database which finally incorporates most of the existing bean goose count data into one place, which includes details of the field characteristics of all of the fields on the Slamannan Plateau and the creation of a website to provide information about the Slamannan Plateau bean geese. As such, this resource provides the basis for more research into habitat preferences and the way in which this has been subject to a process of continual but gradual changes throughout the BGAG monitoring period, as well other valid areas of research such as usage of the habitats within SPA and outwith the designated site, *etc.*

This report also makes a series of recommendations, some of which include:

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

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

Finally, the last of these recommendations proposes:

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, is more precisely targeted at specific 'gaps' in the knowledge base or the purposes of, for example, Site Condition Monitoring.

Such aims are all considered valid. For example, given the apparent 'flux' in the structure and size of the wintering population of bean geese on the Slamannan Plateau which has been indicated by the ageing assessment counts discussed in sub-section 4.5.1 of this report, Carl Mitchell has previously commented that the next few years will be interesting in terms of establishing how such changes continue to manifest themselves.

Also, the preparation of a database incorporating the details of the field characteristics of all of the fields on the Slamannan Plateau which was completed in winter 2012/2013 provides the opportunity for an interesting comparative study as this database involves broadly the same parameters to those collated by Smith, *et al.* (1994). As discussed at a recent BGAG meeting, it is possible that such work could comprise the basis for student research project.

It is also recommended that consideration be given to funding for future tagging of bean geese, but equally, it might be appropriate to attempt to source funding to enable the writing up of all the newly available tracking and other data.

Further, given current strictures on conventional sources of funding it may be necessary to seek alternatives. For example, given the ongoing pressure on the Slamannan Plateau created by proposed wind energy developments SNH recently prepared a protocol outlining the requirements for ornithological survey work which would be required in relation to any proposed wind energy developments on the Plateau.¹²

This work will necessarily generate large amounts of survey data, which could prove useful in its own right. This coordinated approach to dealing with potential wind energy development on the plateau may also provide more opportunities for prospective developers to provide funding for further tagging work from which they may benefit, (as such work necessarily informs both the preparation and consideration of any assessments prepared in support of such planning applications).

Finally, subsequent to the preparation of the briefing note which was previously referenced, SNH requested a short proposal indicating a way ahead for any future monitoring. This has yet to be prepared, but will be based on the recommendations contained within this report.

¹² Draft SNH Guidance on Bean Goose Survey Effort Required to Inform Impact Assessment of On-shore Wind Turbines

6. REFERENCES AND BIBLIOGRAPHY

BCM Environmental Services Limited. 2013. Report on the delivery of a monitoring programme for bean goose on the Slamannan Plateau 2012/2013. *Scottish Natural Heritage Commissioned Report No. 608*.

BCM Environmental Services Limited. 2013. Report on the delivery of a monitoring programme for bean goose on the Slamannan Plateau 2011/2012. *Scottish Natural Heritage Commissioned Report No. 607*.

BCM Environmental Services Limited. 2011. Report on the delivery of a monitoring programme for bean goose on the Slamannan Plateau 2010/2011. *Scottish Natural Heritage Commissioned Report No. 487*.

Hearn, R.D., 2004. *Bean Geese, Anser fabalis in Britain and Ireland 1960/61 – 1999/2000*. Waterbird Review Series. The Wildfowl and Wetlands Trust/Joint Nature Conservation Committee, Slimbridge.

Holt, C.A., Austin, G.E., Calbrade, N.A., Mellan, H.J., Mitchell, C., Stroud, D.A., Wotton, S.R. & Musgrove, A.J. 2011. Waterbirds in the UK 2009/10: The Wetland Bird Survey. BTO/RSPB/JNCC, Thetford.

Maciver, A. & Wilson, T. 2014. *Population and Distribution of Bean Geese in the Slamannan Area 2013/2014*. The Bean Goose Action Group.

Maciver, A. & Wilson, T. 2013. *Population and Distribution of Bean Geese in the Slamannan Area 2012/2013*. The Bean Goose Action Group.

Maciver, A. & Wilson, T. 2012. *Population and Distribution of Bean Geese in the Slamannan Area 2011/2012*. The Bean Goose Action Group.

Maciver, A. & Wilson, T. 2011. *Population and Distribution of Bean Geese in the Slamannan Area 2010/2011*. The Bean Goose Action Group.

Minshull, B.C., Mitchell, C., Maciver, A. & Griffin, L. 2014. Report on the collation of field use data relating to wintering bean geese on the Slamannan Plateau. *Scottish Natural Heritage Commissioned Report No. 711*.

Smith, T., Bainbridge, I. & O'Brien, M., 1994. *Distribution and Habitat Use by Bean Geese in the Slamannan area*. RSPB report to SNH.

In addition, the report for winter 2010/2011 provides a comprehensive list of the various annual bean goose monitoring reports, and should be referred to for confirmation of the full details of these reports which describe the monitoring effort in winters before 2010/2011.

APPENDIX A: DETAILS OF BEAN GOOSE COUNTS

Table A.1. Ageing Assessment Count

11 October 2013 – am – Ageing Assessment Count – Survey Activities and Observations

87 bean geese were aged at around 09.50 in the morning in Field 101 at Easter Jawcraig. Of these, 30 were aged as juveniles (c.34.5%). This ageing count was conducted by AM.

The prevailing weather conditions were very suitable for an ageing count, as it was both sunny and calm. In addition, the flock was within 250 m in what is an improved field, meaning that birds were readily viewable.

This ageing count provided a very high figure for the proportion of the flock that was comprised of juveniles.

Further, although it was not possible for Carl Mitchell, Principal Research Officer – Waterbird Monitoring, WWT, to undertake any an ageing count whilst visiting the plateau to undertake a further cannon-netting and ringing and marking exercise on the October 2013, his WWT colleague Larry Griffin – Principal Species Research Officer at Caerlaverock Wetland Centre, was able to count the numbers of juveniles with pairs of adults around this time.

This brood count was completed at around 16.00 in the afternoon on the 29 October when there was a flock of 190 birds in Field 9 at Luckenburn Farm. Family parties which involved 5, 3, 3, 2, 2, 1 and 1 juvenile respectively were noted. Weather conditions were again favourable for this count.

17 juveniles in 7 broods computes as a mean number of juveniles with adults of 2.42, which compares very favourably to that recorded in winter 2012 – 2013, when the same figure was computed as 2.0.

Both of these counts are included here to indicate that the 2013 breeding season may well have been a very productive one on the basis of the evidence obtained as a result two separate exercises aimed at providing a measure of the productivity of the Slamannan Plateau taiga bean geese in 2013.

Table A.2. Roost counts

23 October 2013 – pm – October Roost Count – Survey Activities and Observations

Roost count total: c.200 birds estimated

Prior to the roost count AM observed c.100 bean geese in Field 9 at Luckenburn Farm.

It was decided to observe birds arriving at the Fannyside roost sites from just north-west of the bend in the Garbethill road.

At 19.00 c.200 birds came into roost, arriving in two skeins and alighting on the Muir; these were comprised of the c.100 birds from Luckenburn Farm arriving from the south, and a further c.100 birds arriving from the north-east. The two groups merged on arriving at the muir. By the time these birds arrived it was dark, and as such only silhouettes of the birds were visible against the light of the urban areas to the west. In these conditions it was not possible to accurately count the geese.

No other goose species were observed.

The weather at the time of the survey visit, (and earlier), was reasonable for the roost count. The general weather situation involved low pressure centred to the north of Scotland which was tracking north eastwards. This weather system was producing strong westerly winds in Scotland. More specifically, there was a north westerly wind, which was considered to be Force 4 or 5 when the roost visit commenced at 17.00. There was broken cloud cover and there were intermittent light showers of rain throughout the survey visit. The temperature was 8°C.

The sunset locally was estimated to be at 17.56. As such, the birds came in between about 60 and 65 minutes after sunset. The roost count visit was concluded at 19.10.

Table A.2. (cont.) Roost counts

18 November 2013 – pm – November Roost Count – Survey Activities and Observations	Roost count total: c.75 birds at Fannyside roosts plus c.90 birds at Darnrig Moss
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In the weeks preceding the roost count evidence obtained as a result of the satellite-tagging of bean geese in autumn 2013 indicated that at least one of the birds had been frequently feeding in the fields east of the Slamannan - Falkirk road and then roosting on the pools at Darnrig Moss. In addition, for example, on 13 November AM and BCM recorded c.60 birds feeding in Field 166G at Strathavon Farm. For this reason, it was decided to undertake the November roost count at both Fannyside and Darnrig Moss. Further, prior to the roost count AM counted c.90 bean geese in Field 166D at Strathavon Farm at 15.40 and 17 bean geese in Field 285A at Threapmuir.

Therefore, on the evening of the roost count AM was positioned at High Stanerig between Fields 163 and 165 in case any birds that had been feeding in adjacent areas to the west flew in to the Darnrig Moss roosts from this direction. Concurrently, BCM was positioned to observe birds arriving at the Fannyside roost sites in Field 30, just south of the boundary with Field 39, north-west of the bend in the Garbethill road. In the event, as detailed here, birds were recorded at both locations by AM and BCM.

At 16.55 c.90 bean geese were observed by AM flying east towards Darnrig Moss where they were suspected to have roosted on the largest of the pools within Field 117, (that north of the former mine-workings and west of Darnrig Farm). As this undoubtedly related to the flock of birds seen earlier at Field 166D, observations here ceased soon afterwards.

Meanwhile, at 17.02 8 bean geese were observed by BCM flying on to East Fannyside Loch from the south-east. Shortly afterwards 17 bean geese were watched flying on to Fannyside Muir from the east; this undoubtedly related to the flock of birds seen earlier at Field 285A. Finally, at 17.23 a flock of bean geese estimated as c.50 was recorded as they were flying on to Fannyside Muir from the north-east, possibly from the Garbethill / Beam Farm directions. Observations here ceased soon afterwards, by which time it was some 90 minutes after sunset.

According to the BBC Weather website sunset in Slamannan was 16.03. The weather at the time of the counts was ideal; although cold there was very little wind and cloud, and there was a full moon. Cloud cover was non-existent or minimal; it was noted as 0/8's. The wind was a very light north-westerly; it was just force 1 during the survey. The birds that came into roost did so an hour after sunset, which may well have been as result of the clear and moonlit conditions, as this was perhaps relatively late compared to normal.

Table A.2. (cont.) Roost counts

23 December 2013 – pm – December Roost Count – Survey Activities and Observations Roost count total: 0

Prior to the roost count it was not possible to undertake a search for any feeding bean goose flocks.

On this occasion, it was decided to observe birds arriving at the Fannyside roost sites from the site of the former peat-workings east of the Fannyside Muir road and it was not possible to cover both this site and Darnrig Moss. AM arrived on site at 16.15, well before dusk, and stayed on site until 17.10 but no bean geese arrived on any of the usual Fannyside roost sites.

Therefore, it was assumed that any flocks which had been feeding at various locations on the Plateau earlier in the day had opted to remain there overnight.

According to the BBC Weather website sunset in Slamannan was 15.43. The weather was reasonable at the time of the survey but had not been earlier in the day; the day had been both very windy and very showery. The cloud cover was 5/8's, there was a southerly wind of Force 5 or 6 and the temperature was about 8°C. There were occasional showers.

Table A.2. (cont.) Roost counts

22 January 2014 – pm – January Roost Count – Survey Activities and Observations	Roost count total: c.115 birds at Fannyside roosts plus c.40 birds at Darnrig Moss
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As with earlier in the winter, in the days preceding the roost count there was evidence that some birds were still feeding in the fields east of the Slamannan - Falkirk road during the day, and so were likely to be roosting on the pools at Darnrig Moss at night. For example, at around midday on the day before the roost count, AM recorded c.62 birds feeding in Field 264 at Wester Jaw, 7 birds feeding in Field 255 at Hillend, as well as other birds further north and west on the plateau, specifically, 17 birds feeding in Field 38 at Easter Fannyside, and, later the same afternoon, c.80 birds feeding in Field 357 at Wester Lochgreen. Further, prior to the roost count itself, AM counted c.28 bean geese in Field 166D at Strathavon Farm and subsequently, after these and other birds had moved, BCM counted c.46 bean geese in Field 163 at Strathavon Farm. For this reason, it was again decided to undertake the January roost count at both Fannyside and Darnrig Moss.

Therefore, on the evening of the roost count AM was positioned to observe birds arriving at the Darnrig Moss roosts in the north east corner of Field 124, some way south east of the brick-works at Jawcraig, in case any birds that had been feeding in adjacent areas to the east flew in to the Darnrig Moss roosts from this direction. Concurrently, BCM was positioned to observe birds arriving at the Fannyside roost sites in north west corner of Field 31, just south of the boundary with Field 39, north-west of the bend in the Garbethill road. Again, in the event, birds were indeed recorded at both locations.

At 17.20 c.40 bean geese were observed by AM flying east towards Darnrig Moss, where they were suspected to have roosted on the small pool on the boundary of Darnrig Moss with Field 118, (to the east of the former brick-works). This possibly related to the flock of birds seen earlier in fields at Strathavon Farm although could equally have been another flock of similar size, as they came from a different direction to that which might be expected given where these birds had last been seen. If this was so the c.46 birds that had been in Field 163 earlier may have roosted on one of the pools further east on Darnrig Moss. Meanwhile, at 17.20 c.80 bean geese were observed by BCM flying on to East Fannyside Loch from the north-east and soon afterwards, at 17.22, a further c.35 bean geese were watched flying on to Fannyside Muir, again from the north-east. As such it was assumed that these birds were possibly from the Garbethill / Beam Farm directions. Observations ceased at 17.30 and 17.35 respectively, by which time it was some 60 or 65 minutes after sunset.

The time of sunset in Slamannan was 16.27. The weather at the time of the survey visit, (and earlier), was reasonable for the roost count. The general weather situation involved high pressure centred over Scandinavia and a series of low pressure systems and associated fronts which were tracking eastwards over the UK, which were producing south westerly winds in Scotland. More specifically, there was a south westerly wind, which was considered to be Force 2 or 3 when the roost visit commenced at 16.30. There was complete cloud cover and were intermittent light showers of rain throughout visit, (and heavier ones immediately afterwards). The temperature was c.6°C.

Table A.2. (cont.) Roost counts

19 February 2014 – pm – February Roost Count – Survey Activities and Observations

Roost count total: 23 birds at Fannyside
roosts plus c.60 birds at Darnrig Moss

As with earlier in the winter, in the days preceding the roost count there again was evidence that some birds were still feeding in the fields east of the Slamannan - Falkirk road during the day, and so were likely to be roosting on the pools at Darnrig Moss at night. For example, on the 4 February BCM recorded c.160 birds feeding in Field 360 at Greencraig Farm whilst on the 11 February AM recorded 84 birds in Field 113 (immediately alongside the B803) and on the 12 February AM and BCM recorded c.80 birds in the same field. Prior to the roost count itself though, both AM and BCM had independently searched the plateau for signs of bean geese without success, although BCM did locate three other geese species on the margins of the study area. However, shortly before the February roost count commenced, AM observed 30 bean geese alighting in Field 166G just to the south of Darnrig Moss.

As such, it was again decided to undertake the February roost count at both Fannyside and Darnrig Moss. Therefore, on the evening of the roost count AM was positioned to observe birds arriving at the Fannyside roost sites in north east corner of Field 30, just south of the boundary with Field 39, north-west of the bend in the Garbethill road. Concurrently, BCM was positioned to observe birds arriving at the Darnrig Moss roosts in the south east corner of Field 107, just north east of the brick-works at Jawcraig, in case any birds that had been feeding at Beam Farm / Tippetcraig to the north-west or in adjacent areas to the south of Jawcraig flew in to the Darnrig Moss roosts from these directions. The roost count was completed between approximately 17.35 and 18.35, and again, in the event, birds were indeed recorded at both locations. In addition, skeins of c. 60 pink-footed geese were seen flying north at both locations as the roost counts were undertaken; similar skeins were seen doing the same earlier in the day.

The only group of geese arriving in the Fannyside roosts area were 23 bean geese which arrived from the north east and alighted on East Fannyside Loch at 18.00. Meanwhile, at the Darnrig Moss roosts area to the east of BCM the initial arrival involved 2 Canada geese which were heard calling as they arrived at 18.03. These birds were not actually seen, but it was assumed that they were the pair that had been seen earlier in Field 367. The next group of geese arriving in the roost area were c.30 bean geese which arrived from the south at 18.16; these birds had probably been feeding at Strathavon Farm. These were followed by what was strongly suspected to be c.30 more bean geese which arrived from the north or north-east at 18.18; it is possible that these birds had been feeding in the 'new' fields north of the B803. Finally, 3 greylag geese arrived at 18.25.

The weather was relatively mild, (c.6°C), and it was largely overcast with earlier light showers and low cloud / mist over the east and north parts of the plateau. The wind was westerly 1-2. Sunset in Slamannan was at 17.27.

APPENDIX B: OTHER DATA - RARE BIRD ALERT REPORTS OF TAIGA BEAN GEESE ON THE SLAMANNAN PLATEAU DURING WINTER 2013/2014

Note that, unlike in previous winters, these records include counts obtained by AM / AM and BCM as the details of some of the BGAG monitoring work was regularly posted on the blog maintained by AM (<http://beangoose.blogspot.co.uk/>) and this information was then taken from there and used by RBA in several instances.

All reports for Clyde area, (i.e., within North Lanarkshire Council boundaries), during winter 2013/2014

Note that the sequence of dates is not chronological.

Taiga Bean Goose <u>Cumbernauld,</u> (Clyde) refers to : "In Afternoon"	Sent: Wed 8-Jan-14, 10:44pm Clyde 14.Taiga Bean Geese 3mls SE of Cumbernauld in field just east of Eastern Fannyside Farm this a'noon
Taiga Bean Goose <u>Fannyside Lochs,</u> (Clyde) refers to : "Recently"	Sent: Sat 22-Feb-14, 10:26am Clyde/Forth 23.Taiga Bean Geese recently East Fannyside Loch roosted. 60.Taiga Bean Geese Darrnigg
Taiga Bean Goose <u>Fannyside Lochs,</u> (Clyde)	Sent: Mon 30-Sep-13, 3:20pm Clyde/Forth 154.Taiga Bean Geese Fannyside Lochs at Luckenburn Farm at 2.15pm
Taiga Bean Goose <u>Fannyside Lochs,</u> (Clyde)	Sent: Tue 1-Oct-13, 1:18pm Clyde/Forth 120.Taiga Bean Geese still Fannyside Lochs north of B803 in fields opposite Luckenburn Farm entrance viewable from road
Taiga Bean Goose <u>Fannyside Lochs,</u> (Clyde) refers to : "Recently"	Sent: Fri 4-Oct-13, 10:13pm Clyde 158+Taiga Bean Geese recently 1.5mls SE of Fannyside Lochs north of B803 in field opposite Luckenburn Farm. Park carefully NS.823.723
Taiga Bean Goose <u>Fannyside Lochs,</u> (Clyde)	Sent: Sun 13-Oct-13, 4:30pm Clyde 6.Tundra Bean Geese 3/4mls SE of Fannyside Lochs south of Fannyside Mill +4.Taiga Bean Geese NS.814.728
Taiga Bean Goose <u>Fannyside Lochs,</u> (Clyde) refers to : "In Afternoon"	Sent: Sun 27-Oct-13, 10:31pm Clyde/Forth 100+Taiga Bean Geese still Fannyside Lochs north of B803 in fields opposite Luckenburn Farm entrance viewable from road this a'noon
Taiga Bean Goose <u>Fannyside Lochs,</u> (Clyde)	Sent: Thu 31-Oct-13, 10:50am Clyde/Forth 180+Taiga Bean Geese Fannyside Lochs north of B803 in fields opposite Luckenburn Farm entrance viewable from road
Taiga Bean Goose <u>Fannyside Lochs,</u> (Clyde) refers to : "Recently"	Sent: Tue 7-Jan-14, 6:03pm Clyde/Forth 59.Taiga Bean Geese recently near Fannyside Lochs. 34.Taiga Bean Geese Wester Jawcraig Farm. 8.Taiga Bean Geese SE of Castle Cary near Bandominie Farm
Taiga Bean Goose <u>Luckenburn,</u> (Clyde)	Sent: Wed 6-Nov-13, 11:05pm Clyde 170.Taiga Bean Geese 1.5mls SE of Fannyside Lochs north of B803 in field opposite Luckenburn Farm. Park carefully NS.823.723
Taiga Bean Goose <u>Luckenburn,</u> (Clyde)	Sent: Thu 7-Nov-13, 6:13pm Clyde 170+Taiga Bean Geese 1.5mls SE of Fannyside Lochs still north of B803 in field opposite Luckenburn Farm at 2pm. Park carefully NS.823.723
Taiga Bean Goose <u>Luckenburn,</u> (Clyde)	Sent: Wed 2-Oct-13, 10:44pm Clyde 125.Taiga Bean Geese 1.5mls SE of Fannyside Lochs north of B803 in field opposite Luckenburn Farm at 2.15pm. Park carefully NS.823.723
Taiga Bean Goose <u>Luckenburn,</u> (Clyde)	Sent: Fri 4-Oct-13, 8:55am Clyde 148.Taiga Bean Geese 1.5mls SE of Fannyside Lochs north of B803 in field opposite Luckenburn Farm at 8am. Park carefully NS.823.723

All reports for Forth area, (i.e., within Falkirk Council boundaries), during winter 2013/2014

Taiga Bean Goose	Sent: Thu 10-Oct-13, 10:33pm
Slamannan, (Forth)	Forth 131.Taiga Bean Geese 2mls north of Slamannan off B803 in fields at Jawcraig
Taiga Bean Goose	Sent: Sun 13-Oct-13, 4:33pm
Slamannan, (Forth)	Forth 85.Taiga Bean Geese 1.5mls NNW of Slamannan south of Jawcraig (+juv.Eurasian White-fronted Goose juv.Pink-footed Goose) NS.845.749
Taiga Bean Goose	Sent: Sun 13-Oct-13, 4:33pm
Slamannan, (Forth)	Forth 75.Taiga Bean Geese 1.5mls WNW of Slamannan south of Shortrig NS.833.738
Taiga Bean Goose	Sent: Mon 25-Nov-13, 9:03pm
Slamannan, (Forth) refers to : Thu 21-Nov-13	Forth 237.Taiga Bean Geese on Thursday near Slamannan
Taiga Bean Goose	Sent: Mon 2-Dec-13, 7:26pm
Slamannan, (Forth) refers to : Sun 1-Dec-13	Forth 214.Taiga Bean Geese y'day NW of Slamannan early a'noon
Taiga Bean Goose	Sent: Mon 13-Jan-14, 11:12am
Slamannan, (Forth) refers to : Thu 9-Jan-14	Forth/Clyde 211.Taiga Bean Geese on Thursday Slamannan Plateau
Taiga Bean Goose	Sent: Sun 19-Jan-14, 10:34pm
Slamannan, (Forth) refers to : "In Afternoon"	Forth 86.Taiga Bean Geese 1ml NNW of Slamannan this a'noon
Taiga Bean Goose	Sent: Mon 20-Jan-14, 10:23pm
Slamannan, (Forth) refers to : "In Afternoon"	Forth 18.Taiga Bean Geese 2mls north of Slamannan at Jawcraig this a'noon
Taiga Bean Goose	Sent: Thu 30-Jan-14, 9:34am
Slamannan, (Forth) refers to : "Recently"	Forth c84.Taiga Bean Geese recently north of Slamannan still

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