



Breeding success of
Greylag Geese on the
Outer Hebrides, September 2016

Wildfowl & Wetlands Trust Report

Author
Carl Mitchell

September 2016

© The Wildfowl & Wetlands Trust

All rights reserved. No part of this document may be reproduced, stored in a retrieval system or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording or otherwise without the prior permission of the copyright holder.

This publication should be cited as:

Mitchell, C. 2016. *Breeding success of Greylag Geese on the Outer Hebrides, September 2016*. Wildfowl & Wetlands Trust Report, Slimbridge. 14pp.

Wildfowl & Wetlands Trust

Slimbridge

Gloucester

GL2 7BT

T 01453 891900

F 01453 890827

E monitoring@wwt.org.uk

Reg. Charity no. 1030884 England & Wales,
SC039410 Scotland

Contents

Summary	iv
1 Introduction	1
2 Methods	2
3 Results	3
4 Discussion	7
5 Recommendations for future monitoring	9
6 Errata for 2015 report	10
7 Acknowledgements	11
8 References	12
9 Appendix 1. Raw data	13

Summary

A total of 1,764 Greylag Geese were aged in the Uists on 4-5 September 2016 and in Harris/Lewis on 6-7 September. In the Uists, 1,147 Greylag Geese were aged and 28.1% were young. The mean brood size of successful pairs was 2.89 young and the majority of broods were of two young. The majority of age samples contained 40% - 45% young. The median flock size was 60 birds, and the majority of flocks contained over 100 birds. In Harris/Lewis, 617 Greylag Geese were aged and 24.5% were young. The mean brood size of successful pairs was 3.2 young and the majority of broods were of two young. The majority of age samples contained 0% - 5% young. The median flock size was 10 birds and the majority of flocks contained 1 - 10 birds. The percentage of young varied in different habitats, with the highest values being recorded in rough grassland in the Uists.

1 Introduction

The status and distribution of the two Greylag Goose *Anser anser* populations that occur in Scotland is changing. The British Greylag Goose population, which is present in Scotland year round, is increasing in abundance and distribution, with breeding now occurring over much of the mainland, Western Isles and Northern Isles (Mitchell *et al.* 2010). Local increases in British Greylag Geese have also led to an increase in reports of damage to agricultural economic interests. In order to manage Greylag Geese in Scotland, up to date information is needed on the abundance, demography (including annual breeding success) and distribution of the geese. This is particularly pertinent in the Uists and Harris/Lewis where Scottish Government and Scottish Natural Heritage (SNH) are undertaking localised trials in order to develop an adaptive approach to managing Greylag Goose abundance and conflict with agricultural economic interests.

In light of the need for demographic data to accompany the management trials, an assessment of annual breeding success was carried out in the Uists and Harris/Lewis in late summer 2016.

2 Methods

An assessment of the breeding success of Greylag Geese in the Uists and Harris/Lewis was undertaken in early September 2016. Greylag Geese within a sample of flocks encountered were aged as either adult or young (identified through plumage characteristics; Figure 1). Young Greylag Geese (left) were characterised by narrower, rounded wing coverts lacking the broad pale parallel lines of the adult, a more mottled belly and flanks and often a black nail on the bill tip. Adults (right) were characterised by broad, blunt ended, pale tipped coverts on the upper wing, broad feathers on the flank and an ivory coloured tip to the bill.



Figure 1. Photographs of young (left) and adult (right) Greylag Geese showing plumage features that determine age in late summer.

Brood sizes of successful pairs were also recorded. Young geese tend to remain with their parents for most of the first winter. Families can be identified on behaviour; two (or rarely one) adult geese are accompanied by young birds, the unit often walking and feeding together.

A car based survey of the islands of South Uist, Benbecula, North Uist and Harris/Lewis was carried out over four days (4-7 September 2016). Greylag Geese that were encountered were either aged from the car, or on foot, using a 20x-60x zoom telescope and a window-mount or tripod. A representative sample of the birds from each island group was made through random encounters of geese. Geese were sampled from all positions within flocks (families are known to frequent the edges of flocks, Owen 1980) wherever possible. Driving from location to location in one broad direction (south to north) minimised the risk of repeat sampling the same flock. Date, location, total flock size, the number of birds aged, the number of young, any brood sizes identified and broad-scale habitat (see Appendix 1 for definitions) were recorded.

The goal was to age a minimum of 10% of the approximate island group populations, i.e. a sample of ~600 Greylag Geese in the Uists and ~400 birds in Harris/Lewis (see Discussion).

Relationships between percentage young and flock size were analysed using Analysis of Variance (ANOVA).

3 Results

In the Uists, a total of 1,147 Greylag Geese from 27 flocks were aged from the southern coast of South Uist to Berneray (Figure 2) and the sample contained 28.1% young (Table 1). The mean brood size of successful pairs was 2.89 young (Table 1) and the majority of broods contained two young (range 1-6 young; Figure 3). The percent young in flocks sampled ranged from 6.9% to 60% although the majority contained 40% - 45% young (Figure 4). The median flock size was 60 birds, and the majority of flocks contained over 100 birds (Figure 5).

In Harris/Lewis, a total of 617 Greylag Geese from 38 flocks were aged from the southern coast of Harris to Ness (Figure 2) and the sample contained 24.5% young (Table 1). The mean brood size of successful pairs was 3.2 young (Table 1) and the majority of broods contained two young (range 1-8 young; Figure 3). The percent young in flocks sampled ranged from 0% to 80%, although the majority contained 0% - 5% young (Figure 4). The median flock size was 10 birds, and the majority of flocks contained 1-10 birds (Figure 5). Flocks of Greylag Geese on Harris/Lewis tended to be smaller, and contain smaller percent young, than those on the Uists although the reasons for this are unknown.

Table 1. Annual breeding success (percent young) and mean brood size of Greylag Geese aged in the Uists and Harris/Lewis, September 2016.

Area checked	Total aged	Percent young	No. of broods	Mean brood size
Uists	1,147	28.1	47	2.89
Harris/Lewis	617	24.5	32	3.23

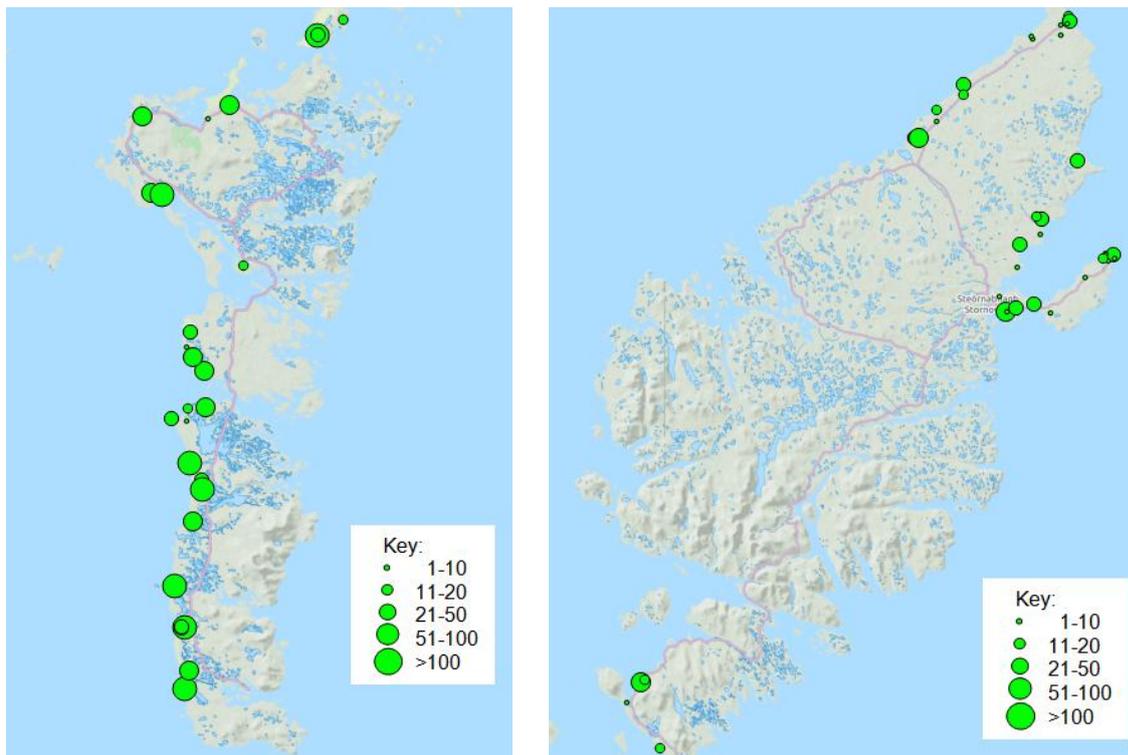


Figure 2. Distribution of Greylag Goose flocks used for age assessments in the Uists (left) and in Harris/Lewis (right), 4-7 September 2016.

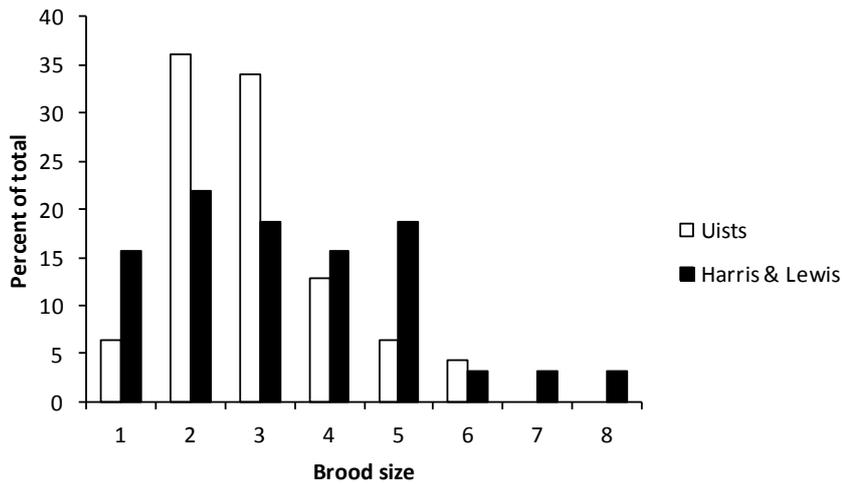


Figure 3. Frequency of brood sizes of Greylag Geese in the Uists and Harris/Lewis in late summer 2016 (expressed as the percentage of the total sample for each area).

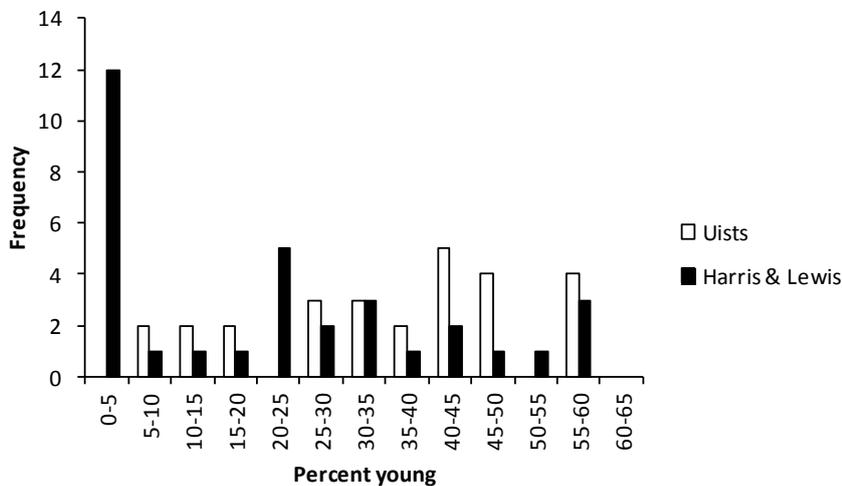


Figure 4. Frequency of values for the percentage of young in samples of Greylag Geese aged in the Uists and Harris/Lewis in late summer 2016.

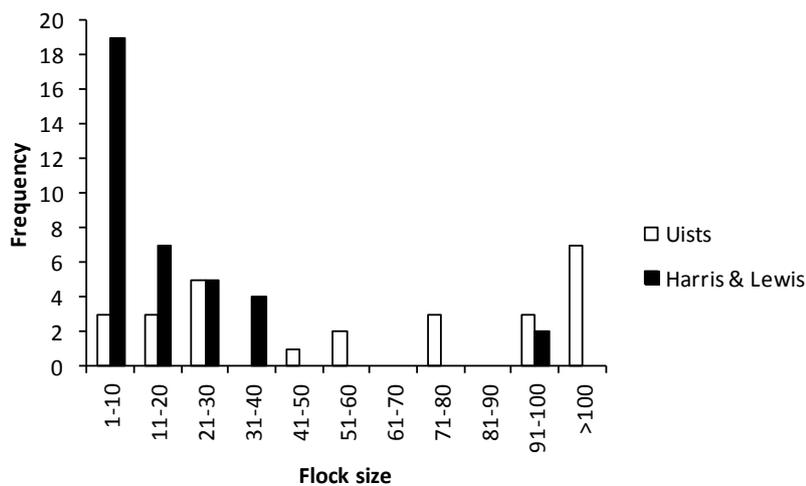


Figure 5. Frequency of flock sizes of Greylag Geese aged in the Uists and Harris/Lewis in late summer 2016.

In the Uists, the percentage of young Greylag Geese recorded in sample flocks declined significantly with increasing flock size ($F_{23}=10.04$, $P=0.004$, Figure 6). This is a similar relationship

to that recorded in 2015 (Mitchell 2015). It is likely that larger flocks contain more non-breeding birds.

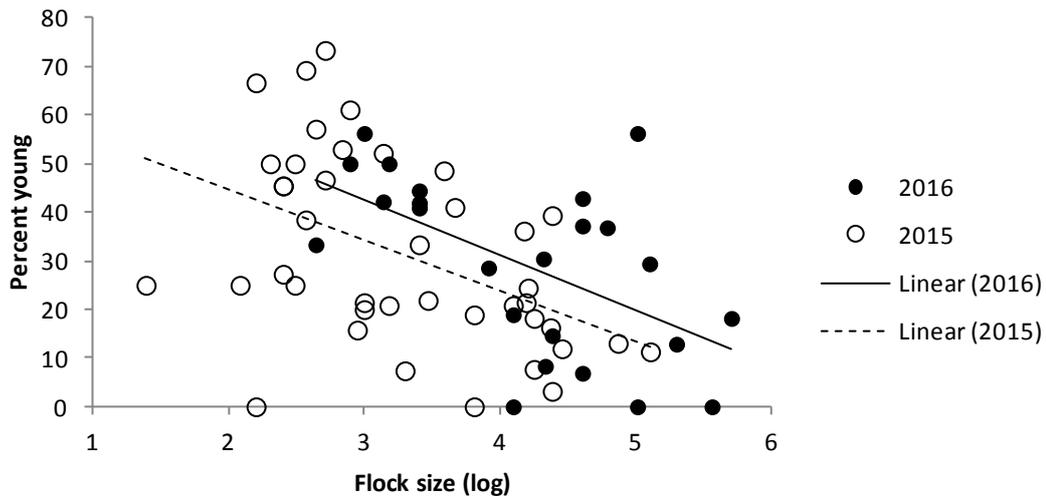


Figure 6. Relationship between percent young and sample flock size of Greylag Geese in the Uists in late summer 2016 (●) and shown for comparison, results from 2015 (○). Flocks comprising a single family only were excluded (n=3). Linear trend lines fitted.

However, in Harris/Lewis the percentage of young Greylag Geese recorded in sample flocks increased significantly with increasing flock size ($F_{27}=5.10$, $P=0.033$, Figure 7). The relationship was probably affected by the nine flocks that contained no young. In addition, the largest flock encountered on Harris/Lewis was of 96 birds, whereas on the Uists, seven of the 27 flocks encountered (25.9%) held over 100 birds. The absence of larger flocks of geese on Harris/Lewis which may hold more non-breeding birds, may also be reflected in the lack of a relationship between flock size and percent young (Figure 7). There was no relationship between percent young and flock size in 2015 (Mitchell 2015).

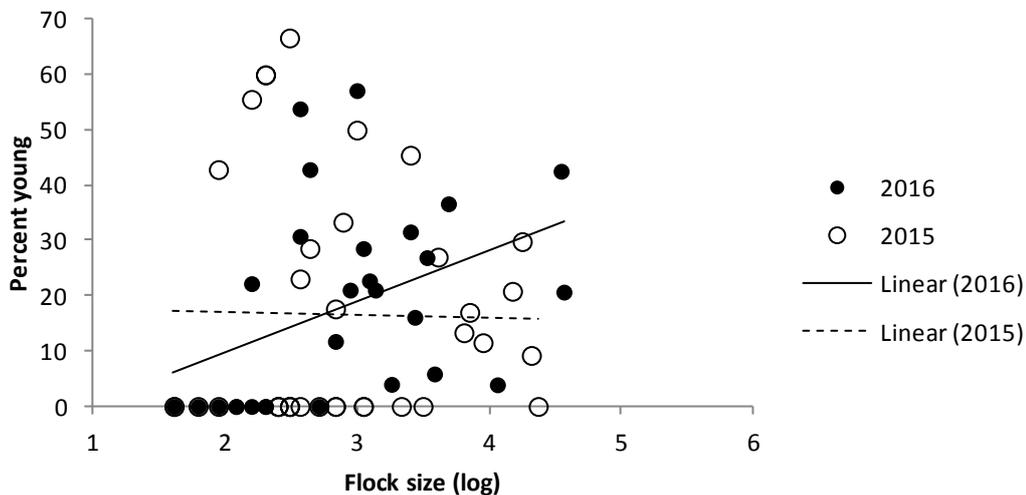


Figure 7. Relationship between percent young and sample flock size of Greylag Geese Harris/Lewis in late August 2016(●) and shown for comparison, results from 2015 (○). Flocks comprising a single family only were excluded (n=10). Linear trend lines fitted.

The percentage of young Greylag Geese recorded in sample flocks appeared to vary according to habitat. In the Uists, the highest values were recorded on rough grassland and the lowest on arable stubbles (Figure 8) although the reason for this is not known. In Harris/Lewis, the majority of birds were recorded on managed grasslands and no comparison with habitat was possible (Figure 8).

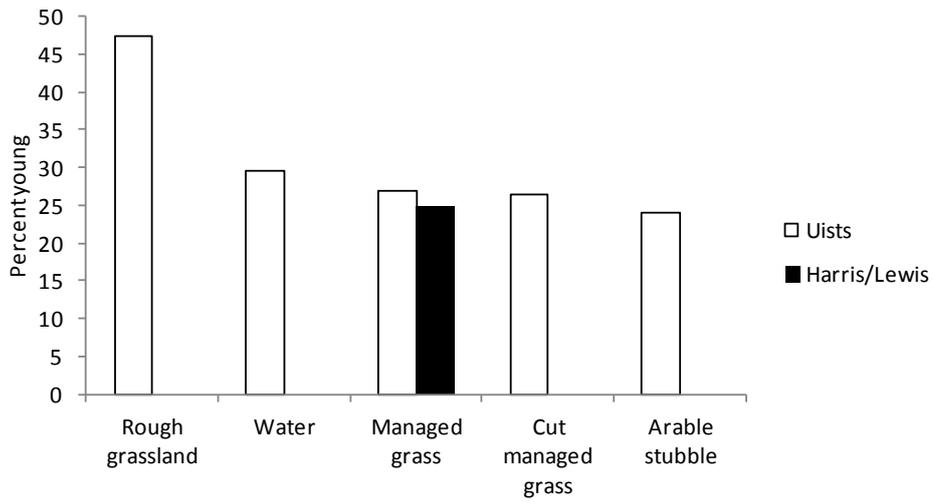


Figure 8. Percent young Greylag Geese recorded in sample flocks on different habitats in the Uists and Harris/Lewis in late summer 2016. Based on counts of >50 birds aged in each habitat.

All raw data are provided in Appendix 1.

4 Discussion

Breeding success of Greylag Geese recorded in the Uists in late summer 2016 (28.1% young) was slightly higher than the previous ten year mean (27.4 + 1.02 SE, 2006 to 2015, Figure 9), and the mean brood size (2.89) was similar to the previous ten year mean (2.91 + 0.10 SE, 2006 to 2015, Figure 9).

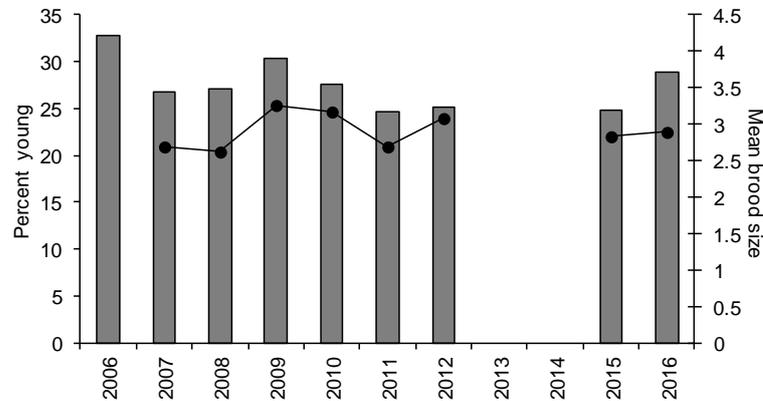


Figure 9. Annual breeding success (bars) of Greylag Geese (percent young) and mean brood size (●) of successful families recorded in the Uists from 2006 to 2016. No breeding success data were collected in 2013 and 2014 and no brood size data were collected in 2006, 2013 and 2014.

Assessments of annual breeding success of Greylag Geese in Harris/Lewis have been carried out in 2015 and 2016. In 2016, overall percentage of young was 7.6% higher than the previous year. As in 2015, the percentage young in Harris/Lewis in 2016 was lower than on the Uists (8.0% and 3.6% lower, respectively). The reasons for the differences in breeding success between the two island groups are unknown; they are very close together and differences in spring weather, which in some years can affect breeding success (Newton & Kerbes 1974), are likely to be small. Predation of eggs and young, especially by corvids, may be different between the two areas (see Newton & Kerbes 1974).

The structure of flocks between the two areas is markedly different. On the Uists, no flocks checked contained zero young and the median flock size was 60 birds. On Harris/Lewis, nine flocks contained zero young and the median flock size was only 10 birds. Thus, Greylag Geese on Harris/Lewis in late summer are more dispersed over the landscape in relatively small groups. Any influence this may have in estimating overall breeding success is unknown.

By way of comparison with the two other areas where SNH are carrying out management trials, in late summer 2016, the breeding success recorded in Tiree (Inner Hebrides) was 34.8% young (Figure 10), with a mean brood size of 2.6 (n=226 broods) and in Orkney, the percentage of young was 28.5% (Figure 10), with a mean brood size of 2.9 (n=29 broods). In all four areas, breeding success was higher in 2016 compared to 2015.

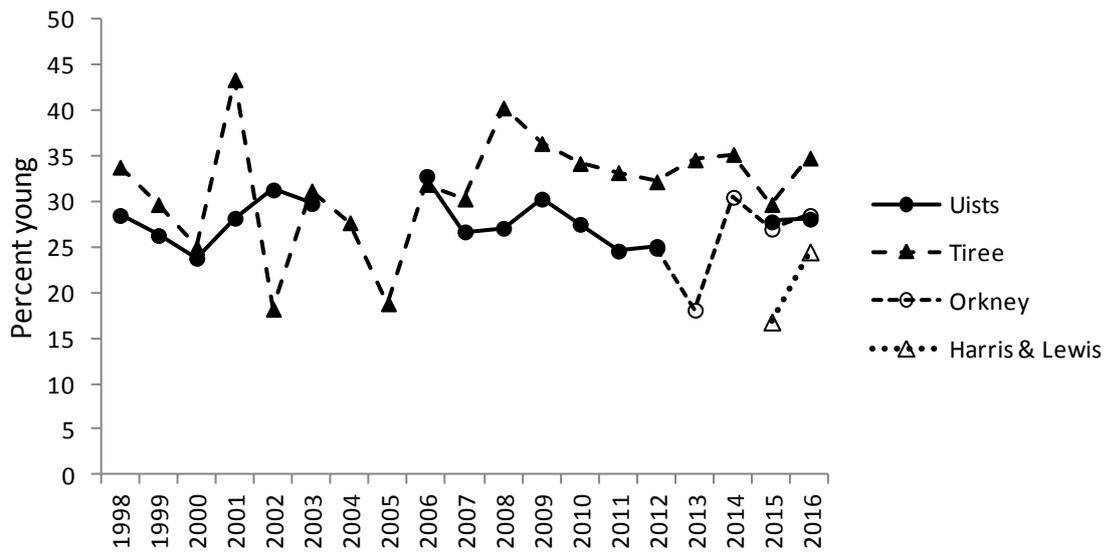


Figure 10. Annual breeding success of Greylag Geese (percent young) recorded in the Uists (1998-2016), Tiree (1998-2016), Orkney (2012-2016) and Harris/Lewis (2015-2016).

5 Recommendations for future monitoring

An annual assessment of breeding success can be undertaken at the same time that post breeding monitoring of abundance is carried out, ideally during the last two weeks of August. However, once the wildfowl hunting season begins (from 1 September), the geese become more wary and are harder to approach, so recording age ratio data before that date is desirable.

Collecting as large a sample size as is practicable is desirable and a goal of at least 5% (preferably 10%) of the total population is suggested. Age counts should be undertaken from a wide range of locations to sample flocks comprising successful breeding pairs and non-breeding aggregations. Samples should also be obtained from a wide range of habitats if possible. Brood sizes should also be obtained wherever practicable.

Under reasonable counting conditions in early September 2016, sample sizes of 1,147 and 617 birds aged on the Uists and Harris/Lewis respectively, were obtained in two full fieldwork days in each island group. This represented c. 18% of the late summer 2016 Uist population (6,399 birds, SNH data, excludes 215 birds counted on Barra) and c. 16% of the late summer 2016 Harris/Lewis population (3,821 birds, SNH data). The number of fieldwork days can be adjusted to suit budgets, although two days for each island group is probably a minimum requirement. In addition, allowance must be made for poor weather during the sampling period. For example, a day of fieldwork can easily be lost due to strong winds and driving rain. Thus, an extra day (five days fieldwork in all) for such an eventuality is recommended.

In 2016, a fieldworker based in north central Scotland undertook the age counts. The costs of travel to and from the Outer Hebrides (ferry and fuel) were likely to be in addition to the costs charged by a local contractor. However, training a local member of SNH staff or a local ornithologist to undertake the age assessments could be considered. This would allow flexibility in the timing of age assessments due to weather conditions and could be something that SNH consider going forwards.

6 Errata for 2015 report

In Mitchell (2015), the y-axis label of Figure 8 (page 6) should read 'Percent young'.

Figure 8 (page 7) should have been labelled Figure 9.

Figure 9 (page 7) should have been labelled Figure 10.

7 Acknowledgements

Thanks go to Richard Hearn (WWT), Flora Donald (SNH) and Roddy MacMinn (SNH) for comments on an earlier draft of this report.

8 References

Mitchell, C. 2015. *Breeding success of Greylag Geese on the Outer Hebrides, August 2015*. Wildfowl & Wetlands Trust Report, Slimbridge. 13pp.

Mitchell, C., L. Griffin, M. Trinder, J. Newth & C. Urquhart. 2010. The status and distribution of summering Greylag Geese in Scotland, 2008/09. *Bird Study* 58: 338-348.

Newton, I. & R.H. Kerbes. 1974. Breeding of greylag geese in the Outer Hebrides, Scotland. *Journal of Animal Ecology* 43: 771-783.

Owen, M. 1980. *Wild geese of the world*. Batsford, London.

9 Appendix 1. Raw data

Date	Grid reference	habitat	flock	number aged	number young	Brood sizes							
						8	7	6	5	4	3	2	1
04/09/2016	NF732198	AS	150	15	5					1			
04/09/2016	NF736748	cut MG	80	8	4							2	
04/09/2016	NF738216	cut MG	100	64	36			2				1	
04/09/2016	NF737257	WA	120	64	27					1	1	6	
04/09/2016	NF734257	RG	30	12	6						2		
04/09/2016	NF734258	RG	50	31	13				1		1		
04/09/2016	NF774466	WA	76	44	18				2		1		
04/09/2016	NF740459	MG	30	27	12						1	1	
04/09/2016	NF757467	WA	14	14	4						2		
04/09/2016	NF755455	MG	5	5	3						1		
04/09/2016	NF754415	cut MG	164	95	18								
04/09/2016	NF764397	WA	23	23	7						1		1
04/09/2016	NF764388	cut MG	200	96	8							2	
04/09/2016	NF753359	AS	60	41	6							1	1
04/09/2016	NF730298	WA	260	58	4					1			
05/09/2016	NF775502	MG	75	43	16					1	1		
05/09/2016	NF765515	MG	60	56	24					1	1		
05/09/2016	NF765539	AS	24	19	7						1		
05/09/2016	NF760526	MG	5	5	3						1		
05/09/2016	NF820599	RG	20	16	9					1	1	1	
05/09/2016	NF738675	MG	100	51	15						1	1	
05/09/2016	NF749672	MG	300	163	21								
05/09/2016	NF798741	MG	4	4	2							1	
05/09/2016	NF819752	MG	100	55	10								
05/09/2016	NF933825	MG	18	18	9								1
05/09/2016	NF907812	cut MG	150	94	26							1	
05/09/2016	NF908812	cut MG	30	26	9								
Harris/Lewis													
05/09/2016	NG022852	MG	19	19	4								
05/09/2016	NG035838	MG	6	6	4							2	
05/09/2016	NF988906	SA	5	5	3					1			
05/09/2016	NG005928	MG	94	47	20						1		
05/09/2016	NG010931	MG	20	14	8					2	1		
06/09/2016	NB444318	MG	96	58	12				1				
06/09/2016	NB438335	MG	7	7	5				1				
06/09/2016	NB445318	MG	10	10	8				1				
06/09/2016	NB455321	MG	40	30	11	1							
06/09/2016	NB494314	MG	10	10	0								
06/09/2016	NB535351	MG	5	5	0								
06/09/2016	NB567374	RG	26	25	1								1

Date	Grid reference	habitat	flock	number aged	number young	Brood sizes							
						8	7	6	5	4	3	2	1
06/09/2016	NB562368	RG	2	2	0								
06/09/2016	NB559377	MG	4	4	2							1	
06/09/2016	NB559375	MG	5	5	3						1		
06/09/2016	NB556371	WA	15	15	0								
06/09/2016	NB569370	SA	6	6	0								
06/09/2016	NB476324	MG	31	31	5				1				
06/09/2016	NB460367	RG	6	6	4					1			
06/09/2016	NB491420	MG	36	34	2								
06/09/2016	NB485422	MG	17	17	2								
06/09/2016	NB535482	MG	34	26	7						1	1	2
06/09/2016	NB488403	MG	9	9	0								
06/09/2016	NB465393	MG	30	19	6								1
07/09/2016	NB534645	MG	13	13	4					1			
07/09/2016	NB533643	MG	7	7	0								
07/09/2016	NB536639	cut MG	21	21	6						2		
07/09/2016	NB532636	MG	9	9	2							1	
07/09/2016	NB526635	MG	8	8	0								
07/09/2016	NB525624	MG	10	10	0								
07/09/2016	NB493622	MG	8	8	0								
07/09/2016	NB492625	MG	9	9	7		1						
07/09/2016	NB414575	MG	22	22	5				1				
07/09/2016	NB413564	MG	14	14	6			1					
07/09/2016	NB381549	RG	13	13	7				1			1	
07/09/2016	NB381536	MG	3	3	1								
07/09/2016	NB356519	MG	23	19	4							1	1
07/09/2016	NB359519	MG	58	51	2							1	

Key to habitat codes (if used):

RG – rough grassland (no recent evidence of reseeding/fertiliser application; uneven sward, often unfenced).

MG – managed grass (uniform sward, fenced, often with livestock, presumed re-seed).

Cut MG – managed grass recently cut for silage (may include some areas of machair).

MO – (heather dominated) moorland.

WA – water (on the sea or freshwater lochs).

SM – salt marsh.

MA – machair.

AS – arable stubble (crop not identified, may include areas of machair).