



**Svalbard Barnacle Goose distribution around  
the Solway Firth 2010-2011: Flock counts  
from the Solway goose management scheme  
area**

**WWT Conservation Programmes Report**

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## Executive Summary

A total of 36 route counts were carried out in winter 2010-2011 within the Solway Barnacle Goose Management Scheme area. Flock counts were made for all goose and swan species encountered, with flocks assigned to fields by code. The times of day, the days of the week and the starting points at which the counts were conducted were varied as much as possible to avoid bias in when a section was surveyed. Instances of direct disturbance aimed at geese and of conversations with farmers were also noted. Data are also presented on the coordinated Solway population counts of the Svalbard Barnacle Goose and on brood size and productivity estimates for this population. The adopted total for this population wintering on the Solway was 35,900 geese (the mean of two counts that were within 10% of the maximum of 36,152 recorded, rounded up to the nearest 100), an increase of 3,000 birds on last winter's estimate of 32,900 geese. Brood sizes were quite large this winter at 2.5 goslings per family with a few large broods recorded (range 1-5 goslings; 65 families sampled), with an average juvenile productivity of 10.8% (range 5.6-21.5% young; 8,092 birds sampled) compared to 1.8 goslings and 5.1% young respectively for last winter. Compared to the four recorded last winter, there were at least six different leucistic Barnacle Geese recorded in winter 2010-2011 including a family group of three where one of the adults was leucistic.



# 1 Introduction

The Solway Firth is an internationally important site for a number of wetland bird species being a key site for the wintering Svalbard Barnacle Goose population. By mid-winter 100% of the population utilise five main sites around the Solway, with three of those being on the north side of the Firth, including Caerlaverock, Kirkconnell (Nith), and Southwick. This century with the growth of the population to just over 30,000 birds, the distribution has spread west towards the Outer Solway with geese now visiting the areas around Colvend and Auchencairn on a regular basis, with significant flocks at Wigtown in March and April.

The geese mainly feed within established nature reserves or within the Solway Barnacle Goose Management Scheme area, often choosing stubbles in early autumn and improved pastures and saltmarsh throughout the rest of the winter. SNH has run this management incentive scheme on the Solway since 1995 in order to integrate farming and goose grazing needs on areas of improved agricultural land. On land entered into the scheme, tiered payments are made to help cover the extra costs of managing for Barnacle Geese. Fields are classified as 'Feeding', 'Buffer' (which receive a tiered payment) or 'Scaring' (non-payment) zones depending in large part on the typical level of winter goose use. Controlled scaring is encouraged in the non-payment zone to try and keep the geese within the feeding or buffer zones.

## 1.1 Objective

The overall objective of the survey is to assess the distribution and abundance of the Svalbard Barnacle Goose and other goose and swan species on the fields and saltmarsh of the north side of the Solway Firth in relation to the Solway Barnacle Goose Management Scheme area.

## 2 Methods

### 2.1 Management Scheme route counts

As with previous surveys of the Scheme area, counts were carried out within a 6-day cycle and the starting points were varied to prevent counting any area at the same time of day, with count days spread evenly throughout the week including weekends. Geese and swans in larger flocks were counted in tens on a tally counter, while those in smaller flocks of <100 were counted individually. All flocks were mapped and coded according to the SNH convention on the field maps provided. Each day was broken down into four counting periods to cover the four main count areas, starting at first light with allowance made for weather conditions, e.g. geese tend to be slow to move off the roost during periods of frost as with those geese flighting off the Blackshaw Bank roost to utilise fields up the River Nith at Greenmerse and Kirkconnell. The time of arrival at each count section was recorded. Where significant numbers of geese moved during a count, the field the geese moved from and to was recorded with a “Comment” added within the Excel spreadsheet provided. Observations of leucistic geese have also been added.

As agreed with SNH, in a slight modification to the previous methodology in order to save costs and carbon miles, the data from the fortnightly census counts for the whole Solway from mid-winter and the weekly census counts for October and April were included as Scheme field counts. The count route repeated every 6-days covered areas to the east as far as Hurkledale and to the west as far as Colvend. Significant use of any fields outwith the intensive survey area was thus monitored via the census counts.

Areas where there are difficulties observing the fields from the road are well known as are the high vantage points which can be utilised to count them from. Otherwise approach on foot was adopted with prior permission being sought for access.

The presence and nature of any disturbance to the geese, intentional or otherwise, was noted using the SNH field code system provided.

Impromptu discussion with any landowners during the surveys was welcomed and a record of each conversation with a farmer regarding the geese was logged.

Care was taken in relation to biosecurity and disease prevention, and where access to fields was required there was compliance with any precautions required by the landowners, with gates being left as they were found.

**Table 1 – Count sections covered within the counting periods.**

Count Period 1	Count Period 2	Count Period 3	Count Period 4
Thwaite	Nith	Southernness	Colvend
Nith	Thwaite	Colvend	Southernness
Southernness	Colvend	Nith	Thwaite
Colvend	Southernness	Thwaite	Nith

As with last winter it soon became clear that the Priestside area was being fairly well used by the Barnacle Geese whereas the section from north of Ward Law covering the Quay Hill was not being used and was not surveyed on a regular basis although it was covered during the co-ordinated counts. In previous years the Priestside section has been dropped due to lack of goose use but this winter it was surveyed. During the co-ordinated counts of geese on the Solway, geese were recorded in the Auchencairn/Rascarrel area in mid-winter and from the end of February onwards significant numbers of Barnacle Geese began using the Wigtown area but this could not be economically covered via the route count budget.

### 2.2 Coordinated Svalbard Barnacle Goose total population counts

Each winter WWT has conducted total population counts of the Svalbard Barnacle Geese present on the Solway from arrival to departure. This involves a network of staff and volunteers counting the geese in survey sections within a one hour to two hour time period at the same time on the same day. There are usually weekly counts



during the arrival period in October and during the departure period in April/May, with fortnightly counts in the months between. This work is now part-funded by SNH under the current contract.

## **2.3 Brood sizes and juvenile productivity of the Svalbard Barnacle Goose**

Each winter WWT carefully assesses the brood sizes and juvenile productivity of a large proportion of the Barnacle Geese from as many sites as possible on the Solway. The dates, land use types, and flock sizes used for sampling are varied as much as possible to avoid any bias in the average estimate obtained, as are the sampling units within the flocks as families with young can tend to associate at the edges of a flock particularly at the front. All observations were carried out by an experienced observer.

## **2.4 Tide tables**

Tide tables are presented in the following figures for the months in which the geese were present in the Barnacle Goose Management Scheme area.

**SEPTEMBER 2010 LAVER'S LIVERPOOL (Gladstone) TIDES**

All times shown are GMT - add one hour from 0100 28 March to 0100 31 October

● New Moon   ◀ First Quarter   ☾ Full Moon   ▶ Last Quarter												
HIGH WATER				LOW WATER				SUN		MOON		
Morning		Afternoon		Morning		Afternoon		Rise	Set	Rise	Set	Ph
Date	Time M Ft	Time M Ft	Time M Ft	Time M Ft	Time M Ft	Time M Ft	Time M Ft					
1 Wed	0251 8.0 26.2	1515 7.8 25.6	0936 2.8 9.2	2206 3.1 10.2	0521 19.02	2136 14.19						
2 Thu	0346 7.6 24.9	1621 7.4 24.3	1030 3.2 10.5	2318 3.4 11.2	0523 19.00	2232 15.19	1724					
3 Fri	0506 7.3 24.0	1754 7.3 24.0	1154 3.4 11.2		0524 18.57	2344 16.09						
4 Sat	0643 7.4 24.3	1922 7.1 25.3	0057 3.2 10.5	1332 3.2 10.5	0526 18.55	1647						
5 Sun	0804 7.9 25.9	2031 8.4 27.6	0219 2.7 8.9	1445 2.6 8.5	0528 18.52	0107 17.15						
6 Mon	0905 8.6 26.2	2125 9.1 29.9	0327 1.9 6.2	1547 1.9 6.2	0530 18.50	0236 17.38						
7 Tue	0955 9.2 30.2	2213 9.6 31.5	0427 1.2 3.9	1642 1.3 4.3	0531 18.48	0407 17.57						
8 Wed	1040 9.6 31.5	2257 10.0 32.8	0518 0.6 2.0	1731 0.9 3.0	0533 18.45	0539 18.15						
9 Thu	1123 9.9 32.5	2341 10.2 33.5	0606 0.3 1.0	1816 0.6 2.0	0535 18.43	0710 18.32	1030					
10 Fri		2405 9.9 32.5	0649 0.2 0.7	1859 0.6 2.0	0537 18.40	0841 18.51						
11 Sat	0074 10.2 33.5	2486 9.8 32.2	0730 0.3 1.0	1939 0.7 2.3	0538 18.38	1010 19.14						
12 Sun	0106 9.9 32.5	2527 9.4 30.8	0809 0.8 2.6	2019 1.2 3.9	0540 18.35	1135 19.43						
13 Mon	0148 9.4 30.8	2609 9.0 29.5	0846 1.4 4.6	2100 1.8 5.9	0542 18.33	1254 20.20						
14 Tue	0233 8.7 28.5	2656 8.4 27.6	0924 2.2 7.2	2145 2.4 7.9	0543 18.31	1401 21.09						
15 Wed	0324 8.0 26.2	2753 7.8 25.8	1011 2.9 9.5	2245 3.1 10.2	0545 18.29	1454 22.07						
16 Thu	0434 7.3 24.0	2840 7.4 24.3	1119 3.5 11.5		0547 18.26	1532 23.12	0550					
17 Fri	0607 7.0 23.0	2940 7.3 24.0	0012 3.4 11.2	1254 3.7 12.1	0549 18.23	1603						
18 Sat	0737 7.2 23.5	2957 7.1 25.3	0143 3.3 10.8	1415 3.4 11.2	0550 18.21	1625 00.24						
19 Sun	0841 7.6 24.9	2953 8.1 26.6	0255 2.8 9.2	1516 2.9 9.5	0552 18.18	1643 01.35						
20 Mon	0926 8.1 26.6	2934 8.5 27.9	0348 2.4 7.9	1601 2.5 8.2	0554 18.16	1658 02.45						
21 Tue	1001 8.4 27.6	2898 8.9 29.2	0428 2.0 6.6	1637 2.1 6.9	0556 18.13	1711 03.55						
22 Wed	1031 8.7 28.5	2841 9.1 29.9	0502 1.8 5.9	1709 1.9 6.2	0557 18.11	1724 05.04						
23 Thu	1100 8.9 29.2	2742 9.2 30.2	0531 1.6 5.2	1739 1.7 5.6	0559 18.09	1737 06.13						
24 Fri	1128 9.0 29.5	2641 9.2 30.2	0600 1.5 4.9	1809 1.6 5.2	0601 18.06	1751 07.23	0919					
25 Sat	1156 9.0 29.5		0628 1.5 4.9	1840 1.6 5.2	0603 18.04	1808 08.34						
26 Sun	0011 9.2 30.2	1224 8.9 29.2	0658 1.5 4.9	1912 1.7 5.6	0604 18.01	1820 09.49						
27 Mon	0040 9.0 29.5	1254 8.5 28.9	0728 1.7 5.6	1945 2.0 6.6	0606 17.99	1838 10.57						
28 Tue	0112 8.8 28.9	1326 8.6 28.2	0759 2.0 6.6	2018 2.3 7.5	0608 17.96	1853 12.08						
29 Wed	0147 8.5 27.9	1403 8.3 27.2	0832 2.4 7.9	2057 2.7 8.9	0610 17.94	1926 13.11						
30 Thu	0230 8.1 26.6	1452 7.9 25.8	0912 2.8 9.2	2147 3.0 9.8	0611 17.92	2130 14.03						

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http://www.laverpublishing.com**LAVER'S LIVERPOOL (Gladstone) TIDES**

All times shown are GMT - add one hour from 0100 28 March to 0100 31 October

● New Moon   ◀ First Quarter   ☾ Full Moon   ▶ Last Quarter												
HIGH WATER				LOW WATER				SUN		MOON		
Morning		Afternoon		Morning		Afternoon		Rise	Set	Rise	Set	Ph
Date	Time M Ft	Time M Ft	Time M Ft	Time M Ft	Time M Ft	Time M Ft	Time M Ft					
1 Fri	0329 7.7 25.3	1600 7.6 24.9	1008 3.2 10.5	2301 3.2 10.5	0613 17.49	2246 14.43						
2 Sat	0451 7.4 24.3	1732 7.5 24.6	1131 3.4 11.2		0615 17.47	1514	0353					
3 Sun	0625 7.5 24.8	1859 7.9 25.9	0036 3.1 10.2	1307 3.2 10.5	0617 17.44	0009 15.39						
4 Mon	0743 8.1 26.6	2007 8.5 27.9	0157 2.5 8.2	1422 2.6 8.5	0619 17.42	0136 15.59						
5 Tue	0843 8.7 28.5	2102 9.2 30.2	0304 1.8 5.9	1524 2.0 6.6	0620 17.40	0205 16.17						
6 Wed	0932 9.3 30.5	2150 9.7 31.8	0402 1.2 3.9	1618 1.4 4.6	0622 17.37	0345 16.35						
7 Thu	1017 9.7 31.8	2234 10.0 32.8	0454 0.7 2.3	1707 1.0 3.3	0624 17.35	0509 16.53						
8 Fri	1059 9.9 32.5	2318 10.1 33.1	0539 0.5 1.6	1752 0.8 2.6	0626 17.32	0735 17.15	1945					
9 Sat	1140 9.9 32.5		0622 0.5 1.6	1836 0.7 2.3	0628 17.30	0904 17.41						
10 Sun	0000 10.0 32.8	1221 9.7 31.8	0703 0.7 2.3	1917 0.9 3.0	0629 17.28	1029 16.16						
11 Mon	0042 9.6 31.5	1302 9.4 30.8	0740 1.2 3.9	1957 1.4 4.6	0631 17.25	1143 16.00						
12 Tue	0124 9.1 29.9	1343 9.0 29.5	0818 1.8 5.9	2039 1.9 6.2	0633 17.23	1243 15.57						
13 Wed	0209 8.5 27.9	1428 8.4 27.6	0855 2.5 8.2	2124 2.6 8.5	0635 17.21	1329 15.02						
14 Thu	0259 7.9 25.9	1523 7.9 25.9	0939 3.1 10.2	2221 3.1 10.2	0637 17.18	1403 12.12						
15 Fri	0404 7.3 24.0	1633 7.5 24.6	1042 3.7 12.1	2340 3.4 11.2	0639 17.16	1429 12.23	2121					
16 Sat	0529 7.0 23.0	1756 7.3 24.0		1215 3.9 12.8	0640 17.14	1448						
17 Sun	0655 7.1 23.7	1912 7.6 24.9	0103 3.4 11.2	1335 3.6 11.8	0642 17.12	1504 00.34						
18 Mon	0801 7.5 24.8	2011 7.9 25.9	0210 3.0 9.8	1435 3.7 10.5	0644 17.09	1516 01.43						
19 Tue	0848 7.9 25.9	2057 8.3 27.2	0303 2.6 8.5	1521 2.8 9.2	0645 17.07	1531 02.52						
20 Wed	0925 8.3 27.2	2134 8.7 28.5	0345 2.3 7.5	1600 2.4 7.9	0646 17.05	1544 04.01						
21 Thu	0957 8.6 28.2	2209 8.9 29.2	0421 2.0 6.6	1635 2.1 6.9	0648 17.03	1558 05.11						
22 Fri	1028 8.8 28.9	2241 9.1 29.9	0454 1.8 5.9	1709 1.8 5.9	0650 17.01	1615 06.22						
23 Sat	1058 9.0 29.5	2313 9.1 29.9	0526 1.6 5.2	1742 1.7 5.6	0652 16.98	1635 07.35						
24 Sun	1126 9.1 29.9	2345 9.1 29.9	0559 1.6 5.2	1817 1.7 5.6	0655 16.96	1702 08.48	0138					
25 Mon	1200 9.1 29.9	2416 9.1 29.9	0632 1.6 5.2	1852 1.7 5.6	0657 16.94	1737 09.59						
26 Tue	0018 9.0 29.5	2433 9.0 29.5	0705 1.8 5.9	1928 1.9 6.2	0659 16.92	1824 11.04						
27 Wed	0054 8.8 28.9	2509 8.8 28.9	0739 2.0 6.6	2006 2.2 7.2	0701 16.90	1924 11.59						
28 Thu	0135 8.6 28.2	2552 8.5 27.9	0816 2.4 7.9	2049 2.5 8.2	0703 16.88	2035 12.42						
29 Fri	0223 8.2 26.9	2645 8.7 26.9	0890 2.7 8.9	2142 2.7 8.9	0705 16.86	2155 13.16						
30 Sat	0323 7.9 25.9	2751 7.9 25.9	0957 3.1 10.2	2254 2.9 9.5	0707 16.84	2318 13.42	1247					
31 Sun	0439 7.5 24.9	2912 7.9 25.9	1114 3.3 10.8		0709 16.82	1403						

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● New Moon   ◀ First Quarter   ☾ Full Moon   ▶ Last Quarter																
HIGH WATER						LOW WATER			SUN		MOON					
Morning			Afternoon			Morning			Afternoon			Rise	Set	Rise	Set	Ph
Date	Time	M Ft	Time	M Ft	Time	M Ft	Time	M Ft	Time	M Ft						
1 Mon	0002	7.8 25.6	1830	8.1 26.6	0015	2.7 8.9	1209	3.1 10.2	0711	18.40	0043	14.21				
2 Tue	0115	8.2 26.9	1938	8.6 28.2	0120	2.3 7.5	1352	2.6 8.5	0712	18.38	0209	14.38				
3 Wed	0116	8.7 28.5	2036	9.0 29.5	0235	1.9 6.2	1455	2.1 6.9	0714	18.36	0335	14.55				
4 Thu	0107	9.1 29.9	2127	9.4 30.8	0334	1.4 4.6	1551	1.7 5.6	0716	18.34	0503	15.15				
5 Fri	0054	9.4 30.8	2213	9.7 31.8	0426	1.1 3.6	1642	1.3 4.3	0718	18.32	0631	15.39				
6 Sat	0037	9.6 31.5	2258	9.7 31.8	0513	1.0 3.3	1730	1.1 3.6	0720	18.30	0758	16.09				
7 Sun	1119	9.7 31.8	2342	9.6 31.5	0557	1.0 3.3	1815	1.1 3.6	0722	18.29	0918	16.50				0452
8 Mon			2400	9.6 31.5	0637	1.2 3.9	1858	1.2 3.9	0724	18.27	1026	17.42				
9 Tue	0025	9.3 30.5	2447	9.3 30.5	0716	1.6 5.2	1941	1.6 5.2	0726	18.25	1120	18.45				
10 Wed	0107	8.9 29.2	2522	9.0 29.5	0754	2.0 6.6	2022	2.0 6.6	0728	18.23	1200	19.55				
11 Thu	0149	8.4 27.6	2600	8.6 28.2	0830	2.6 8.5	2106	2.5 8.2	0730	18.22	1259	21.07				
12 Fri	0235	7.9 25.9	2644	8.2 26.9	0911	3.1 10.2	2154	2.9 9.5	0731	18.20	1351	22.19				
13 Sat	0330	7.5 24.6	2753	7.8 25.6	1000	3.5 11.5	2254	3.2 10.5	0733	18.19	1309	23.30				
14 Sun	0436	7.2 23.6	2900	7.5 24.6	1112	3.8 12.5			0735	18.17	1324					1638
15 Mon	0550	7.1 23.3	2980	7.5 24.6	0007	3.3 10.8	1232	3.8 12.5	0737	18.16	1337	00.00				
16 Tue	0800	7.3 24.0	3010	7.7 25.3	0108	3.2 10.5	1338	3.5 11.5	0739	18.14	1350	01.47				
17 Wed	0547	7.6 24.9	2009	8.0 28.2	0206	3.0 8.8	1431	3.1 10.2	0741	18.13	1404	02.56				
18 Thu	0652	8.0 26.2	2054	8.3 27.2	0254	2.7 8.9	1517	2.7 8.9	0743	18.11	1420	04.07				
19 Fri	0521	8.3 27.2	2135	8.6 28.2	0338	2.5 7.5	1559	2.4 7.5	0744	18.10	1439	05.19				
20 Sat	0257	8.6 28.2	2212	8.8 28.9	0417	2.1 6.9	1639	2.1 6.9	0745	18.09	1503	06.32				
21 Sun	0311	8.9 29.2	2348	8.9 29.2	0455	1.9 6.2	1718	1.9 6.2	0748	18.07	1536	07.45				
22 Mon	1106	9.1 29.9	2405	9.0 29.5	0533	1.7 5.6	1757	1.7 5.6	0750	18.06	1519	08.54				1729
23 Tue	1142	9.2 30.2			0611	1.5 5.6	1838	1.5 5.6	0751	18.05	1716	09.53				
24 Wed	0003	9.1 29.9	1221	9.2 30.2	0649	1.7 5.6	1919	1.7 5.6	0753	18.04	1825	10.41				
25 Thu	0045	9.0 29.5	1302	9.1 29.9	0728	1.5 6.2	2003	1.8 5.9	0755	18.03	1944	11.18				
26 Fri	0130	8.8 28.9	1348	8.9 29.2	0800	2.1 6.9	2049	2.0 6.6	0756	18.02	2106	11.46				
27 Sat	0219	8.5 27.9	1440	8.7 28.5	0855	2.4 7.9	2142	2.2 7.2	0758	18.01	2230	12.08				
28 Sun	0315	8.3 27.2	1539	8.4 27.6	0949	2.7 8.9	2242	2.3 7.5	0800	18.00	2354	12.27				
29 Mon	0421	8.0 26.2	1646	8.3 27.2	1054	2.8 9.2	2340	2.4 7.9	0801	18.59		1244	2038			
30 Tue	0532	8.0 26.2	1757	8.3 27.2			1206	2.9 9.5	0803	18.58	0118	13.00				

**JANUARY 2011 LAVER'S LIVERPOOL (Gladstone) TIDES**

● New Moon    ◐ First Quarter    ○ Full Moon    ▶ Last Quarter												
HIGH WATER				LOW WATER				SUN		MOON		Ph.
Morning		Afternoon		Morning		Afternoon		Rise	Set	Rise	Set	
Date	Time M Ft	Time M Ft	Time M Ft	Time M Ft	Time M Ft	Time M Ft	Time M Ft					
1 Sat	0824 8.2 26.9	2054 8.3 27.2	0241 2.4 7.9	1509 2.5 8.2	0828 1603	0553	1320					
2 Sun	0921 8.6 28.2	2151 8.6 28.2	0343 2.2 7.2	1612 2.1 6.9	0828 1604	0657	1413					
3 Mon	1012 8.9 29.2	2240 8.8 28.9	0437 2.0 6.6	1708 1.8 5.9	0827 1606	0748	1516					
4 Tue	1057 9.1 29.9	2323 8.9 29.2	0524 1.9 6.2	1755 1.6 5.2	0827 1607	0827	1627					●
5 Wed	1137 9.3 30.5		0606 1.8 5.9	1837 1.6 5.2	0827 1608	0855	1740					0905
6 Thu	0002 8.9 29.2	1214 9.3 30.5	0644 1.8 5.9	1914 1.6 5.2	0826 1609	0917	1854					
7 Fri	0036 8.8 28.9	1248 9.2 30.2	0717 1.9 6.2	1947 1.7 5.6	0826 1611	0935	2005					
8 Sat	0109 8.7 28.5	1322 9.1 29.9	0748 2.0 6.6	2017 1.9 6.2	0825 1612	0949	2115					
9 Sun	0142 8.5 27.9	1357 8.8 28.9	0817 2.3 7.5	2045 2.1 6.9	0825 1614	1003	2224					
10 Mon	0216 8.3 27.2	1433 8.5 27.9	0848 2.5 8.2	2116 2.4 7.9	0824 1615	1016	2332					
11 Tue	0252 8.0 26.2	1512 8.2 26.9	0923 2.9 9.5	2152 2.7 8.9	0823 1617	1036						
12 Wed	0334 7.6 24.9	1557 7.8 26.6	1006 3.2 10.5	2237 3.1 10.2	0823 1618	1046	0042					◐
13 Thu	0425 7.3 24.0	1654 7.4 24.3	1100 3.5 11.5	2337 3.4 11.2	0822 1620	1105	0152					1133
14 Fri	0533 7.1 23.3	1807 7.3 24.0		1218 3.7 12.1	0821 1621	1130	0304					
15 Sat	0652 7.2 23.6	1924 7.4 24.3	0057 3.4 11.2	1342 3.5 11.5	0820 1623	1202	0415					
16 Sun	0813 7.6 24.9	2030 7.7 25.3	0212 3.2 10.5	1450 3.0 9.8	0819 1625	1247	0522					
17 Mon	0910 8.1 26.6	2124 8.2 26.9	0313 2.8 9.2	1548 2.5 8.2	0818 1626	1346	0621					
18 Tue	0948 8.6 28.2	2212 8.7 28.5	0407 2.3 7.5	1642 2.0 6.6	0817 1628	1459	0709					
19 Wed	1033 9.1 29.9	2257 9.1 29.9	0457 1.8 5.9	1732 1.4 5.9	0816 1630	1622	0746					◐
20 Thu	1110 9.5 31.2	2340 9.4 30.8	0544 1.4 4.6	1820 1.0 3.3	0815 1632	1749	0815					2123
21 Fri		1200 9.8 32.2	0630 1.1 3.6	1906 0.7 2.3	0814 1633	1918	0838					
22 Sat	0024 9.6 31.5	1242 9.9 32.5	0713 1.0 3.3	1949 0.5 2.0	0812 1635	2046	0857					
23 Sun	0108 9.6 31.5	1326 9.9 32.5	0754 1.0 3.3	2030 0.7 2.3	0811 1637	2213	0915					
24 Mon	0151 9.4 30.8	1410 9.7 31.8	0835 1.2 3.9	2112 1.0 3.3	0810 1639	2339	0932					
25 Tue	0236 9.1 29.9	1456 9.3 30.5	0915 1.5 4.9	2154 1.5 4.9	0808 1641		0952					
26 Wed	0324 8.6 28.2	1547 8.7 28.5	1001 2.0 6.6	2242 2.1 6.9	0807 1643	0104	1014					▶
27 Thu	0411 8.1 26.6	1649 8.2 26.9	1057 2.5 8.2	2343 2.7 8.9	0805 1645	0225	1043					1259
28 Fri	0500 7.7 25.3	1807 7.7 25.3		1210 2.9 9.5	0804 1647	0343	1120					
29 Sat	0551 7.6 24.9	1933 7.6 24.9	0103 3.0 9.8	1339 3.0 9.8	0802 1648	0450	1207					
30 Sun	0649 7.8 25.6	2049 7.9 25.9	0224 2.9 9.5	1502 2.7 8.9	0801 1650	0545	1306					
31 Mon	0714 8.2 26.9	2147 8.2 26.9	0333 2.6 8.5	1610 2.3 7.5	0759 1652	0627	1413					

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http://www.laverpublishing.com**LAVER'S LIVERPOOL (Gladstone) TIDES FEBRUARY 2011**

● New Moon    ◐ First Quarter    ○ Full Moon    ▶ Last Quarter												
HIGH WATER				LOW WATER				SUN		MOON		Ph.
Morning		Afternoon		Morning		Afternoon		Rise	Set	Rise	Set	
Date	Time M Ft	Time M Ft	Time M Ft	Time M Ft	Time M Ft	Time M Ft	Time M Ft					
1 Tue	1004 8.7 28.5	2233 8.5 27.9	0430 2.2 7.2	1703 1.9 6.2	0757 1654	0658	1525					
2 Wed	1046 9.0 29.5	2311 8.8 28.9	0515 1.9 6.2	1745 1.6 5.2	0756 1656	0722	1630					
3 Thu	1122 9.2 30.2	2344 8.9 29.2	0553 1.7 5.6	1821 1.5 4.9	0754 1658	0741	1758					●
4 Fri	1155 9.3 30.5		0626 1.6 5.2	1853 1.4 4.6	0752 1700	0757	1901					0233
5 Sat	0015 8.9 29.2	1227 9.3 30.5	0655 1.6 5.2	1921 1.5 4.9	0751 1702	0811	2010					
6 Sun	0044 8.9 29.2	1257 9.2 30.2	0723 1.7 5.6	1947 1.6 5.2	0749 1704	0824	2118					
7 Mon	0113 8.8 28.9	1328 9.0 29.5	0751 1.8 5.9	2012 1.8 5.9	0747 1706	0838	2227					
8 Tue	0142 8.6 28.2	1359 8.7 28.5	0820 2.1 6.9	2041 2.0 6.6	0745 1708	0853	2336					
9 Wed	0212 8.3 27.2	1430 8.4 27.6	0851 2.4 7.9	2112 2.4 7.9	0743 1710	0910						
10 Thu	0245 8.0 26.2	1506 8.0 26.2	0927 2.8 9.2	2149 2.9 9.5	0741 1712	0932	0046					◐
11 Fri	0325 7.6 24.9	1554 7.5 24.6	1011 3.2 10.5	2238 3.1 10.8	0739 1714	1000	0156					0720
12 Sat	0423 7.2 23.6	1704 7.2 23.6	1115 3.6 11.8	2354 3.6 11.8	0737 1716	1038	0303					
13 Sun	0549 7.0 23.0	1836 7.1 23.3		1252 3.6 11.8	0735 1718	1128	0405					
14 Mon	0721 7.3 24.0	2000 7.5 24.6	0130 3.4 11.2	1418 3.1 10.2	0733 1720	1232	0457					
15 Tue	0833 7.9 25.9	2103 8.1 26.6	0245 2.9 9.5	1524 2.5 8.2	0731 1722	1349	0539					
16 Wed	0927 8.5 27.9	2154 8.7 28.5	0345 2.3 7.5	1623 1.8 5.9	0729 1724	1514	0612					
17 Thu	1014 9.1 29.9	2239 9.3 30.5	0439 1.7 5.6	1715 1.1 3.6	0727 1726	1643	0638					
18 Fri	1058 9.7 31.8	2322 9.7 31.8	0528 1.1 3.3	1803 0.6 2.0	0725 1728	1814	0659					
19 Sat	1141 10.0 32.8		0614 0.7 2.8	1848 0.2 0.7	0723 1730	1944	0718					0837
20 Sun	0005 9.9 32.5	1223 10.2 33.5	0657 0.5 1.6	1930 0.2 0.3	0721 1732	2114	0737					
21 Mon	0047 9.9 32.5	1306 10.1 33.1	0738 0.5 1.6	2009 0.4 0.7	0719 1734	2242	0757					
22 Tue	0129 9.6 31.5	1348 9.8 32.2	0817 0.8 2.6	2048 0.8 2.6	0716 1736		0819					
23 Wed	0211 9.3 30.5	1432 9.3 30.5	0856 1.2 3.9	2127 1.5 4.9	0714 1738	0009	0846					
24 Thu	0256 8.7 28.5	1521 8.6 28.2	0939 1.8 5.9	2212 2.2 7.2	0712 1739	0130	0921					
25 Fri	0349 8.1 26.6	1623 7.9 25.9	1033 2.5 8.2	2312 2.9 8.5	0710 1741	0241	1006					2328
26 Sat	0459 7.6 24.9	1746 7.3 24.0	1148 3.0 9.8		0707 1743	0340	1102					
27 Sun	0627 7.4 24.3	1921 7.3 24.0	0039 3.3 10.8	1325 3.1 10.2	0705 1745	0426	1206					
28 Mon	0753 7.6 24.9	2039 7.6 24.9	0209 3.2 10.5	1452 2.8 9.2	0703 1747	0501	1316					

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**MARCH 2011 LAVER'S LIVERPOOL (Gladstone) TIDES**

All times shown are GMT - add one hour from 0100 27 March to 0100 30 October

● New Moon   ◐ First Quarter   ○ Full Moon   ▶ Last Quarter													
HIGH WATER				LOW WATER				SUN   MOON					
Morning		Afternoon		Morning		Afternoon		Rise	Set	Rise	Set	Ph.	
Date	Time	M	Ft	Time	M	Ft	Time	M	Ft	Time	M	Ft	
1 Tue	0859	8.1	26.6	2133	8.1	26.6	0321	2.8	9.2	1558	2.3	7.5	0701 1749 0527 1428
2 Wed	0947	8.5	27.9	2215	8.4	27.6	0415	2.3	7.5	1646	1.9	6.2	0658 1751 0547 1539
3 Thu	1020	8.8	28.9	2249	8.7	28.5	0457	1.9	6.2	1724	1.6	5.2	0656 1752 0604 1649
4 Fri	1100	9.1	29.9	2319	8.9	29.2	0531	1.7	5.6	1756	1.5	4.9	0654 1755 0619 1758
5 Sat	1130	9.2	30.2	2348	8.9	29.2	0601	1.5	4.9	1824	1.4	4.6	0651 1757 0633 1907 2040
6 Sun				1201	9.2	30.2	0629	1.5	4.9	1850	1.4	4.6	0649 1759 0646 2015
7 Mon	0010	9.0	29.5	1230	9.2	30.2	0657	1.4	4.6	1915	1.4	4.6	0647 1801 0701 2124
8 Tue	0044	8.9	29.2	1300	9.0	29.5	0725	1.5	4.9	1942	1.6	5.2	0644 1802 0718 2233
9 Wed	0112	8.7	28.5	1328	8.8	28.9	0754	1.8	5.9	2011	1.9	6.2	0642 1804 0738 2343
10 Thu	0139	8.5	27.9	1358	8.5	27.9	0826	2.1	6.9	2041	2.2	7.2	0640 1806 0804
11 Fri	0210	8.2	26.9	1433	8.1	26.6	0859	2.5	8.2	2115	2.7	8.9	0637 1808 0837 0050
12 Sat	0249	7.9	25.9	1519	7.7	25.3	0940	2.9	9.5	2200	3.1	10.2	0635 1810 0921 0152
13 Sun	0342	7.4	24.3	1626	7.2	23.6	1039	3.3	10.8	2309	3.5	11.5	0632 1812 1017 0247
14 Mon	0450	7.1	23.0	1800	7.1	23.3			1210	3.4	11.2	0630 1814 1126 0332	
15 Tue	0641	7.3	24.0	1930	7.5	24.6	0051	3.4	11.2	1345	3.0	9.8	0628 1815 1244 0408
16 Wed	0801	7.8	25.6	2037	8.1	26.6	0215	2.9	9.5	1457	2.3	7.5	0625 1817 1409 0436
17 Thu	0890	8.6	28.2	2130	8.8	28.9	0320	2.2	7.2	1559	1.6	5.2	0623 1819 1537 0459
18 Fri	0944	9.2	30.2	2215	9.4	30.8	0415	1.6	5.2	1652	0.9	3.0	0620 1821 1706 0570
19 Sat	1032	9.7	31.8	2259	9.7	31.8	0506	1.0	3.3	1740	0.4	1.3	0618 1823 1837 0539
20 Sun	1110	10.1	33.1	2342	9.9	32.5	0557	0.6	2.0	1824	0.1	0.3	0616 1825 2008 0558
21 Mon				1200	10.2	33.5	0636	0.3	1.6	1906	0.1	0.3	0613 1827 2139 0620
22 Tue	0024	9.9	32.5	1244	10.1	33.1	0717	0.4	1.3	1945	0.4	1.3	0611 1828 2306 0646
23 Wed	0105	9.7	31.8	1327	9.7	31.8	0759	0.6	2.0	2024	0.5	1.9	0608 1830 0719
24 Thu	0147	9.3	30.5	1411	9.1	29.9	0839	1.1	3.6	2103	1.6	5.2	0606 1832 0824 0802
25 Fri	0221	8.8	28.9	1500	8.4	27.6	0922	1.8	5.5	2146	2.4	7.9	0603 1834 0913 0855
26 Sat	0324	8.2	26.9	1603	7.7	25.2	1010	2.4	7.9	2245	3.1	10.2	0601 1836 0222 0958
27 Sun	0453	7.6	24.9	1755	7.2	23.6	1131	3.0	9.8				0559 1837 0301 1107
28 Mon	0526	7.3	24.0	1856	7.1	23.3	1203	3.4	11.2	1303	3.1	10.2	0556 1839 0330 1211
29 Tue	0707	7.5	24.9	2012	7.4	24.3	1242	3.3	10.8	1424	2.8	9.2	0554 1841 0352 1330
30 Wed	0820	7.9	25.6	2106	7.9	25.9	0159	2.9	9.5	1527	2.4	8.1	0551 1843 0411 1440
31 Thu	0911	8.3	27.2	2146	8.3	27.2	0345	2.5	8.2	1613	2.0	6.6	0549 1845 0429 1549

## 2.5 SNH field code maps

A field code system has been used by SNH to cover all of the fields within the Management Scheme area typically used by the geese. These are the codes used in the results tables. Where geese were recorded in an uncoded field, the coding was extended in a logical and consecutive manner. The figures are ordered in a sequence from east (Priestside area) to west (Colvend area).

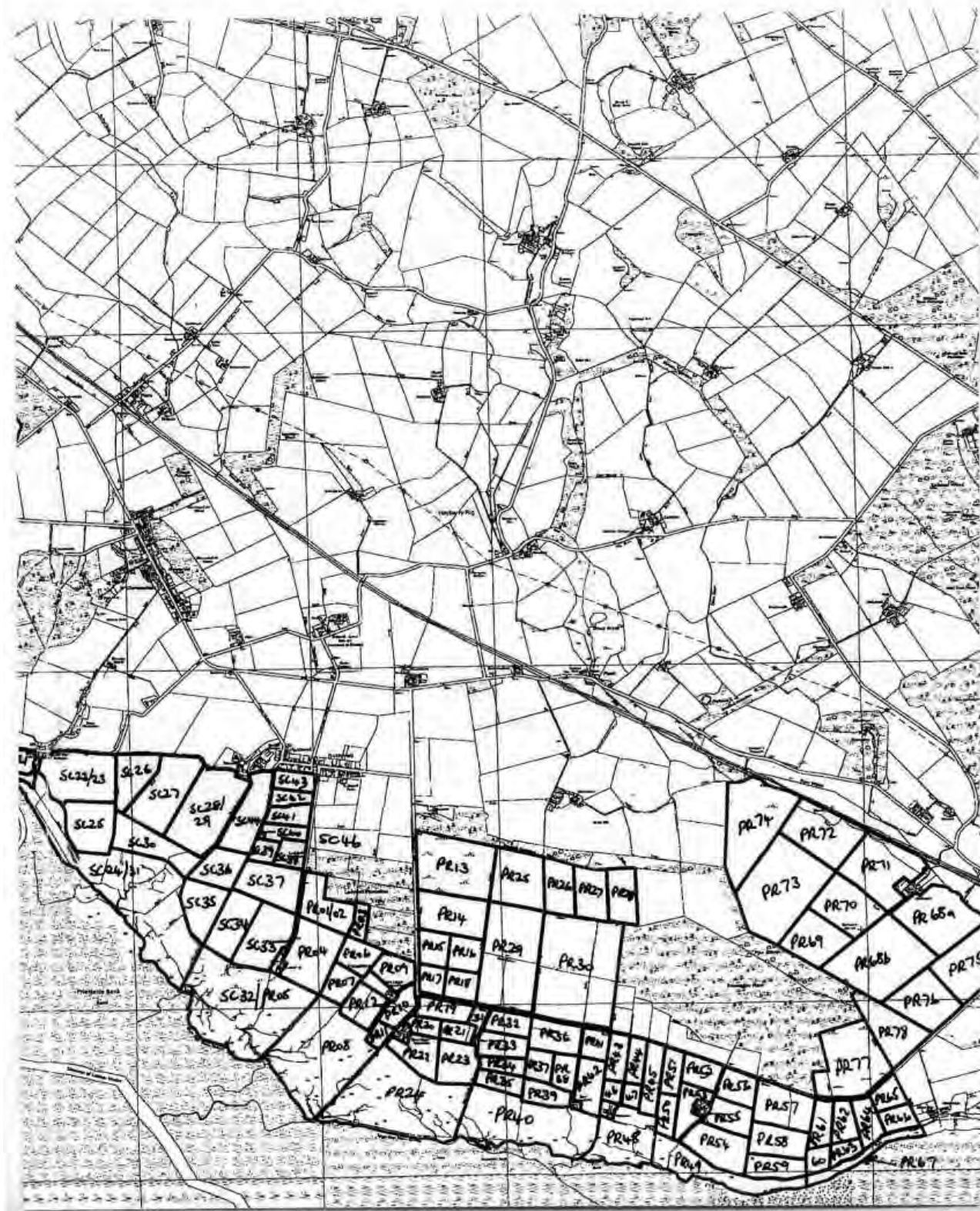


Figure 3. Field codes for the Priestside/Hurkledale/Thwaite area of the Goose Management Scheme.



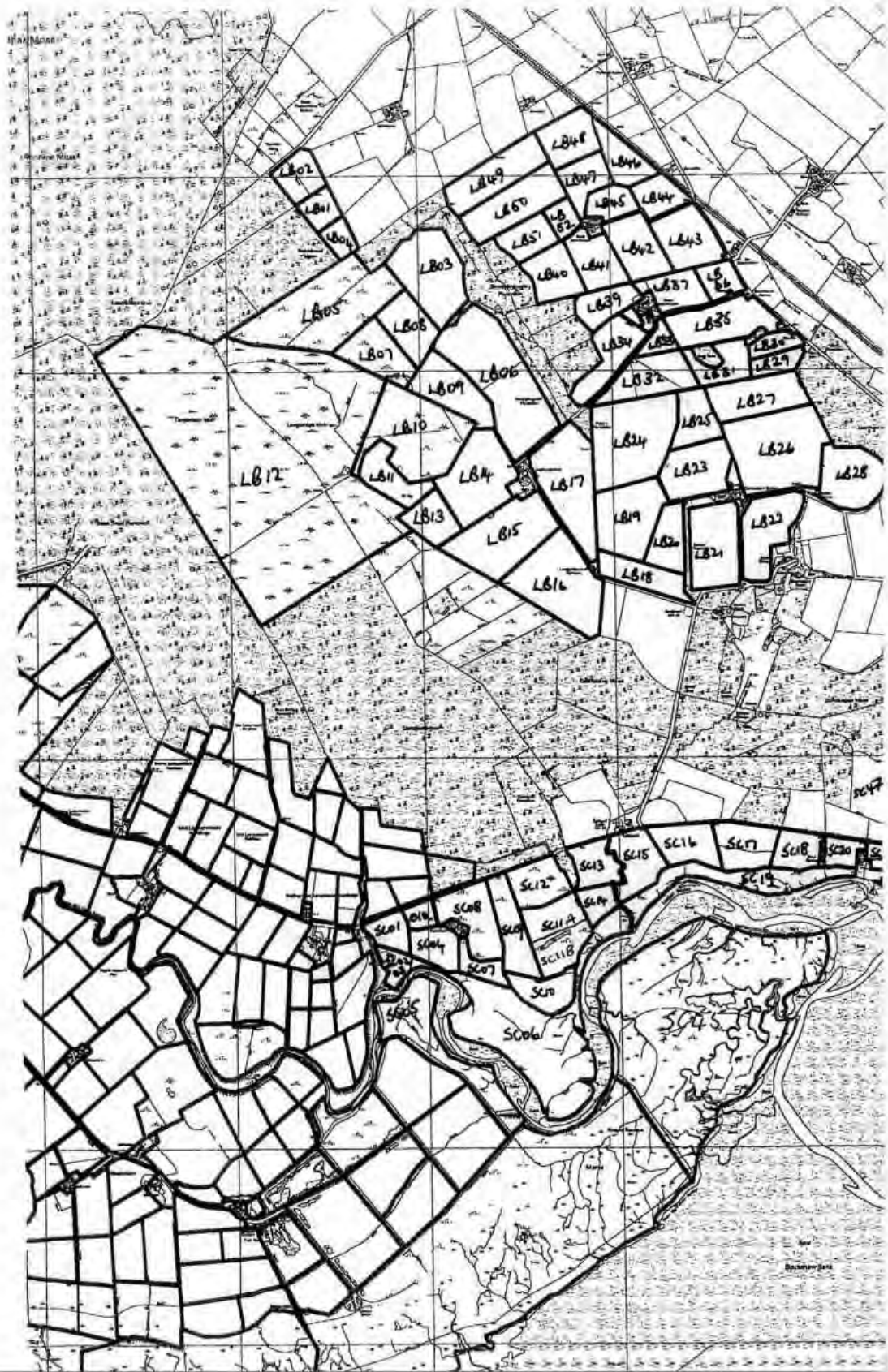


Figure 4. Field codes for the Powhillon/Stanhope/Longbridgemuir area of the Goose Management Scheme.

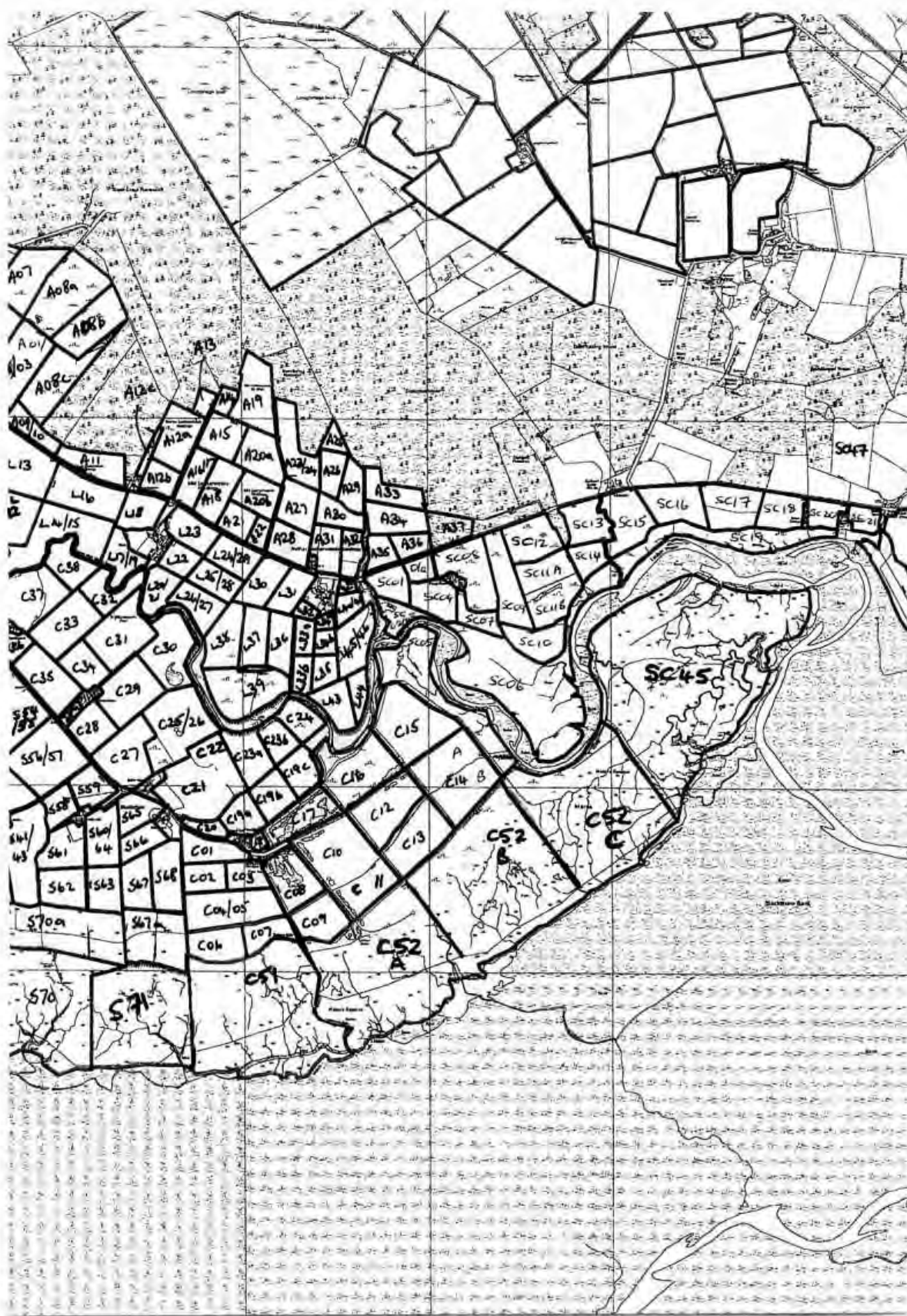


Figure 5. Field codes for the Caerlaverock/Nether Locharwoods area of the Goose Management Scheme.

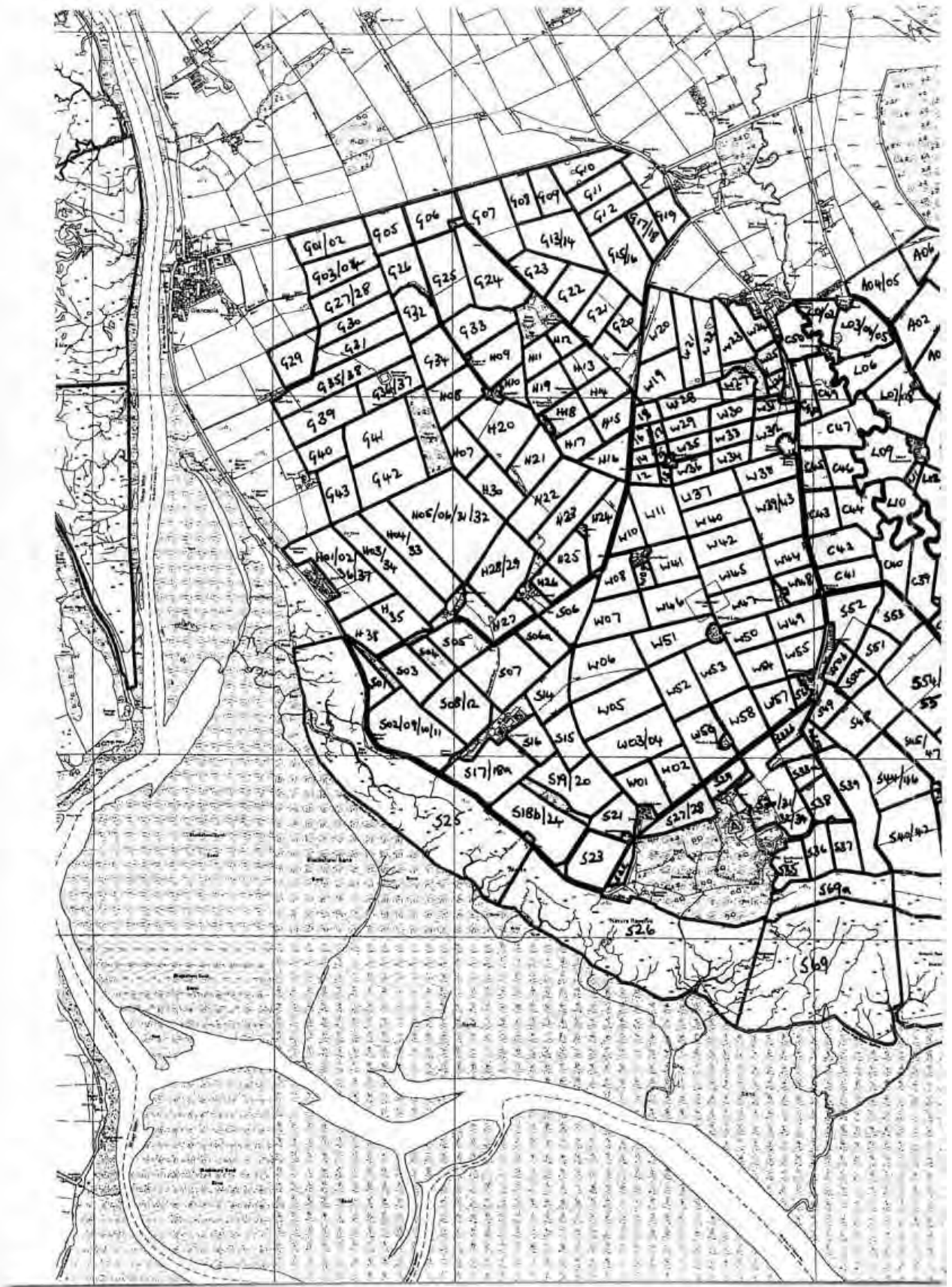


Figure 6. Field codes for the Lantonside/Ward Law area of the Goose Management Scheme.



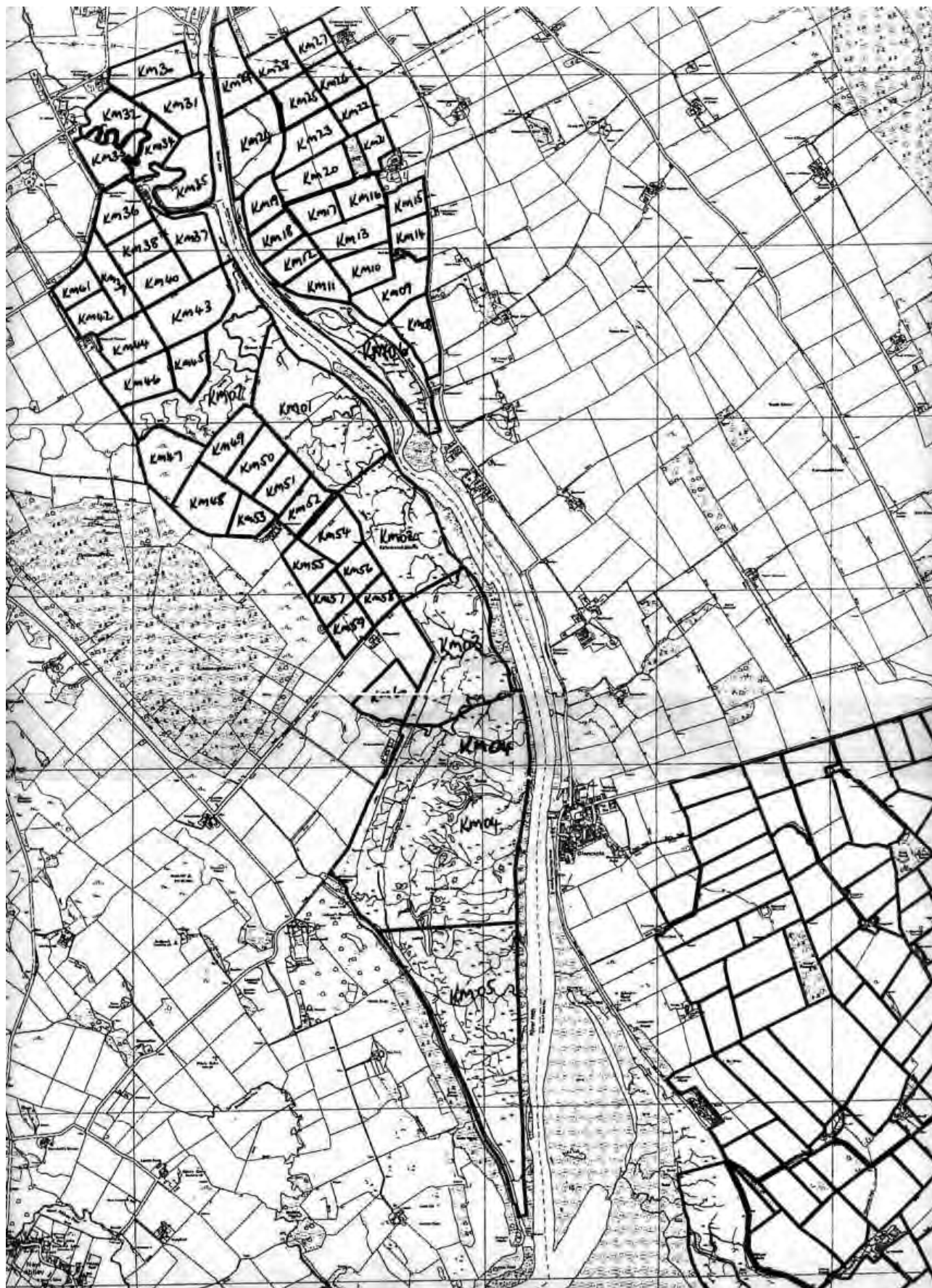


Figure 7. Field codes for the Kelton/Greenmerse/Kirkconnell area of the Goose Management Scheme.



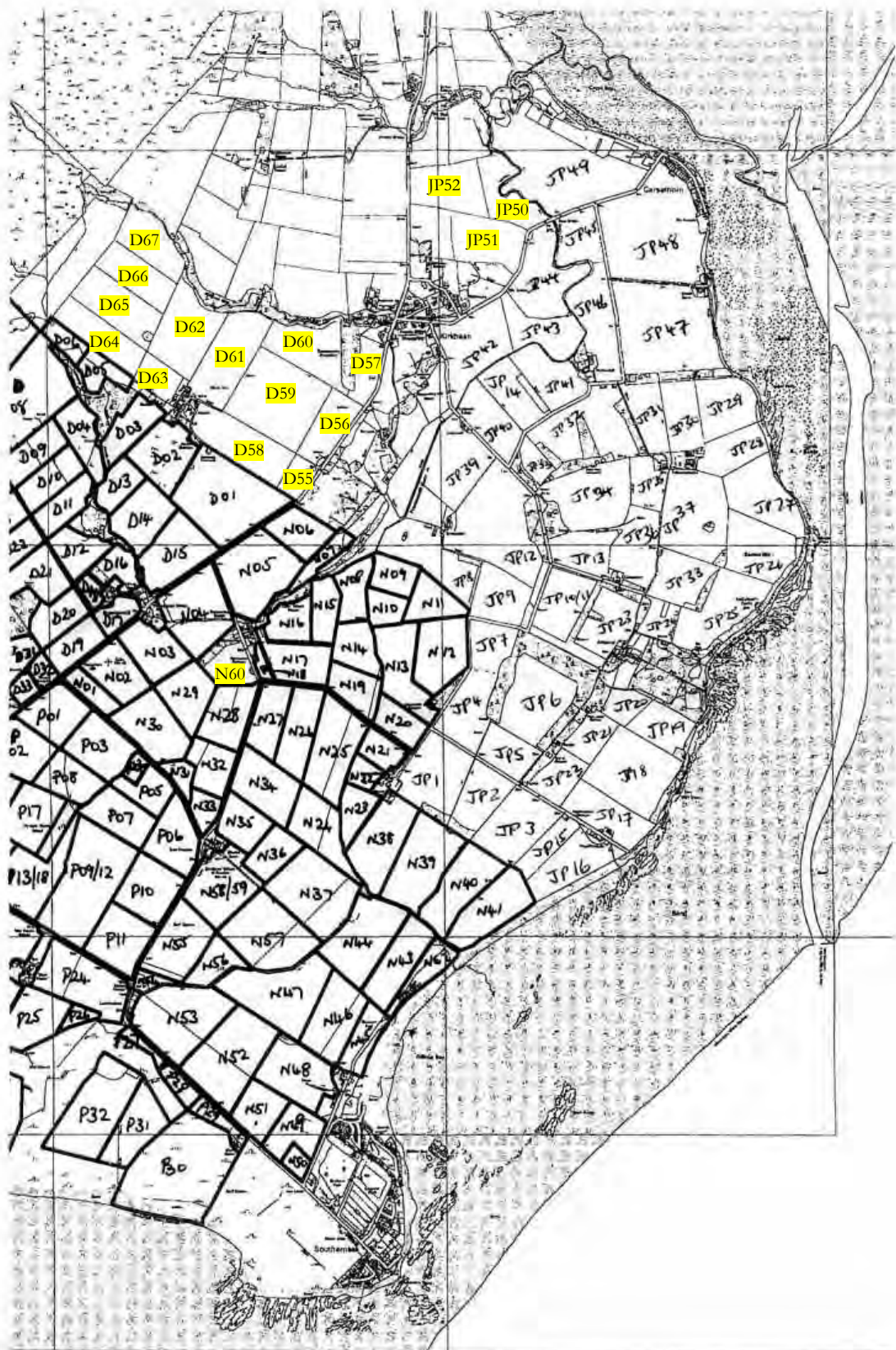


Figure 8. Field codes for the Carsethorn/Southernness area of the Goose Management Scheme (new field codes in areas used by the geese more regularly since 2008-2009 are shown highlighted).

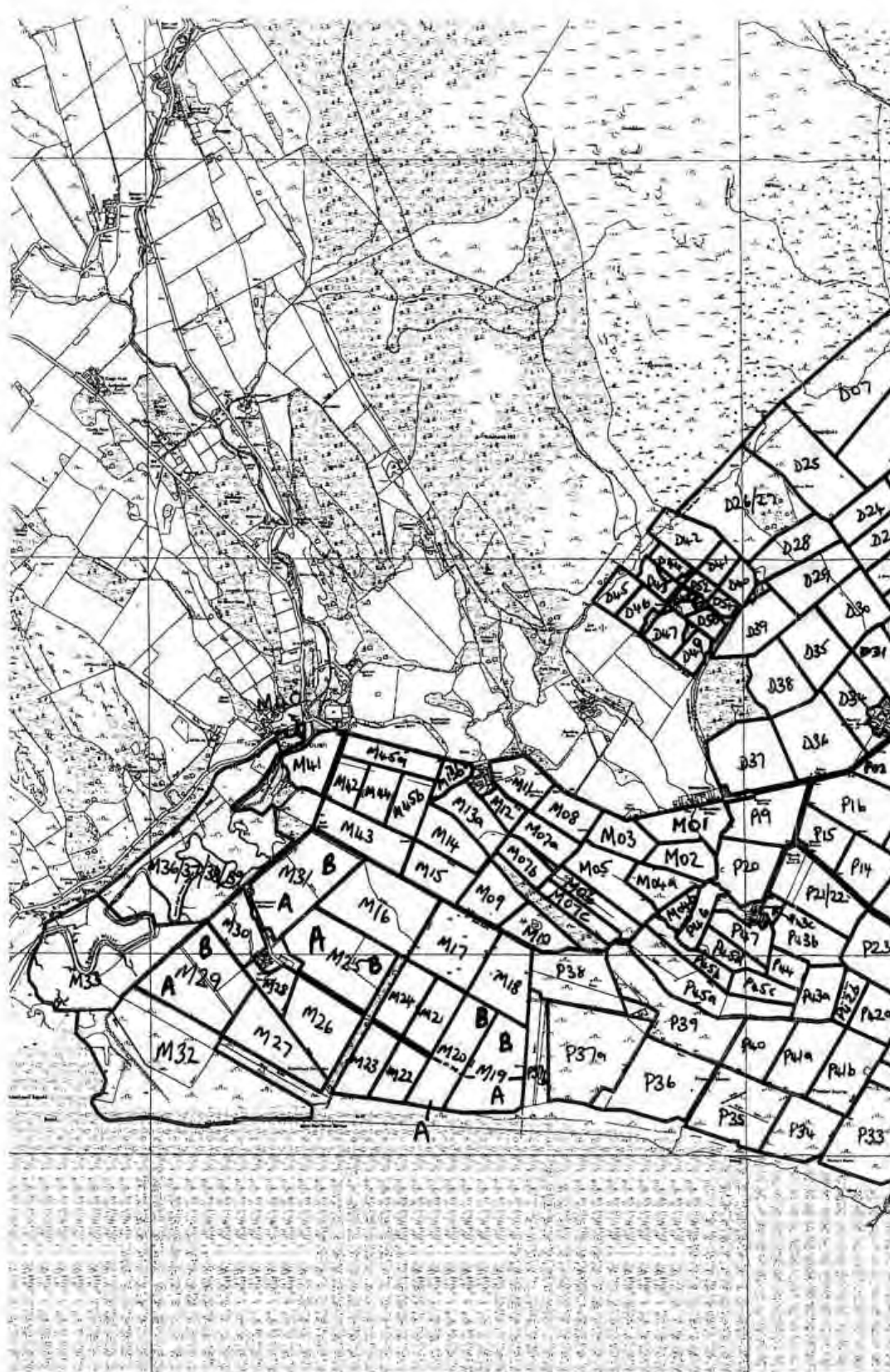


Figure 9. Field codes for the West Preston/Cowcourse/Mersehead area of the Goose Management Scheme.

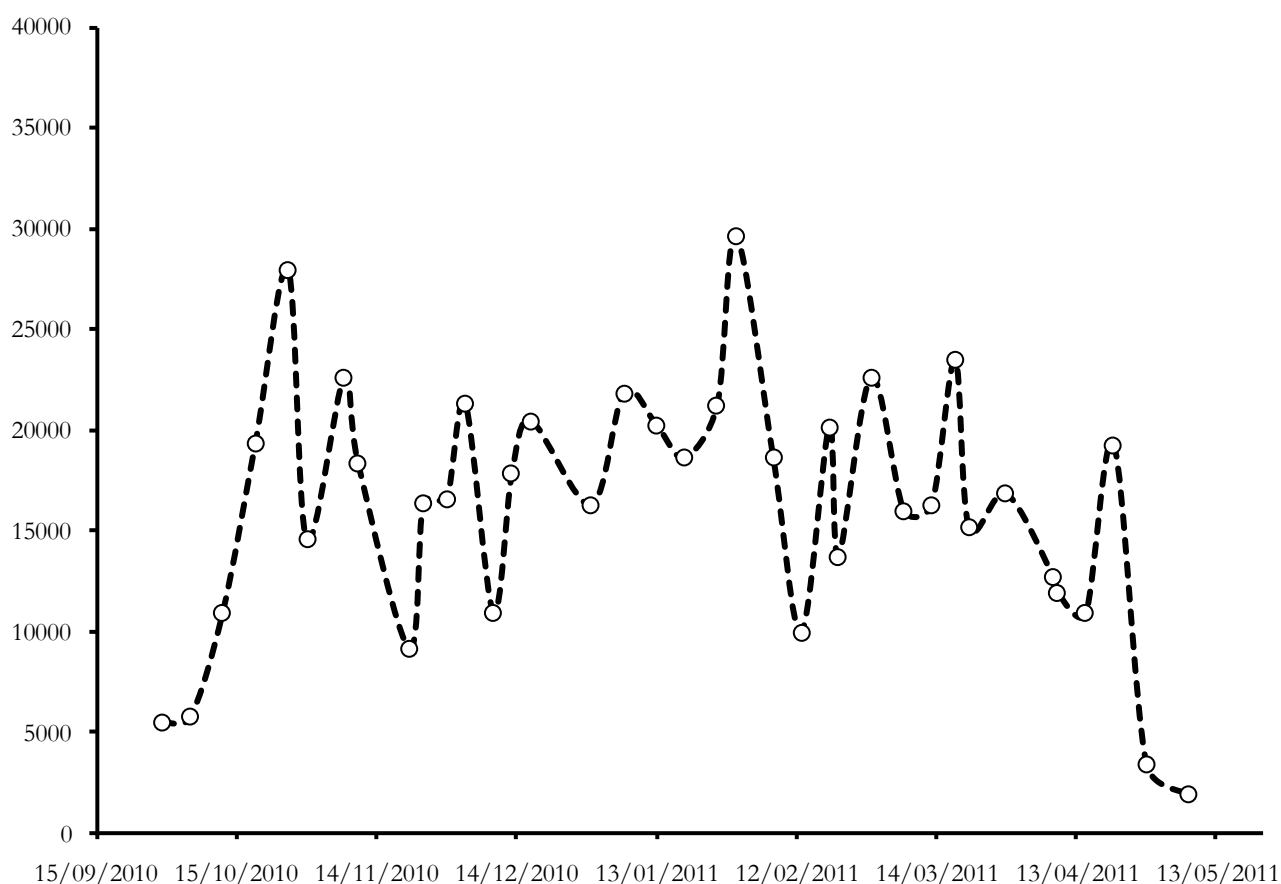




Figure 10. Field codes for the Boreland of Colvend/Glenstocken area of the Goose Management Scheme.

### 3 Results

#### 3.1 Barnacle Goose counts within the Management Scheme area



**Figure 11. Svalbard Barnacle Goose route count totals within the Management Scheme area.**

Some totals are greater than those recorded during coordinated census counts of the Solway population because double counting of flocks that move between fields often occurs over the course of a route count; the methodology does not seek to remove this bias as the aim is to record the numbers of geese using individual fields. Fluctuations in goose numbers within the Scheme area also occur due to the effect of high tides pushing geese off low lying saltmarsh areas on the south side of the Solway and due to geese dispersing mid-winter after peak arrival to foraging areas outside the Scheme.

The mean number of geese recorded during the counts was 16,149 (21,571 in 2009-2010) ranging from a minimum of 3,396 at the end of the season on 28 April 2011 (3,710 on 26 April 2010) - at a time when many of the geese have departed to Norway or are staging on Rockcliffe Marsh in Cumbria prior to departure - up to a maximum of 29,649 (33,380 in 2009-2010). In an exceptional movement, nearly 2,000 geese returned to Caerlaverock from Rockcliffe Marsh on 7 May 2011 after a thunderstorm in the evening, the birds remaining for a few days before commencing their migration or moving back to Rockcliffe. Overall within the Scheme area there tends to be a decline in goose use as food resources within the area are depleted by the end of January. In winter 2010-2011 there was lower goose use of the Scheme areas from mid-November until mid-December due to the prolonged freezing conditions with the geese mainly occurring in fringe areas and different fields to usual.

Flock sizes and field distribution of the Barnacle Geese within the Management Scheme area are given in Table 2.

**Table 2. Svalbard Barnacle Goose flock sizes recorded during the Management Scheme route counts.**

	29/09/10	05/10/10	12/10/10	19/10/10	26/10/10	30/10/10	07/11/10	10/11/10	21/11/10	24/11/10	29/11/10	03/12/10	09/12/10	13/12/10	17/12/10	30/12/10	06/01/11	13/01/11	19/01/11
A01/03										2		820					15		
A04/05																			
A15																			
A16/17																			
A18															360				
A20b																			
A21															80				
C01				2570											460			192	80
C02																		590	
C03																			
C04/05				1440			780	1220										1960	
C06																			810
C07					80														130
C08							20		30	640							180	70	280
C09																			
C10/11			600	2630				10	1550							610	330	1150	
C12					40			3100											
C13	4800		2110	380			2600	1430											
C14			200				3630												
C15				30			210		770					3440					
C16							40		30	10									
C17									20	10							65		13
C19a						40	1120		50					640					23
C19b							1550	1630		10									
C19c								1630											
C20					50														220
C21/22																			
C23a																			
C23b																			
C24																			
C25/26								1300		460									
C27										2910									2550
C29										80									
C30			10	510			1360	520	1000						1590				
C31																			
C34																	1360	12	
C40																			
C41																	210		
C51/S71		860	155		5000	4000			570	90			26		30	2000	690	2640	280
C52		500		180	4500	590								210	240	250	1060	1250	400
Corbelly/Overton											2000	2920	4400				6		
Drumburn Merse												850						160	
D12															1000				
D38																	1200		
G05			32																
H01/02/36/37												220							
H28/29				700															

H35												80						
JP02					4500							20						
JP16												3500						
JP48															60	280	55	
JP49																		
JP51												560	3					
KM01									20								2430	
KM02								150		180							1560	746
KM03								160	770				1975					
KM04			92			360		770								635		1820
KM05																510		
KM06															970			
KM08																		
KM09																		
KM10											55					1810	30	
KM11																		
KM13																		
KM17																		
KM18																		
KM20														60				
KM24																		
KM31										5								
KM35																		
KM46																		
KM47																270		
KM49																		
KM50					150													
L09														760				
L12																	90	
L16																		
L25/28																		2350
L30																		
L36																		
L37																		
L38																	45	
L43																		
LB36																85		
M01										52								1050
M05																		
M09								310										
M12																	25	
M13a															430		45	
M15						510									35	590		
M16	610	110	220	60				300										
M17		40				90												
M18																		
M19				870	1900	570											340	
M20		40				120											220	
M21						10	460									70	70	
M22					2600										310		200	

Svalbard barnacle goose distribution around the Solway Firth 2008-200910-2011

M23																		110	
M24														2300					
M25			1180			330		430	200										
M26					1420											740		8	
M27		960				25										850		660	
M28								190											
M29						840			2050					118			210	190	
M30						10								172					
M31							210		40					1500					880
M32				120		910								330				580	
M33					1230								130	150	1810		180	260	
M36/37/38/39														1000					
M41																		250	
M42																			
M43																		100	
M44																			
M45a														1290					
M45b																		280	
N10																			
N16																			
N17							260												
N23														62					
N24														40					
N25														1440					
N26														80					
N28																3		175	
N30								40											
N32																			
N39	60	20							470									310	
N40																90			
N43																820			
N44																260			
N46																		1750	
N47																560	830		
N51													640				70		
N52													730					55	
N53											2980								
N55																			
P06																35			
P07																			
P09/12												1130							
P10																1830	320		
P11												1110					810		
P19											1360								1200
P20											1360								150
P21/22						2770	1630												
P23										4430									1400
P24							1310		720					1189					
P25						750	420											620	
P26																			

P30												1300						
P31																	210	
P32																	470	
P33																		620
P34															6			
P35			50													580		70
P36																		
P37a										40								60
P39					1200	38								200				
P40			860					450								580		
P41a				2700	2400			450										
P41b				2700				450										370
P42a							1450		1830	260								283
P42b																	190	
P43a					670			1700			580							
P43b								2170			220							
P44					230													
P45a							880		520	350							1440	
P45b																		
P45c								650										
P45d																		
P46										212								
P47					710				200									
PR04																		45
PR08																	820	
PR24																	90	
PR33																		
PR38																		
PR52																		
PR56																		
PR58																		
PR59																		
PR68a											3400	3420						
PR68b												290	1680					
PR70																		
PR71																		
PR72												1600						
PR74												1600						
R08										1180								
R10								850										
R13										400							1230	
R14									320									
R21												600			800			
R24											3130							
R26											200							
S02/09/10/11															680			
S06a															2610			
S07															860			
S14															1960			
S15															170			



Svalbard barnacle goose distribution around the Solway Firth 2008-200910-2011

S18b/24									614										
S23																	2480		
S25		520				610													
S26			92				250												
S30/31/32/34									5										
S39							1530			2380									
S40/42																			
S45/47																			
S48																			
S50a																			
S51																			
S53																			
S54/55		60																	
S56/57																			
S58																			
S59																			
S60/64																			
S65																	380		
S66				120						140					310		1120		
S67				1030													930		
S67a										30									2550
S68		130		2800												1170			
S69					400	350										1760			
S70					250	1500										2000	680	50	
SC04																			
SC05																			
SC06		10		1860														520	
SC07																			
SC16		480					200												
SC17		110																	
SC18																			
SC20																			
SC25										1120			730		140				
SC26															2810				
SC27															1500				
SC28/29												2060			30				
SC30															2490				
SC32/PR05																			
SC36																			
SC45		1000	760		4600	540					2800								1370
W05											540								
W07																			
W52											720								
Total	5470	5700	10901	19310	27920	14523	22590	18340	9111	16332	16547	21265	10926	17819	20446	16253	21826	20217	18585

Table 2. Continued.

26/01/11	30/01/11	07/02/11	13/02/11	19/02/11	21/02/11	28/02/11	07/03/11	13/03/11	18/03/11	21/03/11	29/03/11	08/04/11	09/04/11	15/04/11	21/04/11	28/04/11	07/05/11	Total	
																		837	A01/03
				4														4	A04/05
					90													90	A15
											8							8	A16/17
																		360	A18
				220														220	A20b
																		80	A21
	210			610	220	140	35			12								4529	C01
		110		1900					1180	180								3960	C02
	45	60				8		100		170								383	C03
210	1460			3380	290	1770		1470	820	105		130						15035	C04/05
											35							845	C06
			320						310									840	C07
	2650			80	310	85	72	1130			620		370		107	1		6645	C08
		170	180		30		1490											1870	C09
510		410	310	980	920	3100		150		870	460		1340		4740			20670	C10/11
		40	90						260						190			3720	C12
		210		380					1790			390	530		2310			16930	C13
									130				550					4510	C14
1950	1820			490	370	30				2100		30	270		87			11597	C15
260						20			6	530	31							927	C16
20	1600			60	100		17											1905	C17
					130	30								210				2243	C19a
					140	170												3500	C19b
					750			1280				330						3990	C19c
		12	760															1042	C20
1030	1820	40	170										540					3600	C21/22
1320			220					470	1540									3550	C23a
	1250																	1250	C23b
25	1250	410																1685	C24
																		1760	C25/26
		690					540					660						7350	C27
		70	300		1210				720	680								3060	C29
45	950				210	1960	850		1870	730	700		220		1930			14455	C30
			1310		580					1710								3600	C31
			20		390													1782	C34
		42				110		430										582	C40
		60																270	C41
150	470	190		1600						535	720	220	1150					21376	C51/S71
620	150	90	200	410	2400	210					210	150	530			165	1880	16195	C52
																		9326	Corbelly/Overton
			580					270										1860	Drumburn Merse
																		1000	D12
																		1200	D38
																		32	G05
																		220	H01/02/36/37
																		700	H28/29
																		80	H35

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																	4520	JP02
																	3500	JP16
	1																396	JP48
	40																40	JP49
																	563	JP51
								150		1810	20						4430	KM01
										600	270						3506	KM02
							2460			800	610	190					6965	KM03
1180			280			2400					50		140				7727	KM04
						9						95					614	KM05
95						150	5		1130		200		2				2552	KM06
							970	25									995	KM08
							20										20	KM09
			370			290	260		80		60						2955	KM10
	2920	110			640	1080						220					4970	KM11
											6						6	KM13
								30									30	KM17
								1950									1950	KM18
																	60	KM20
		180															180	KM24
		820															825	KM31
						190											190	KM35
		210															210	KM46
																	270	KM47
									290								290	KM49
																	150	KM50
		170															930	L09
						28											90	L12
																	28	L16
																	2350	L25/28
2210																	2210	L30
970																	970	L36
1380		160															1540	L37
470																	515	L38
					70												70	L43
																	85	LB36
	1670		50														2822	M01
								680				210					890	M05
																	310	M09
																	25	M12
				370													845	M13a
		60				810											2005	M15
400								190			24	80					1994	M16
150																	280	M17
		1850															1850	M18
				120													3800	M19
		450					90				50						970	M20
7		350				200						55					1222	M21
		110									60						3280	M22
		40															150	M23

11		72					10						50				2443	M24
	730	2		10		280	100	770	440		154	100	200		1500		6426	M25
		48	270				400				386		250				3522	M26
		124									630		20		70		3339	M27
			170														360	M28
				680													4088	M29
												1					183	M30
180		190	210	130								130					3470	M31
												85		80			2105	M32
	430		420	580								44	250	750			6234	M33
																	1000	M36/37/38/39
	70																320	M41
		90															90	M42
600																	700	M43
		32															32	M44
																	1290	M45a
																	280	M45b
								8									8	N10
							3										3	N16
																	260	N17
																	62	N23
																	40	N24
																	1440	N25
																	80	N26
										25							203	N28
																	40	N30
	2380																2380	N32
																	860	N39
																	90	N40
	840																1660	N43
	280																540	N44
																	1750	N46
																	1390	N47
			50														760	N51
																	785	N52
		70															3050	N53
		130															130	N55
																	35	P06
500																	500	P07
			310														1440	P09/12
	1150																3300	P10
	1150										4250						7320	P11
		95															2655	P19
	7								3100		1830						6447	P20
1700											200						6300	P21/22
																	5830	P23
1500								1460									6179	P24
70		950	100														2910	P25
								70									70	P26
																	1300	P30

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																	210	P31
				830													1300	P32
																	620	P33
				2200		1750											3956	P34
				2000		2000								1650			6350	P35
				290							120						410	P36
				180													280	P37a
						2380											3818	P39
														2100			3990	P40
	1360			11				1000			870		2700	1600			13091	P41a
							1550	2100			1400			1630			10200	P41b
						3000			1800		1000	670	2500				12793	P42a
		120				5000	210					80					5600	P42b
700		70		1									350				4071	P43a
550							2820	980			3000	510					10250	P43b
							19			700							949	P44
	360					290	22										3862	P45a
								70									70	P45b
								1670		320							2640	P45c
									1000								1000	P45d
																	212	P46
200	25					350	58	980		1200							3723	P47
																	45	PR04
550																	1370	PR08
550												100					740	PR24
		110															110	PR33
							110										110	PR38
						620											620	PR52
						1040											1040	PR56
									350								350	PR58
						40											40	PR59
																	6820	PR68a
																	1970	PR68b
												220					220	PR70
						300											300	PR71
																	1600	PR72
	1																1601	PR74
																	1180	R08
																	850	R10
																	1630	R13
																	320	R14
																	1400	R21
																	3130	R24
																	200	R26
																	680	S02/09/10/11
																	2610	S06a
																	860	S07
																	1960	S14
																	170	S15
																	614	S18b/24

		390																2870	S23
				380	380									390				2280	S25
		810	610											2000				3762	S26
																		5	S30/31/32/34
85																		3995	S39
											180							180	S40/42
						260							780					1040	S45/47
											1370							1370	S48
						25												25	S50a
		1160				550				570			420					2700	S51
		1160	1060			990				170								3380	S53
		1540						270		80		1120						3070	S54/55
		210										850						1060	S56/57
						420												420	S58
		45																45	S59
					810													810	S60/64
											60							440	S65
		30																1720	S66
		30									20		270					2280	S67
																		2580	S67a
	10	30								2430	1510		300					8380	S68
			640		120									2030				5300	S69
			820	1600														6900	S70
					130													130	SC04
1010		30																1040	SC05
		990			1090								350		1850			6670	SC06
					1200													1200	SC07
																		680	SC16
																		110	SC17
														45				45	SC18
			120															120	SC20
																		1990	SC25
																		2810	SC26
		1760																3260	SC27
																		2090	SC28/29
		860																3350	SC30
				610										30				640	SC32/PR05
	2550																	2550	SC36
		360			570	1740	140	860		120		940	400	250				16450	SC45
									1480									2020	W05
					560													560	W07
																		720	W52
21208	29649	18622	9940	20106	13710	22585	15974	16272	23454	15132	16799	12700	11890	10867	19234	3396	1880	597499	

### 3.2 Pink-footed Goose counts for the Management Scheme area

Pink-footed Goose counts are very variable as the extent to which geese remain in the area tends to be very weather and crop dependent. Typical peak times include the autumn as geese arrive back from Iceland into the UK and from February to April as birds from further south in the UK move north again. During the December Icelandic Grey Goose Count co-ordinated by WWT, record numbers of Pink-footed Geese were recorded on the Solway due to deep snow elsewhere further northeast in their range in Scotland.

**Table 3. Pink-footed Goose flock sizes recorded during the Management Scheme route counts.**

	29/09/10	05/10/10	12/10/10	19/10/10	26/10/10	30/10/10	07/11/10	10/11/10	21/11/10	24/11/10	29/11/10	03/12/10	09/12/10	13/12/10	17/12/10	30/12/10	06/01/11	13/01/11	19/01/11
A01/03										560		5460					220	50	
A04/05																			
A16/17																			
A18																			
A20b																			
A21															45				
A34																			
C04/05										75									
C10/11			1																
C13	2																		
C27																			30
C39																			
C40																			
C41																8	55		
C46											520								
C52																			
Corbelly/Overton												100							
Drumburn Merse												200							
D59																			
G05		35	1475			3													
H01/02/36/37												380							
H28/29				60															
H35												400							
JP02					30							100							
JP10/11																		3	
JP17																			
JP18																	580		
JP21									72										850
JP44																150			
JP48													34			10	110		
JP49																			
JP51													400						
JP52																			
KM01																			
KM02																			

KM04																		
KM06																		
KM08																		
KM09																		
KM10											2280						750	
KM11																		
KM13										110								
KM17																		
KM18																		
KM20														150				
KM31										1250								
KM32																		
KM33																		
KM34																	95	
KM35																		
KM37	410																	
KM38																160		
KM39	230																	
KM49																		
L01/02																		
L09																		
L12																	1100	
L16																		
L25/28																		200
L30																		
L36																2		
L38																	70	
M16	250	400	120															
M17		280																
N10																		
N16																		
N21														204				
N37																		
N39	510	470							450								860	
N40															190			
P09/12																		
P11											10							
P35			25															
P43b																		
PR16																		
PR36																		
PR38																		
PR45																		
PR51																		
PR52																		
PR56																		
PR58																		
PR59																		
PR68a											1100							
PR68b																		



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PR69																			
PR70																			
PR72												500							
PR73																			
PR74																		800	
S25		710			1500														
S30/31/32/34									121										
S39						50													
S44/46																			
S45/47																			
S48																			
S50a																			
S51																			
S52																			
S53																			
S54/55																			
SC06																			
SC16												6	18						
SC22/23													15	107	70		90		
SC27												30							
SC28/29												110							
SC45																			90
W05																			
W40																2000			
W51																			
W52											90								
Total	1402	1895	1621	60	1530	53	0	0	193	1085	1970	10676	467	311	265	2358	1217	3728	1170

**Table 3. Continued.**

26/01/10	30/01/11	07/02/11	13/02/11	19/02/11	21/02/11	28/02/11	07/03/11	13/03/11	18/03/11	21/03/11	29/03/11	08/04/11	09/04/11	15/04/11	21/04/11	28/04/11	07/05/11	Total	
		70																6360	A01/03
				450														450	A04/05
											176							176	A16/17
				9						50								59	A18
				70														70	A20b
				15						70								130	A21
		13																13	A34
																		75	C04/05
															21			22	C10/11
																		2	C13
																		30	C27
			20															20	C39
						320		110										430	C40
	7	280																350	C41
																		520	C46
												65				200	60	65	C52
										520								620	Corbelly/Overton
				210														410	Drumburn Merse

						680											680	D59
																	1513	G05
																	380	H01/02/36/37
																	60	H28/29
																	400	H35
																	130	JP02
			340														343	JP10/11
								810									810	JP17
																	580	JP18
																	922	JP21
																	150	JP44
																	154	JP48
	10																10	JP49
	220																620	JP51
	990																	JP52
									30		1010	40					1080	KM01
												10					10	KM02
												10	80	5			95	KM04
								15	130			150		15			310	KM06
							60	330									390	KM08
							20			70							90	KM09
			70			60		120		160							3440	KM10
					200												200	KM11
												14					124	KM13
									230								230	KM17
									110								110	KM18
																	150	KM20
		110				800											2160	KM31
		90															90	KM32
		45															45	KM33
																	95	KM34
						700											700	KM35
																	410	KM37
																	160	KM38
																	230	KM39
										190							190	KM49
					40												40	L01/02
		120															120	L09
																	1100	L12
		7				150											157	L16
																	200	L25/28
	2																2	L30
																	2	L36
																	70	L38
																	770	M16
																	280	M17
									320								320	N10
								190									190	N16
																	204	N21
				160													160	N37

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																		2290	N39
																		190	N40
			160															160	P09/12
										1								11	P11
																		25	P35
								45										45	P43b
		3																3	PR16
								230										230	PR36
								280										280	PR38
								10										10	PR45
										80								80	PR51
								300										300	PR52
								30										30	PR56
											380		340					720	PR58
							340											340	PR59
930																		2030	PR68a
				60														60	PR68b
	130																	130	PR69
															480			480	PR70
																		500	PR72
							730											730	PR73
	2000																	2800	PR74
																		2210	S25
																		121	S30/31/32/34
																		50	S39
															10			10	S44/46
							250											250	S45/47
																60		60	S48
							55											55	S50a
										110								110	S51
			90															90	S52
			30							80								110	S53
								420		90								510	S54/55
															30			30	SC06
																		24	SC16
																		282	SC22/23
																		30	SC27
																		110	SC28/29
																		90	SC45
								210	230									440	W05
																		2000	W40
							1000											1000	W51
																		90	W52
930	3359	738	710	1974	970	3355	420	2760	1050	1800	1187	564	145	570	51	202	60	50846	Total

### 3.3 Greylag Goose counts for the Management Scheme area

Small numbers of Greylag Geese were recorded within the Scheme area, most records occurring on the ponds and fields at WWT Caerlaverock or nearby. Post-moult flocks build up in this area during the late summer, with numbers declining from a few hundred to less than ten over the course of the winter. Numbers were probably boosted this year in December by birds which may have been Icelandic in origin and perhaps displaced to the Solway along with the Pink-footed Geese due to the prolonged freezing conditions and deep snow further northeast in Scotland.

**Table 4. Greylag Goose flock sizes recorded during the Management Scheme route counts.**

	29/09/10	05/10/10	12/10/10	19/10/10	26/10/10	30/10/10	07/11/10	10/11/10	21/11/10	24/11/10	29/11/10	03/12/10	09/12/10	13/12/10	17/12/10	30/12/10	06/01/11	13/01/11	19/01/11
A01/03												6							
C14					10														
C15					46														
C16															6				
C17													7		20	8	40	25	
C24																			
Drumburn Merse																	50		
G05		42	13																
JP48													2						
M43																		4	
SC16													5						
SC22/23													92	128	160				
SC27												50							
SC28/29															70				
Total	0	42	13	0	56	0	0	0	0	0	0	56	106	128	256	8	90	29	0

26/01/10	30/01/11	07/02/11	13/02/11	19/02/11	21/02/11	28/02/11	07/03/11	13/03/11	18/03/11	21/03/11	29/03/11	08/04/11	09/04/11	15/04/11	21/04/11	28/04/11	07/05/11	Total	
																		6	A01/03
																		10	C14
																		46	C15
																		6	C16
	1																	101	C17
30																		30	C24
																		50	Drumburn Merse
																		55	G05
	3																	5	JP48
																		4	M43
																		5	SC16
																		380	SC22/23
																		50	SC27
											37							107	SC28/29
30	4	0	0	0	0	0	0	0	0	0	37	0	0	0	0	0	0	855	Total

### 3.4 Canada Goose counts for the Management Scheme area

Small numbers of Canada Geese were recorded within the Scheme area, most records occurring on the ponds and fields at WWT Caerlaverock or nearby. As with the Greylag Geese with which they often associate in mixed flocks, post-moult flocks build up in this area during the late summer, with numbers declining from a few hundred to less than ten over the course of the winter.

**Table 5. Canada Goose flock sizes recorded during the Management Scheme route counts.**

	29/09/10	05/10/10	12/10/10	19/10/10	26/10/10	30/10/10	07/11/10	10/11/10	21/11/10	24/11/10	29/11/10	03/12/10	09/12/10	13/12/10	17/12/10	30/12/10	06/01/11	13/01/11	19/01/11
C08																			
C17										6			56		30	60	40	90	
Drumburn Merse																	30		
G05		40																	
KM15																			
M16																			
M17						10													
M25						48													
PR16																			
S54/55		70																	
SC26																			
Total	0	110	0	0	0	58	0	0	0	6	0	0	56	0	30	60	70	90	0

26/01/11	30/01/11	07/02/11	13/02/11	19/02/11	21/02/11	28/02/11	07/03/11	13/03/11	18/03/11	21/03/11	29/03/11	08/04/11	09/04/11	15/04/11	21/04/11	28/04/11	07/05/11	Total	
	75																	75	C08
	20	40																342	C17
																		30	Drumburn Merse
																		40	G05
							1											1	KM15
						2		6										8	M16
																		10	M17
																		48	M25
		15																15	PR16
																		70	S54/55
							1											1	SC26
0	95	55	0	0	0	2	2	6	0	0	0	0	0	0	0	0	0	640	Total

### 3.5 Whooper Swan counts for the Management Scheme area

The Scheme area and fields at its fringe especially around WWT Caerlaverock, Kelton and Thwaite generally hold up to 500 whooper swans throughout the winter, with numbers increasing gradually as the swans arrive from Iceland up to mid-November and decreasing rapidly at the end of March as birds head north on migration. Some flocks occurring on fields outside the Scheme area are noted as comments on the Excel database but do not contribute to the totals given in Table 6.

**Table 6. Whooper Swan flock sizes recorded during the Management Scheme route counts.**

	29/09/10	05/10/10	12/10/10	19/10/10	26/10/10	30/10/10	07/11/10	10/11/10	21/11/10	24/11/10	29/11/10	03/12/10	09/12/10	13/12/10	17/12/10	30/12/10	06/01/11	13/01/11	19/01/11
A01/03										75							20	20	
C08			17	19	50				1		50			1		22			
C09																	7		
C10/11																5		10	
C16					5														
C17			46	5		50	119	105	93	40	50	98	223	152	160	280	260	205	28
C19a																			
C24																			238
C29																10			
C30																			
C33																			
C41														2					
KM01																			
KM06																			
KM11																			
KM12						18				98									
KM13											68								
KM15														24					
KM22															130				
KM23								18				80							
KM33														16					
KM50					15	2													
L13																		6	
L23																			
L36																	4		
L43																			
PR06						5													
PR09																			
PR16																			
PR74																			
PR76																	15		
S39						11	43			4									
SC16																			
SC22/23													8	156					
SC26												2							
SC27									63	83	50	175			26				
SC28/29												10			80				
SC30																			
SC34					50														
SC36																			
SC37						60													

Svalbard barnacle goose distribution around the Solway Firth 2008-200910-2011

SC41																			
SC44																			
Total	0	0	63	24	120	146	162	123	157	300	218	365	231	351	396	317	306	241	266

26/01/11	30/01/11	07/02/11	13/02/11	19/02/11	21/02/11	28/02/11	07/03/11	13/03/11	18/03/11	21/03/11	29/03/11	08/04/11	09/04/11	15/04/11	21/04/11	28/04/11	07/05/11	Total	
																		115	A01/03
	250	5		210			20	120	10		4	19	4				1	802	C08
																		7	C09
																		15	C10/11
																		5	C16
200	30	20	212	30		110	207	60	125	155	3		1	2	1	1		3071	C17
					228													228	C19a
20		180																438	C24
																		10	C29
						23						10						33	C30
			12	25														37	C33
					92													2	C41
																		92	KM01
		8		50				150	16			5						229	KM06
							109											109	KM11
																		116	KM12
																		68	KM13
																		24	KM15
																		130	KM22
																		98	KM23
																		16	KM33
										130								147	KM50
					30	35												71	L13
			7															7	L23
																		4	L36
			60															60	L43
																		5	PR06
4																		4	PR09
25	18	6		30														79	PR16
	15							14										29	PR74
																		15	PR76
																		58	S39
	1																	1	SC16
																		164	SC22/23
							149			61								212	SC26
										34	22	68						521	SC27
								130		50	157	146	165		18			756	SC28/29
										48								48	SC30
																		50	SC34
														99				99	SC36
																		60	SC37
				45		60												105	SC41
										37								37	SC44
249	314	219	291	390	350	228	485	474	151	515	186	248	170	101	19	1	1	8177	Total

### 3.6 Mute Swan counts for the Management Scheme area

Mute Swans mainly occur on the ponds at WWT Caerlaverock with scattered pairs elsewhere.

**Table 7. Mute Swan flock sizes recorded during the Management Scheme route counts.**

	29/09/10	05/10/10	12/10/10	19/10/10	26/10/10	30/10/10	07/11/10	10/11/10	21/11/10	24/11/10	29/11/10	03/12/10	09/12/10	13/12/10	17/12/10	30/12/10	06/01/11	13/01/11	19/01/11
C08				26	38											3			
C16					3														
C17	14	25	29	38	8	40	42	38	45	26	50	40	48	42	38	65	52	50	60
C52		2																	
L13																		2	
M17						2													
M25						2													
P45c																			
PR74																			
Total	14	27	29	64	49	44	42	38	45	26	50	40	48	42	38	68	52	52	60

26/01/11	30/01/11	07/02/11	13/02/11	19/02/11	21/02/11	28/02/11	07/03/11	13/03/11	18/03/11	21/03/11	29/03/11	08/04/11	09/04/11	15/04/11	21/04/11	28/04/11	07/05/11	Total	
	5			40				10				4	2		2	2		132	C08
							2											5	C16
60	55	70	65	30	60	55	37	20	25	30	24	19	15	29	20	22	17	1403	C17
																		2	C52
																		2	L13
																		2	M17
																		2	M25
									2									2	P45c
														2				2	PR74
60	60	70	65	70	60	55	39	30	27	30	24	23	17	31	22	24	17	1552	Total

### 3.7 Deliberate disturbance to geese in the Management Scheme area

Records of disturbance activities specifically directed towards the geese were as follows within the Management Scheme area:

- From mid-January 2011 through to April 2011 gas guns were variously deployed in four scaring zone fields at Netherwood Mains (KM10, KM13 , KM17 & KM18) to deter Pink-footed Geese and Barnacle Geese; when coupled with spinning face scarers as in KM13 and KM17 these seemed more effective;
- During January and February 2011 a gas gun was noted at West Preston (P31) in a scaring zone field, this was deployed to scare Barnacle Geese from a crop of kale that the birds had started exploiting rather exceptionally during the freezing conditions and due to snow cover of their normal feeding pastures;
- Two barrels were noted in the buffer zone Lands field (S39) from March to April;



- Gas guns noted elsewhere such as at Preistside (PR09 & PR16) plus flags and scarecrows elsewhere were thought not necessarily to be directed towards goose scaring;
- At Boreland of Colvend a large wind turbine was installed and operational on the hilltop field just east of the farmhouse (R25) by 19 February 2011; it will be interesting to see what, if any, effect this has on goose use of the surrounding scaring zone fields in this area at the fringe of the wintering goose distribution.

### 3.8 Count section dates and times of coverage

**Table 8. Survey dates and times for the Management Scheme route count sections.**

	Wednesday	Tuesday	Tuesday	Tuesday	Tuesday	Saturday	Sunday	Wednesday	Sunday	Wednesday	Monday	Friday	Thursday	Monday	Friday	Thursday	Thursday	Thursday
	29/09/10	05/10/10	12/10/10	19/10/10	26/10/10	30/10/10	07/11/10	10/11/10	21/11/10	24/11/10	29/11/10	03/12/10	09/12/10	13/12/10	17/12/10	30/12/10	06/01/11	13/01/11
Thwaite	11:00	11:00	12:30	11:30	15:30	08:30	13:30	16:30	14:30	12:00	16:30	14:00	13:30	14:30	14:30	n.c.	15:00	16:00
Nith	09:00	09:00	10:30	09:00	17:00	10:30	11:30	15:00	11:30	10:00	14:30	09:00	12:00	12:30	09:30	14:00	08:30	14:00
Southernness	10:00	10:00	10:00	17:00	11:00	13:30	10:00	10:00	10:30	10:00	09:30	12:00	10:30	11:00	11:00	14:30	11:30	09:00
Colvend	n.c.	10:00	10:00	10:00	10:00	15:30	08:30	11:30	09:15	11:00	13:00	10:30	08:30	09:30	10:30	n.c.	14:00	11:00

Wednesday	Wednesday	Sunday	Monday	Sunday	Saturday	Monday	Monday	Monday	Sunday	Friday	Monday	Tuesday	Friday	Saturday	Friday	Thursday	Thursday	Saturday
19/01/11	26/01/11	30/01/11	07/02/11	13/02/11	19/02/11	21/02/11	28/02/11	07/03/11	13/03/11	18/03/11	21/03/11	29/03/11	08/04/11	09/04/11	15/04/11	21/04/11	28/04/11	07/05/11
09:00	12:30	16:30	11:30	13:45	17:00	10:00	09:30	09:00	17:30	14:00	10:00	13:00	10:30	12:00	11:00	13:00	10:30	09:00
08:30	09:00	15:00	09:30	11:15	15:30	08:00	08:30	10:00	18:30	08:00	08:30	11:00	08:00	10:00	09:00	11:00	09:00	08:00
11:30	11:30	11:00	11:15	10:00	15:30	n.c.	17:30	14:00	09:00	09:30	10:30	09:30	08:30	15:00	12:00	14:00	11:00	10:00
10:30	10:00	09:30	10:00	09:00	17:30	10:00	16:30	10:00	11:45	11:00	10:00	09:00	10:00	n.c.	n.c.	n.c.	n.c.	n.c.

In summary, these dates represent coverage on seven Mondays, five Tuesdays, five Wednesdays, five Thursdays, five Fridays, four Saturdays and five Sundays, giving 36 counts in total.

On 30 December 2010, thick fog prevented counts in the Thwaite and Colvend areas, as it did with the Priestsides area on 13 January 2011 when full coverage of the Colvend area was also hampered by a low cloud base and heavy rain. On 29 March 2011, fog prevented an early start to the count.

### 3.9 Farmer liaisons regarding geese

As counts were conducted within the Scheme area, any significant conversations about goose numbers with the farmers were noted. Sometimes these were on days on which a count was not being conducted. All conversations were about goose numbers and whether or not the counts being conducted gave a good representation of what the farmer's impression of field use was like; generally the farmers felt that the counts gave a good representation of what was happening on their fields and were mainly happy with them, with a few fields due to the nature of the count sampling methodology proving more contentious. On 13 March 2011 it was interesting to note that Stephen Roan at Boreland of Colvend (where the wind turbine had been installed in February) felt as though geese had not used his fields for a month or so. Farmers engaging in conversations about geese are noted in Table 9.

**Table 9. Records of conversations with farmers regarding goose activity in the Scheme area.**

29/09/10					
05/10/10					
12/10/10					
19/10/10	Jack Graham				
26/10/10					
30/10/10					
07/11/10	Steven Murray's wife	Stuart Brown			
10/11/10					
21/11/10					
29/11/10					
03/12/10					
09/12/10					
13/12/10					
30/12/10					
06/01/11					
13/01/11					
19/01/11					
26/01/11					
30/01/11	Steven Murray	Stuart Brown	Jack Graham	Alastair Martin	Alastair Wylie
07/02/11					
13/02/11	Alastair Wylie	Jim Kirkland			
19/02/11					
21/02/11					
28/02/11					
07/03/11					
13/03/11	Steven Roan				
18/03/11					
21/03/11	Jim Kirkland				
29/03/11					
08/04/11					
09/04/11	Jim Kirkland				
15/04/11					
21/04/11					
28/04/11					
07/05/11					

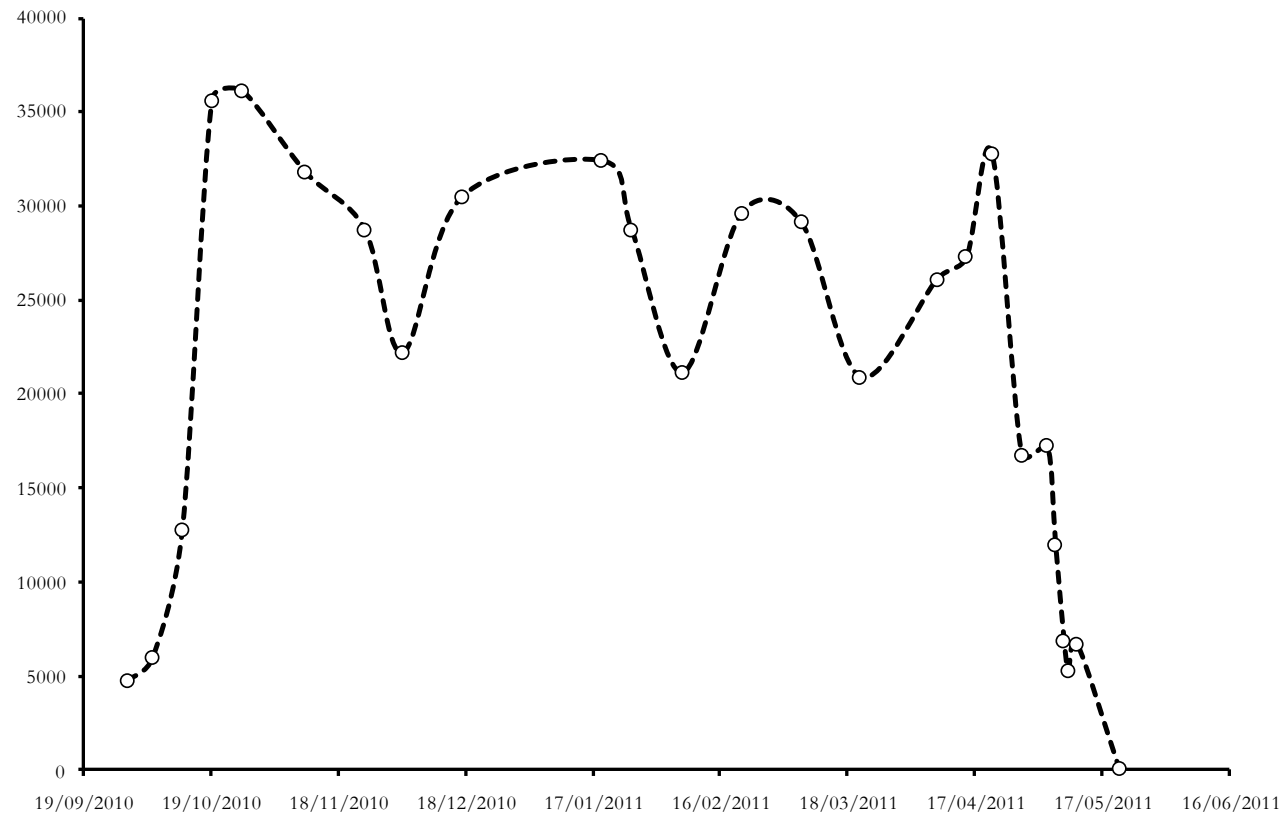
### 3.10 Coordinated Svalbard Barnacle Goose population count totals

**Table 10. Coordinated Svalbard Barnacle Goose population count totals for the Solway 2010-2011.**

Count section	29/09/2010	05/10/2010	12/10/2010	19/10/2010	26/10/2010	10/11/2010	24/11/2010	03/12/2010	17/12/2010	19/01/2011	26/01/2011	07/02/2011	21/02/2011
Annan to Gretna	0	0	0	0	0	0	0	0	0	0	0	0	0
Ruthwell to Cummertrees	0	0	0	0	0	0	1120	7060	6970	90	550	2730	0
Longbridgemuir	0	0	0	0	0	0	0	0	0	0	0	0	0
Caerlaverock	3250	2400	3840	13550	14870	10840	6760	820	3060	11163	7705	7359	12130
Kirkconnell & Ward Law	0	520	124	700	150	0	770	3725	5660	2649	1275	2730	1690
Mersehead to Airds Pt	670	2030	6850	9850	12850	6650	7280	9980	2806	4963	5908	4853	6830
Caulkerbush to Rascarrel	0	0	0	0	515	1470	1330	600	5170	1540	1000	900	700
Dundrennan to Wigtown	0	0	0	0	0	0	125	n.c.	0	n.c.	n.c.	80	420
Rockcliffe Marsh	800	1000	1900	11450	7735	10000	6250	n.c.	2160	8090	7000	n.c.	4090
Burgh Marsh	0	0	0	0	0	0	2000	n.c.	250	400	1500	920	250
Bowness to Grune	0	0	9	90	32	2840	3120	n.c.	4400	3500	3789	1550	3525
Total	4720	5950	12723	35640	36152	31800	28755	22185	30476	32395	28727	21122	29635
Notes				1	2			3				4	5

07/03/2011	21/03/2011	08/04/2011	15/04/2011	21/04/2011	28/04/2011	04/05/2011	06/05/2011	08/05/2011	09/05/2011	11/05/2011	21/05/2011	Count section
0	0	0	0	0	0	0	0	0	0	0	0	Annan to Gretna
1960	350	0	395	0	0	0	0	0	0	0	0	Ruthwell to Cummertrees
0	0	0	0	0	0	0	0	0	0	0	0	Longbridgemuir
3144	10457	6990	5960	11214	166	0	0	1880	1265	223	0	Caerlaverock
2070	1500	1216	532	0	0	0	0	0	0	0	0	Kirkconnell & Ward Law
8800	2825	4494	3980	8020	3230	36	0	0	0	0	0	Mersehead to Airds Pt
40	0	0	0	0	0	0	0	0	0	0	0	Caulkerbush to Rascarrel
488	1230	650	n.c.	n.c.	n.c.	0	0	0	0	0	0	Dundrennan to Wigtown
8170	3020	9610	11380	10740	12500	17000	12000	5000	4000	6500	44	Rockcliffe Marsh
300	0	150	0	1700	800	0	0	0	0	0	0	Burgh Marsh
4150	1510	2960	5030	1100	70	220	0	0	0	0	0	Bowness to Grune
29122	20892	26070	27277	32774	16766	17256	12000	6880	5265	6723	44	Total
				6					7			Notes

Notes: <sup>1</sup> Mersehead count is the mean of the two counts for dates either side; <sup>2</sup> Not a totally co-ordinated count due to very poor weather in some sections causing delay with some large flocks counted under poor visibility conditions so total should be treated with caution; <sup>3</sup> No count in some sections due to thick snow and ice; <sup>4</sup> Strong wind and rain in some sections, Rockcliffe Marsh too flooded for safe access; <sup>5</sup> Visibility poor in Wigtown area so Baldoon not surveyed; Mersehead count was mean of the two counts for dates either side; <sup>6</sup> Bad heat haze made counting difficult in Bowness to Grune section; <sup>7</sup> Rockcliffe count was a quick estimate from remote position.



**Figure 12. The total population of Svalbard Barnacle Geese recorded on the Inner Solway from September 2010 to May 2011.**

Total population counts of Svalbard Barnacle Geese rose rapidly on the Inner Solway from 4,720 on 29 September 2010 to 35,640 on 19 October 2010 (Table 10; Figure 12). The numbers recorded then fluctuated as in previous years mainly in relation to count visibility conditions and goose dispersal. Due to this count variation, with possible inaccuracies and increased chances of double-counting for the reasons outlined in the 'Notes' above, an adopted count total for the population is usually derived by averaging those counts within 10% of the maximum recorded during the winter. In 2010-2011 the counts of 35,640 on 19 October and 36,152 (the maximum count recorded) on 26 October, fulfil this criterion and are thus averaged to produce **an adopted population total of 35,900 Barnacle Geese** (rounded up to the nearest 100; compared to 32,900 in 2009-2010).

### 3.11 Brood size and juvenile productivity of the Svalbard Barnacle Goose

**Table 11. Brood size and juvenile productivity for Svalbard Barnacle Geese on the Solway 2009-2010.**

Date	Flock Size	Sample Size	Total Juvs	Field	Crop	Brood of 1	Brood of 2	Brood of 3	Brood of 4	Brood of 5	Brood of 6	Single Juvs	% juvs	Obs
28/09/2010	385	385	58	O5	pasture								15.1	LRG
07/10/2010	1480	1135	68	OM1	merse	2	4	4	3	2			6.0	LRG
07/10/2010	2350	855	48	O7	pasture	3	11	5	4				5.6	LRG
25/10/2010	2860	1500	144	O8	pasture	5	7	6	2				9.6	LRG
25/10/2010	4600	810	70	A8	pasture								8.6	LRG
25/10/2010	380	310	30	O4	pasture	1	2	2	1	1			9.7	LRG
30/10/2010	1450	405	30	V6	pasture								7.4	LRG
01/11/2010	910	415	42	A8	pasture								10.1	LRG
24/11/2010	1110	555	67	E1	pasture								12.1	LRG
29/11/2010	1360	260	47	T12	pasture								18.1	LRG
29/11/2010	3130	469	101	KF44	pasture								21.5	LRG
03/12/2010	820	718	112	N1b	pasture								15.6	LRG
07/01/2011	280	275	55	X118	pasture								20.0	LRG
Total		8092	872											
<b>Overall juv%</b>			<b>10.8</b>											
						Brood size totals:								
						11	24	17	10	3	0	Total broods	65	
						Number of juveniles per brood size category:						Max %juvs	21.5	
						11	48	51	40	15	0	Total juvs	165	
												<b>Mean brood</b>	<b>2.54</b>	

The juvenile productivity of the Svalbard Barnacle Goose observed in flocks sampled on the Inner Solway from September 2010 to January 2011 from Eastpark in the east to Colvend in the west ranged from 5.6% to 21.5% (1.8% to 11.8% in 2009-2010) with a mean of 10.8% young for n = 13 flocks with 8,092 geese sampled (5.1%; n = 18 flocks; 14,423 geese sampled in 2009-2010). Across the same area, the total number of broods sampled was 65, with a mean family size of 2.5 young (1.8 young, n = 99 in 2009-2010) being recorded per family (range 1-5 young; range 1-3 young in 2009-2010).

### 3.12 Leucistic Barnacle Geese

A minimum of six leucistic Barnacle Geese was inferred from the fact that three white birds were recorded in separate flocks in the Rockcliffe area on 19 October 2010 at the same time as a single leucistic bird at Caerlaverock. The three birds at Rockcliffe may have included a Ross's Goose which was seen in later surveys and did not include the family group containing three leucistic birds (plus a normal parent and a normal juvenile) often seen later in the season as a tight unit in the Newton Marsh area.

### 3.13 Other geese

From 21 September 2010 throughout the winter, a Ross's Goose was often noted on the WWT Caerlaverock reserve, at Thwaite or in the Rockcliffe area. Other geese of note recorded during the counts included a juvenile Light-bellied Brent Goose seen at Eastpark in October 2010. A single small Canada Goose of the *butchinsii* type was reported from Kirkconnell Merse in March 2011.

### 3.14 Acknowledgements

Thanks go to Mike Carrier and Bob Jones for conducting census counts in the Rockcliffe/Burgh Marsh area, Dave Blackledge for counts covering the Bowness to Grune route, Marian & Dave Rochester for covering the Borgue to Wigtown route, David & Hilary Hawker for covering Kirkcudbright to Rascarrel, Peter Williams for covering Rascarrel to Sandyhills and Dave Fairlamb for covering the Southwick area to Drumburn. Counts in the Caerlaverock area were also made by Mike Youdale and Brian Morrell.