



**Svalbard Barnacle Goose distribution  
around the Solway Firth 2008-2009**

Flock counts from the Solway Barnacle 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 2008-2009 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 29,900 geese (the mean of five counts that were within 10% of the maximum of 31,111 recorded, rounded down to the nearest 100), a slight increase on last winter's estimate of 29,000 geese. Brood sizes were very consistent this winter at 2.0 goslings per family with very few large broods recorded (range 1-4 goslings; 162 families sampled), with an average juvenile productivity of 8.7% (range 1.7-13.6% young; 10,300 birds sampled) compared to 2.4 goslings and 12.8% young respectively for last winter. Four different leucistic Barnacle Geese were recorded in winter 2008-2009.



# 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 under 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.

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.

Through liaison with the current network of volunteer goose counters on the Solway, significant use of any fields outwith the current survey area was monitored with addition of these areas to the traditional survey route if significant use by the geese was recorded. Particular attention was given to the areas around Priests side and also Auchencairn and Rascarrel as these areas have had fairly regular flocks in previous years.

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 the season progressed it soon became clear that the Cummertrees/Hurkledale/Priests side 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. In previous years the Priests side section has been dropped due to lack of goose use but this winter it was surveyed and the Quay Hill section was dropped after agreement with SNH to keep the mileage within budget. During the co-ordinated counts of geese on the Solway, it was felt that the low counts being recorded in the Auchencairn area did not justify extension of the route count methodology to that area with most birds choosing to visit the Boreland of Colvend area instead this winter. From March 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 a separate grant.

## 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 were 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 2008 LAVER'S LIVERPOOL (Alfred) TIDES**

All times shown are GMT - add one hour from 0100 30 March to 0100 26 October

● New Moon		◐ First Quarter	○ Full Moon	◑ Last Quarter	HIGH WATER		LOW WATER		SUN	MOON						
Morning		Afternoon		Morning		Afternoon		Rise	Set	Rise	Set					
Date	Time	M	Ft	Time	M	Ft	Time	M	Ft	Time	M	Ph.				
1 Mon				1208	9.6	31.5	0639	0.5	1.6	1840	0.9	3.0				
2 Tue	0023	9.9	32.5	1243	9.5	31.2	0712	0.6	2.0	1914	1.0	3.3				
3 Wed	0057	9.7	31.8	1315	9.3	30.5	0743	0.9	2.0	1946	1.2	3.9				
4 Thu	0131	9.4	30.8	1348	9.0	29.5	0813	1.4	4.6	2019	1.7	5.6				
5 Fri	0203	8.9	29.2	1419	8.6	28.2	0842	1.9	6.2	2049	2.2	7.2				
6 Sat	0235	8.4	27.6	1454	8.1	26.6	0909	2.5	8.2	2120	2.8	9.2				
7 Sun	0313	7.7	25.3	1536	7.6	24.9	0940	3.2	10.5	2203	3.4	11.2				
8 Mon	0403	7.1	23.3	1634	7.1	23.3	1026	3.7	12.1	2319	3.8	12.5				
9 Tue	0519	6.7	22.0	1802	6.9	22.6	1209	4.1	13.5	0536	1842	1629	2313			
10 Wed	0714	6.7	22.0	1945	7.2	23.6	1005	3.8	12.5	1348	3.8	12.5	0537	1839	1658	
11 Thu	0831	7.3	24.0	2047	7.9	25.9	0227	3.3	10.8	1455	3.2	10.5	0539	1837	1718	0028
12 Fri	0919	8.0	28.2	2133	8.5	27.9	0326	2.6	8.5	1546	2.6	8.5	0541	1834	1734	0148
13 Sat	0958	8.5	27.9	2211	9.1	29.9	0412	2.0	6.6	1628	2.0	6.6	0543	1832	1746	0307
14 Sun	1034	8.9	29.2	2248	9.4	30.8	0453	1.5	4.9	1706	1.5	4.9	0544	1829	1757	0428
15 Mon	1109	9.3	30.5	2323	9.7	31.8	0531	1.1	3.6	1744	1.1	3.6	0546	1827	1808	0550
16 Tue	1142	9.5	31.2	2358	9.9	32.5	0608	0.7	2.3	1820	0.8	2.6	0548	1825	1819	0714
17 Wed				1218	9.5	31.2	0644	0.6	2.0	1858	0.7	2.3	0549	1822	1833	0841
18 Thu	0024	9.9	32.5	1253	9.5	31.2	0721	0.6	2.0	1935	0.9	3.0	0551	1820	1851	1010
19 Fri	0111	9.7	31.8	1331	9.2	30.2	0756	0.9	3.0	2011	1.2	3.9	0553	1817	1916	1142
20 Sat	0150	9.4	30.8	1410	8.9	29.2	0831	1.4	4.6	2052	1.6	5.2	0555	1815	1953	1309
21 Sun	0235	8.8	28.9	1456	8.4	27.6	0911	1.9	6.2	2140	2.2	7.2	0556	1812	2048	1424
22 Mon	0320	8.2	26.9	1600	7.9	25.9	1001	2.6	8.5	2246	2.7	8.9	0558	1810	2201	1520
23 Tue	0448	7.8	24.9	1728	7.6	24.9	1117	3.1	10.2				0600	1807	2326	1558
24 Wed	0622	7.5	24.6	1900	7.8	25.6	0200	2.8	9.2	1305	3.2	10.5	0602	1805		1623
25 Thu	0749	7.9	25.9	2017	8.3	27.2	0322	2.4	7.9	1427	2.7	8.9	0603	1803	0054	1641
26 Fri	0856	8.5	27.9	2115	9.0	29.5	0312	1.9	6.2	1529	2.2	7.2	0605	1800	0221	1654
27 Sat	0947	9.0	29.5	2203	9.4	30.8	0408	1.3	4.3	1619	1.7	5.6	0607	1759	0345	1705
28 Sun	1028	9.3	30.5	2243	9.7	31.8	0455	1.0	3.3	1700	1.4	4.6	0609	1755	0506	1716
29 Mon	1106	9.5	31.2	2320	9.8	32.2	0534	0.9	3.0	1737	1.2	3.9	0611	1753	0625	1726
30 Tue	1140	9.5	31.2	2355	9.7	31.8	0608	0.9	3.0	1811	1.1	3.6	0612	1750	0743	1738

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**LAVER'S LIVERPOOL (Alfred) TIDES OCTOBER 2008**

All times shown are GMT - add one hour from 0100 30 March to 0100 26 October

● New Moon		◐ First Quarter	○ Full Moon	◑ Last Quarter	HIGH WATER		LOW WATER		SUN	MOON		
Morning		Afternoon		Morning		Afternoon		Rise	Set	Rise	Set	
Date	Time	M	Ft	Time	M	Ft	Time	M	Ft	Time	M	Ph.
1 Wed				1212	9.4	30.8	0639	1.0	3.3	1844	1.2	3.9
2 Thu	0027	9.5	31.2	1243	9.3	30.5	0708	1.2	3.9	1917	1.4	4.5
3 Fri	0058	9.1	29.9	1314	9.0	29.5	0736	1.6	5.2	1948	1.8	5.9
4 Sat	0129	8.7	28.5	1343	8.7	28.5	0803	2.1	6.9	2017	2.3	7.5
5 Sun	0202	8.3	27.2	1417	8.2	26.9	0828	2.6	8.5	2048	2.8	9.2
6 Mon	0237	7.8	25.6	1455	7.8	25.6	0859	3.1	10.2	2127	3.3	10.8
7 Tue	0322	7.2	23.6	1550	7.3	24.0	0941	3.7	12.1	2232	3.7	12.1
8 Wed	0432	6.8	22.3	1713	7.0	23.0	1103	4.1	13.5			
9 Thu	0520	6.7	22.0	1853	7.2	23.6	0015	3.7	12.1	1257	4.0	13.1
10 Fri	0748	7.3	24.0	2003	7.8	25.6	0138	3.3	10.8	1410	3.4	11.2
11 Sat	0840	7.9	25.9	2052	8.5	27.9	0241	2.6	8.5	1505	2.7	8.9
12 Sun	0920	8.5	27.9	2133	9.0	29.5	0332	2.0	6.6	1551	2.1	6.9
13 Mon	0958	9.0	29.5	2212	9.5	31.2	0415	1.5	4.9	1634	1.5	4.9
14 Tue	1035	9.4	30.8	2259	9.8	32.2	0457	1.0	3.3	1714	1.1	3.6
15 Wed	1113	9.6	31.5	2330	10.0	32.8	0538	0.7	2.3	1756	0.8	2.6
16 Thu	1151	9.7	31.8				0619	0.6	2.0	1837	0.7	2.3
17 Fri	0011	9.9	32.5	1232	9.6	31.5	0658	0.7	2.3	1918	0.8	2.6
18 Sat	0053	9.7	31.8	1312	9.4	30.8	0736	1.0	3.3	2000	1.1	3.6
19 Sun	0136	9.2	30.2	1357	9.0	29.5	0816	1.5	4.9	2045	1.6	5.2
20 Mon	0227	8.7	28.5	1449	8.5	27.9	0859	2.1	6.9	2131	2.1	6.9
21 Tue	0329	8.1	26.6	1557	8.1	26.6	0954	2.7	8.9	2256	2.5	8.2
22 Wed	0448	7.7	25.3	1720	7.9	25.9	1119	3.1	10.2			
23 Thu	0612	7.7	25.3	1841	8.1	26.6	0226	2.5	8.2	1251	3.1	10.2
24 Fri	0729	8.0	28.2	1953	8.5	27.9	0342	2.2	7.2	1403	2.7	8.9
25 Sat	0831	8.5	27.9	2049	8.9	29.2	0447	1.9	6.2	1502	2.3	7.5
26 Sun	0920	8.8	28.9	2136	9.2	30.2	0540	1.6	5.2	1550	2.0	6.6
27 Mon	1001	9.1	29.9	2217	9.3	30.5	0624	1.4	4.6	1631	1.7	5.6
28 Tue	1038	9.2	30.2	2253	9.4	30.8	0702	1.3	4.3	1707	1.5	5.2
29 Wed	1111	9.3	30.5	2327	9.3	30.5	0754	1.3	4.3	1744	1.5	5.2
30 Thu	1144	9.3	30.5				0856	1.4	4.6	1818	1.5	4.9
31 Fri	0001	9.1	29.9	1215	8.1	29.9	0937	1.6	5.2	1851	1.7	5.6

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**NOVEMBER 2008 LAVER'S LIVERPOOL (Alfred) TIDES**

● New Moon		◐ First Quarter	○ Full Moon	◑ Last Quarter	HIGH WATER		LOW WATER		SUN	MOON			
Morning		Afternoon		Morning		Afternoon		Rise	Set	Rise	Set		
Date	Time	M	Ft	Time	M	Ft	Time	M	Ft	Time	M	Ph.	
1 Sat	0032	8.8	28.9	1246	8.9	29.2	0705	1.9	5.9	1922	2.0	6.6	
2 Sun	0104	8.5	27.9	1317	8.7	28.5	0732	2.2	7.2	1953	2.3	7.5	
3 Mon	0136	8.2	26.9	1350	8.4	27.6	0800	2.5	8.2	2027	2.6	8.5	
4 Tue	0211	7.8	25.9	1430	8.1	26.6	0834	3.0	9.8	2109	3.0	9.8	
5 Wed	0256	7.5	24.6	1520	7.7	25.3	0926	3.4	11.2	2207	3.2	10.5	
6 Thu	0357	7.0	23.3	1629	7.4	24.3	1025	3.7	12.1	2321	3.3	10.8	
7 Fri	0517	7.0	23.3	1749	7.5	24.6	1151	3.8	12.5				
8 Sat	0640	7.3	24.0	1893	7.8	25.6	0039	3.1	10.2	1311	3.4	11.2	
9 Sun	0743	7.8	25.6	2000	8.4	27.6	0146	2.6	8.5	1414	2.8	9.2	
10 Mon	0834	8.3	27.2	2049	8.9	29.2	0245	2.1	6.9	1509	2.2	7.2	
11 Tue	0918	8.8	28.9	2136	9.3	30.5	0337	1.6	5.2	1558	1.7	5.6	
12 Wed	1003	9.3	30.5	2221	9.6	31.5	0425	1.2	3.9	1648	1.2	3.9	
13 Thu	1046	9.5	31.2	2306	9.8	32.2	0511	0.9	3.0	1734	0.9	3.0	
14 Fri	1130	9.7	31.8	2352	9.7	31.8	0555	0.7	2.3	1820	0.8	2.6	
15 Sat				1215	9.6	31.5	0639	0.8	2.6	1907	0.8	2.6	
16 Sun	0040	9.5	31.2	1301	9.5	31.2	0722	1.1	3.6	1955	1.0	3.3	
17 Mon	0129	9.2	30.2	1350	9.2	30.2	0806	1.5	4.9	2045	1.4	4.6	
18 Tue	0224	8.7	28.5	1445	8.8	28.9	0854	2.0	6.6	2143	1.7	5.6	
19 Wed	0325	8.3	27.2	1549	8.5	27.9	0951	2.5	8.2	2250	2.1	6.9	
20 Thu	0432	8.0	26.2	1657	8.3	27.2	1103	2.8	9.2	0747	1608		1321
21 Fri	0544	7.9	25.9	1808	8.2	26.9	0001	2.2	7.2	1218	2.9	9.5	
22 Sat	0653	7.9	25.9	1917	8.3	27.2	0108	2.2	7.2	1325	2.8	9.2	
23 Sun	0756	8.2	26.9	2017	8.5	27.9	0204	2.2	7.2	1424	2.6	8.5	
24 Mon	0848	8.4	27.6	2108	8.6	28.2	0304	2.1	6.9	1516	2.4	7.9	
25 Tue	0933	8.6	28.2	2150	8.8	28.9	0409	2.0	6.6	1601	2.2	7.2	
26 Wed	1011	8.8	28.9	2229	8.9	28.9	0429	1.9	6.2	1643	2.0	6.6	
27 Thu	1048	8.9	29.2	2306	8.8	28.9	0505	1.8	5.9	1721	1.9	6.2	
28 Fri	1121	9.0	29.5	2340	8.7	28.5	0540	1.8	5.9	1759	1.9	6.2	
29 Sat	1154	9.0	29.5				0612	1.9	6.2	1834	2.0	6.6	
30 Sun	0013	8.6	28.2	1227	8.9	29.2	0641	2.0	6.				

JANUARY 2009

LAVER'S LIVERPOOL TIDES

Date	HIGH WATER				LOW WATER				SUN	MOON	Ph.
	Morning		Afternoon		Morning		Afternoon				
	Time	M Ft	Time	M Ft	Time	M Ft	Time	M Ft			
1 Thu	0143	8.5 27.9	1400	8.8 28.8	0805	2.1 8.9	2038	2.0 8.6	0828 1604	1034 2144	
2 Fri	0221	8.4 27.8	1438	8.7 28.5	0847	2.3 7.5	2115	2.1 6.8	0827 1605	1044 2259	
3 Sat	0301	8.2 26.9	1522	8.6 27.5	0927	2.5 8.2	2157	2.3 7.5	0827 1606	1054	
4 Sun	0348	8.0 26.2	1612	8.3 27.2	1015	2.8 9.2	2247	2.8 8.5	0827 1608	1108 0017	
5 Mon	0443	7.8 25.6	1711	8.1 26.8	1114	3.0 9.8	2351	2.8 9.2	0827 1608	1120 0138	1157
6 Tue	0549	7.8 24.9	1818	8.0 26.2	1227	3.0 8.8	0826 1610	1138 0308			
7 Wed	0701	7.8 25.6	1930	8.1 26.6	0108	2.8 9.2	1346	2.8 9.2	0826 1612	1207 0439	
8 Thu	0812	8.1 28.8	2042	8.5 27.8	0223	2.6 8.2	1501	2.4 7.9	0826 1613	1248 0603	
9 Fri	0816	8.7 28.5	2148	8.9 28.2	0331	2.1 6.9	1607	1.8 5.9	0824 1614	1362 0717	
10 Sat	1012	9.2 30.2	2242	9.3 30.6	0430	1.6 5.2	1705	1.2 3.8	0824 1616	1515 0812	
11 Sun	1103	9.6 31.1	2334	9.8 31.5	0524	1.3 4.3	1800	0.8 2.6	0823 1617	1650 0849	
12 Mon	1153	9.9 32.5			0615	1.0 3.3	1851	0.5 1.8	0822 1619	1826 0914	0328
13 Tue	0023	9.7 31.8	1240	10.0 32.8	0702	0.9 3.0	1939	0.4 1.3	0821 1621	1957 0931	
14 Wed	0110	9.6 31.5	1327	9.8 32.5	0747	1.0 3.3	2024	0.5 1.6	0821 1622	2123 0945	
15 Thu	0104	9.4 30.8	1411	9.7 31.8	0828	1.2 3.8	2106	0.8 2.6	0820 1624	2246 0957	
16 Fri	0237	9.1 29.8	1454	9.3 30.5	0909	1.5 4.8	2146	1.3 4.3	0819 1626	1008	
17 Sat	0320	8.8 28.2	1538	8.7 28.5	0951	2.0 8.8	2227	1.9 6.2	0818 1627	0005 1020	
18 Sun	0405	8.1 26.6	1625	8.1 26.6	1035	2.5 8.2	2314	2.6 8.5	0818 1629	0124 1034	
19 Mon	0457	7.8 24.9	1722	7.6 24.9	1128	3.0 9.8			0815 1631	0241 1051	0247
20 Tue	0603	7.3 24.0	1836	7.2 23.8	0009	3.1 10.2	1232	3.3 10.8	0814 1633	0356 1114	
21 Wed	0722	7.2 23.6	2000	7.2 23.8	0115	3.3 10.8	1345	3.4 11.2	0813 1634	0508 1146	
22 Thu	0832	7.8 24.9	2105	7.5 24.8	0227	3.2 10.5	1503	3.1 10.2	0812 1636	0606 1230	
23 Fri	0925	8.0 26.2	2154	7.8 25.9	0332	2.9 9.5	1604	2.7 8.9	0810 1638	0655 1326	
24 Sat	1008	8.6 27.9	2238	8.3 27.2	0421	2.6 8.2	1650	2.3 7.5	0809 1640	0731 1433	
25 Sun	1048	8.8 28.9	2312	8.5 27.9	0503	2.2 7.2	1730	2.0 6.8	0808 1642	0757 1546	
26 Mon	1126	9.0 28.5	2348	8.7 28.5	0540	1.8 6.2	1806	1.7 5.8	0806 1644	0816 1702	
27 Tue	1158	9.1 28.9			0615	1.7 5.8	1840	1.6 5.2	0805 1646	0830 1818	0755
28 Wed	0018	8.8 28.9	1232	9.2 30.2	0647	1.6 5.2	1913	1.5 4.9	0803 1647	0842 1933	
29 Thu	0050	8.6 28.9	1305	9.2 30.2	0719	1.6 5.2	1945	1.4 4.8	0802 1649	0855 2048	
30 Fri	0123	8.9 28.2	1338	9.2 30.2	0751	1.8 5.2	2015	1.5 4.9	0800 1651	0903 2208	
31 Sat	0158	8.9 28.9	1414	9.1 29.8	0824	1.7 5.8	2048	1.7 5.8	0758 1653	0914 2325	

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LAVER'S LIVERPOOL TIDES

FEBRUARY 2009

Date	HIGH WATER				LOW WATER				SUN	MOON	Ph.
	Morning		Afternoon		Morning		Afternoon				
	Time	M Ft	Time	M Ft	Time	M Ft	Time	M Ft			
1 Sun	0232	8.7 28.5	1453	8.9 29.2	0859	2.0 6.8	2122	2.0 6.8	0757 1655	0927	
2 Mon	0313	8.4 27.8	1538	8.6 28.2	0938	2.3 7.5	2204	2.4 7.9	0755 1657	0844 0048	2313
3 Tue	0403	8.0 26.2	1635	8.1 26.6	1028	2.7 8.9	2302	2.8 9.2	0753 1658	1007 0214	
4 Wed	0509	7.5 24.9	1747	7.7 25.3	1144	3.1 10.2			0752 1701	1041 0340	
5 Thu	0630	7.5 24.6	1910	7.7 25.3	0024	3.1 10.2	1321	3.1 10.2	0750 1703	1132 0458	
6 Fri	0755	7.8 25.6	2035	8.0 26.2	0200	2.9 9.5	1451	2.8 8.5	0748 1705	1243 0609	
7 Sat	0908	8.4 27.6	2142	8.7 28.5	0321	2.4 7.9	1602	1.8 5.9	0748 1707	1411 0644	
8 Sun	1005	9.1 28.9	2236	9.2 30.2	0424	1.8 5.9	1700	1.1 3.5	0744 1709	1548 0714	
9 Mon	1054	9.7 31.8	2323	9.6 31.5	0517	1.2 3.9	1751	0.5 1.8	0742 1711	1720 0734	1450
10 Tue	1139	10.0 32.8			0604	0.8 2.6	1837	0.2 0.7	0740 1713	1859 0750	
11 Wed	0007	9.8 32.2	1223	10.1 33.1	0648	0.6 2.0	1920	0.1 0.3	0738 1715	2015 0803	
12 Thu	0048	9.7 31.8	1304	10.0 32.8	0728	0.5 2.0	2000	0.3 1.0	0736 1717	2140 0814	
13 Fri	0127	9.5 31.2	1343	9.7 31.8	0806	0.8 2.8	2036	0.7 2.3	0734 1719	2301 0826	
14 Sat	0205	9.2 30.2	1421	9.3 30.5	0841	1.2 3.9	2110	1.3 4.3	0732 1721	0840	
15 Sun	0241	8.8 28.9	1458	8.7 28.5	0915	1.7 5.8	2144	2.0 6.5	0730 1723	0021 0850	
16 Mon	0318	8.2 28.9	1539	8.1 28.8	0950	2.3 7.5	2221	2.7 8.9	0728 1725	0138 0917	
17 Tue	0402	7.7 26.3	1627	7.4 25.8	1038	3.0 9.8	2312	3.3 10.8	0726 1727	0252 0945	2138
18 Wed	0451	7.1 25.3	1738	6.8 22.3	1142	3.4 11.2			0724 1729	0351 1025	
19 Thu	0553	6.9 22.5	1925	6.7 22.0	0023	3.6 11.8	1303	3.6 11.8	0722 1731	0450 1116	
20 Fri	0802	7.2 23.6	2042	7.2 23.8	0145	3.6 11.8	1431	3.3 10.8	0720 1733	0531 1220	
21 Sat	0902	7.7 25.3	2133	7.7 25.3	0305	3.2 10.5	1545	2.8 9.2	0717 1735	0600 1331	
22 Sun	0948	8.3 27.2	2215	8.2 26.8	0403	2.7 8.9	1631	2.2 7.2	0715 1737	0622 1448	
23 Mon	1027	8.7 28.5	2250	8.5 27.5	0445	2.2 7.2	1709	1.8 5.9	0713 1739	0638 1602	
24 Tue	1103	9.0 28.5	2323	8.8 28.8	0521	1.8 5.9	1745	1.4 4.8	0711 1740	0651 1719	
25 Wed	1136	9.2 30.2	2354	8.9 29.2	0555	1.5 4.9	1818	1.2 3.9	0709 1742	0702 1835	
26 Thu			1209	9.3 30.5	0627	1.3 4.3	1860	1.1 3.6	0708 1744	0713 1853	0137
27 Fri	0026	9.1 28.9	1241	9.4 30.8	0659	1.2 3.9	1921	1.1 3.6	0704 1746	0724 2113	
28 Sat	0057	9.1 28.9	1315	9.4 30.8	0730	1.2 3.9	1951	1.1 3.6	0702 1748	0738 2235	

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MARCH 2009

LAVER'S LIVERPOOL TIDES

All times shown are GMT - add one hour from 0100 29 March to 0100 25 October

Date	HIGH WATER				LOW WATER				SUN	MOON	Ph.
	Morning		Afternoon		Morning		Afternoon				
	Time	M Ft	Time	M Ft	Time	M Ft	Time	M Ft			
1 Sun	0131	9.1 29.8	1351	9.3 30.5	0802	1.3 4.3	2021	1.4 4.5	0700 1760	0751	
2 Mon	0205	8.9 29.2	1430	9.0 29.5	0836	1.6 5.2	2055	1.7 5.6	0657 1752	0812 0001	
3 Tue	0247	8.6 28.2	1516	8.5 27.9	0916	2.0 6.6	2137	2.3 7.5	0655 1754	0842 0126	
4 Wed	0335	8.1 26.5	1613	7.9 25.9	1006	2.5 8.5	2235	2.9 9.5	0653 1755	0925 0248	
5 Thu	0444	7.5 24.5	1730	7.4 24.3	1125	3.0 9.8			0650 1758	1029 0352	
6 Fri	0514	7.3 24.0	1905	7.4 24.3	0001	3.2 10.5	1314	3.0 9.8	0648 1800	1147 0441	
7 Sat	0748	7.7 26.3	2032	7.8 25.9	0150	3.1 10.2	1447	2.4 7.9	0646 1801	1317 0514	
8 Sun	0858	8.4 27.5	2133	8.5 28.2	0314	2.4 7.9	1554	1.5 5.2	0643 1803	1448 0537	
9 Mon	0952	9.1 28.9	2221	9.2 30.2	0414	1.7 5.6	1648	0.8 3.0	0641 1805	1618 0555	
10 Tue	1036	9.6 31.5	2305	9.5 31.5	0503	1.1 3.6	1733	0.4 1.3	0638 1807	1745 0608	
11 Wed	1120	9.9 32.5	2345	9.7 31.8	0547	0.7 2.3	1815	0.1 0.3	0636 1809	1810 0621	
12 Thu			1200	10.0 32.8	0627	0.5 1.6	1854	0.2 0.7	0634 1811	2033 0632	0238
13 Fri	0022	9.6 31.5	1238	9.8 32.2	0704	0.6 2.0	1930	0.4 1.3	0631 1813	2155 0645	
14 Sat	0057	9.5 31.2	1314	9.5 31.2	0739	0.8 2.6	2003	0.8 3.0	0629 1814	2316 0701	
15 Sun	0132	9.2 30.2	1349	9.1 29.8	0810	1.2 3.8	2032	1.5 4.9	0626 1816	0720	
16 Mon	0205	8.8 28.0	1424	8.6 28.2	0839	1.7 5.6	2059	2.1 6.9	0624 1818	0832 0745	
17 Tue	0238	8.3 27.2	1500	8.0 26.2	0911	2.2 7.2	2130	2.7 8.9	0622 1820	0142 0821	
18 Wed	0318	7.8 25.6	1545	7.3 24.0	0952	2.8 9.2	2218	3.3 10.8	0619 1822	0241 0908	
19 Thu	0410	7.2 23.6	1649	6.7 22.0	1057	3.3 10.8	2333	3.7 12.1	061		

## 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).

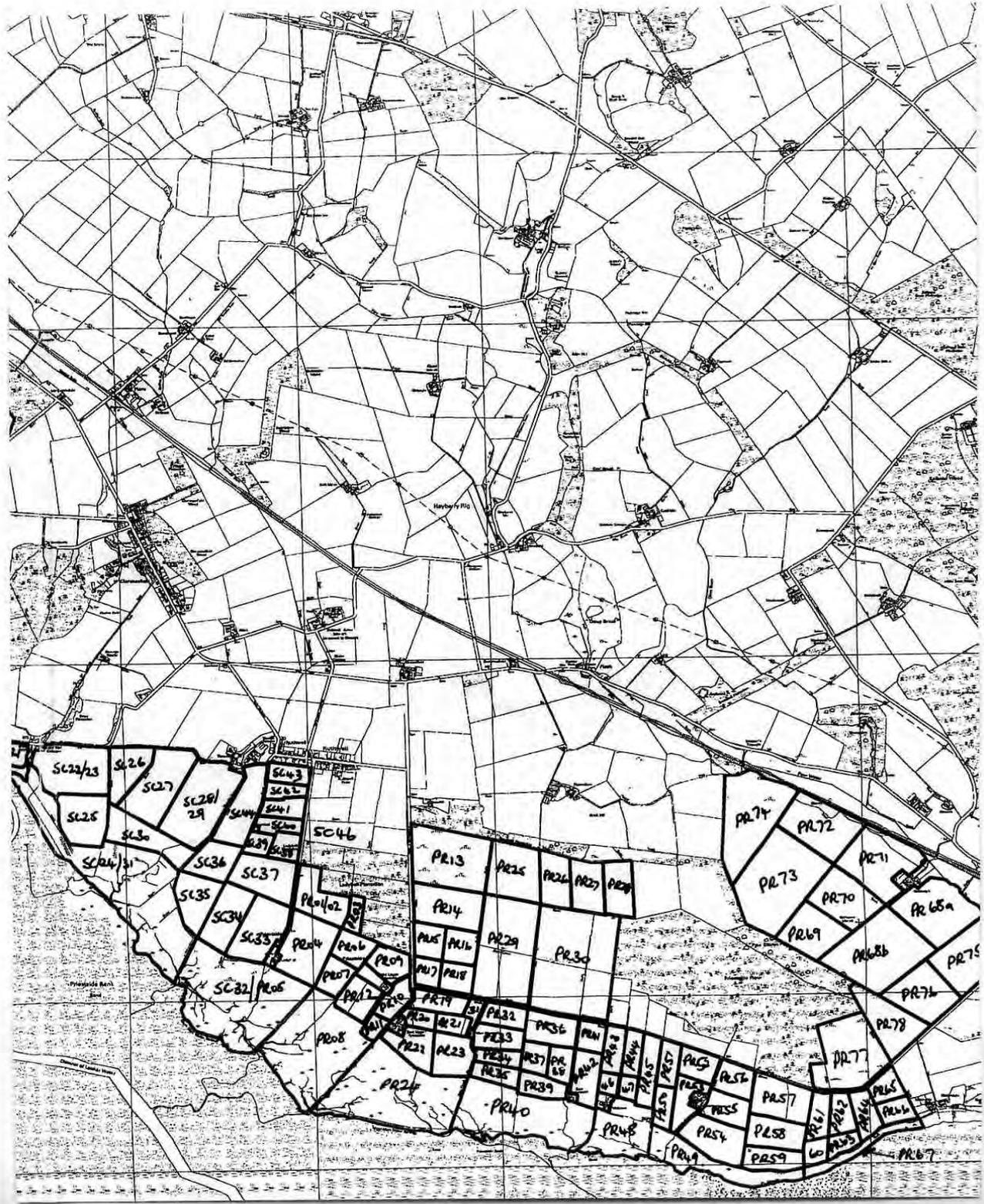


Figure 3. Field codes for the Priestside/Hurkledale/Thwaite area of the Goose Management Scheme.

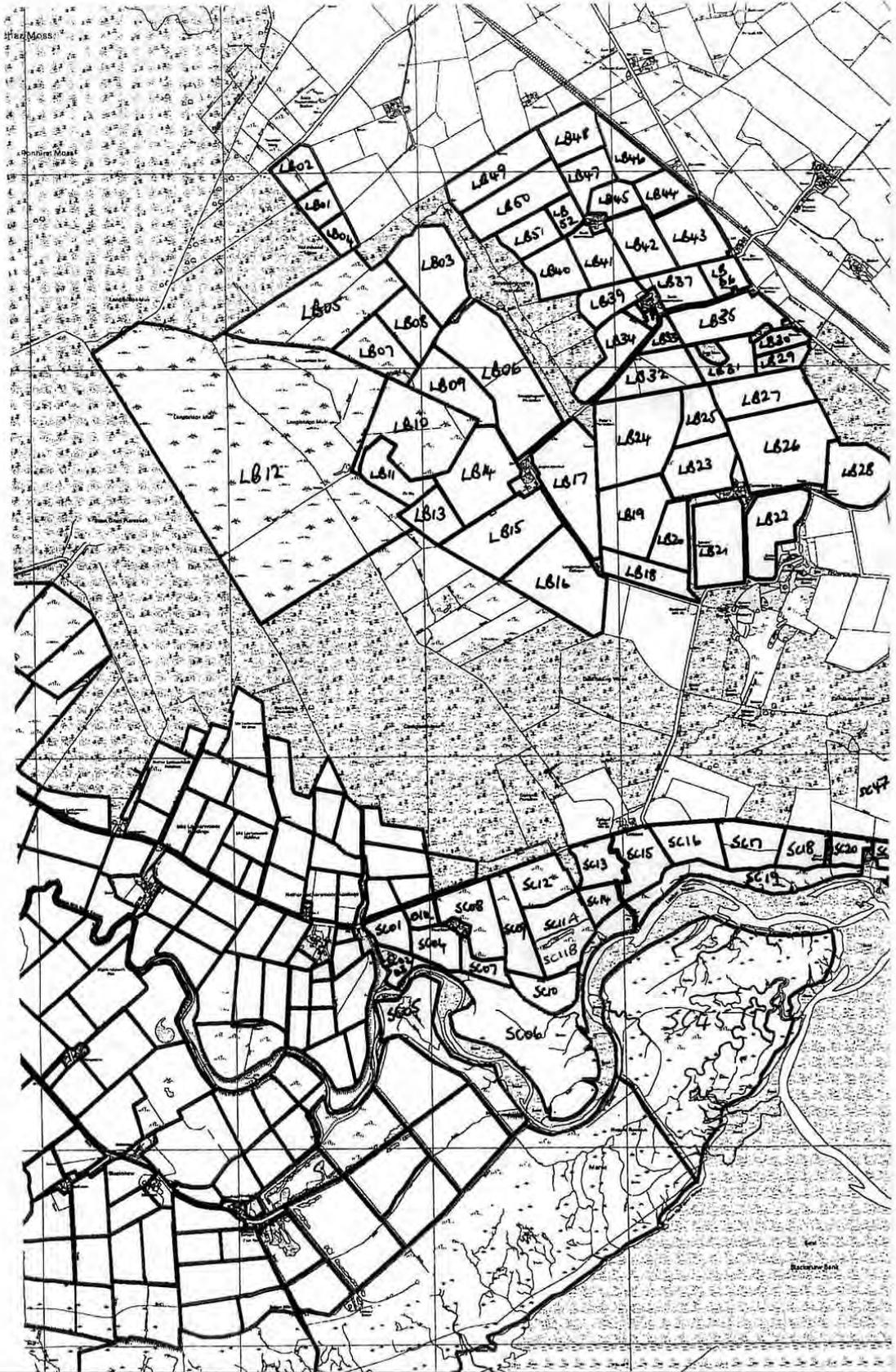


Figure 4. Field codes for the Powhillon/Stanhope/Longbridgemuir area of the Goose Management Scheme.

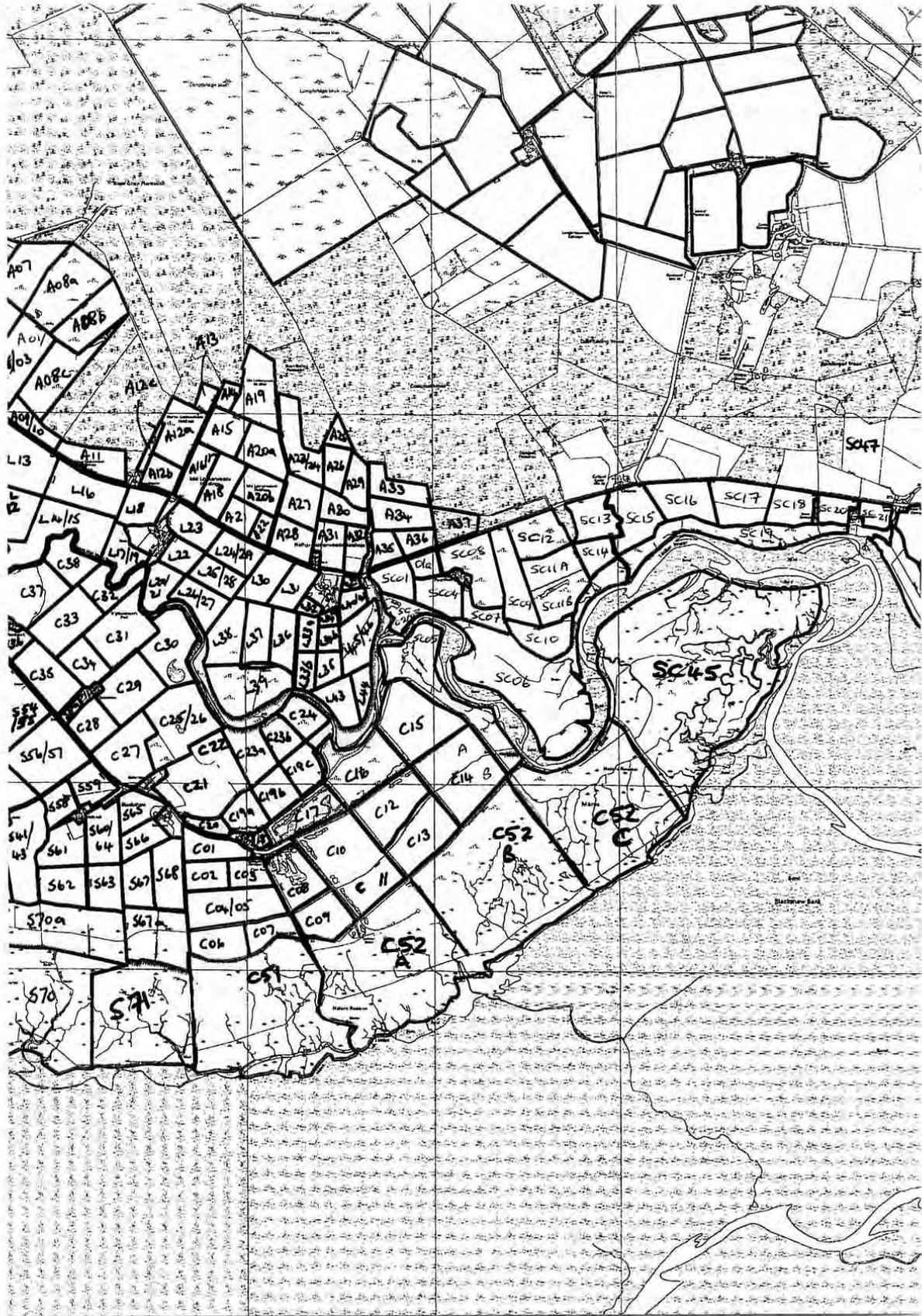


Figure 5. Field codes for the Caerlaverock/Nether Locharwoods area of the Goose Management Scheme.

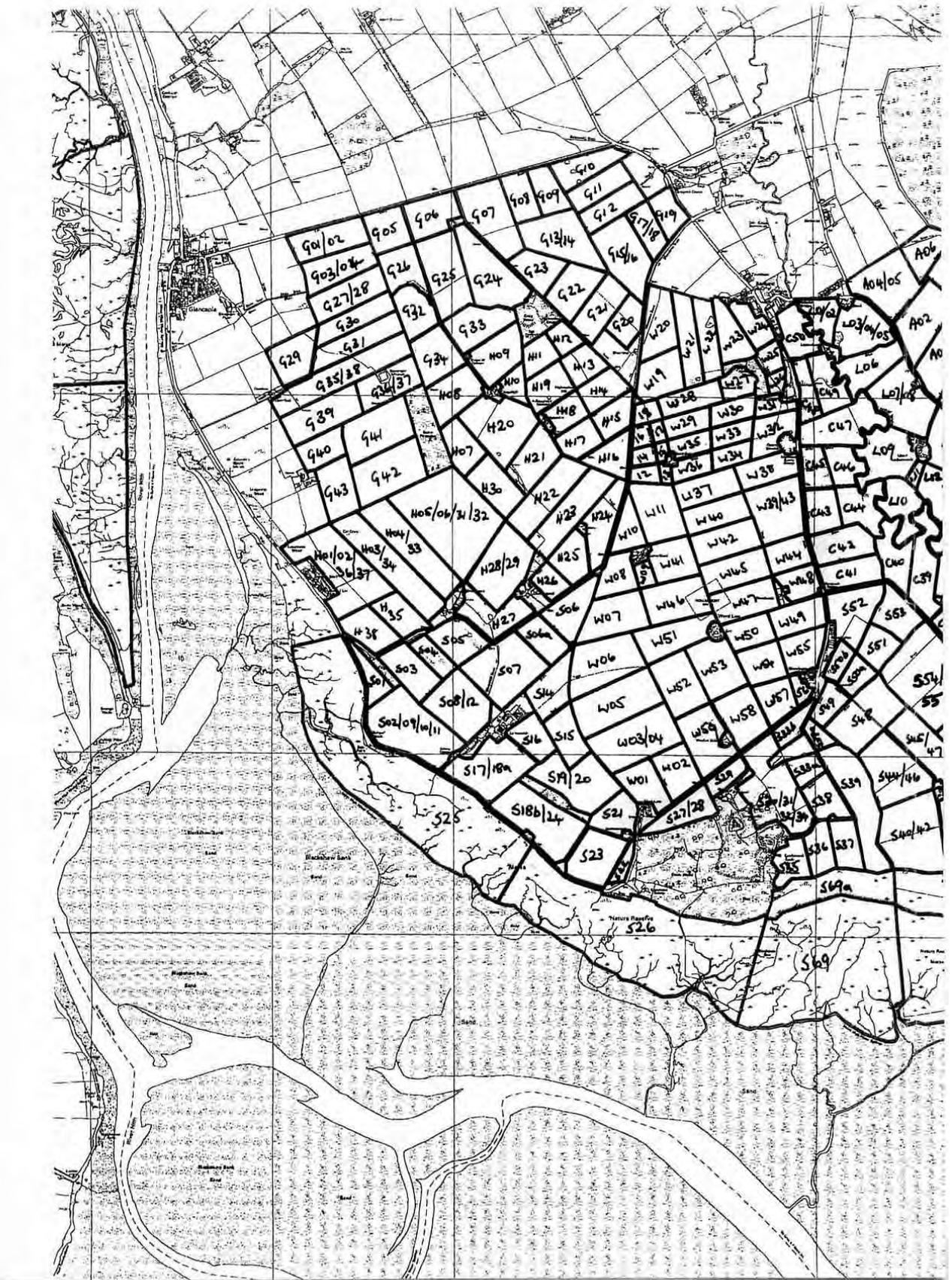


Figure 6. Field codes for the Lantonside/Ward Law area of the Goose Management Scheme.

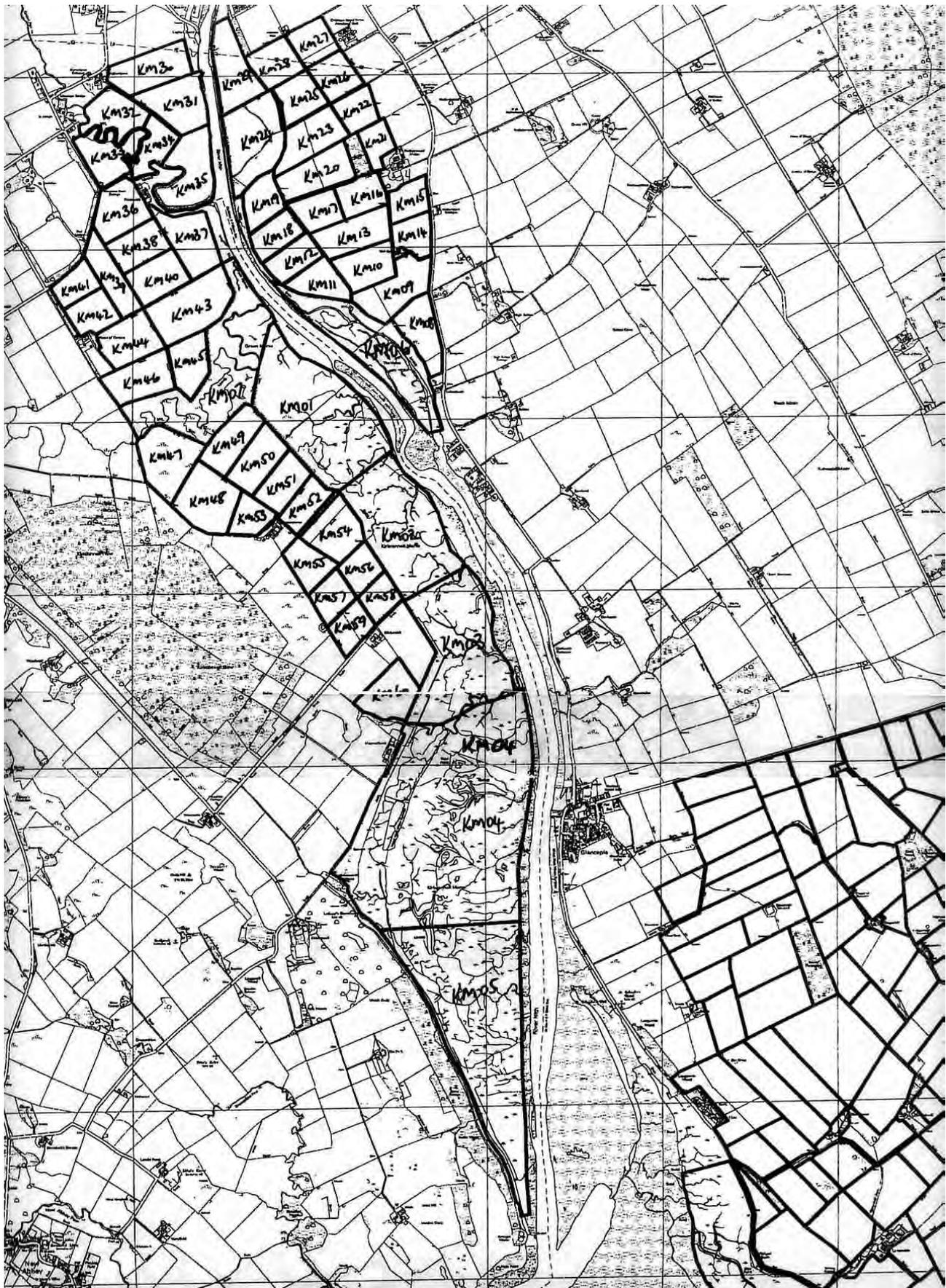


Figure 7. Field codes for the Kelton/Greenmerse/Kirkconnell area of the Goose Management Scheme.

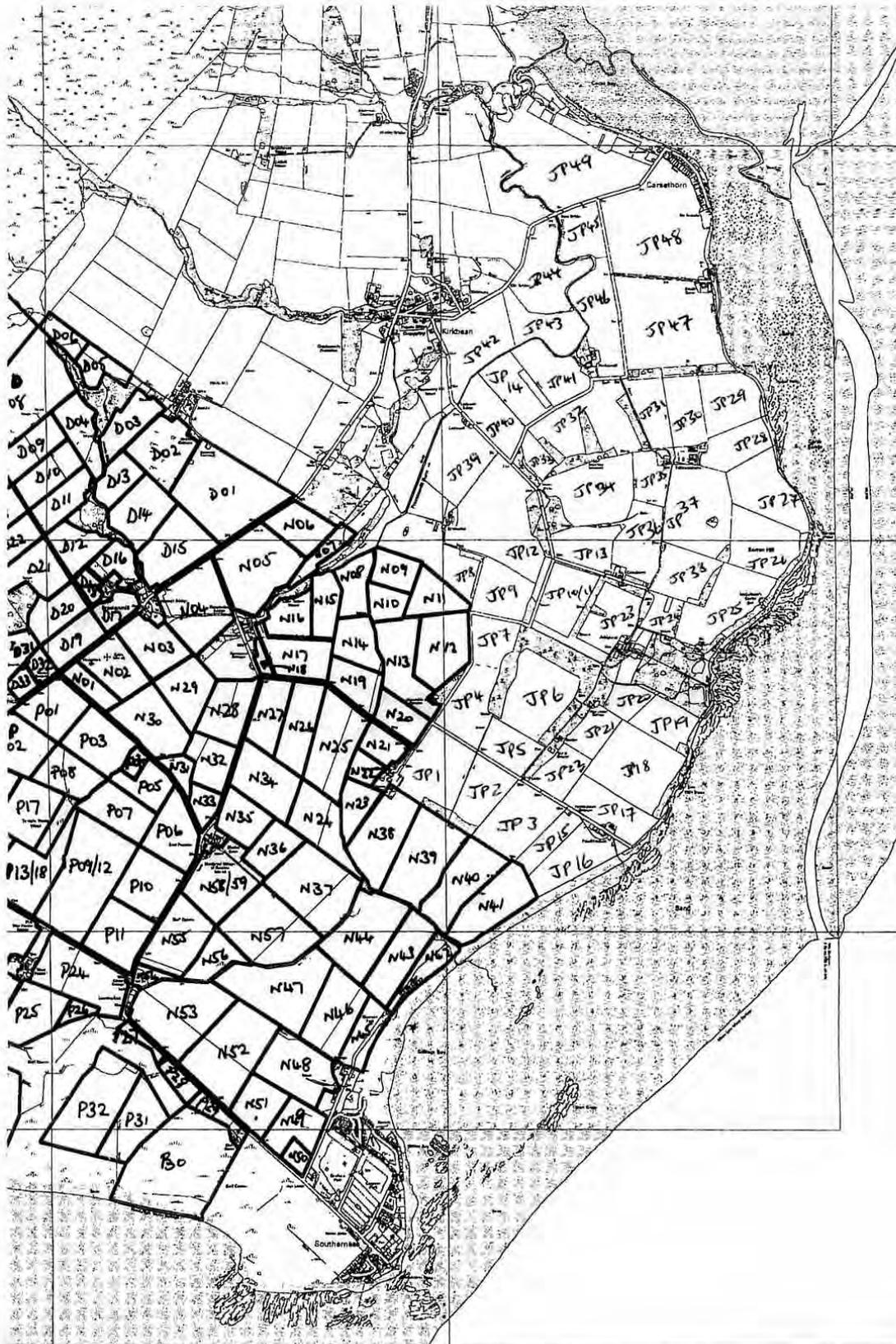


Figure 8. Field codes for the Carsethorn/Southernness area of the Goose Management Scheme.

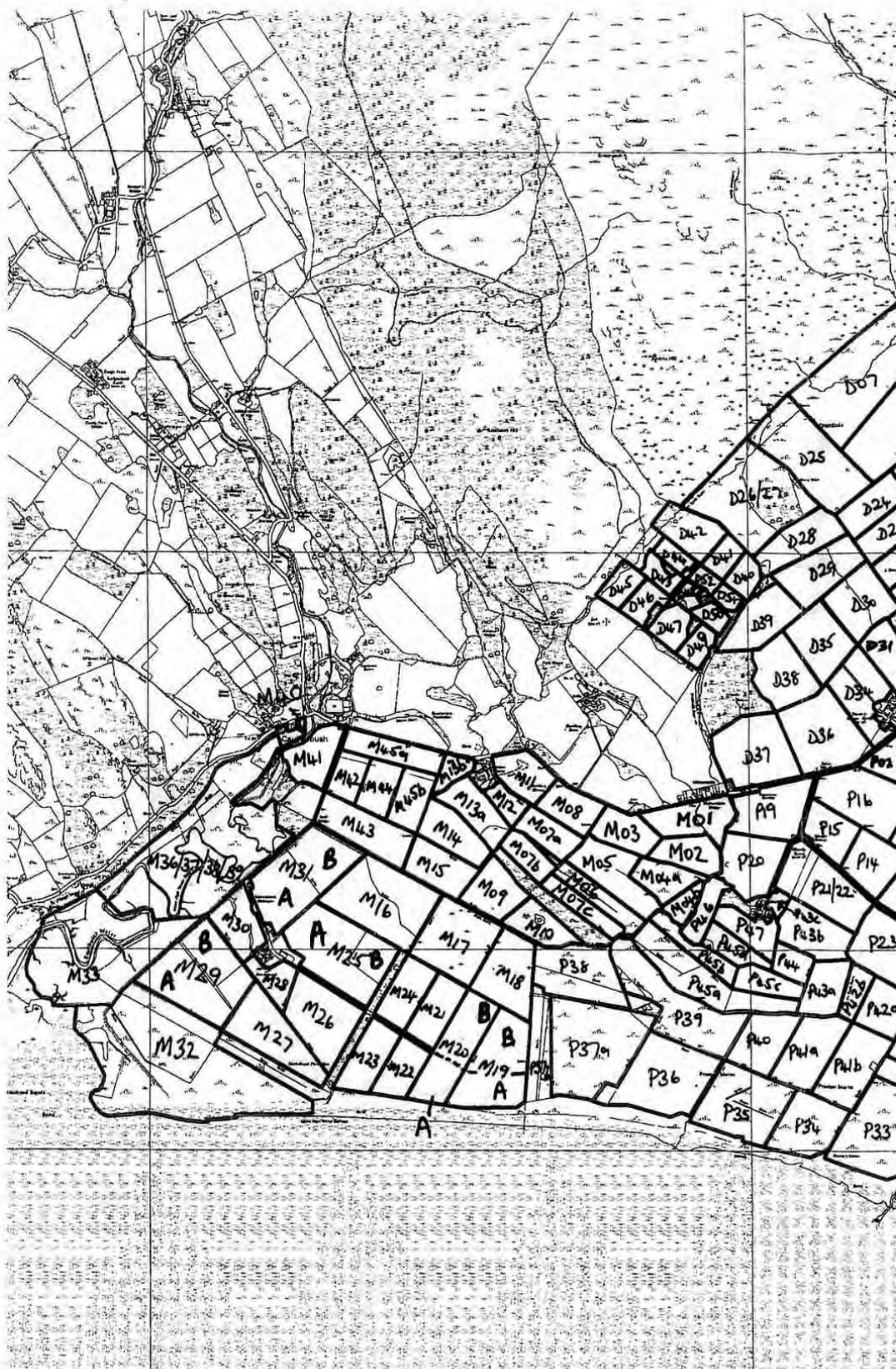
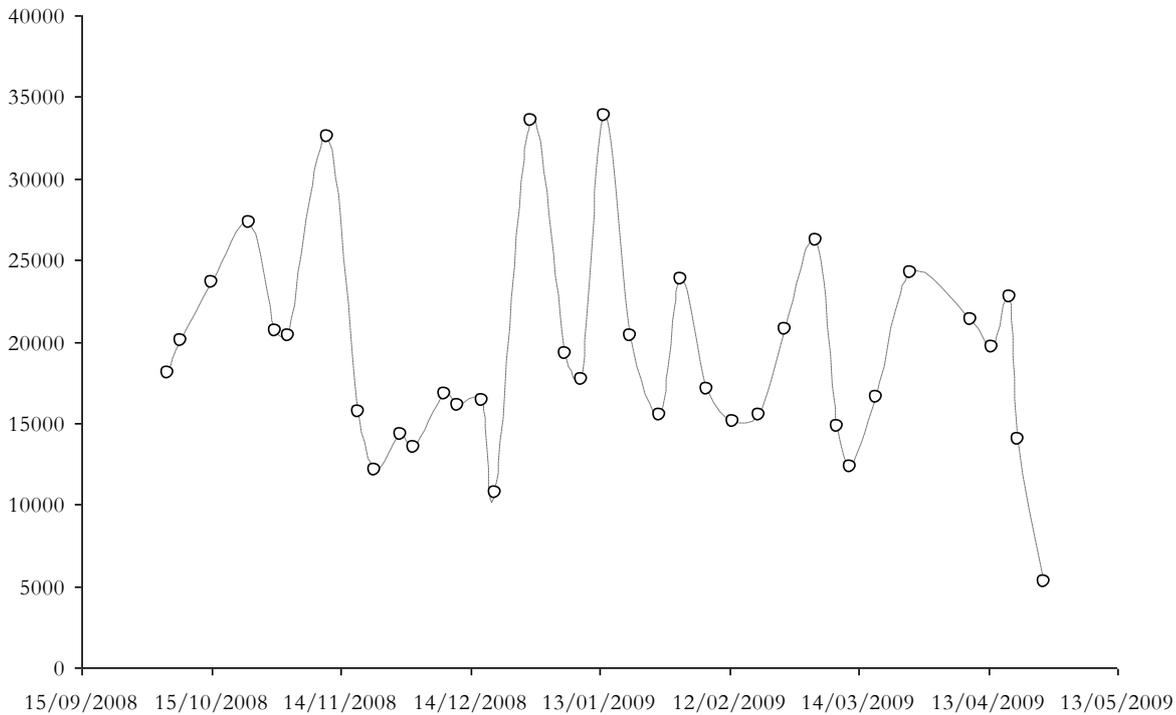


Figure 9. Field codes for the West Preston/Cowcourse/Mersehead area of the Goose Management Scheme.



## 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 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 19,100 ranging from a minimum of 5,223 at the end of the season on 26 April 2009 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 33,856. Overall within the Scheme area there tends to be a decline in goose use as food resources within the area are depleted.

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

	05/10/08	08/10/08	15/10/08	24/10/08	30/10/08	02/11/08	11/11/08	18/11/08	22/11/08	28/11/08	01/12/08	08/12/08	11/12/08	17/12/08	20/12/08	28/12/08	05/01/09	09/01/09	14/01/09
A21																			
C1					1400						30			40		110			710
C10	2980						640	580	100							1220	180	40	
C12	420			1250						290				680					590
C13	890			490										440		1220			700
C14a	760			500															
C14b				1650															220
C15		2020	480	2400			740						2310	120					
C16			30	780			730		310				1320		200		310		
C19a	340		230						22	300									
C19b/c					850	640			570	950	200			490		450		100	140
C2		340																	
C20			280			40		60	460		20	290	50					20	140
C21				630	600	560		2	220					5			630	50	
C23a	2100													200				1580	
C23b	1750									50								90	
C25/26				660														60	
C27				3020			890							1110	260				
C28	1150					90	1100							180					
C29				1500		70	1000								10				
C3							2820	690						50	4	3200		570	230
C30		3200		1150				90	250					10					
C33								405						70					
C35																			
C37		160															4		25
C39		620					50												
C4/5								820		50	750	500		60	70	2770		340	
C40						150													
C41/43																			
C51	560												110	250		440		210	
C52a		200							100	380						180	320	600	100
C52b		75	540				410					100			250			910	
C52c								20		1000									30
C6	25								20										
C7					800			250										60	220
C8								37	30	50		230						96	20
C9						1660		2	1130	400				190	620	330		1290	
Drumburn Marse																600			
H4/3		1365																	
JP16																		930	
JP18																			
KM1				2500			620	4200	10							2010			
KM10																			
KM13																			
KM17																			
KM18																			
KM2									1160										
KM3											10		1460				420		
KM31																			
KM32																			
KM4						1750	1680	250					540						
KM42																			
KM43				1950															
KM47																		1200	
KM48																			
KM49												1080	1060				3300		
KM50																			
KM51																680			
KM52																			
KM53												1350							
KM54																			
KM6				1250				620										4000	
KM9																			
L09																			
L4/15																			
L25/28																			
L24/29																			
L26/27																			
L30													680	250					
L31															6				390
L36							1800					830						380	
L37																			
L38																			
L43												700							850
M1												250							
M11																			
M12																10			
M13a																			
M15														310		1120			
M16	1240						170	200							20	30			
M19a																			
M19b				1560	160							110							
M2	55																		
M20a				190														140	
M20b		1650		800	120	600												480	
M21																			
M22			900																60
M23			560	15		45						60							
M24								90											
M25																			
M25a							30	190	10							50			310
M25b							220												
M26			650	60			130										30		
M27	1810		580	160	1650	95	940	270	30			600		10	120	30	290	220	120
M28												750							
M29a								1000								670		360	2500
M29b			100			50			100						30		100	810	
M3						1750						550		40				80	
M30			1380			120		220											
M31a						2230			350	120			90	130		275			
M31b					390	1040	660						550	750	50				
M32						680		80				80							270
M33											480		380		60				
M36/37/38/39								220		1260				950	200	230		290	40
M4a																			
M42														490					
M43					470							70	160	230	230				
M44																			
M45a																		6	
M45b																1250			
M48																			
M4a										1000		20							560
M4b																			
M5																			
M7a																			
M7b										180									
st Preston mudbank	2300	2000	550																

Table 2. Continued

	05/10/08	08/10/08	15/10/08	24/10/08	30/10/08	02/11/08	11/11/08	18/11/08	22/11/08	28/11/08	01/12/08	08/12/08	11/12/08	17/12/08	20/12/08	28/12/08	05/01/09	09/01/09	14/01/09
N17																			
N2		390																	
N28																90			
N37											1700			1310					
N38							330							10					
N39										250			1	10					
N40				570										600					
N41												500							
N43																			
N44				630										850					
N46													690						
N47																			
N49																			
N51																			
N52																			
Nith channel		910	4720																
P1																2300			
P10																			
P11																			
P13/18																			
P14																			1450
P19																1750	1050		
P20									1000										
P21/22											680					2950			
P23							1830												1080
P24																	1650	7	680
P25									100	270		350	10			80			
P30																			970
P31																			
P32							1800									800			
P33																20			
P34							1000	500								470			
P35					1060	30	2000						900			50			
P36					190														
P37a					750														680
P39																			110
P40																			
P41a					2100		2000									2100			
P41b			5350	1950	2200		3000	1000	2100						210				
P42a									2060	2000									1720
P42b																			
P43a								450											
P43b														1880					
P45a				1210															800
P45b																			
P45c																			
P45d																			
P46																			
P47																			
P5									600							300			
P7																			
P9											1800		1500						650
PR23														900					
PR24							2300												
PR29								140											
PR32												20		250					
PR33												260				900			
PR36																			1
PR37/38																			
PR41																			
PR47																			
PR48a																			
PR51																			
PR54																			
PR58																	500		
PR61																			
PR68a																			
PR68b							2920					3000							
PR70																			
PR75							1040			1100		10							
PR76												1							
PR78																			
R6																			
R10																			
R12																			
R21																			
R22																			
R25											600								
R7																			
R9											1100								2150
S18b/24									2500					1520					
S2/9/10/11										930	1100								
S23							1180												
S25		1180		270	1800		610									1320		5	
S26					200													410	
S35																			
S36										500									2000
S37										260									
S39											1120					150			1000
S40/42																			2000
S41/43																			300
S44/46																			
S45/47																			2410
S48																			
S51					3100														2250
S53						1300								610					
S54/55							650												2180
S56/57										10				560	1310				
S58														620					
S59									805					35	70		740		460
S60/64	14		420				7		5	4				30	80				
S62																			1000
S63											280					70			
S65										600						520			610
S66	5	160			70									110			280		
S67a																			
S68	1255	3980		150	600		1280	130		100	1000								600
S69				2900															6370
S70										910							20	4	
S71			3160				1550												
SC11a						2100						1850					1610		
SC16							95												
SC17							105							860					
SC18														1960					
SC23																			
SC25					2100		1450										900		
SC27													92				1680		
SC30									1020								290		
SC34										3000							3100		
SC35					70														
SC4																860			
SC45	35		770					400				1610							4600
SC47																			10
SC5																			
SC6	2150																		2800
SC9														860					
W3/4																			

Table 2. Continued

20/01/09	27/01/09	01/02/09	07/02/09	13/02/09	19/02/09	25/02/09	04/03/09	09/03/09	12/03/09	18/03/09	26/03/09	09/04/09	14/04/09	18/04/09	20/04/09	26/04/09	Total	
	10	10															20	A21
70	20	190		10	30		480	110									3200	C1
	50			230	1		1730		2300								10051	C10
380	460				2280				1190				870				8410	C12
					140					400	2500	710		810			8300	C13
10						320								430			2020	C14a
						1880				1060							4810	C14b
	20	1800					3670	2390						630	1450		18030	C15
		20	740				70		60								4580	C16
																	892	C19a
70	150	930				730						30	260				6560	C19b/c
					1100		1400	490									3330	C2
230					310		470	100	280	10	70						2830	C20
270	20			180													3167	C21
140																	4070	C23a
																	1840	C23b
			20										80				820	C25/26
	130										650		430				6490	C27
30																	2550	C28
																	2580	C29
30		30															7624	C3
1600			80				300	290				2100		2130			11200	C30
																	475	C33
5																	5	C35
1	2																192	C37
																	670	C39
				110				200				50	1270				6990	C4/5
																	150	C40
250																	250	C41/43
190	820											90					3590	C51
740		30		20			170				200				920		3430	C52a
	10			1090						150		980					4515	C52b
																	1050	C52c
																3	48	C6
60				370										520			2280	C7
110	90	30							20						150	540	1403	C8
	1010	1500			50	1380						220		650	500	380	9782	C9
										2						20	2152	Drumburn Merse
																	1365	H4/33
																	1880	JP16
200						750											20	JP18
					220		2510		2500	2200	20	960		2600			20330	KM11
2000						10											2010	KM10
											150						150	KM13
600																	600	KM17
	90																90	KM18
						510				2900				520	1960		7050	KM2
																	1890	KM3
																	4200	KM31
		4200															300	KM32
		300															5950	KM4
							2510	1200				250	280				2510	KM42
																	1950	KM43
																	1200	KM47
																	2180	KM48
					2030	2180											7470	KM49
					1020												1020	KM50
																	680	KM51
									1300								1300	KM52
																	1350	KM53
					1800												1800	KM54
																	6170	KM6
250		120				150	30	1000			330		1520				3100	KM9
						180											180	L09
							400										400	L14/15
													800				800	L25/28
													650				650	L24/29
													430				430	L26/27
																	930	L30
1700																	2096	L31
																	2630	L36
1700																	2080	L37
														1920			1920	L38
																	1550	L43
800		1520									20				250		2840	M1
																	10	M11
				1050													1050	M12
											60						60	M13a
											180		120				1730	M15
110							1440				15			280			3505	M16
						1080	2810			1200							5090	M19a
												550	40				2710	M19b
																840	945	M2
																340	2250	M20a
50	500			1220			200										3700	M20b
																	70	M21
											20	50					1050	M22
												20	180				960	M23
												40	35				165	M24
																	50	M25
250		230	510		2					100	50			370	890	15	2957	M25a
							1280										1550	M25b
130	70	90					1430	560	230		350						2810	M26
									180		360						11215	M27
																	540	M28
																	7650	M29a
60		130				1400	590							440		510	2970	M29b
									1100								3480	M3
																	1810	M30
30		120															3370	M31a
																	5010	M31b
																	4310	M32
																	2120	M33
200	1200	230						110	610				1010	140			5490	M36/37/38/39
						100								630			730	M4a
																	1620	M42
																	2960	M43
470		50															920	M44
		450															106	M45a
																	1250	M45b
																	20	M48
																	1560	M4a
																	50	M4b
																	3010	M5
																	120	M7a
																	830	M7b
																	4850	st Preston mudbank



### 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.

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

	05/10/08	08/10/08	15/10/08	24/10/08	30/10/08	02/11/08	11/11/08	18/11/08	22/11/08	28/11/08	01/12/08	08/12/08	11/12/08	17/12/08	20/12/08	28/12/08	05/01/09	09/01/09	14/01/09
A1								175						20					
A2																			
A21																			
C8																			
C9																			
C10/11	10																		
C12	350																		
C13	40																		
C17																			
C23a																			
C30																			
C33								80	110				40						
C37		60													1				
C39		60																	
C42																			85
C52b				150															
H4/33		335																	
JP1																			800
JP2																			
JP18																			
JP26																			
JP28																			
KM1																			
KM2																			
KM3																			
KM4							3												
KM6																			
KM13																			
KM4																			
KM9																			
KM10																			
KM43				250															
JP2																			
JP9																			
L9																			
L14/15																			280
L16																			
C37																			
C40																			
M2	395																		
M16	15	400		40		190	240												
M20b				250	200	140													
M32																			
N2		630																	
N10																			
N12																			
N13																			
N14																			
N21																			
N24																			
N38							280							330					
N39												90		650	130		42		
N40																			
N43																			
N44																			
P9/12																			
P10																10			
P35							20												
P41b			20																
PR29																			
PR37/38																			
PR39																			
PR47																			
PR48a																			
PR51																			
PR54																			
PR57																			
PR58																			
PR61																			
PR68a																			
PR68b																			
PR69																			270
PR75																			
PR76												5							
PR78																			
SC5																			
SC6																			
SC47																			900
S18b/24																			
S39											20						15		
S44/46																			
S45/47																			
S50a																			
S54/55																			
S59															10				
S61																			
S68	6																		2
W03/04																			
Drum Bay																			
Niith Estuary			520		130														
Park Farm																			
<b>Total</b>	<b>816</b>	<b>1485</b>	<b>540</b>	<b>690</b>	<b>330</b>	<b>330</b>	<b>543</b>	<b>255</b>	<b>110</b>	<b>0</b>	<b>20</b>	<b>95</b>	<b>40</b>	<b>1000</b>	<b>141</b>	<b>10</b>	<b>57</b>	<b>0</b>	<b>2337</b>

Table 3. Continued.

20/01/09	27/01/09	01/02/09	07/02/09	13/02/09	19/02/09	25/02/09	04/03/09	09/03/09	12/03/09	18/03/09	26/03/09	09/04/09	14/04/09	18/04/09	20/04/09	26/04/09	Total
										140							195 A1
				200													140 A2
																	200 A21
		4											1				1 C8
																	4 C9
					25												35 C10/11
					10												360 C12
					12												52 C13
							1	1	1								3 C17
																90	90 C23a
														40			40 C30
																	230 C33
																	61 C37
																	60 C39
																	85 C42
																10	160 C52b
																	335 H4/33
					100												900 JP1
				570	1050												1620 JP2
							1000	200			140	150	25				1515 JP18
							1000					160					1160 JP26
											800						800 JP28
				20			50	160	900	600		170		50			1950 KM1
						10				100					110		220 KM2
														50			50 KM3
							60							400			403 KM4
																	60 KM6
											300						300 KM13
												50					50 KM4
											95						95 KM9
						10											10 KM10
							360										250 KM43
																	360 JP2
						160											160 JP9
		20				890											910 L9
							600										880 L14/15
	10							500									500 L16
									1140								10 C37
																	1140 C40
														40			395 M2
																	925 M16
																	590 M20b
				1													1 M32
																	630 N2
										260				250			510 N10
	200															290	490 N12
		510												100			610 N13
														630			630 N14
								350									350 N21
								130									130 N24
																	610 N38
	510		500	580	1700	180	800		50	320	15	220					5787 N39
							120										120 N40
							130										130 N43
							510										510 N44
	15																15 P9/12
																	10 P10
																	20 P35
																	20 P41b
														45			45 PR29
										350							350 PR37/38
													700				700 PR39
								190									190 PR47
	40																40 PR48a
																	650 PR51
							60							650			60 PR54
										60							60 PR57
					50				100								150 PR58
									310								310 PR61
		10								30							40 PR68a
							840										840 PR68b
		40															270 PR69
																	40 PR75
																	5 PR76
					60												60 PR78
								20									20 SC5
														20			20 SC6
																	900 SC47
		1															1 S18b/24
							70							30			135 S39
							130										130 S44/46
								500									500 S45/47
							200										200 S50a
			10				160		90	80		100					440 S54/55
																	10 S59
																	2 S61
																	6 S68
			50														50 W03/04
										50		65	1500	100	640	300	2655 Drum Bay
									1000								650 Nith Estuary
																	1000 Park Farm
15	761	584	560	1371	3007	2510	5331	3691	1511	1930	1350	1565	2271	1710	750	690	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.

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

	05/10/08	08/10/08	15/10/08	24/10/08	30/10/08	02/11/08	11/11/08	18/11/08	22/11/08	28/11/08	01/12/08	08/12/08	11/12/08	17/12/08	20/12/08	28/12/08	05/01/09	09/01/09	14/01/09	
C8	10																			
C12	310																			
C16					14			18	16					10	10					4
C17	4	10	2	4				15	2		18			4						
C28	25																			
C33								35												
C37		8																		
C52b		70					18													
M16	14						30													
PR75										1										
S68							1	1												
<b>Total</b>	<b>363</b>	<b>88</b>	<b>2</b>	<b>4</b>	<b>14</b>	<b>48</b>	<b>1</b>	<b>69</b>	<b>18</b>	<b>1</b>	<b>18</b>	<b>0</b>	<b>0</b>	<b>14</b>	<b>10</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>4</b>

	20/01/09	27/01/09	01/02/09	07/02/09	13/02/09	19/02/09	25/02/09	04/03/09	09/03/09	12/03/09	18/03/09	26/03/09	09/04/09	14/04/09	18/04/09	20/04/09	26/04/09	Total	
																		10	C8
																		310	C12
																		72	C16
				6	14	4	2											85	C17
																		25	C28
																		35	C33
																		8	C37
																		88	C52b
																		44	M16
																		1	PR75
																		2	S68
<b>0</b>	<b>0</b>	<b>0</b>	<b>6</b>	<b>14</b>	<b>4</b>	<b>2</b>	<b>0</b>	<b>2</b>	<b>Total</b>										

### 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.**

	05/10/08	08/10/08	15/10/08	24/10/08	30/10/08	02/11/08	11/11/08	18/11/08	22/11/08	28/11/08	01/12/08	08/12/08	11/12/08	17/12/08	20/12/08	28/12/08	05/01/09	09/01/09	14/01/09	
C8	2	50																		35
C10		5	104																	
C12	280																			
C17	1	55		105	80	9	1	130			6	1			2	15	10			36
C28	6																			
C51		20																		
M16	60						90	118												
M25b							6	12	10							12	10			
M27																				
M30								33												
M31																				
M32																				
M43				60																
P34																				
P35					6	20	10									57				
SC16	18	16					68													
S33				75										60						
S33a															110					
S54/55		105																		
S60/64	9																			
<b>Total</b>	<b>376</b>	<b>251</b>	<b>104</b>	<b>240</b>	<b>86</b>	<b>29</b>	<b>175</b>	<b>293</b>	<b>10</b>	<b>0</b>	<b>176</b>	<b>1</b>	<b>0</b>	<b>60</b>	<b>181</b>	<b>25</b>	<b>10</b>	<b>36</b>	<b>35</b>	

	20/01/09	27/01/09	01/02/09	07/02/09	13/02/09	19/02/09	25/02/09	04/03/09	09/03/09	12/03/09	18/03/09	26/03/09	09/04/09	14/04/09	18/04/09	20/04/09	26/04/09	Total	
		2																90	C8
																		109	C10
																		280	C12
	65	60	76	15	16	27	9	4	9	10	10	2	3					757	C17
																		6	C28
																		20	C51
													4					272	M16
																		38	M25b
																		12	M27
																		33	M30
																		170	M31
																		2	M32
																		60	M43
	53																	110	P34
																		36	P35
																		102	SC16
																		135	S33
																		110	S33a
																		105	S54/55
																		9	S60/64
<b>118</b>	<b>62</b>	<b>76</b>	<b>15</b>	<b>16</b>	<b>27</b>	<b>9</b>	<b>4</b>	<b>9</b>	<b>10</b>	<b>10</b>	<b>10</b>	<b>8</b>	<b>3</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>9</b>	<b>Total</b>

### 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 around 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.

**Table 5 Whooper Swan flock sizes recorded during the Management Scheme route counts.**

	05/10/08	08/10/08	15/10/08	24/10/08	30/10/08	02/11/08	11/11/08	18/11/08	22/11/08	28/11/08	01/12/08	08/12/08	11/12/08	17/12/08	20/12/08	28/12/08	05/01/09	09/01/09	14/01/09	
A1								320						5						
C8	8			1	1		10			36	11	1							11	4
C10							2													
C17	2	7		5	2	1	1	1		102	30	50	25	10	10	140	50	60	75	
C27																8				
C29							2							1						
C30																				
C33							65	5	100	60		57	20	240	38				15	
C37														93	116	6			50	
C40																				
C41																	9			
KM12																				
KM24													30							
KM35													50			60				
KM40														37						
KM49																				28
KM50						25														
L9																130	60			
L10																				
M16																				
M20b					2															
PR29								3												
PR18										70										
PR36															5					
PR75				164	228	250				150						70				
PR76									38	5		130								
PR68b											40									
PR72								130												
SC16	12	49	70																	
SC28																				
SC29																		64		
SC33														10						
SC44																				
SC46													50							
S33a															1					
S56/57																				
S39											122									
S61													160	40	50	110			50	232
S62																		5		
Conheath																				
Thwaite																				
<b>Total</b>	<b>22</b>	<b>56</b>	<b>70</b>	<b>170</b>	<b>233</b>	<b>276</b>	<b>80</b>	<b>459</b>	<b>138</b>	<b>423</b>	<b>203</b>	<b>238</b>	<b>285</b>	<b>485</b>	<b>226</b>	<b>533</b>	<b>179</b>	<b>121</b>	<b>404</b>	

27/01/09	01/02/09	07/02/09	13/02/09	19/02/09	25/02/09	04/03/09	09/03/09	12/03/09	18/03/09	26/03/09	09/04/09	14/04/09	18/04/09	20/04/09	26/04/09	Total	
																325	A1
21	57			35				116	55			1				370	C8
																2	C10
88	45	60	90	95	95	100	75	24	140	60	25	12	5	5	5	1510	C17
																8	C27
																3	C29
80																80	C30
																625	C33
1																331	C37
27																27	C40
																9	C41
		4														4	KM12
																30	KM24
																110	KM35
																37	KM40
																28	KM49
																25	KM50
																190	L9
												4				4	L10
								19		1						20	M16
																2	M20b
																3	PR29
																70	PR18
																5	PR36
																862	PR75
																173	PR76
																40	PR68b
																130	PR72
																131	SC16
							167	89								256	SC28
																64	SC29
																10	SC33
								17								17	SC44
																50	SC46
																1	S33a
																122	S56/57
																5	S39
77																916	S61
																5	S62
									35	40						75	Conheath
									100	110						210	Thwaite
<b>294</b>	<b>102</b>	<b>64</b>	<b>90</b>	<b>130</b>	<b>95</b>	<b>100</b>	<b>242</b>	<b>265</b>	<b>330</b>	<b>211</b>	<b>25</b>	<b>17</b>	<b>5</b>	<b>5</b>	<b>5</b>	<b>Total</b>	

### 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 5 Mute Swan flock sizes recorded during the Management Scheme route counts.**

	05/10/08	08/10/08	15/10/08	24/10/08	30/10/08	02/11/08	11/11/08	18/11/08	22/11/08	28/11/08	01/12/08	08/12/08	11/12/08	17/12/08	20/12/08	28/12/08	05/01/09	09/01/09	14/01/09	
C8	4		4	4	2	2	2	6												
C10				4			3													
C16										1										
C17		8	4	4	7	5		4		3	13	25	15	5	22	40	20	60	44	
C30																				
C51							7													
C52b	10	6			8	10														
M16	1	1	1	1			2								1	5				
M25								2		1										
M30								2		2										
P44		4								2					2					
PR57																				
S33				2	2									20						
S33a															17					
S39																				
S71				2	6	10	3													
SC06							4	17	25											
SC45			8	2																
Total	15	19	17	19	25	27	21	31	25	7	13	25	15	25	42	45	20	60	44	

	20/01/09	27/01/09	01/02/09	07/02/09	13/02/09	19/02/09	25/02/09	04/03/09	09/03/09	12/03/09	18/03/09	26/03/09	09/04/09	14/04/09	18/04/09	20/04/09	26/04/09	Total	
										9								33	C8
														2		1	1	11	C10
														2	2	2	2	9	C16
60	32	45	60	90	95	95	100	75	24	30	55	60	50	40	40	40	35	1265	C17
2																		2	C30
																		7	C51
											10							44	C52b
																	1	19	M16
													2		2			3	M25
																		6	M30
																		4	F44
																		2	PR57
										2								24	S33
																		17	S33a
															1			1	S39
																		21	S71
																		46	SC06
											2							12	SC45
62	32	45	60	90	95	95	100	75	35	42	55	62	54	45	45	45	39		Total

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

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

- From 18 March onwards, gas guns were present in fields KM10 and KM13 although these scaring devices were probably mainly in place to deter feeding Pink-footed Geese in that area;
- From 26 March onwards, canes with coloured tapes were noted in fields SC25 and SC30;
- On 20 April a tractor was driven at speed towards feeding geese on field M1, pushing them off of that field;
- On 26 April a quad was driven at speed towards feeding geese on field M2, pushing them off of that field.

### 3.8 Count section dates and times of coverage

**Table 6. Survey dates and times for the Management Scheme route count sections.**

	Sunday	Wednesday	Wednesday	Friday	Thursday	Sunday	Tuesday	Tuesday	Saturday	Friday	Monday	Monday	Thursday	Wednesday	Saturday	Sunday	Monday	Friday
	05/10/08	08/10/08	15/10/08	24/10/08	30/10/08	02/11/08	11/11/08	18/11/08	22/11/08	28/11/08	01/12/08	08/12/08	11/12/08	17/12/08	20/12/08	28/12/08	05/01/09	09/01/09
Thwaite	08:00	08:00	10:00	08:30	16:00	15:00	14:30	09:00	09:00	09:00	15:00	09:00	14:30	09:00	09:00	15:30	09:00	15:00
Nith	10:30	08:00	08:00	08:30	14:00	13:00	12:30	09:00	13:00	13:00	13:00	13:00	13:00	12:00	12:00	15:00	12:00	13:00
Southernness	15:30	17:00	10:00	14:00	11:30	10:00	15:00	13:10	13:30	14:30	10:30	14:00	11:00	13:00	13:00	14:00	13:00	11:00
Colvend	17:00	18:30	10:00	16:00	08:30	09:00	16:15	16:00	15:30	15:30	10:00	15:00	09:30	14:00	14:30	12:00	15:00	10:00

	Wednesday	Tuesday	Tuesday	Sunday	Saturday	Friday	Thursday	Wednesday	Wednesday	Monday	Thursday	Wednesday	Thursday	Thursday	Tuesday	Saturday	Monday	Sunday
	14/01/09	20/01/09	27/01/09	01/02/09	07/02/09	13/02/09	19/02/09	25/02/09	04/03/09	09/03/09	12/03/09	18/03/09	26/03/09	09/04/09	14/04/09	18/04/09	20/04/09	26/04/09
	10:00	15:00	10:00	15:30	09:30	09:30	16:00	10:00	09:00	17:00	17:00	11:00	08:00	15:00	09:00	15:00	16:00	12:00
	09:00	13:00	12:00	13:00	11:30	11:30	14:00	12:00	10:00	14:00	14:00	08:00	10:00	10:00	12:00	08:00	11:00	11:00
	13:30	11:00	14:00	11:00	14:00	14:00	11:00	15:00	14:00	09:00	10:00	10:00	14:00	10:00	17:00	10:00	08:00	08:30
	15:00	10:00	15:00	10:00	15:30	16:00	10:00	16:30	16:00	08:00	09:00	10:00	16:00	08:00	18:00	09:00	09:30	09:00

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

### 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. Generally as might be expected it was farmers in fringe areas or with fields not receiving payments that were most concerned to log their observations of goose flocks. In areas less frequented by the geese, the common problem is that count dates and times do not necessarily coincide with when the geese are present, an unavoidable artefact of the methodology.

**Table 7. Records of conversations with farmers regarding goose activity inside and outside the Scheme area.**

05/10/08 Alastair Wylie  
 08/10/08  
 15/10/08  
 24/10/08  
 30/10/08 Son at Glenstocken  
 02/11/08 Stephen Roan at Boreland of Colvend  
 11/11/08  
 18/11/08  
 22/11/08 Steven Murray at West Preston Farm  
 01/12/08 Spoke to worker at Boreland Farm about geese  
 08/12/08 Stephen Roan, Boreland of Colvend, observed >1,000 barnacle geese in his fields in last week  
 11/12/08  
 17/12/08 Phone conversation with Alastair Martin about geese at Nether Locharwoods  
 20/12/08  
 28/12/08 Steven Roan  
 05/01/09 Spoke with Stephen and Stewart Brown at Newfield  
 09/01/09 Jake at Green Merse Farm, he said no geese at farm that morning  
 14/01/09  
 20/01/09  
 27/01/09 Stephen and Stewart Brown  
 01/02/09 Jack Graham on 30/01/09  
 07/02/09  
 13/02/09  
 19/02/09 Jake at Green Merse expressed desire to know more about the goose scheme  
 25/02/09 Conversation with farm worker about geese  
 04/03/09 Jamie Blackett (Arbigland Farm) observed 1,000+ Pink-footed geese at JP18 this week feeding on wheat seedlings, not present today due to chemical spraying  
 09/03/09  
 12/03/09  
 18/03/09  
 26/03/09  
 09/04/09  
 14/04/09  
 18/04/09 Steven Murray at West Preston Farm  
 20/04/09 Steven Roan at Boreland of Colvend  
 26/04/09

### 3.10 Coordinated Svalbard Barnacle Goose population count totals

**Table 8. Coordinated Svalbard Barnacle Goose population count totals for the Solway 2008-2009.**

Count section	01/10/2008	08/10/2008	15/10/2008	22/10/2008	29/10/2008	18/11/2008	19/12/2008	14/01/2009	03/02/2009	18/03/2009	08/04/2009	15/04/2009	22/04/2009	29/04/2009	06/05/2009	13/05/2009
Annan to Gretna	0	0	nc	nc	nc	nc	nc	0	nc	nc	nc	nc		0	0	0
Ruthwell to Cummertrees	0	0	0	0	0	140	1105	0	5800	245	10	0	0	0	0	0
Longbridgemuir	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Caerlaverock	3290	10760	9021	10380	10930	4238	4950	14870	2560	2970	8650	5270	3540	10	0	0
Kirkconnell & Ward Law	0	3455	4720	2220	2000	5070	3310	0	4550	5100	1210	3120	20	0	0	0
Mersehead to Airds Pt	107	6180	10070	9250	9040	6770	5790	6230	3630	6622	7040	7655	6600	1470	0	0
Caukerbush to Rascarrel	0	0	0	0	950	0	0	nc	1330	0	0	0	0	0	0	0
Dundrennan MOD	0	0	0	0	75	220	0	0	0	3200	1500	2060	790	0	0	0
Rockcliffe Marsh	1170	2620	6200	4060	6010	4245	1020	5220	1320	10520	3110	5635	9390	6550	8020	9500
Burgh Marsh	0	0	60	165	0	nc	1900	130	0	0	2400	3925	300	340	0	0
Bowness to Grune	0	7	1040	0	1300	1400	1100	2100	1340	1550	614	1745	1100	303	0	0
<b>Total</b>	<b>4567</b>	<b>23022</b>	<b>31111</b>	<b>26075</b>	<b>30305</b>	<b>22083</b>	<b>19175</b>	<b>28550</b>	<b>20530</b>	<b>30207</b>	<b>24534</b>	<b>29410</b>	<b>21740</b>	<b>8673</b>	<b>8020</b>	<b>9500</b>
Notes			1			2	3	4	5	6						7

Notes:

1 Visibility poor for Bob Jones' estimate of 3,750 off western end of Rockcliffe Marsh; total count includes four flock counts where 3,500 or more birds present. Potential for double counting between the 4,720 at Lantonside mud at 08:20 and 5,090 at GM etc at 09:00? LRG ill, BRM had to cover whole route.

2 Estimate of 2,000 on new merse from Lantonside to Castle Corner.

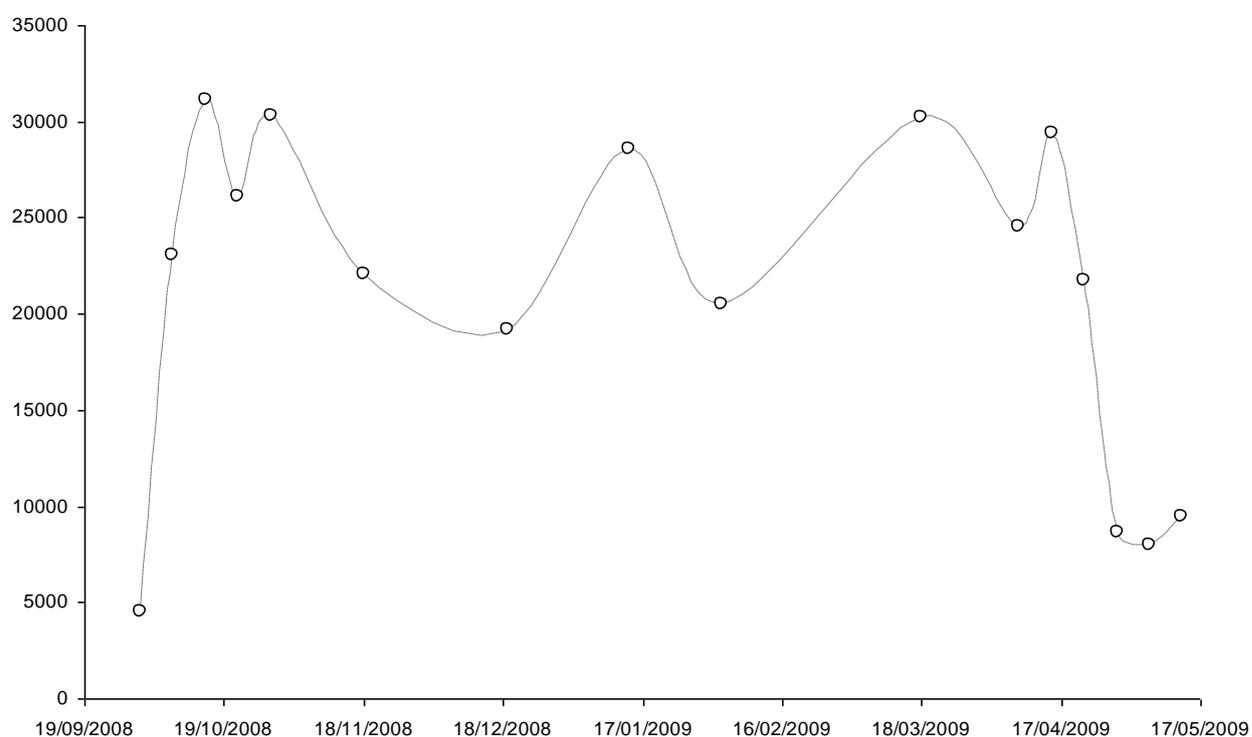
3 Peter Williams counted Auchencairn section on 19/11/08.

4 Dave Fairlamb counted Mersehead section on 18/12/08. David and Hilary Hawker counted Auchencairn to Kirkcudbright but very bad count conditions. Marian and Dave Rochester counted Mucraig to Wigtown but no geese.

5 Marian and Dave Rochester counted Muncraig to Whithorn but no geese. Farmer at Baurch said there had been no geese all winter. David and Hilary Hawker abandoned count at Auchencairn due to fog and visibility of less than 100m.

6 Dave Blackledge counted Bowness and Burgh sections on 04/02/09. Bob Jones had access problems on 03/02/09. David and Hilary Hawker had 0 in good weather from Kirkcudbright to Auchencairn though no access to Wall Hill MOD. Marian and Dave Rochester had 0 geese in Muncraig section.

7 Bob Jones had zero on his western section of Rockcliffe Marsh.



**Figure 12. The total population of Svalbard Barnacle Geese recorded on the Inner Solway from October 2008 to May 2009.**

Total population counts of Svalbard Barnacle Geese rose rapidly on the Inner Solway from 4,567 on 1 October 2008 to 23,022 one week later (Table 8; 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 possibly 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 2008-2009 counts on 15 October, 29 October, 14 January, 18 March and 15 April of 31,111 (the maximum count recorded), 30,305, 28,550, 30,207 and 29,410 respectively, fulfil this criterion and are thus averaged to produce **an adopted population total of 29,900 Barnacle Geese** (rounded down to the nearest 100).

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

**Table 9. Brood size and juvenile productivity for Svalbard Barnacle Geese on the Solway 2008-2009.**

Date	Flock Size	Sample Size	Total Juvs	Field	Brood of 1	Brood of 2	Brood of 3	Brood of 4	Brood of 5	Brood of 6	Single Juvs	% juvs	Obs
02/10/2008	1020	1020	59	O7	9	13	4	3				5.8	LRG
22/10/2008	1250	1250	135	KM6								10.8	LRG
27/10/2008	1250	1210	82	E13								6.8	LRG
28/10/2008	1500	1480	173	E13	6	8	4					11.7	LRG
31/10/2008	2000			O5	7	11	6						LRG
02/11/2008	1040	680	50	PR75	4	9	5	1				7.4	LRG
03/11/2008	1000	930	78	R4	7	6	3					8.4	LRG
05/11/2008	220	220	8	O2	3	1	1					3.6	LRG
06/11/2008	420	420	7	A6	3			1				1.7	LRG
12/11/2008	600			O5	1	1							LRG
12/11/2008	5550	470	59	V4								12.6	LRG
18/11/2008	620	620	72	KM6		7	1	2				11.6	LRG
25/11/2008	217	217	9	O8	2	2	1					4.1	LRG
26/11/2008	540	540	48	UM	4	13	6					8.9	LRG
11/12/2008	900	900	76	P2								8.4	LRG
26/12/2008	230	129	13	S1	2	4	1					10.1	LRG
15/01/2009	300	214	29	R4b								13.6	LRG
Total		10300	898										
<b>Overall juv%</b>			<b>8.7</b>		<b>Brood size totals:</b>								
					48	75	32	7	0	0		Total broods	162
					<b>Number of juveniles per brood size category:</b>								
					48	150	96	28	0	0		Max %juvs	13.6
												Total juvs	322
												<b>Mean brood</b>	<b>1.99</b>

The juvenile productivity of the Svalbard Barnacle Goose observed in flocks sampled on the Inner Solway from October 2008 to January 2009 from Priestshead in the east to Mersehead in the west ranged from 1.7% to 13.6% with a mean of 8.7% young (n = 15 flocks; 10,300 geese sampled). Across the same area, the total number of broods sampled was 162, with a mean family size of 2.0 young being recorded per family (range 1-4 young).

### 3.12 Leucistic Barnacle Geese

A maximum of four leucistic Barnacle Geese were recorded on four separate occasions; twice during a coordinated population count and twice during a route count with no double counting. White birds were recorded on almost all counts and distributed themselves across all count sections on both sides of the Solway through the course of the winter.

### 3.13 Other geese

Other geese of note recorded during the counts included Light-bellied Brent Geese (at least one adult and one juvenile), an adult Dark-bellied Brent Goose, and at least two Cackling Canada Geese and a Taverner's Canada Goose, all appeared to be of wild origin, one of the Cackling Canada Geese arriving with the first Barnacle Goose migrants, probably being the one recorded with them on migration past Norway. A Richardson's Canada Goose was also reported on the Solway this winter.