



**Svalbard Barnacle Goose distribution  
around the Solway Firth 2009-2010**

Flock counts from the Solway Barnacle Goose  
Management Scheme area

**WWT Conservation Programmes Report**

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## Executive Summary

A total of 33 route counts were carried out in winter 2009-2010 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 32,900 geese (the mean of two counts that were within 10% of the maximum of 34,070 recorded, rounded up to the nearest 100), an increase of 3,000 birds on last winter's estimate of 29,900 geese. Brood sizes were very consistent this winter at 1.8 goslings per family with very few large broods recorded (range 1-3 goslings; 99 families sampled), with an average juvenile productivity of 5.1% (range 1.8-11.8% young; 14,423 birds sampled) compared to 2.0 goslings and 8.7% young respectively for last winter. As with last winter, four different leucistic Barnacle Geese were recorded in winter 2009-2010.



# 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.

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 Priestside 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 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, 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. 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 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 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 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		Rise	Set	Rise	Set	
	Time	M Ft	Time	M Ft	Time	M Ft	Time	M Ft	Time	M Ft	Time	M Ft	
1 Tue	0915	7.6 24.9	2129	8.3 27.2	0333	2.7 8.9	1546	2.7 8.9	0521	1901	1749	0134	
2 Wed	0957	8.1 26.6	2209	8.7 28.5	0418	2.2 7.2	1629	2.3 7.5	0523	1859	1804	0247	
3 Thu	1035	8.5 27.9	2245	9.0 29.5	0454	1.8 5.9	1705	1.9 6.2	0525	1857	1816	0400	
4 Fri	1108	8.7 28.5	2318	9.1 29.9	0527	1.5 4.9	1737	1.6 5.2	0527	1854	1828	0514	
5 Sat	1139	8.8 28.9	2349	9.2 30.2	0569	1.3 4.3	1807	1.5 4.9	0528	1852	1838	0627	1604
6 Sun			1208	8.9 29.2	0630	1.2 3.9	1837	1.4 4.6	0530	1849	1850	0742	
7 Mon	0020	9.2 30.2	1238	8.9 29.2	0700	1.2 3.9	1908	1.4 4.6	0532	1847	1904	0858	
8 Tue	0051	9.2 30.2	1309	8.9 29.2	0730	1.3 4.3	1940	1.5 4.9	0533	1845	1921	1018	
9 Wed	0126	9.1 29.9	1344	8.8 28.9	0801	1.5 4.9	2013	1.7 5.6	0535	1842	1944	1139	
10 Thu	0204	8.9 29.2	1422	8.6 28.2	0833	1.9 6.2	2048	2.1 6.9	0537	1840	2016	1300	
11 Fri	0248	8.5 27.9	1509	8.2 26.9	0912	2.3 7.6	2136	2.6 8.5	0538	1837	2103	1414	
12 Sat	0343	7.9 26.9	1611	7.7 25.3	1004	2.9 9.5	2250	3.1 10.2	0540	1835	2207	1516	
13 Sun	0455	7.6 24.6	1733	7.4 24.3	1125	3.3 10.8			0542	1832	2327	1602	0217
14 Mon	0525	7.3 24.0	1808	7.6 24.9	0037	3.1 10.2	1307	3.2 10.5	0544	1830		1635	
15 Tue	0555	7.8 25.8	2024	8.3 27.2	0209	2.8 8.5	1434	2.6 8.5	0546	1828	0056	1658	
16 Wed	0601	8.6 27.9	2121	9.1 29.9	0320	1.8 5.9	1539	1.9 6.2	0547	1825	0228	1718	
17 Thu	0652	9.1 29.9	2209	9.6 31.6	0410	1.0 3.3	1632	1.3 4.3	0549	1823	0359	1731	
18 Fri	1038	9.6 31.2	2253	10.0 32.8	0504	0.4 1.3	1718	0.8 2.6	0551	1820	0527	1745	
19 Sat	1120	9.7 31.8	2334	10.1 33.1	0548	0.2 0.7	1800	0.6 2.0	0553	1818	0659	1759	1845
20 Sun			1200	9.7 31.8	0629	0.1 0.3	1839	0.6 2.0	0554	1815	0820	1815	
21 Mon	0015	9.9 32.5	1238	9.6 31.6	0707	0.4 1.3	1916	0.8 2.6	0556	1813	0945	1833	
22 Tue	0053	9.6 31.5	1314	9.3 30.5	0743	0.8 2.6	1951	1.2 3.9	0558	1810	1107	1857	
23 Wed	0130	9.2 30.2	1349	8.9 29.2	0816	1.4 4.6	2024	1.7 5.6	0600	1808	1223	1929	
24 Thu	0206	8.6 28.2	1424	8.4 27.6	0848	2.0 6.5	2058	2.3 7.5	0601	1806	1329	2012	
25 Fri	0245	8.0 28.2	1505	7.9 27.6	0923	2.7 8.9	2142	2.8 9.5	0603	1803	1422	2106	
26 Sat	0331	7.3 24.0	1566	7.4 24.3	1010	3.3 10.8	2248	3.4 11.2	0605	1801	1502	2210	
27 Sun	0436	6.8 22.3	1723	7.0 23.0	1121	3.8 12.5			0607	1798	1631	2320	0450
28 Mon	0530	6.6 21.7	1803	7.1 23.3	0010	3.6 11.8	1245	3.8 12.5	0608	1796		1553	
29 Tue	0748	7.0 23.0	2007	7.6 24.9	0139	3.4 11.2	1409	3.4 11.2	0610	1793	1610	0032	
30 Wed	0842	7.6 24.9	2056	8.2 26.9	0253	2.8 9.2	1511	2.9 9.5	0612	1791	1623	0145	

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**LAVER'S LIVERPOOL TIDES OCTOBER 2009**

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		Rise	Set	Rise	Set	
	Time	M Ft	Time	M Ft	Time	M Ft	Time	M Ft	Time	M Ft	Time	M Ft	
1 Thu	0924	8.1 26.6	2137	8.5 28.2	0340	2.3 7.5	1655	2.3 7.5	0614	1749	1635	0258	
2 Fri	1001	8.5 27.9	2213	9.0 29.5	0418	1.8 5.9	1632	1.9 6.2	0615	1746	1647	0411	
3 Sat	1034	8.8 28.9	2246	9.2 30.2	0451	1.5 4.9	1705	1.5 5.2	0617	1744	1659	0526	
4 Sun	1106	9.0 29.5	2318	9.3 30.5	0524	1.2 3.9	1738	1.4 4.6	0619	1741	1712	0643	
5 Mon	1136	9.1 29.9	2351	9.3 30.5	0557	1.1 3.6	1812	1.2 3.9	0621	1739	1728	0802	0012
6 Tue			1209	9.1 29.9	0631	1.1 3.6	1846	1.2 3.9	0623	1737	1750	0924	
7 Wed	0027	9.3 30.5	1245	9.1 29.9	0704	1.3 4.3	1921	1.4 4.6	0624	1734	1820	1046	
8 Thu	0105	9.2 30.2	1323	9.0 29.5	0738	1.5 4.9	1958	1.8 5.2	0626	1732	1802	1204	
9 Fri	0147	8.9 29.2	1406	8.7 28.5	0815	1.9 6.2	2039	2.0 6.6	0628	1729	2001	1310	
10 Sat	0236	8.4 27.6	1456	8.3 27.2	0858	2.4 7.9	2133	2.5 8.2	0630	1727	2115	1400	
11 Sun	0334	7.9 25.9	1601	7.8 25.6	0956	2.9 9.5	2251	2.9 9.5	0632	1726	2240	1436	
12 Mon	0449	7.5 24.6	1724	7.6 24.9	1118	3.2 10.5			0633	1722		1502	0057
13 Tue	0520	7.5 24.6	1853	7.9 25.9	0030	2.8 9.2	1254	3.1 10.2	0635	1720	0006	1521	
14 Wed	0740	7.9 25.9	2004	8.4 27.6	0154	2.3 7.5	1416	2.6 8.5	0637	1718	0106	1537	
15 Thu	0840	8.6 28.2	2100	9.0 29.5	0301	1.7 5.6	1518	1.8 5.2	0639	1716	0303	1551	
16 Fri	0930	9.1 29.9	2149	9.5 31.2	0354	1.1 3.6	1609	1.4 4.6	0641	1713	0428	1605	
17 Sat	1014	9.4 30.8	2230	9.7 31.8	0440	0.7 2.3	1654	1.0 3.3	0643	1711	0553	1619	
18 Sun	1054	9.6 31.5	2311	9.7 31.8	0522	0.5 1.6	1736	0.9 3.0	0645	1709	0717	1637	
19 Mon	1133	9.5 31.2	2349	9.6 31.5	0600	0.6 2.0	1814	0.9 3.0	0646	1707	0840	1659	0533
20 Tue			1209	9.4 30.8	0636	0.9 3.0	1820	1.1 3.6	0648	1704	1000	1727	
21 Wed	0028	9.3 30.5	1243	9.2 30.2	0710	1.3 4.3	1924	1.4 4.6	0650	1702	1111	1806	
22 Thu	0101	8.9 28.2	1318	8.9 28.2	0742	1.7 5.6	1957	1.8 5.9	0652	1700	1211	1856	
23 Fri	0138	8.5 27.9	1354	8.5 27.9	0813	2.3 7.5	2032	2.3 7.5	0654	1698	1257	1957	
24 Sat	0216	8.0 26.2	1435	8.1 26.6	0847	2.8 9.2	2113	2.8 9.2	0656	1696	1330	2105	
25 Sun	0301	7.5 24.6	1523	7.6 24.9	0931	3.3 10.8	2210	3.2 10.5	0658	1694	1355	2216	
26 Mon	0367	7.0 23.0	1627	7.2 23.6	1036	3.7 12.1	2323	3.4 11.2	0700	1692	1414	2328	0042
27 Tue	0524	6.7 22.0	1803	7.2 23.6	1154	3.8 12.5			0702	1649		1429	
28 Wed	0656	6.9 22.6	1918	7.5 24.6	0037	3.3 10.8	1308	3.5 11.5	0703	1647	1441	0040	
29 Thu	0755	7.4 24.3	2012	7.9 25.9	0146	3.0 9.8	1413	3.1 10.2	0705	1645	1453	0153	
30 Fri	0842	7.9 25.9	2056	8.4 27.6	0243	2.5 8.2	1506	2.6 8.5	0707	1643	1506	0306	
31 Sat	0921	8.4 27.6	2135	8.8 28.9	0330	2.0 6.6	1648	2.1 6.9	0709	1641	1518	0422	

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**NOVEMBER 2009**

**LAVER'S LIVERPOOL TIDES**

Date	HIGH WATER				LOW WATER				SUN		MOON		Ph.
	Morning		Afternoon		Morning		Afternoon		Rise	Set	Rise	Set	
	Time	M Ft	Time	M Ft	Time	M Ft	Time	M Ft	Time	M Ft	Time	M Ft	
1 Sun	0857	8.8 28.9	2212	9.1 29.9	0411	1.6 5.2	1630	1.7 5.6	0711	1638	1633	0540	
2 Mon	1032	9.0 29.5	2248	9.3 30.5	0450	1.3 4.3	1709	1.4 4.6	0713	1637	1653	0702	
3 Tue	1108	9.2 30.2	2327	9.4 30.8	0528	1.2 3.9	1749	1.2 3.9	0715	1636	1620	0826	1915
4 Wed	1145	9.3 30.5			0605	1.2 3.9	1829	1.2 3.9	0717	1634	1659	0943	
5 Thu	0008	9.4 30.8	1227	9.3 30.5	0644	1.3 4.3	1910	1.3 4.3	0719	1632	1754	1100	
6 Fri	0052	9.2 30.2	1310	9.2 30.2	0724	1.5 4.9	1954	1.5 4.9	0721	1630	1805	1156	
7 Sat	0139	8.9 29.2	1358	8.9 29.2	0805	1.8 5.9	2042	1.8 5.9	0722	1628	2028	1237	
8 Sun	0231	8.5 28.2	1453	8.6 28.2	0855	2.2 7.2	2139	2.1 6.9	0724	1626	2156	1306	
9 Mon	0331	8.1 26.6	1556	8.2 26.9	0954	2.6 8.5	2249	2.4 7.9	0726	1625	2323	1327	
10 Tue	0441	7.8 25.6	1709	8.0 26.2	1106	2.9 8.9			0728	1623		1343	1559
11 Wed	0569	7.8 25.6	1826										

**JANUARY 2010 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	Ph.		
Date	Time	M	Ft	Time	M	Ft	Time	M	Ft					
1 Fri	1110	9.4	30.8	2336	9.4	30.8	0539	1.4	4.6	1814	1.1	3.6	0828 1604 1707 0903	
2 Sat	1157	9.7	31.8				0627	1.2	3.9	1904	0.8	2.6	0828 1605 1841 0932	
3 Sun	0025	9.5	31.2	1245	9.8	32.2	0714	1.1	3.6	1953	0.7	2.3	0827 1606 2013 0954	
4 Mon	0113	9.5	31.2	1333	9.7	31.8	0800	1.2	3.9	2039	0.8	2.6	0827 1607 2142 1011	
5 Tue	0201	9.2	30.2	1421	9.5	31.2	0845	1.4	4.6	2126	1.1	3.6	0827 1608 2308 1025	
6 Wed	0250	8.9	29.2	1509	9.2	30.2	0930	1.8	5.9	2212	1.5	4.9	0826 1610 1039	
7 Thu	0340	8.5	27.9	1602	8.7	28.5	1018	2.2	7.2	2303	2.1	6.9	0826 1611 0031 1054	
8 Fri	0436	8.0	26.2	1702	8.2	26.9	1114	2.6	8.5	0825 1613 0153 1112	1042			
9 Sat	0542	7.7	25.3	1812	7.8	25.6	0000	2.5	8.2	1221	3.0	9.8	0825 1614 0313 1133	
10 Sun	0654	7.6	24.9	1930	7.7	25.3	0108	2.8	9.2	1336	3.1	10.2	0824 1615 0430 1201	
11 Mon	0806	7.7	25.3	2039	7.8	25.6	0219	2.9	9.5	1451	2.9	9.5	0823 1617 0540 1238	
12 Tue	0906	8.0	26.2	2136	8.0	26.2	0323	2.7	8.9	1555	2.7	8.9	0822 1619 0639 1327	
13 Wed	0954	8.4	27.6	2222	8.3	27.2	0415	2.5	8.2	1647	2.3	7.5	0822 1620 0726 1426	
14 Thu	1036	8.6	28.2	2300	8.5	27.9	0459	2.3	7.5	1730	2.1	6.9	0821 1622 0800 1534	
15 Fri	1112	8.9	29.2	2335	8.6	28.2	0536	2.1	6.9	1806	1.9	6.2	0820 1623 0826 1645	
16 Sat	1146	9.0	29.5				0609	2.0	6.6	1839	1.8	5.9	0819 1625 0845 1757	0713
17 Sun	0006	8.6	28.2	1219	9.1	29.9	0639	1.9	6.2	1909	1.7	5.6	0818 1627 0900 1908	
18 Mon	0037	8.6	28.2	1251	9.0	29.5	0710	1.9	6.2	1939	1.7	5.6	0817 1629 0913 2019	
19 Tue	0107	8.6	28.2	1322	8.9	29.2	0742	1.9	6.2	2009	1.8	5.9	0816 1630 0925 2129	
20 Wed	0137	8.4	27.6	1354	8.8	28.9	0814	2.1	6.9	2041	2.0	6.6	0814 1632 0936 2240	
21 Thu	0209	8.3	27.2	1426	8.5	27.9	0848	2.3	7.5	2114	2.3	7.5	0813 1634 0948 2352	
22 Fri	0243	8.0	26.2	1503	8.2	26.9	0924	2.6	8.5	2151	2.6	8.5	0812 1636 1042	
23 Sat	0324	7.8	25.6	1548	7.9	25.9	1006	3.0	9.8	2236	2.9	9.5	0811 1638 1019 0108	1054
24 Sun	0417	7.5	24.6	1648	7.6	24.9	1102	3.3	10.8	2340	3.2	10.5	0809 1639 1041 0226	
25 Mon	0529	7.3	24.0	1809	7.4	24.0	1224	3.4	11.2	0808 1641 1114 0346				
26 Tue	0656	7.4	24.3	1934	7.6	24.9	0109	3.2	10.5	1355	3.1	10.2	0806 1643 1200 0501	
27 Wed	0814	7.8	25.6	2047	8.1	26.6	0230	2.8	9.2	1509	2.6	8.5	0805 1645 1305 0650	
28 Thu	0917	8.4	27.6	2146	8.7	28.5	0336	2.3	7.5	1614	1.9	6.2	0804 1647 1428 0654	
29 Fri	1010	9.0	29.5	2239	9.2	30.2	0434	1.7	5.6	1712	1.2	3.9	0802 1649 1601 0729	
30 Sat	1100	9.6	31.5	2327	9.6	31.5	0527	1.2	3.9	1805	0.7	2.3	0800 1651 1736 0755	
31 Sun	1146	9.9	32.5				0617	0.9	3.0	1854	0.3	1.0	0759 1653 1910 0814	0619

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

● New Moon ◐ First Quarter ○ Full Moon ◑ Last Quarter														
HIGH WATER				LOW WATER				SUN		MOON		Ph.		
Morning		Afternoon		Morning		Afternoon		Rise	Set	Rise	Set	Ph.		
Date	Time	M	Ft	Time	M	Ft	Time	M	Ft					
1 Mon	0012	9.7	31.8	1230	10.1	33.1	0703	0.6	2.0	1938	0.2	0.7	0757 1655 2040 0830	
2 Tue	0056	9.7	31.8	1314	10.0	32.8	0745	0.7	2.3	2020	0.3	1.0	0755 1657 2208 0845	
3 Wed	0139	9.5	31.2	1357	9.8	32.2	0826	0.9	3.0	2100	0.8	2.6	0754 1659 2334 0901	
4 Thu	0221	9.1	29.9	1440	9.3	30.5	0905	1.3	4.3	2139	1.4	4.6	0752 1701 0917	
5 Fri	0304	8.6	28.2	1526	8.7	28.5	0946	1.9	6.2	2221	2.1	6.9	0750 1703 0057 0938	
6 Sat	0353	8.1	26.6	1620	8.0	26.2	1033	2.6	8.5	2313	2.8	9.2	0748 1705 0217 1004	2051
7 Sun	0454	7.5	24.6	1731	7.4	24.3	1136	3.1	10.2				0746 1707 0331 1038	
8 Mon	0613	7.2	23.6	1902	7.1	23.3	1024	3.3	10.8	1303	3.4	11.2	0745 1709 0434 1123	
9 Tue	0739	7.3	24.0	2025	7.3	24.0	1050	3.4	11.2	1433	3.2	10.5	0743 1710 0525 1219	
10 Wed	0849	7.7	25.3	2125	7.7	25.3	1035	3.1	10.2	1544	2.8	9.2	0741 1712 0603 1324	
11 Thu	0940	8.1	26.6	2209	8.1	26.6	1042	2.7	8.9	1636	2.4	7.9	0739 1714 0631 1434	
12 Fri	1020	8.5	27.9	2245	8.4	27.6	1045	2.3	7.5	1715	2.0	6.6	0737 1716 0652 1546	
13 Sat	1054	8.8	28.9	2315	8.6	28.2	1021	2.0	6.6	1748	1.7	5.6	0735 1718 0708 1657	
14 Sun	1127	9.0	29.5	2345	8.7	28.5	0551	1.8	5.9	1818	1.5	4.9	0733 1720 0722 1808	
15 Mon	1157	9.1	29.9				0621	1.6	5.2	1846	1.4	4.6	0731 1722 0734 1917	0253
16 Tue	0013	8.8	28.9	1227	9.2	30.2	0651	1.5	4.9	1915	1.4	4.6	0729 1724 0745 2029	
17 Wed	0041	8.8	28.9	1256	9.1	29.9	0721	1.5	4.9	1944	1.4	4.6	0727 1726 0757 2141	
18 Thu	0109	8.7	28.5	1324	8.9	29.2	0752	1.6	5.2	2013	1.6	5.2	0724 1728 0810 2255	
19 Fri	0138	8.6	28.2	1354	8.7	28.5	0823	1.9	6.2	2043	2.0	6.6	0722 1730 0826	
20 Sat	0209	8.4	27.6	1429	8.5	27.9	0855	2.3	7.5	2115	2.3	7.5	0720 1732 0846 0011	
21 Sun	0247	8.1	26.6	1512	8.1	26.6	0932	2.6	8.5	2155	2.7	8.9	0718 1734 0914 0128	
22 Mon	0336	7.7	25.3	1612	7.6	24.9	1024	3.0	9.8	0716 1736 0952 0243	0253			
23 Tue	0448	7.3	24.0	1739	7.3	24.0	1145	3.3	10.8	0714 1738 1047 0350	1043			
24 Wed	0627	7.3	24.0	1916	7.5	24.6	1031	3.3	10.8	1329	3.1	10.2	0711 1740 1159 0443	
25 Thu	0754	7.7	25.3	2034	8.0	26.2	1026	3.0	9.8	1452	2.5	8.2	0709 1742 1324 0524	
26 Fri	0902	8.4	27.6	2134	8.7	28.5	1019	2.3	7.5	1600	1.7	5.6	0707 1744 1456 0553	
27 Sat	0955	9.1	29.9	2224	9.2	30.2	1020	1.7	5.6	1658	1.0	3.3	0705 1746 1630 0615	
28 Sun	1042	9.7	31.8	2309	9.6	31.5	0512	1.1	3.6	1748	0.4	1.3	0702 1748 1802 0633	1629

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**MARCH 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		Ph.		
Morning		Afternoon		Morning		Afternoon		Rise	Set	Rise	Set	Ph.		
Date	Time	M	Ft	Time	M	Ft	Time	M	Ft					
1 Mon	1127	10.0	32.8	2351	9.8	32.2	0600	0.6	2.0	1833	0.1	0.3	0700 1750 1933 0649	
2 Tue				1209	10.2	33.5	0643	0.4	1.3	1915	0.0	0.0	0658 1751 2103 0705	
3 Wed	0032	9.8	32.2	1251	10.0	32.8	0724	0.4	1.3	1954	0.3	1.0	0655 1753 2230 0722	
4 Thu	0112	9.6	31.5	1330	9.7	31.8	0802	0.7	2.3	2030	0.8	2.6	0653 1755 2355 0741	
5 Fri	0151	9.2	30.2	1410	9.2	30.2	0839	1.2	3.9	2105	1.5	4.9	0651 1757 0806	
6 Sat	0230	8.7	28.5	1453	8.5	27.9	0916	1.8	5.9	2142	2.3	7.5	0648 1759 0114 0838	
7 Sun	0315	8.1	26.6	1543	7.7	25.3	0959	2.5	8.2	2226	3.0	9.8	0646 1801 0223 0919	
8 Mon	0412	7.5	24.6	1654	7.1	23.3	1057	3.2	10.5	2336	3.6	11.8	0644 1803 0319 1012	1544
9 Tue	0531	7.1	23.3	1830	6.8	22.3	1230	3.5	11.5	0641 1805 0402 1115				
10 Wed	0704	7.1	23.3	2001	7.0	23.0	0118	3.7	12.1	1406	3.3	10.8	0639 1807 0434 1223	
11 Thu	0820	7.4	24.3	2101	7.5	24.6	0239	3.4	11.2	1517	2.9	9.5	0637 1808 0457 1334	
12 Fri	0912	7.9	25.9	2144	7.9	25.9	0336	2.8	9.2	1607	2.4	7.9	0634 1810 0515 1446	
13 Sat	0953	8.4	27.6	2218	8.3	27.2	0419	2.4	7.9	1645	2.0	6.6	0632 1812 0530 1557	
14 Sun	1027	8.7	28.5	2248	8.6	28.2	0454	2.0	6.6	1718	1.7	5.6	0629 1814 0543 1707	
15 Mon	1059	9.0	29.5	2316	8.8	28.9	0526	1.7	5.6	1748	1.4	4.6	0627 1816 0554 1818	
16 Tue	1129	9.1	29.9	2345	8.9	29.2	0556	1.4	4.6	1818	1.3	4.3	0625 1818 0606 1930	2103
17 Wed	1159	9.2	30.2				0627	1.3	4.3	1848	1.2	3.9	0622 1820 0619 2044	
18 Thu	0012	8.9	29.2	1228	9.1	29.9	0659	1.3	4.3	1918	1.3	4.3	0620 1821 0634 2159	
19 Fri	0041	8.9	29.2	1258	9.0	29.5	0730	1.4	4.6	1947	1.5	4.9	0617 1823 0653 2316	
20 Sat	0112	8.8	28.9	1330	8.8	28.9	0802	1.7	5.6	2018	1.8	5.9	0615 1825 0716	
21 Sun	0145	8.6	28.2	1408	8.5	27.9</								

## 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).

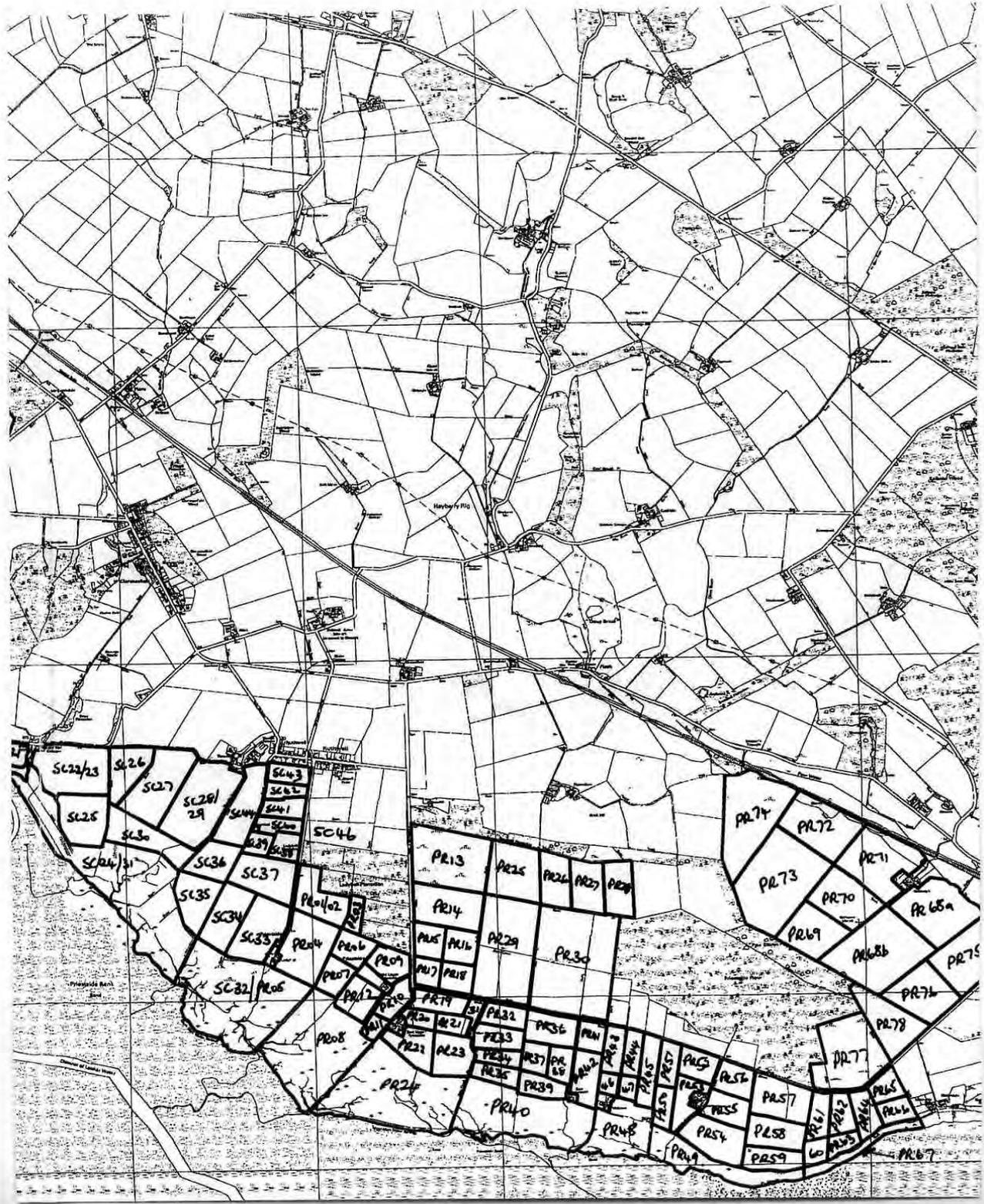


Figure 3. Field codes for the Priestside/Hurkledale/Thwaite area of the Goose Management Scheme.

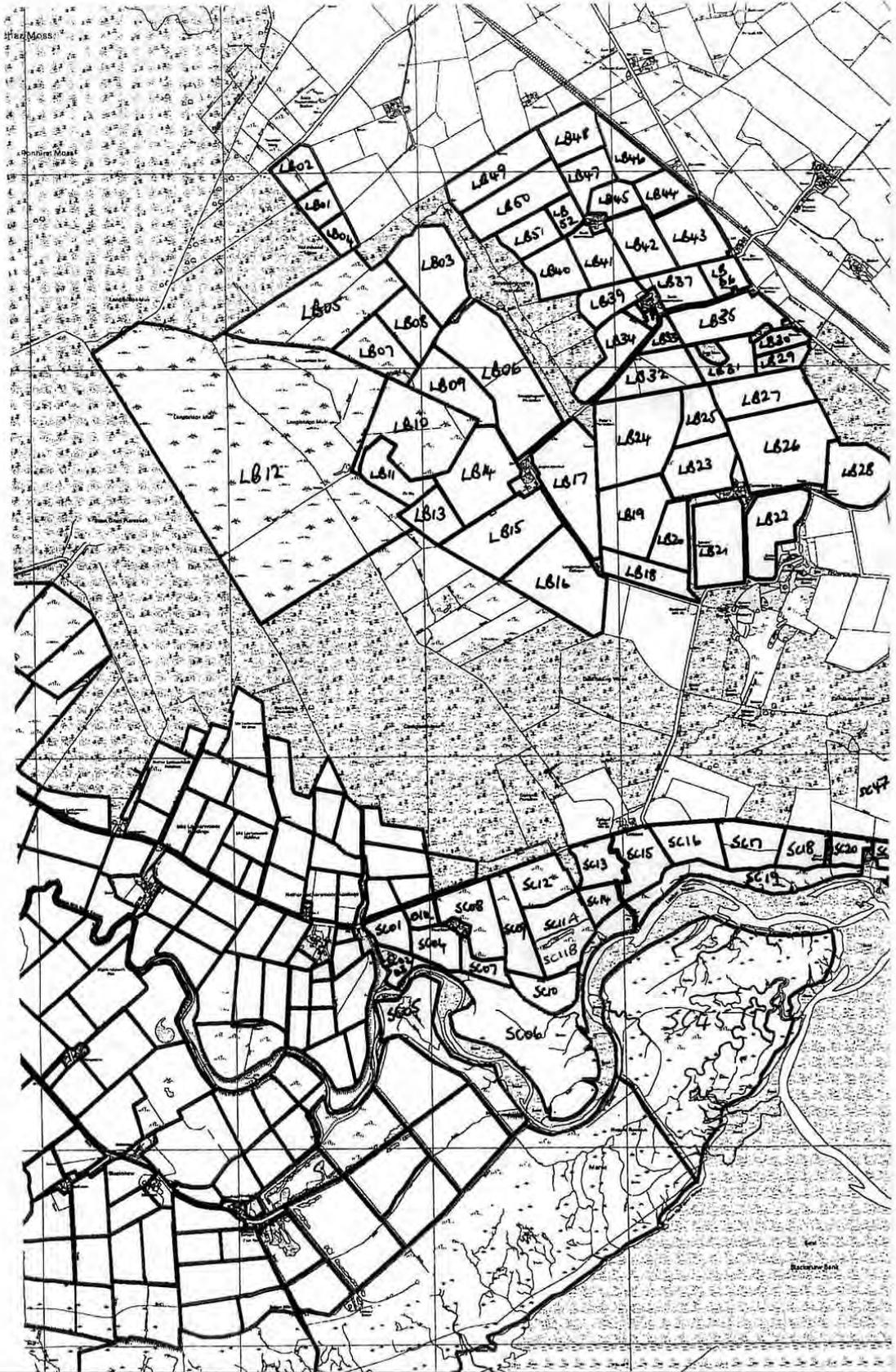


Figure 4. Field codes for the Powhillon/Stanhope/Longbridgemuir area of the Goose Management Scheme.

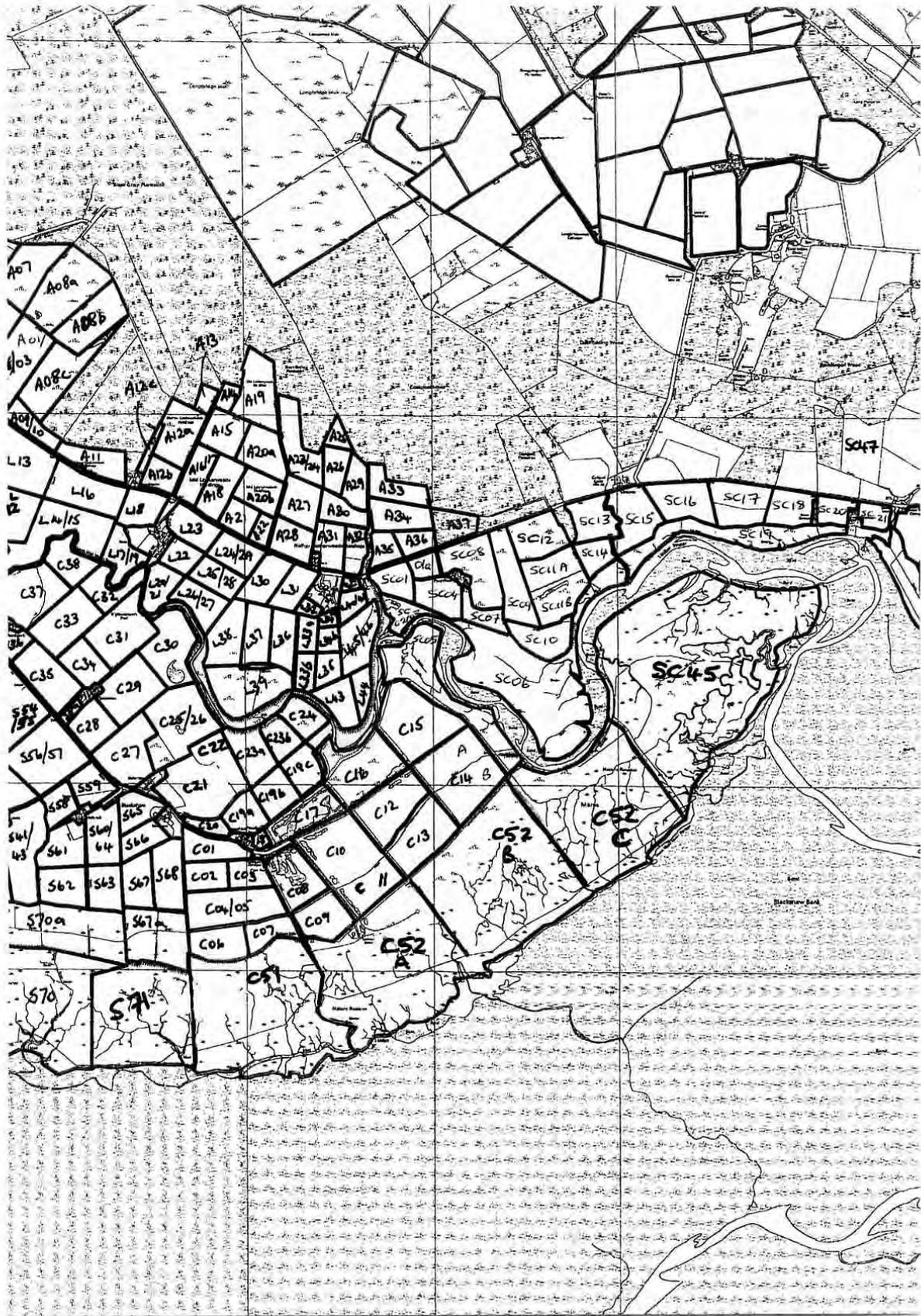


Figure 5. Field codes for the Caerlaverock/Nether Locharwoods area of the Goose Management Scheme.

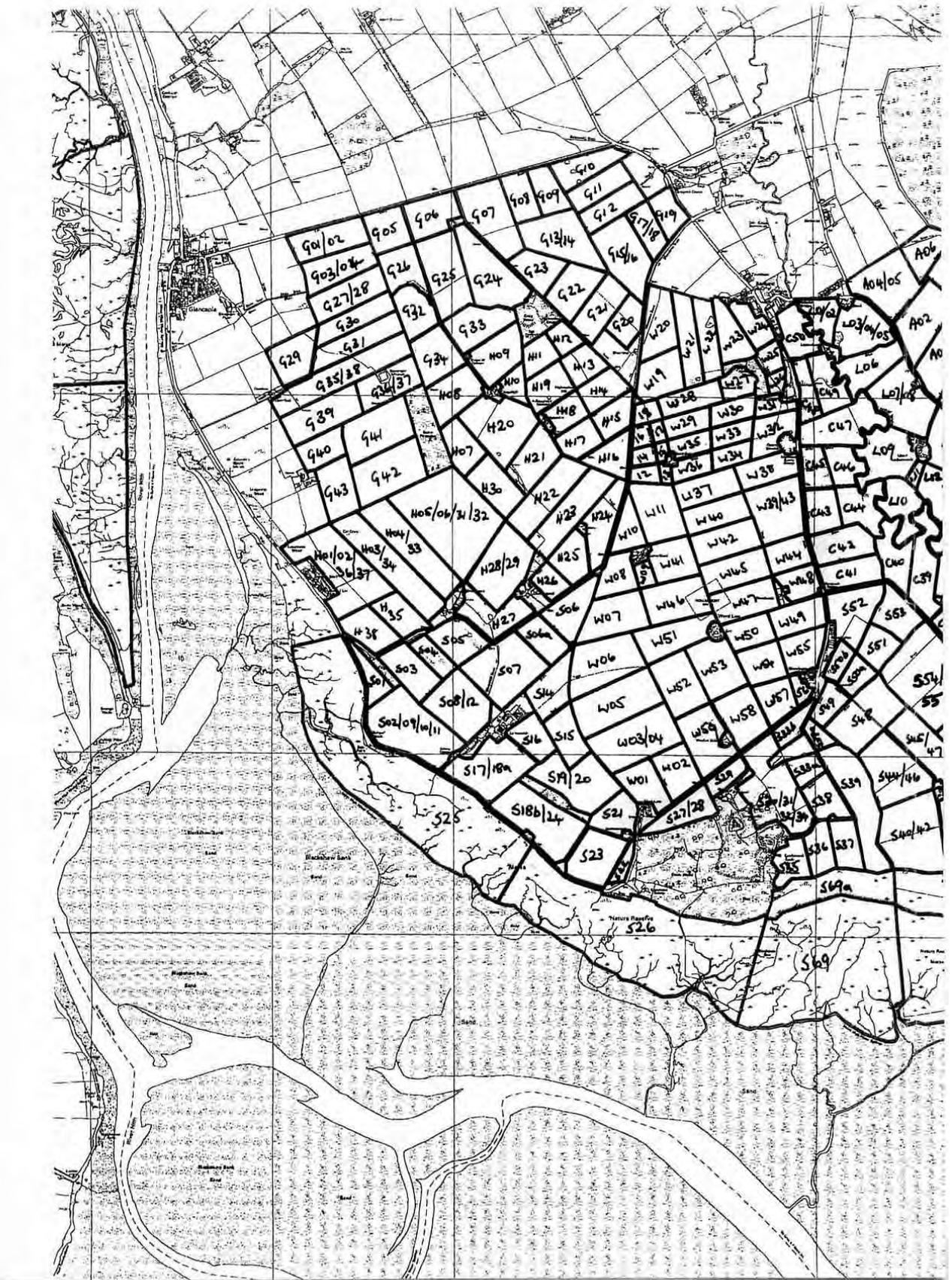


Figure 6. Field codes for the Lantonside/Ward Law area of the Goose Management Scheme.

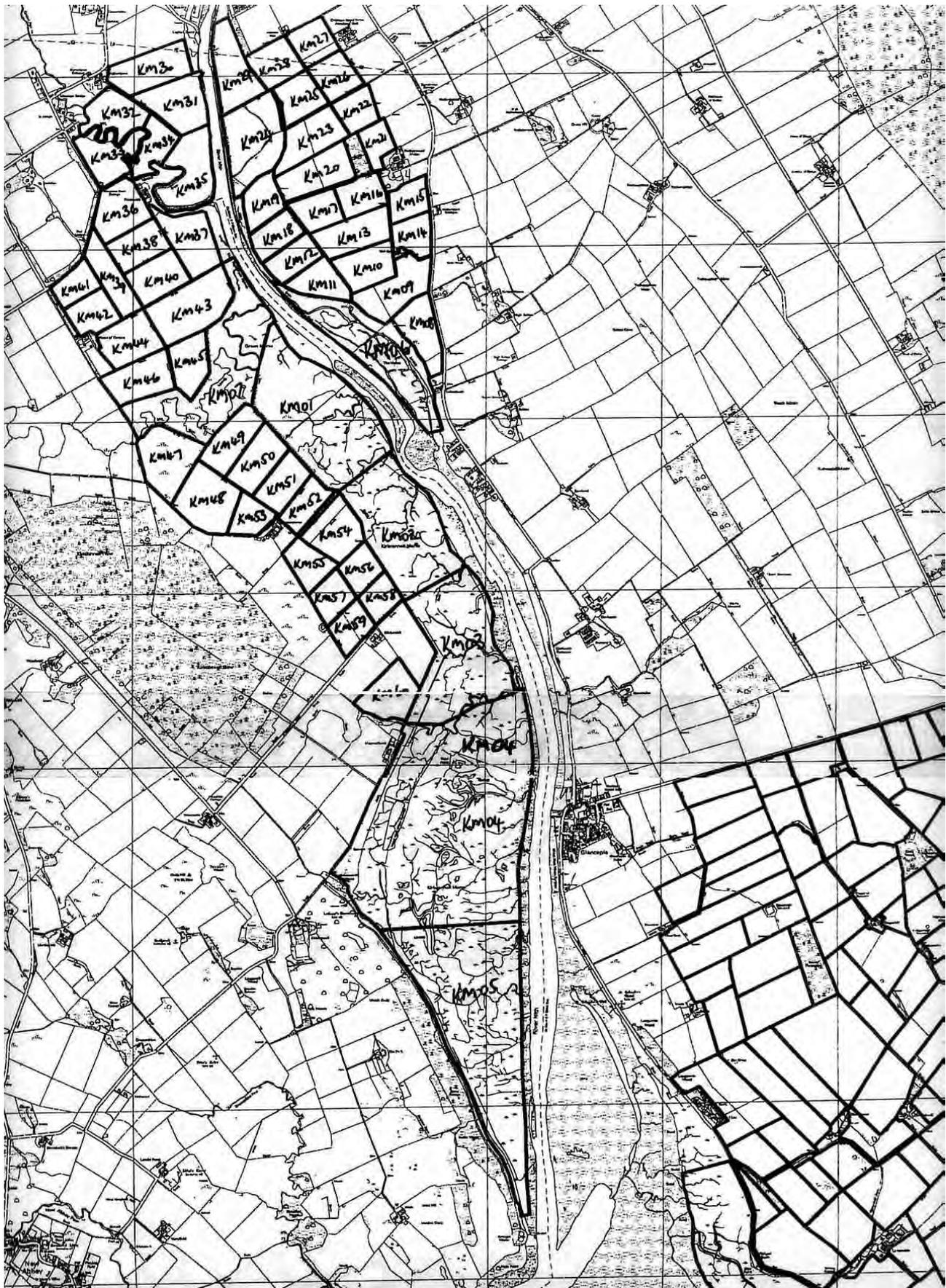


Figure 7. Field codes for the Kelton/Greenmerse/Kirkconnell area of the Goose Management Scheme.

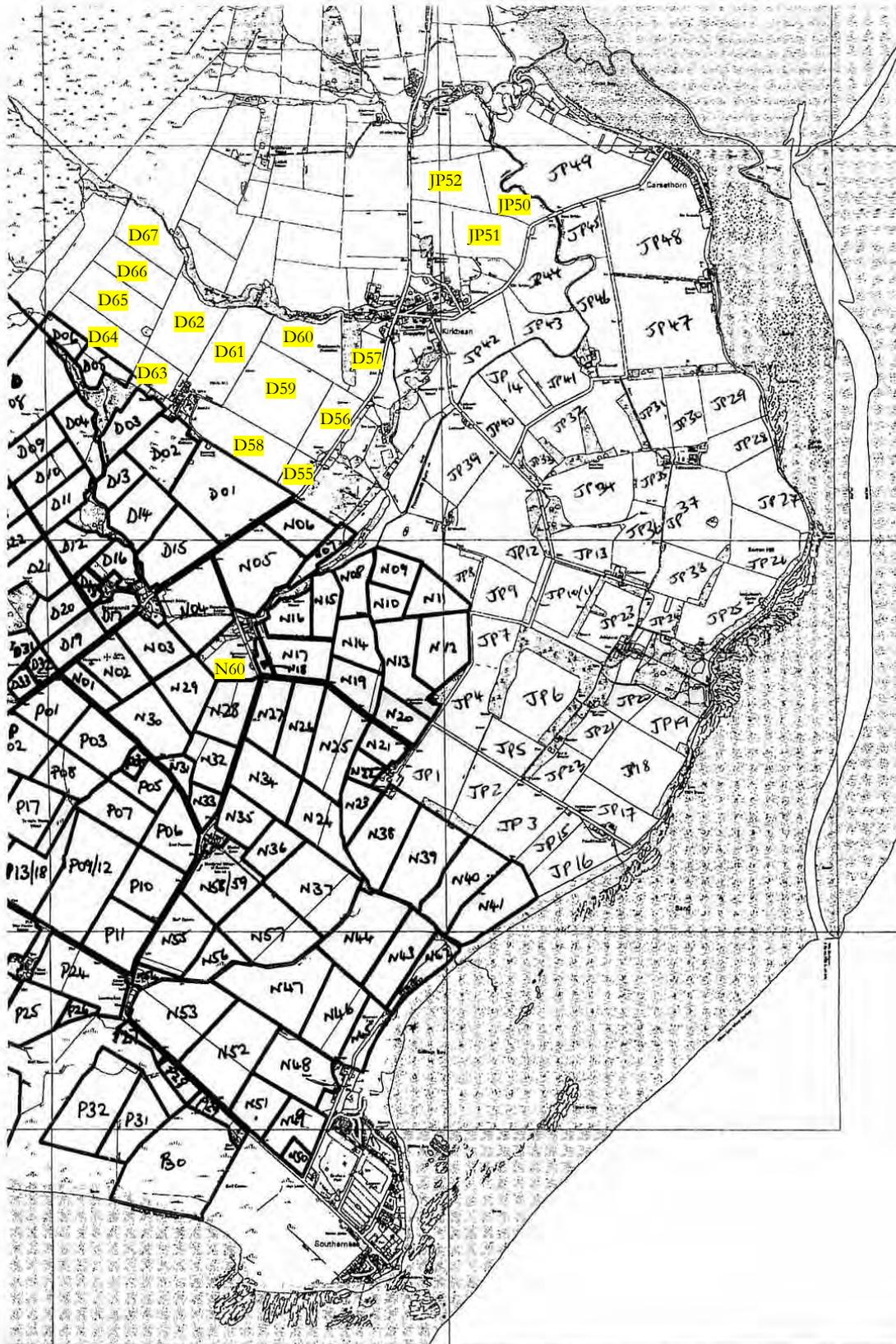


Figure 8. Field codes for the Carsethorn/Southernness area of the Goose Management Scheme (new field codes in areas unused by the geese in 2008-2009 are shown highlighted as in Table 2).

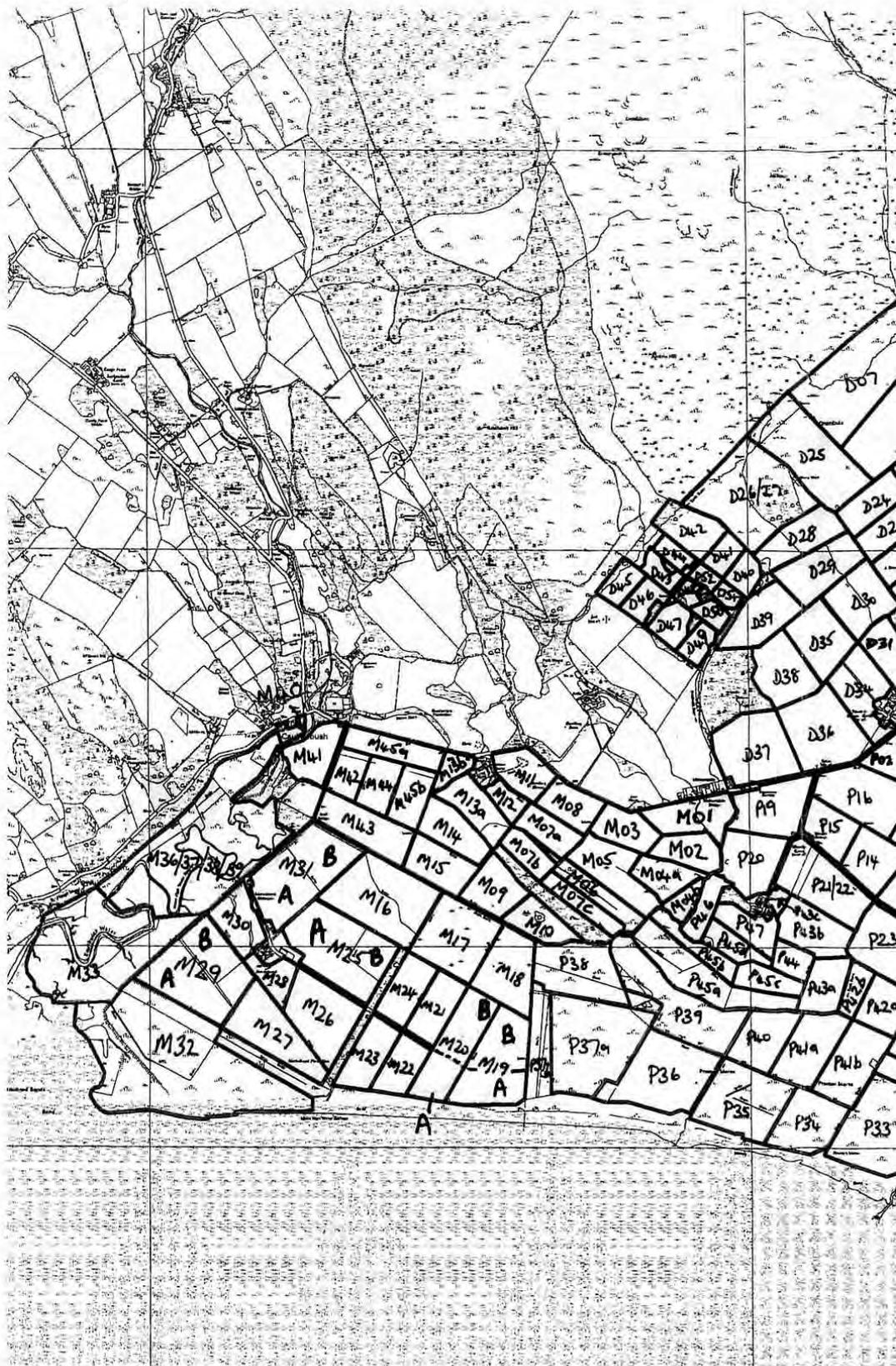
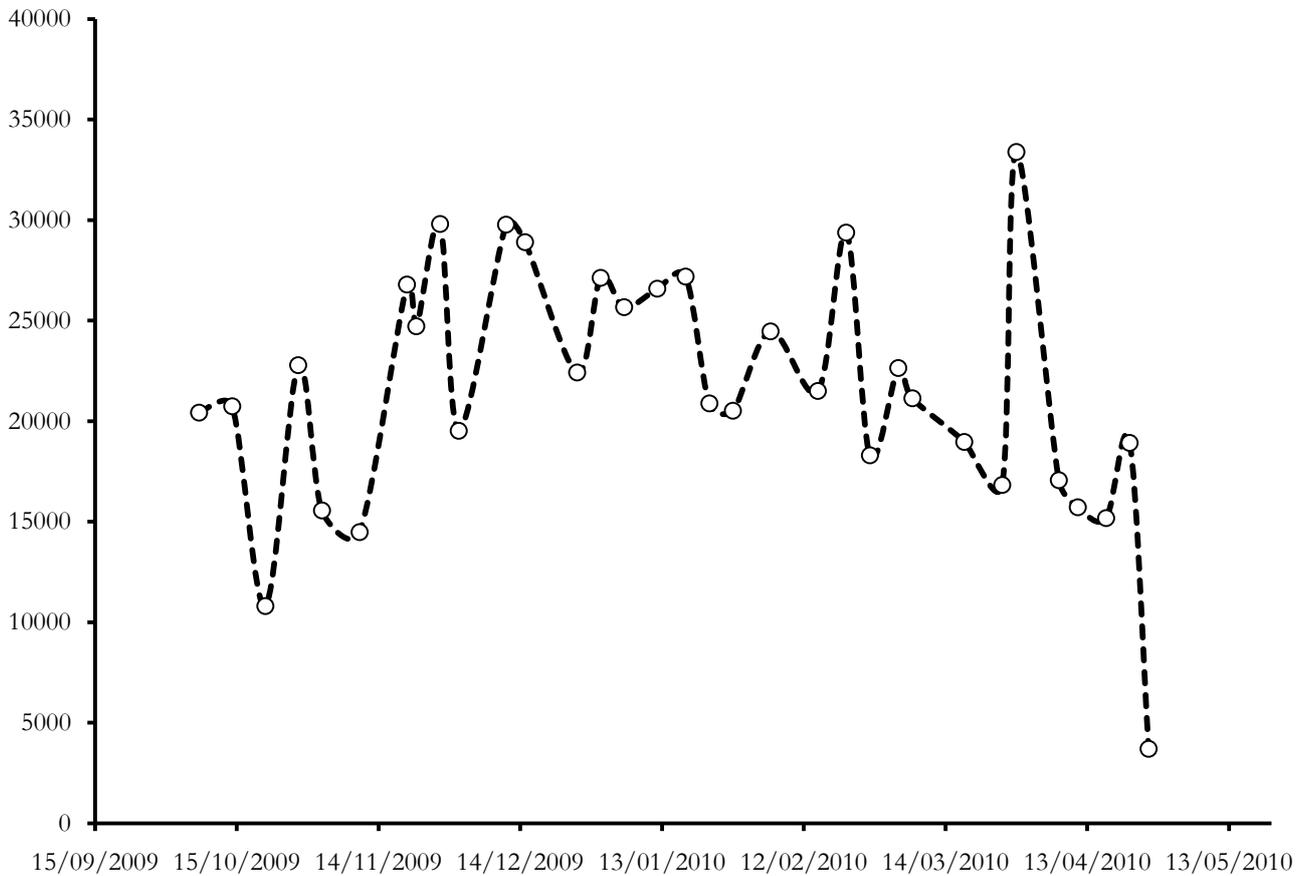


Figure 9. Field codes for the West Preston/Cowcourse/Mersehead area of the Goose Management Scheme.



## 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 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 21,571 (19,100 in 2008-2009) ranging from a minimum of 3,710 at the end of the season on 26 April 2010 (5,223 on same date in 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 33,380 (33,856 in 2008-2009). 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.

Flock sizes and field distribution of the barnacle geese within the Management Scheme area are given in Table 2. New field codes added to those originally provided by SNH to account for extensions to the feeding distribution in 2009-2010 compared to winter 2008-2009 are highlighted, and shown in Figure 8.

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

	07/10/2009	14/10/2009	21/10/2009	28/10/2009	02/11/2009	10/11/2009	20/11/2009	22/11/2009	27/11/2009	01/12/2009	11/12/2009	15/12/2009	26/12/2009	31/12/2009	05/01/2010	12/01/2010	18/01/2010
A18																	1100
C01				490		1020		100	40		260						
C02				50													
C03						850		310									
C04/05				630	960		760			25	130	270					
C06																	
C07								25		130							
C08	20							30	450	75	610	60					90
C09							670	1410									
C10/11	8000						60		50	1130						870	
C12									360			3920					4000
C13	4400									130		280				3090	
C14	900								440		1500	130					
C15											710						
C16	350								2210	65							
C17											7						
C19a		300		180	50					210		220					
C19b		900			320				660		360						1100
C19c					600				960	40		410					
C20				200	60				520	300		310				90	
C21/22							10		260	330							660
C23a								430									
C23b																	
C24																	
C25/26									3140		3800						
C27			42				1660	65									200
C28																	
C29	160					900											
C30	600					500				400	1320	1870					1300
C31									920								
C39								110		420				220	720		
C40								330	60						2580		
C44				1500													
C51/S71		1100	4140				90			110	210						160
C52		50	2710	4100			1280	30			220			1850	20	1860	910
Corbally/Overton													1000	130	1430	70	
Drumum Mense													250	30			
D36																	
D59																410	
IP05																190	
IP15																	
IP16																	
IP41																	
IP43																	
IP49															510		
IP50																	
KM01									3930								
KM02																	
KM03										380		620					
KM04																	
KM05																	
KM06				4300													2450
KM09										310							
KM10																	
KM11																	
KM12					720				120								1670
KM13																	
KM14																	
KM17															2100		
KM18																2800	
KM19																410	
KM20																	
KM22																	
KM23																	
KM24																	
KM30																	
KM31																	
KM33																	
KM35																	
KM37									240								570
KM43							2110	2340									
KM44							920										
KM45							90										
KM47																	
KM49													3000				
KM50												1700					310
KM55												100					740
L14/15											470						
L20/21											150						
L26/27							400	310			250						
L30								140		50			1560				
L31								630									
L36									340								
L37									1440								
L38										480		1600					1850
L45																	1200
M01					520	190											
M05																	
M07a																	220
M07b									2160								
M12																40	
M14													2000				
M15																	
M16		2200						100									
M18		400															
M19		1210		400				1210									1580
M20				200	160								340				
M21					560							40					20
M22													1020				
M23				3200	710				36								
M24				2900	860												
M25					180			157	45								110
M26		720		180	410	550			130		70						280
M27				450	2500	250	1070	440	210			900					
M28				440				10									
M29					30		1200	860	680	420			750				
M30		1850		280	50	1600		75									
M31				175			890	360	290		1640					2660	330
M32					90	450	220	720	440	840							
M33															3700		310
M36/37/38/39													1710				
M41									4								
M43		1050		400	60				590							50	740
M44											1530						
M45a											700				47		
M45b					210		70	780									
N04																	
N05																	
N11																40	
N24															310	440	
N28												380					
N29								1620				380					
N32												380					
N34									230								



Table 2. Continued

23/01/2010	28/01/2010	05/02/2010	15/02/2010	21/02/2010	26/02/2010	04/03/2010	07/03/2010	18/03/2010	26/03/2010	29/03/2010	07/04/2010	11/04/2010	17/04/2010	22/04/2010	26/04/2010	Total	
			360				160			450						1100	A18
130																3010	C01
150	590															790	C02
150			300	460				210								2280	C03
				1420						1670				2300		8165	C04/05
		40										40		410		490	C06
														250		405	C07
160		80	40	60	360		140			1670			20			3865	C08
							3740						390			5820	C09
			1120	540			820	520				720				13500	C10/11
				1960				1480								12440	C12
	2400											510				10810	C13
	2400			1360				90				10				6830	C14
							670			400			20			1800	C15
		370						980		30		280				4285	C16
																7	C17
				230						160		330				1680	C19a
		40						55		1200						4635	C19b
	490							220				1320				4040	C19c
		1160	70	620				7				35	25			3487	C20
		370		3460			35	540	90							5755	C21/22
	910							100	140							1580	C23a
	60															60	C23b
							120									120	C24
																6940	C25/26
											95		710			2572	C27
																200	C28
																1060	C29
				1260			580			3150		280				11260	C30
										3150			570			4640	C31
																1470	C39
				530			250									3750	C40
																1500	C44
1640	120	2640	920	110	2550						3000		730			17520	C51/S71
1470		2440	1480	370	600	80	180				2000	520	2630	1400		26200	C52
			290	1780	160		80	100		250	310	240	610			2320	Orbulla/Overton
																1780	D3c
																410	D59
																190	IP05
			2600													2600	IP15
		1250	320	3210	1860		850			920						8410	IP16
					3											3	IP41
					210			660								870	IP43
							1150	1240	690	150						3740	IP49
					540											540	IP50
		2600											65			6530	KM01
														980		65	KM02
											185					1980	KM03
												1160				185	KM04
																1160	KM05
2700										520						9760	KM06
																520	KM09
	180		55							1870						2105	KM10
											10					10	KM11
											15					2525	KM12
			1450							610						2060	KM13
						50	1200	780								2030	KM14
																2100	KM17
											280					3080	KM18
											2					412	KM19
					1500											1500	KM20
				55												55	KM22
	80															80	KM23
						720										870	KM24
							110									720	KM30
					110											110	KM31
																110	KM33
																810	KM35
																1430	KM37
																4450	KM43
																920	KM44
																90	KM45
																6200	KM47
																2980	KM49
										190						1740	KM50
							1500									1500	KM55
																470	L14/15
																150	L20/21
			5													960	L26/27
																1755	L30
																630	L31
																340	L36
																1440	L37
										3150						3600	L38
																5380	L43
				840	18					120						2178	M01
																990	M03
				920												1140	M07a
																2160	M07b
																40	M12
													10			2010	M14
														410		410	M15
										90		330		200		2920	M16
																400	M18
																5780	M19
		1850	530		65			750	330	50						3745	M20
		40			50		110		15	110						945	M21
										90						1110	M22
																3940	M23
																3760	M24
										40						602	M25
		260	640		180			20								3440	M26
630								230		1400		240		680	990	9990	M27
									530	890	420					450	M28
																5780	M29
				470	32		2190	470	730	1250		310		680		5347	M30
		830		310												12125	M31
1080					880						220					4940	M32
			2160		990						700		2610	250	220	10940	M33
								25		180						1915	M36/37/38/39
																4	M41
									320	85	480					3825	M43
																1530	M44
	1400			5	20				480	220						3182	M45a
										840	410					2310	M45b
									690							690	N04
				110												110	N05
																40	N11
																750	N24
																3871	N28
6		1450	350		15									50		380	N29
																230	N32
																1100	N34

Table 2. Continued.



### 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.**

	07/10/2009	14/10/2009	21/10/2009	28/10/2009	02/11/2009	10/11/2009	20/11/2009	22/11/2009	01/12/2009	11/12/2009	15/12/2009	26/12/2009	31/12/2009	05/01/2010	12/01/2010	18/01/2010
A01/03															260	90
A04/05																
A18																
A20b																
C09																
C16			230													
C40																
C44				600												
C45																250
C52																
Drumburn Merse																
D30															80	
D59															95	
JP02																
JP03									125		2350					
JP05															80	
JP06																
JP37																
JP41																
JP43																
JP44																
JP45																
JP49															40	
JP51																
KM03																
KM06																
KM09																
KM10																
KM11																
KM12															150	
KM13																
KM14																
KM20																
KM22																
KM23																
KM25																
KM30																
KM31																
KM33																
KM39										45						
KM43																
KM47													35			
KM50																
L16																
L13																
L16																
M16								60								
M18			2200													
M20	4200															
M26	1870															
M29	50															
M32											285					
M45b											40					
N10																
N11															10	
N23															350	600
N38															25	210
N39																340
N40					40	210			340	1030	2100		400			
P40									10							
P41a	670															
P45d											40					
PR01/02																
PR06																
PR14																
PR24																
PR27																
PR29																
PR39																
PR57																
PR59																
PR61																
PR68a																
PR68b																
PR69																
PR75																
PR76																
S25	2000		910													
S39																
S44/46																
S48																
S49																
S50a																
SC26															5	
SC45										200						
W07																
W38										220						
W40																700
Total	8790	2430	910	600	40	210	60	650	350	3745	2100	35	550	685	810	1640

**Table 3. Continued.**

23/01/2010	28/01/2010	05/02/2010	15/02/2010	21/02/2010	26/02/2010	04/03/2010	07/03/2010	18/03/2010	26/03/2010	29/03/2010	07/04/2010	11/04/2010	17/04/2010	22/04/2010	26/04/2010	Total	
			180													180	A01/03
					200											200	A04/05
									120							120	A18
							5				25					25	A20b
																5	C09
				85		530										230	C16
																615	C40
																600	C44
																250	C45
															60	60	C52
											160	1400	40			1600	Drumburn Mces
																80	D30
																95	D59
		162														162	IP02
			160				85									2720	IP03
																80	IP05
			60													60	IP06
						12										12	IP37
						620										620	IP41
						850		50								900	IP43
						510										510	IP44
			220													220	IP45
330								820	20	500						1710	IP49
									680							680	IP51
	8			30										20		50	KM03
																8	KM06
												50	45			95	KM09
				465						170						635	KM10
												240				240	KM11
																150	KM12
		60	40						100		50					250	KM13
								600	210	90						900	KM14
								920								920	KM20
				440												440	KM22
			145									45				190	KM23
												820				820	KM25
										850						850	KM30
						500										500	KM31
					60											60	KM33
											120					165	KM39
											60					60	KM43
																35	KM47
				65												65	KM50
					350											350	L06
					170											170	L13
			35													35	L16
																60	M16
																2200	M18
																4200	M20
																1870	M26
																50	M29
																285	M32
																40	M45b
													930			930	N10
																10	N11
650																1600	N23
																235	N38
			30													370	N39
		280	700	30	50	220										5400	N40
																10	P40
																670	P41a
																40	P45d
											250					250	PR01/02
												980				980	PR06
									570							570	PR14
										220						220	PR24
						180										180	PR27
												620				620	PR29
			10													10	PR39
									190							190	PR57
								1100								1100	PR59
									380							380	PR61
						7										7	PR68a
				630					45							675	PR68b
									310							310	PR69
												12				12	PR75
			15	420				500								935	PR76
																2910	S25
																35	S39
													23			23	S44/46
										8						8	S48
													10			10	S49
								35								35	S50a
																5	SC26
																260	SC45
300																300	W07
																220	W38
																700	W40
1288	0	677	1450	2170	3009	2775	2215	1685	1913	1240	2162	2670	1048	20	60	47987	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.**

	07/10/2009	14/10/2009	21/10/2009	28/10/2009	02/11/2009	10/11/2009	20/11/2009	22/11/2009	27/11/2009	01/12/2009	11/12/2009	15/12/2009	26/12/2009	31/12/2009	05/01/2010	12/01/2010	18/01/2010
A22																	4
C16						10			130	45	30	28					4
C17				25	20	50						42					4
C23a								35									
IP42																	11
IP49																	
L20/21										30							
L40/41																	
L43									30								
M16										20							
M20	19																
P14															12		
SC22/23																	12
SC28/29																	
Total	19	0	0	25	20	60	0	35	160	95	30	70	0	12	0	31	0

	23/01/2010	28/01/2010	05/02/2010	15/02/2010	21/02/2010	26/02/2010	04/03/2010	07/03/2010	18/03/2010	26/03/2010	29/03/2010	07/04/2010	11/04/2010	17/04/2010	22/04/2010	26/04/2010	Total
																	4
																	243
				3	12		10										166
																	35
																	11
	10																10
																	30
																	35
																	30
																	20
																	19
																	12
																	12
										1							1
																	1
	10	0	35	3	12	0	10	0	0	1	0	0	0	0	0	0	628
																	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.**

	07/10/2009	14/10/2009	21/10/2009	28/10/2009	02/11/2009	10/11/2009	20/11/2009	22/11/2009	27/11/2009	01/12/2009	11/12/2009	15/12/2009	26/12/2009	31/12/2009	05/01/2010	12/01/2010	18/01/2010
C08								4					14				
C17					2	40	15	45	62	40	15	20					
M16										30							
M19							10										
M25							15	30									
M29							35		22								
M31							10										
P14															30		
P41a									8	20							
P43a																	
S54/55			430														
Total	0	430	0	0	2	40	85	79	92	90	15	34	0	30	0	0	0

	23/01/2010	28/01/2010	05/02/2010	15/02/2010	21/02/2010	26/02/2010	04/03/2010	07/03/2010	18/03/2010	26/03/2010	29/03/2010	07/04/2010	11/04/2010	17/04/2010	22/04/2010	26/04/2010	Total
																	18
	30	20		4													313
							8										38
																	10
																	45
																	57
																	10
																	30
																	28
	16																16
																	430
	66	20	0	4	0	8	0	0	0	0	0	0	0	0	0	0	995
																	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.

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

	07/10/2009	14/10/2009	21/10/2009	28/10/2009	02/11/2009	10/11/2009	20/11/2009	22/11/2009	27/11/2009	01/12/2009	11/12/2009	15/12/2009	26/12/2009	31/12/2009	05/01/2010	12/01/2010	18/01/2010
A02									42								
A04/05																	
A22																	2
C08									20						110		
C17				25	32	50	7	10	48	56	90		275	182	90	221	210
C18				6													
C19a																	
C19b							30										
C30																	
KM11									8								
KM12	82																
KM23															30		
KM31														81			
KM36									96								
KM43						20											
KM45							40	50									
KM50				20													
L09												32					
M16							1										
PR04																	
PR09															10		
PR18										72							
PR29								83									
S33a									8			35					
SC20																	
SC22/23																	48
SC26															106		
SC27																	
SC28/29																	
SC34									216	222		82					
SC44																	
Total	82	0	0	51	32	70	78	143	438	350	90	149	275	379	230	271	210

23/01/2010	28/01/2010	05/02/2010	15/02/2010	21/02/2010	26/02/2010	04/03/2010	07/03/2010	18/03/2010	26/03/2010	29/03/2010	07/04/2010	11/04/2010	17/04/2010	22/04/2010	26/04/2010	Total
											8					42
																8
																2
																2
																802
250	150	180		170	166	220	40	20		6	50	1	3			2923
				40	48		210	215	180	160	140					6
																9
																9
																30
																36
											11	25				36
																8
																82
																30
																81
																96
																20
																90
																20
																20
																32
																1
10			10													20
																10
																72
																83
																43
																10
																48
																106
										85		16				101
										45						45
																520
										5		90				95
260	200	200	210	214	220	250	235	180	295	146	168	42	3	0	0	5471

### 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.**

	07/10/2009	14/10/2009	21/10/2009	28/10/2009	02/11/2009	10/11/2009	20/11/2009	22/11/2009	27/11/2009	01/12/2009	11/12/2009	15/12/2009	26/12/2009	31/12/2009	05/01/2010	12/01/2010	18/01/2010
C08				8	2				10				11				
C16																	
C17				3	35	50	45	50	42	62	45	59	79	70	60	84	70
C32				20	4												
M16																	2
M25								2									
SC05																	
SC06				3	1												2
Total	0	0	0	34	42	50	45	62	42	62	45	70	79	70	60	84	74

	23/01/2010	28/01/2010	05/02/2010	15/02/2010	21/02/2010	26/02/2010	04/03/2010	07/03/2010	18/03/2010	26/03/2010	29/03/2010	07/04/2010	11/04/2010	17/04/2010	22/04/2010	26/04/2010	Total
				5			4	3		2	10						55
			4									2	2	2	2	2	14
	75	70	85	70	44	12	30	32	40	55	35	60	50	50	40	35	1537
																	24
	2																4
																	2
			4														4
																	4
																	6
	77	70	93	75	44	12	34	35	40	57	45	62	52	52	42	37	1646

### 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 beginning of October 2009 throughout the winter to April 2010 tape streamers on canes and barrels were noted on field C29;
- From 21 February, 4 March, and 11 April onwards, gas guns were present in fields KM9, KM10 and KM17 (with streamers too) respectively although these scaring devices were probably mainly in place to deter feeding Pink-footed Geese in that area;
- From 11 December onwards at various dates, flags were noted on fields PR17, PR18 and PR29 although this scaring was possibly directed towards large flocks of pigeons feeding in that area;
- From 11 December onwards at various dates a scarecrow or a bag on a stick was noted at field N30, possibly to deter pigeons;
- From 4 March balloons were noted on field P06;
- From 26 March and 7 April blue barrels were noted on fields SC30 and SC35 respectively, possibly directed towards Whooper Swans feeding in that area.

### 3.8 Count section dates and times of coverage

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

	Wednesday	Wednesday	Wednesday	Wednesday	Monday	Tuesday	Friday	Sunday	Friday	Tuesday	Friday	Tuesday	Saturday	Thursday	Tuesday	Tuesday	Monday
	07/10/09	14/10/09	21/10/09	28/10/09	02/11/09	10/11/09	20/11/09	22/11/09	27/11/09	01/12/09	11/12/09	15/12/09	26/12/09	31/12/09	05/01/10	12/01/10	18/01/10
Thwaite	10:00	10:00	10:00	10:00	12:00	15:00	09:30	16:00	08:40	13:00	15:30	14:10	16:00	14:00	15:30	14:00	09:00
Ninh	08:00	08:00	08:00	09:00	09:00	13:00	08:30	14:00	13:30	13:40	13:30	12:20	15:00	12:00	14:00	12:15	11:00
Southernness	10:00	10:00	n.c.	10:00	14:00	12:00	15:00	09:00	14:40	14:30	12:10	10:20	14:00	10:00	10:00	10:00	12:00
Colvend	n.c.	n.c.	10:00	10:00	16:00	10:00	16:00	10:00	16:10	15:50	09:15	09:00	12:00	09:00	12:00	09:30	15:00

Saturday	Thursday	Friday	Monday	Sunday	Friday	Thursday	Sunday	Thursday	Friday	Monday	Wednesday	Sunday	Saturday	Thursday	Monday
23/01/10	28/01/10	05/02/10	15/02/10	21/02/10	26/02/10	04/03/10	07/03/10	18/03/10	26/03/10	29/03/10	07/04/10	11/04/10	17/04/10	22/04/10	26/04/10
16:00	14:30	09:00	13:30	15:00	16:00	15:30	08:00	12:15	17:30	16:00	10:00	10:30	09:30	14:00	17:00
15:00	13:30	13:00	12:30	12:00	14:00	14:00	10:30	10:45	12:00	18:00	07:30	08:45	08:00	18:00	15:00
12:30	09:00	15:15	09:30	09:00	10:00	09:00	11:30	08:00	09:00	10:00	11:30	13:00	08:00	10:00	09:00
14:00	11:30	16:30	10:30	11:00	12:00	10:15	14:00	10:00	11:00	13:00	10:00	15:00	10:00	12:00	n.c.

In summary, these dates represent coverage on five Mondays, five Tuesdays, five Wednesdays, five Thursdays, six Fridays, three Saturdays and four Sundays, giving 33 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 in the Scheme area.**

08/10/2009	Alastair Martin				
14/10/2009	Alastair Wylie				
21/10/2009					
28/10/2009	Farm worker, Newmains				
02/11/2009	Stephen Roan, Boreland	Jim Kirkland			
10/11/2009	Jim Kirkland's wife	Stephen Roan			
20/11/2009					
22/11/2009	Jim Kirkland				
27/11/2009	Farmer, Nethertown	Farmer, Ladyhall	Alastair Wylie	Stephen Brown	Stuart Brown
01/12/2009	Browns	Jim Kirkland			
11/12/2009	Farmer, Colvend	Jim Kirkland	Stuart Brown		
15/12/2009	Tractorman, Cowcorse	Steven Murray, West Preston	Jack Graham		
26/12/2009					
31/12/2009	Tractorman, Boreland	Steven Murray, West Preston	Alastair Wylie	Stuart Brown	
05/01/2010	Jamie Blackett, Arbigland				
12/01/2010	Jim Kirkland	Stuart Brown			
18/01/2010					
23/01/2010					
28/01/2010					
05/02/2010	Stuart Brown	Jim Kirkland	Stephen Roan	Farmer, Ladyhall	
15/02/2010					
21/02/2010					
26/02/2010					
04/03/2010	Jack Graham				
07/03/2010					
18/03/2010					
26/03/2010					
29/03/2010					
07/04/2010					
11/04/2010	Alastair Wylie	Jim Kirkland			
17/04/2010	Stephen Brown				
22/04/2010					
26/04/2010					

### 3.10 Coordinated Svalbard Barnacle Goose population count totals

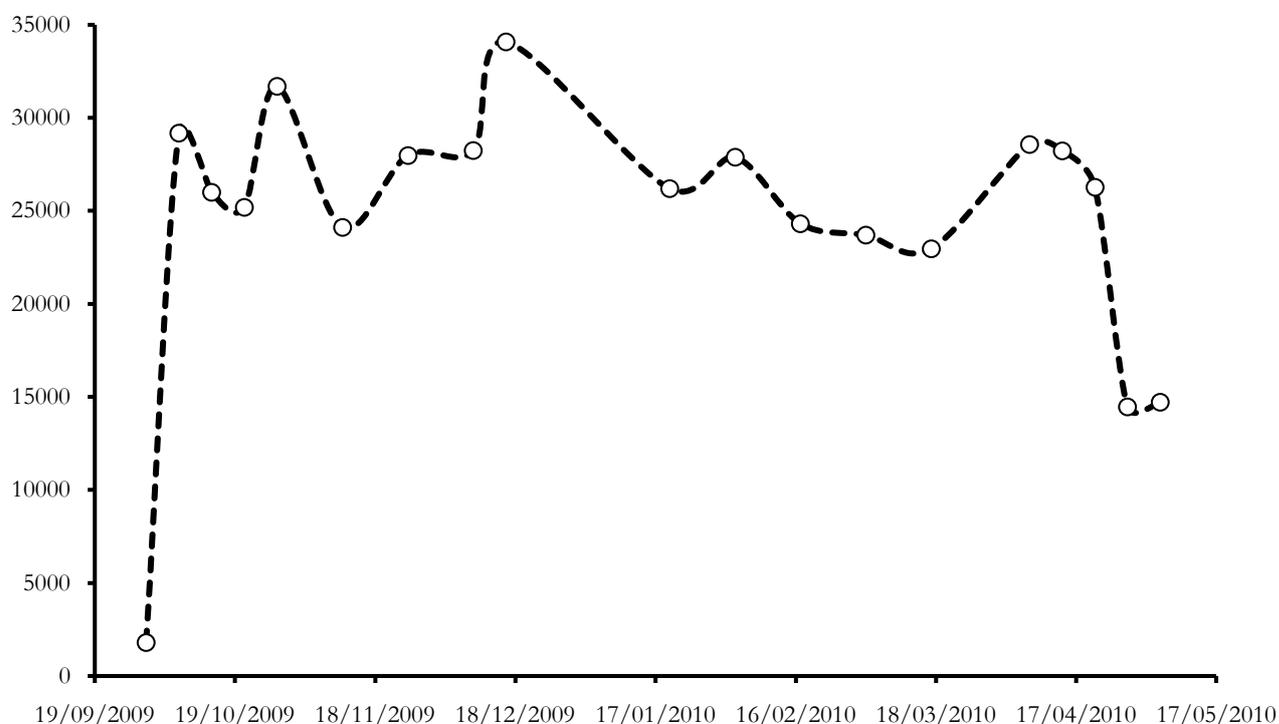
**Table 8. Coordinated Svalbard Barnacle Goose population count totals for the Solway 2009-2010.**

Count section	30/09/2009	07/10/2009	14/10/2009	21/10/2009	28/10/2009	11/11/2009	25/11/2009	09/12/2009	16/12/2009	06/01/2010	20/01/2010	03/02/2010	17/02/2010	03/03/2010	17/03/2010	07/04/2010	14/04/2010	21/04/2010	28/04/2010	05/05/2010
Annan to Gretna	0	0	0	0	0	0	0	0	nc											
Ruthwell to Cumbertrees	0	0	0	500	100	0	2000	0	650	nc										
Langbriggemuir	0	0	0	0	0	0	0	0	nc											
Caerlaverock	1500	20430	6120	7582	9670	11310	7590	10490	11070	nc	7410	2690	4115	10865	7512	8220	5720	10120	16	1
Kirkconnell & Ward Law	0	0	1500	3220	4300	230	1530	2750	3450	nc	1980	6200	2700	1660	780	1362	2220	500	0	0
Mershead to Airds Pt	255	6790	12210	10453	8695	4050	6940	8137	10080	nc	7687	8489	9290	5421	4537	5310	8200	5883	2310	0
Caulkerbush to Rascarril	0	nc	nc	0	120	0	150	785	420	nc	30	2810	230	20	0	2250	0	nc	0	0
Dandereman to Wigtown	0	nc	nc	0	0	0	0	0	0	nc										
Rockcliffe Marsh	32	1950	6080	2380	8700	6720	6500	5020	5490	nc	670	3410	5920	1950	2855	9610	8240	7860	10410	11710
Baugh Marsh	0	0	0	0	0	0	0	0	0	nc	5250	50	0	26	0	0	0	250	1700	3000
Bowness to Grune	0	0	75	1055	100	1790	3260	1060	2910	3180	3160	3443	2025	3670	3046	1550	3100	1650	20	0
Total	1787	29170	25985	25190	31685	24100	27970	28242	34070	nc	26187	27872	24310	23687	22959	28560	28230	26263	14456	14711
Notes				1						2	3	4			5					

Notes:

1 Mershead count is the average of the two counts for dates either side.

- 2 Count abandoned due to accumulated snow causing access problems.
- 3 Total of four leucistic Barnacle Geese counted, including two at Rockcliffe Marsh and two at Mersehead.
- 4 Snowfall prevented Mersehead coverage; count is the average of the two counts for dates either side.
- 5 Mersehead count was incomplete due to thick fog.



**Figure 12. The total population of Svalbard Barnacle Geese recorded on the Inner Solway from October 2009 to May 2010.**

Total population counts of Svalbard Barnacle Geese rose rapidly on the Inner Solway from 1,787 on 30 September 2009 to 29,170 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 2009-2010 the counts of 31,685 on 28 October and 34,070 (the maximum count recorded) on 16 December, fulfil this criterion and are thus averaged to produce **an adopted population total of 32,900 Barnacle Geese** (rounded up to the nearest 100; compared to 29,900 in 2008-2009).

### 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 2009-2010.**

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
02/10/2009	400	190	14	O5	2	4						7.4	LRG
02/10/2009	111	111	2	O4	2							1.8	LRG
05/10/2009	4000	2983	137	O4								4.6	LRG
08/10/2009	3500	560	25	R10								4.5	LRG
12/10/2009 <sup>1</sup>	3000	1750	52	O7	9	15	3					3.0	LRG
12/10/2009	750	610	37	A8	7	6	6					6.1	LRG
12/10/2009	410	410	14	O4	5	3	1					3.4	LRG
15/10/2009	1630	1160	35	OM1	3	5	2					3.0	LRG
02/11/2009	1680	825	88	P1								10.7	LRG
11/11/2009	2000	880	24	O7								2.7	LRG
11/11/2009	325	325	10	O3	6	2						3.1	LRG
12/11/2009	350	340	40	E10	4	6	8					11.8	LRG
18/11/2009	860	820	45	G12								5.5	LRG
20/11/2009	1620	760	55	X16								7.2	LRG
23/11/2009	3200	1150	60	O6								5.2	LRG
25/11/2009	1250	600	48	H10/13								8.0	LRG
17/12/2009	680	674	43	KM2/3								6.4	LRG
28/01/2010	3150	275	13	V9b								4.7	LRG
Total		14423	742										
<b>Overall juv%</b>			<b>5.1</b>		<b>Brood size totals:</b>								
					38	41	20	0	0	0		Total broods	99
					<b>Number of juveniles per brood size category:</b>								
					38	82	60	0	0	0		Max %juvs	11.8
												Total juvs	180
												<b>Mean brood</b>	<b>1.82</b>

<sup>1</sup> Brood data not necessarily based on the same birds as the juvenile percentage assessment

The juvenile productivity of the Svalbard Barnacle Goose observed in flocks sampled on the Inner Solway from October 2009 to January 2010 from Eastpark in the east to Mersehead in the west ranged from 1.8% to 11.8% (1.7% to 13.6% in 2008-2009) with a mean of 5.1% young for n = 18 flocks with 14,423 geese sampled (8.7%; n = 15 flocks; 10,300 geese sampled in 2008-2009). Across the same area, the total number of broods sampled was 99, with a mean family size of 1.8 young (2.0 young, n = 162 in 2008-2009) being recorded per family (range 1-3 young).

### 3.12 Leucistic Barnacle Geese

A maximum of four leucistic Barnacle Geese was recorded on two occasions during a coordinated population count with no double counting, and were thought to be the same birds as in 2008-2009. 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 being seen as far west as Colvend on the north side of the Solway.

### 3.13 Other geese

Other geese of note recorded during the counts included at least two Light-bellied Brent Geese (an adult plus juvenile), and two Dark-bellied Brent Geese (reported by experienced observer). Surprisingly, considering the four different individuals reported in 2008-2009, no small Canada Geese were observed this winter.