



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

<div> <div> <div>● New Moon</div> <div>◐ First Quarter</div> <div>○ Full Moon</div> <div>◑ Last Quarter</div> </div> </div>											
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 Ft	Time M Ft	Time M Ft	Time M Ft				Ph.
1 Tue	0915 7.6 24.9	2129 8.3 27.2	0333 2.7 8.9	1546 2.7 8.9	0521 1901	1748 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					○ 1604
5 Sat	1139 8.8 28.9	2349 9.2 30.2	0559 1.3 4.3	1807 1.5 4.9	0528 1852	1838 0527					
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 1.6 4.9	0533 1845	1921 1018					
9 Wed	0126 9.1 29.9	1344 8.6 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 7.5	2136 2.6 8.5	0539 1837	2103 1414					
12 Sat	0343 7.9 25.9	1611 7.7 25.3	1004 2.9 9.5	2250 3.1 10.2	0540 1835	2207 1516					○ 0217
13 Sun	0455 7.6 24.6	1733 7.4 24.3	1125 3.3 10.8		0542 1832	2327 1616					
14 Mon	0575 7.3 24.0	1806 7.6 24.9	1207 3.1 10.2	1307 3.2 10.5	0544 1830	1635					
15 Tue	0655 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	0801 8.6 27.9	2121 9.1 29.9	0320 1.8 5.9	1539 1.9 6.2	0547 1825	0228 1716					
17 Thu	0852 9.1 29.9	2209 9.6 31.6	0410 1.0 3.9	1632 1.3 4.3	0549 1823	0359 1731					
18 Fri	1038 9.5 31.2	2253 10.0 32.8	0504 0.4 1.3	1718 0.8 2.6	0551 1820	0527 1745					● 1845
19 Sat	1120 9.7 31.8	2334 10.1 33.1	0548 0.2 0.7	1800 0.6 2.0	0553 1818	0555 1759					
20 Sun		1200 9.7 31.8	0529 0.1 0.3	1839 0.6 2.0	0554 1815	0620 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	0645 1833					
22 Tue	0053 9.9 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 31.6	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 26.2	1505 7.9 25.9	0923 2.7 8.9	2142 2.8 9.5	0603 1803	1422 2106					
26 Sat	0331 7.3 24.0	1556 7.4 24.3	1010 3.3 10.8	2246 3.4 11.2	0605 1801	1502 2210					● 0450
27 Sun	0436 6.8 22.3	1723 7.0 23.0	1121 3.8 12.5		0607 1758	1631 2320					
28 Mon	0530 6.6 21.7	1803 7.1 23.3	0010 3.6 11.8	1245 3.8 12.5	0608 1756	1553					
29 Tue	0748 7.0 23.0	2007 7.6 24.9	0139 3.4 11.2	1409 3.4 11.2	0610 1753	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 1751	1623 0145					

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LAVER'S LIVERPOOL TIDES

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

<div> <div> <div>● New Moon</div> <div>◐ First Quarter</div> <div>○ Full Moon</div> <div>◑ Last Quarter</div> </div> </div>											
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 Ft	Time M Ft	Time M Ft	Time M Ft				Ph.
1 Thu	0924 8.1 26.6	2137 8.6 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 1748	1647 0411					
3 Sat	1034 8.8 28.9	2246 9.2 30.2	0451 1.5 4.9	1705 1.6 5.2	0617 1744	1659 0525					
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					○ 0512
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					
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 1.6 5.2	0626 1732	1902 1204					
9 Fri	0147 8.9 29.2	1406 8.7 28.5	0816 1.9 6.2	2039 2.0 6.5	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					○ 0857
12 Mon	0449 7.5 24.6	1724 7.6 24.9	1118 3.2 10.5		0633 1722	1502					
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	0136 1537					
15 Thu	0840 8.6 28.2	2100 9.0 29.5	0301 1.7 5.6	1518 1.8 6.2	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	0638 0.9 3.0	1850 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 1658	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 1656	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 1654	1355 2215					
26 Mon	0357 7.0 23.0	1627 7.2 23.6	1036 3.7 12.1	2323 3.4 11.2	0700 1652	1414 2328					● 0442
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	1505 0306					
31 Sat	0921 8.4 27.6	2135 8.8 28.9	0330 2.0 6.6	1548 2.1 6.9	0709 1641	1518 0422					

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NOVEMBER 2009

LAVER'S LIVERPOOL TIDES

● New Moon ◐ First Quarter ○ Full Moon ◑ Last Quarter																	
HIGH WATER						LOW WATER						SUN		MOON			
Morning			Afternoon			Morning			Afternoon			Rise	Set	Rise	Set	Ph.	
Date	Time	M	Ft	Time	M	Ft	Time	M	Ft	Time	M	Ft					
1 Sun	0857	8.8	28.9	2212	9.1	29.9	0411	1.6	5.2	1530	1.7	5.6	0711	1638	1533	0540	○ 1915
2 Mon	1032	9.0	29.5	2248	9.3	30.5	0450	1.3	4.3	1709	1.4	4.6	0713	1637	1553	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	
4 Wed	1145	9.3	30.5				0559	1.2	3.9	1829	1.2	3.9	0717	1634	1659	0948	
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	0806	1.8	5.9	2042	1.8	5.9	0722	1628	2028	1237	
8 Sun	0231	8.6	28.2	1453	8.6	28.2	0855	2.2	7.2	2139	2.1	6.9	0724	1626	2155	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	● 1559
10 Tue	0441	7.8	25.6	1709	8.0	26.2	1106	2.9	9.5				0728	1623	1343		
11 Wed	0559	7.8	25.6	1826	8.1	26.6	1208	2.4	7.9	1226	2.9	9.5	0730	1621	0048	1358	
12 Thu	0711	8.0	26.2	1935	8.4	27.6	0124	2.2	7.2	1343	2.6	8.5	0732	1620	0212	1411	
13 Fri	0812	8.4	27.6	2033	8.8	28.9	0231	1.8	5.9	1449	2.2	7.2	0734	1618	0334	1425	
14 Sat	0904	8.8	28.9	2124	9.1	29.9	0327	1.5	4.9	1543	1.8	5.9	0736	1617	0456	1441	
15 Sun	0940	9.1	29.9	2209	9.2	30.2	0414	1.3	4.3	1630	1.5	4.9	0738	1616	0618	1501	
16 Mon	1031	9.2	30.2	2251	9.2	30.2	0456	1.2	3.9	1712	1.4	4.6	0739	1614	0739	1527	● 1914
17 Tue	1108	9.3	30.5	2330	9.1	29.9	0533	1.2	3.9	1751	1.4	4.6	0741	1612	0853	1601	
18 Wed	1145	9.2	30.2				0609	1.4	4.6	1828	1.5	4.9	0743	1611	0958	1647	
19 Thu	0006	9.0	29.5	1220	9.1	29.9	0643	1.6	5.2	1904	1.7	5.6	0745	1610	1058	1744	
20 Fri	0041	8.7	28.5	1256	8.9	29.2	0716	2.0	6.6	1939	1.9	6.2	0747	1609	1126	1850	
21 Sat	0117	8.6	27.9	1333	8.7	28.5	0748	2.3	7.5	2016	2.2	7.2	0748	1607	1158	2000	
22 Sun	0156	8.1	26.8	1413	8.4	27.6	0821	2.6	8.5	2053	2.5	8.2	0750	1605	1217	2112	
23 Mon	0238	7.8	25.6	1457	8.0	26.2	0901	3.0	9.8	2139	2.8	9.2	0752	1605	1233	2212	
24 Tue	0326	7.5	24.6	1548	7.7	26.3	0954	3.3	10.8	2234	3.0	9.8	0754	1604	1247	2325	● 2139
25 Wed	0422	7.2	23.6	1649	7.5	24.6	1057	3.5	11.5	2337	3.1	10.2	0755	1602	1259		
26 Thu	0533	7.1	23.3	1759	7.5	24.6				1204	3.1	11.5	0757	1601	1301	0045	
27 Fri	0646	7.3	24.0	1905	7.7	25.3	0041	3.0	9.8	1309	3.3	10.5	0758	1600	1322	0159	
28 Sat	0745	7.7	25.3	2003	8.1	26.5	0143	2.7	8.9	1410	2.9	9.8	0800	1600	1336	0313	
29 Sun	0835	8.1	26.8	2052	8.5	27.8	0240	2.3	7.5	1506	2.4	7.9	0802	1559	1354	0435	
30 Mon	0919	8.6	29.2	2138	8.9	29.2	0332	1.9	6.2	1557	2.0	6.6	0803	1558	1418	0558	

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		
Date	Time M Ft	Time M Ft	Time M Ft	Time M Ft	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	1002							
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 1008							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 24.3		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 26.2	0230 2.8 9.2	1509 2.6 8.5	0805 1645	1300 0651							
28 Thu	0917 8.4 27.6	2146 8.7 28.2	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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● New Moon ● First Quarter ○ Full Moon ● Last Quarter													
HIGH WATER				LOW WATER				SUN		MOON		Ph.	
Morning		Afternoon		Morning		Afternoon		Rise	Set	Rise	Set		
Date	Time M Ft	Time M Ft	Time M Ft	Time M Ft	Time M Ft	Time M Ft	Time M Ft						
1 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							2351
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	0024 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	0150 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	0305 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	0402 2.7 8.9	1636 2.4 7.9	0739 1714	0651 1434							
12 Fri	1020 8.5 27.9	2245 8.4 27.6	0445 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	0521 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 1918							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	2042 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	2255 3.2 10.5	0716 1736	0952 0241							0403
23 Tue	0448 7.3 24.0	1739 7.3 24.0	1145 3.3 10.8		0714 1738	1047 0350							
24 Wed	0627 7.3 24.0	1916 7.5 24.6	0031 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	0206 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	0319 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	0420 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							01629

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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		
Date	Time	M	Ft	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
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
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 0718
21 Sun	0145	8.6	28.2	1408	8.5	27.9	0835	2.0	6.6	2050	2.2	7.2	0613 1827 0753 0031
22 Mon	0224	8.2	26.9	1458	8.1	26.6	0914	2.4	7.9	2133	2.7	8.9	0610 1829 0841 0140
23 Tue	0317	7.8	25.5	1557	7.6	24.9	1008	2.8	9.2	2234	3.1	10.2	0608 1831 0945 0237
24 Wed	0433	7.4	24.3	1727	7.3	24.0	1130	3.0	10.2				0605 1832 1110 0320
25 Thu	0609	7.4	24.3	1902	7.5	24.6	0009	3.3	10.8	1311	2.8	9.2	0603 1834 1229 0353
26 Fri	0734	7.8	25.6	2017	8.1	26.6	0145	2.9	9.5	1433	2.2	7.2	0600 1836 1358 0417
27 Sat	0840	8.5	27.9	2115	8.7	28.5	0258	2.3	7.5	1539	1.5	4.9	0558 1838 1529 0436
28 Sun	0933	9.1	29.9	2203	9.2	30.2	0358	1.6	5.2	1636	0.9	3.0	0556 1840 1658 0453
29 Mon	1020	9.6	31.5	2245	9.5	31.2	0451	1.1	3.6	1724	0.5	1.6	0553 1842 1827 0509
30 Tue	1103	9.9	32.5	2327	9.7	31.8	0536	0.7	2.3	1808	0.3	1.0	0551 1843 1956 0525
31 Wed	1145	9.9	32.5				0619	0.1	0.6	1848	0.3	1.0	0548 1845 2124 0543

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).

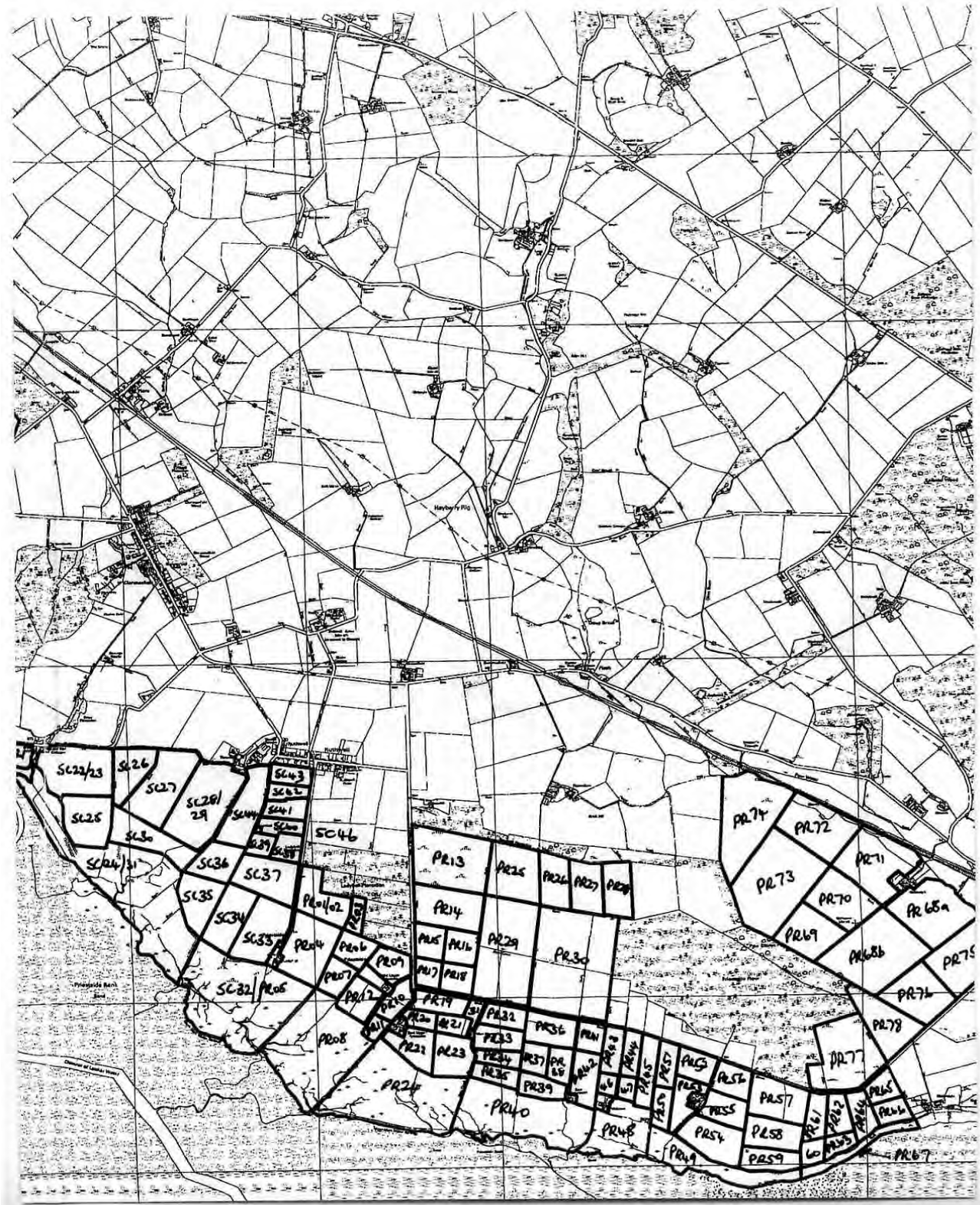


Figure 3. Field codes for the Priestside/Hurkledale/Thwaite area of the Goose Management Scheme.

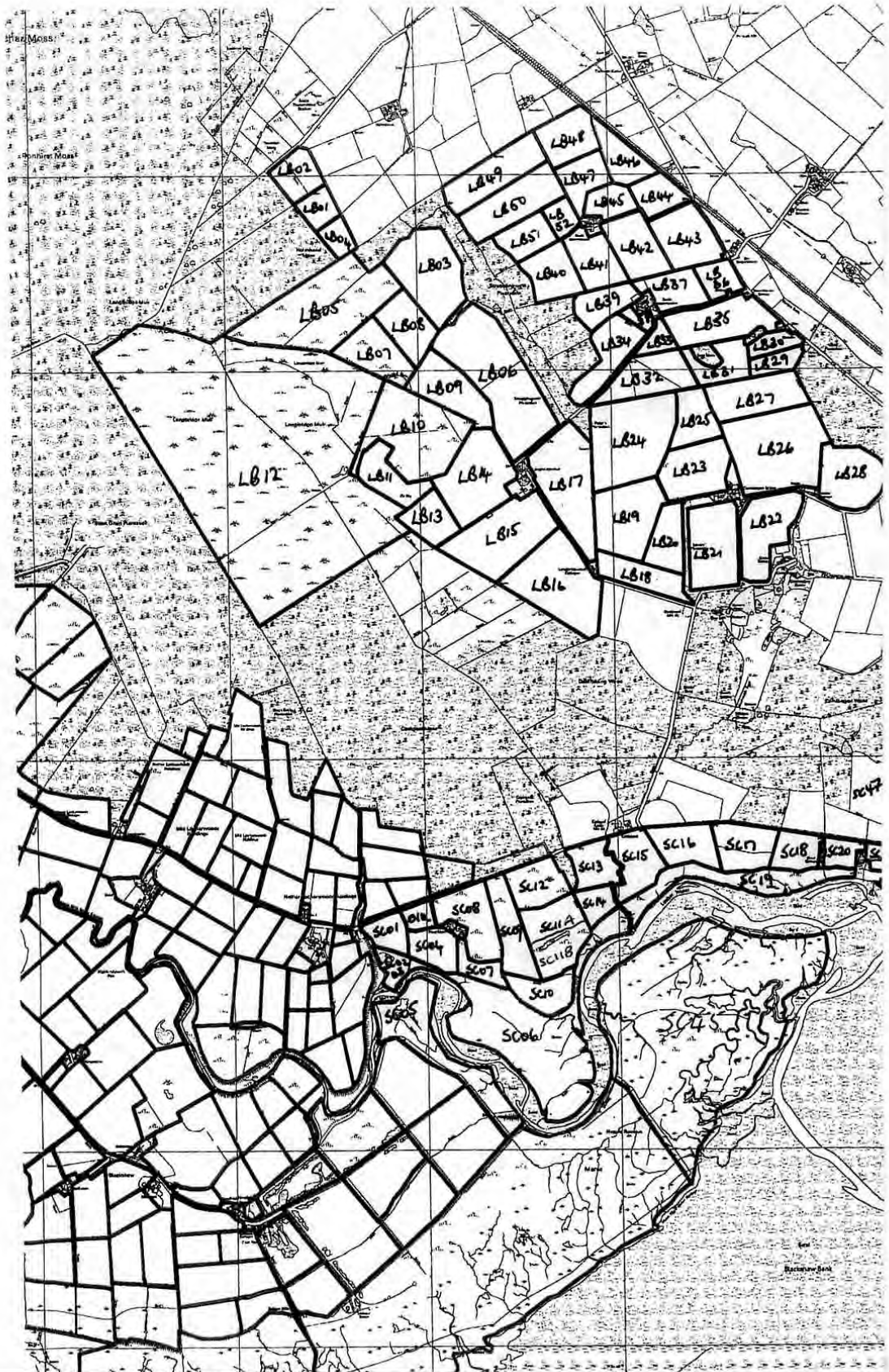


Figure 4. Field codes for the Powhillon/Stanhope/Longbridgemuir area of the Goose Management Scheme.

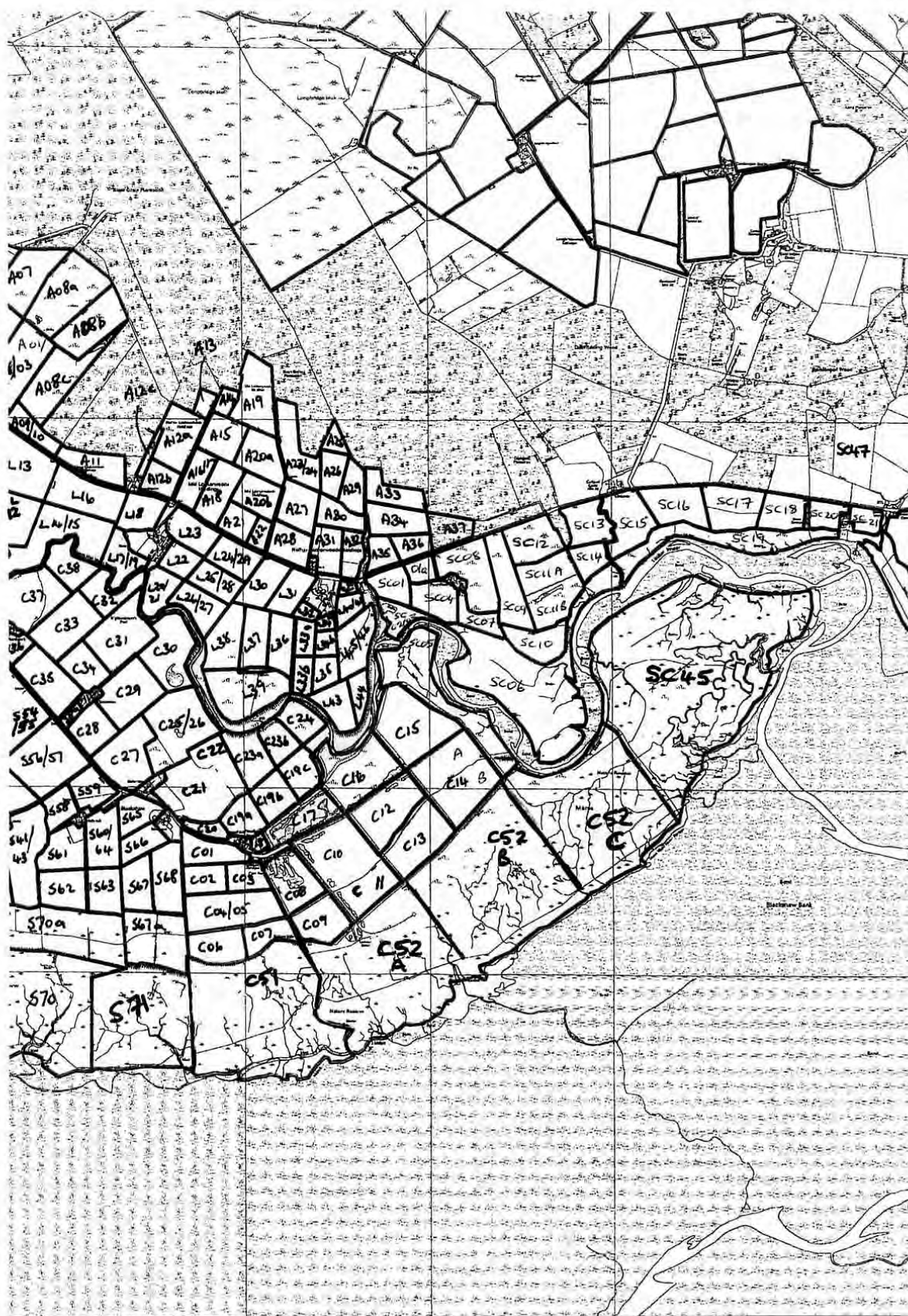


Figure 5. Field codes for the Caerlaverock/Nether Locharwoods area of the Goose Management Scheme.



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

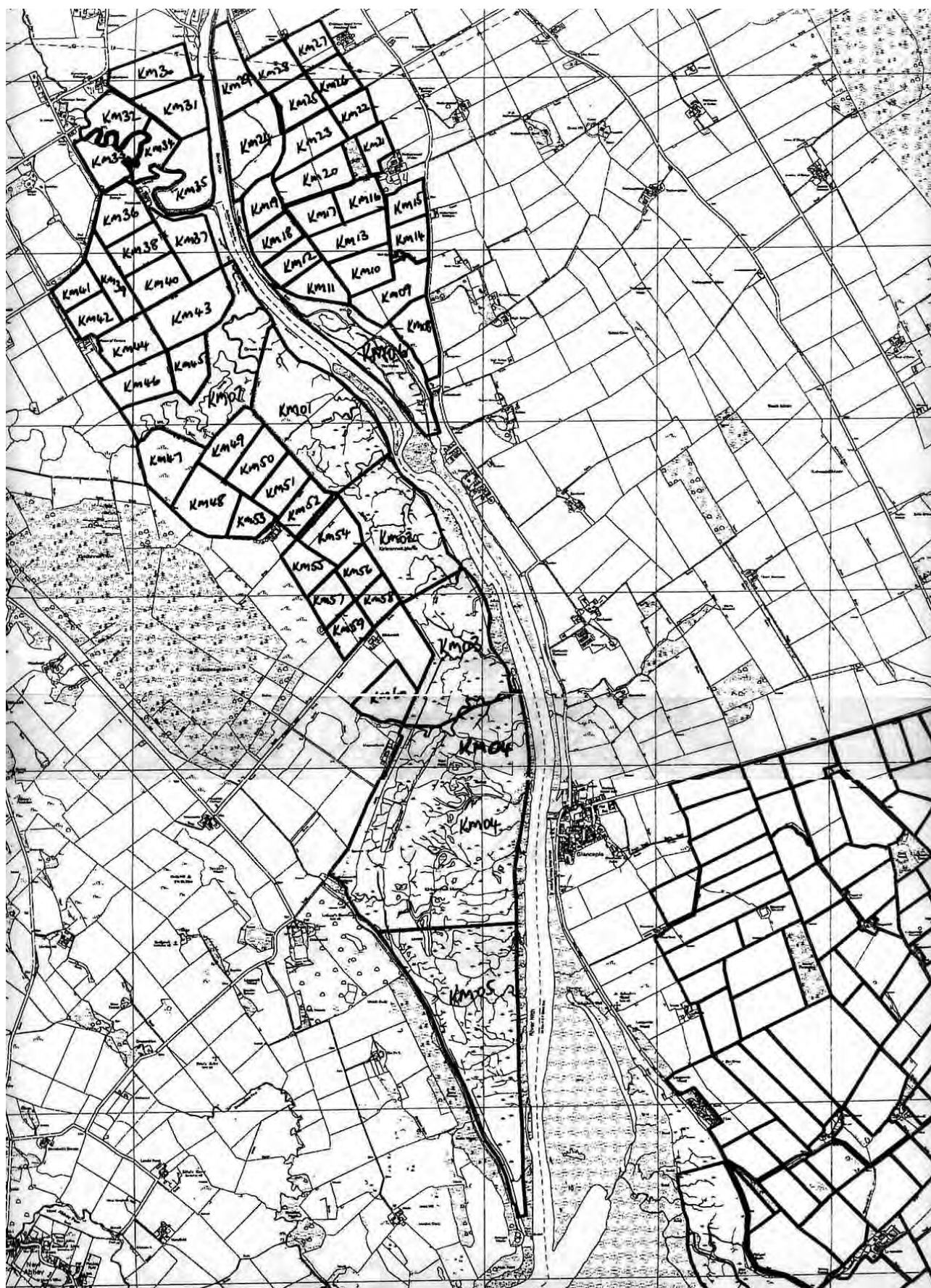


Figure 7. Field codes for the Kelton/Greenmerse/Kirkconnell area of the Goose Management Scheme.

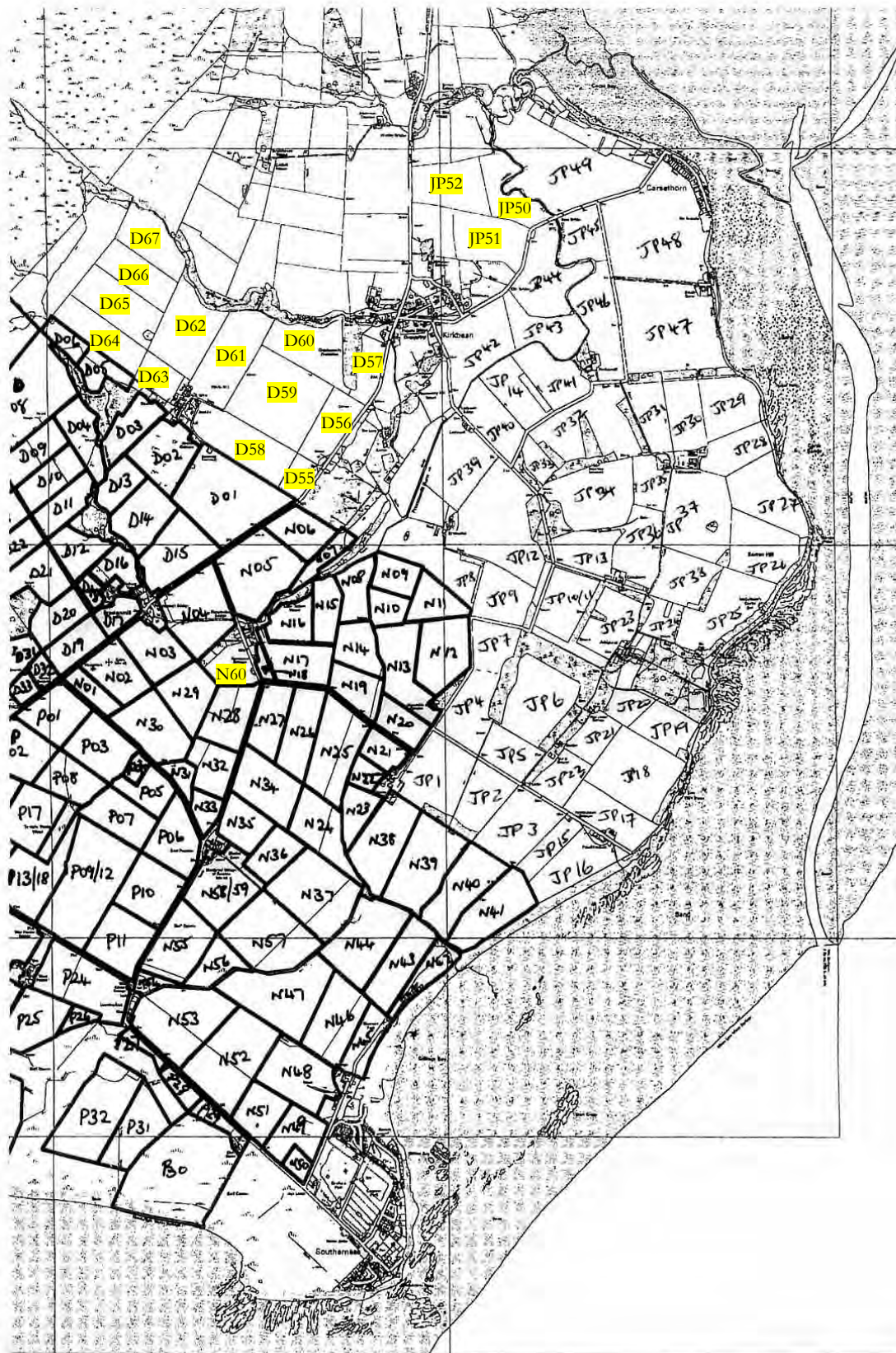


Figure 8. Field codes for the Carsethorn/Southernness area of the Goose Management Scheme
(new field codes in areas unused by the geese in 2008-2009 are shown highlighted as in Table 2).

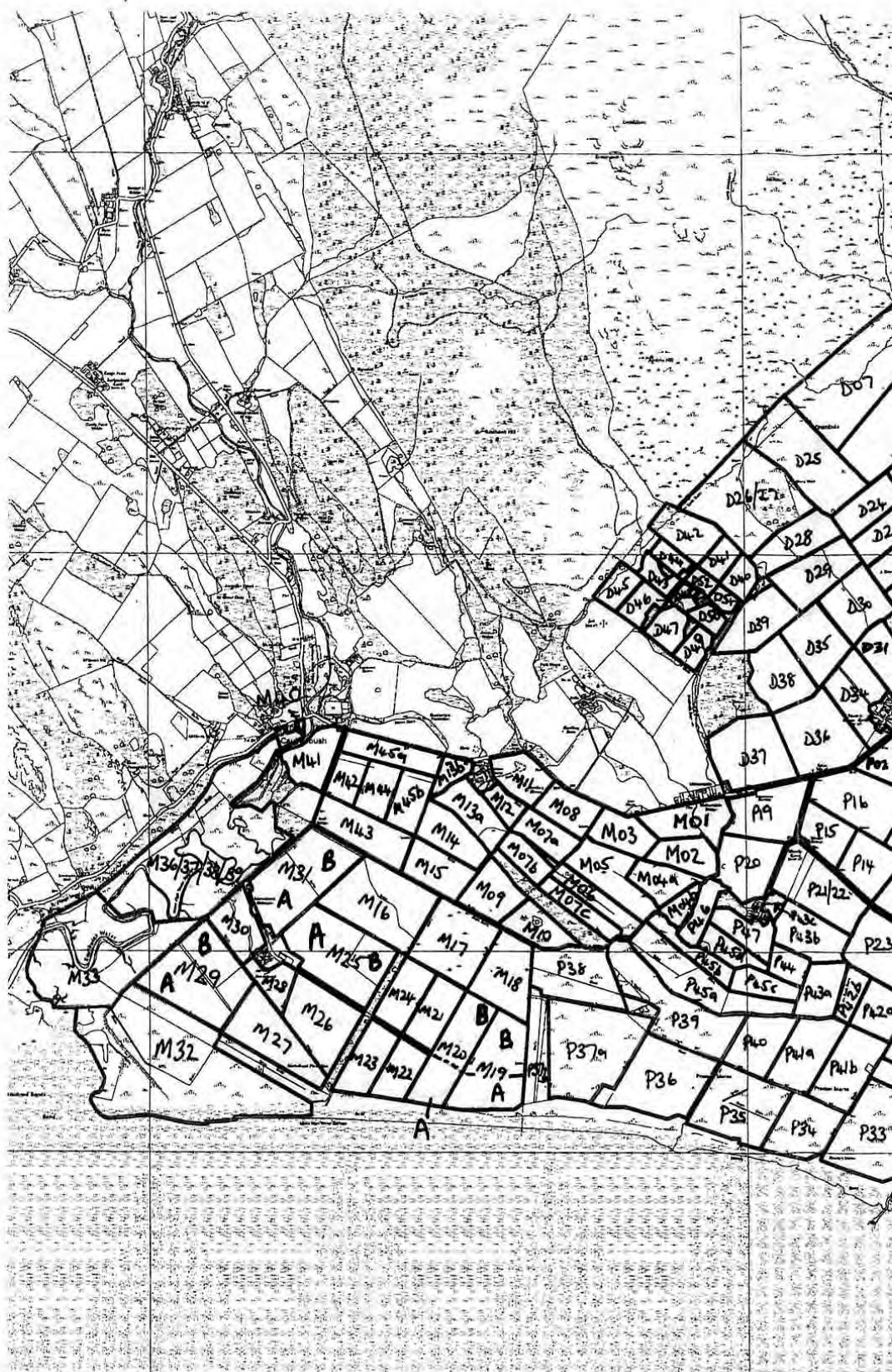


Figure 9. Field codes for the West Preston/Cowcourse/Mersehead area of the Goose Management Scheme.



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

3 Results

3.1 Barnacle Goose counts within the Management Scheme area

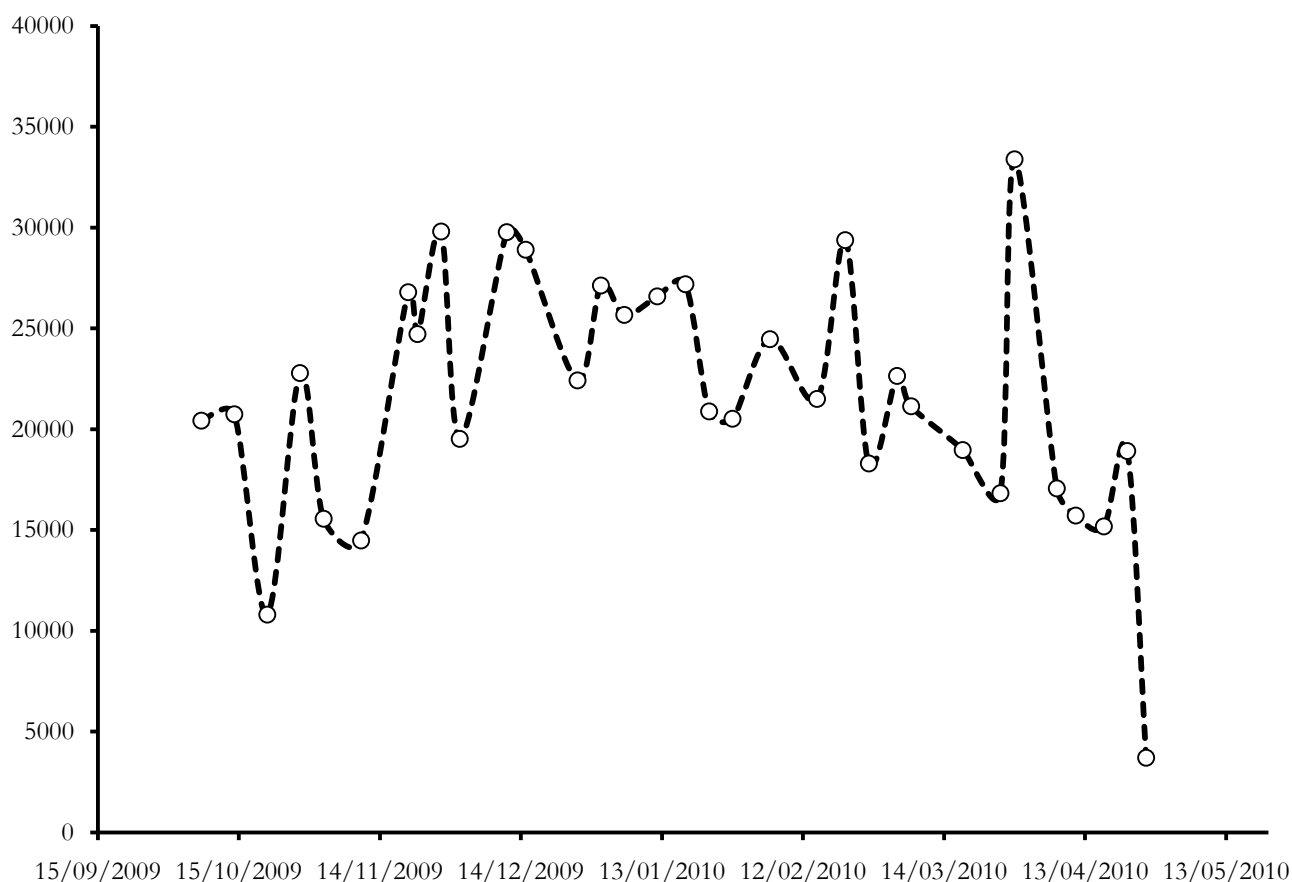


Figure 11. Svalbard Barnacle Goose route count totals within the Management Scheme area.

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

The mean number of geese recorded during the counts was 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						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									
C28																	200
C29	160					900											
C30	600					500				400	1320	1870					1300
C31									920								
C39								110		420				220	720		
C40								530	60						2580		
C44				1500													
C51/S71		1100	4140				90			110	210						160
C52		50	2710	4100			1280	30			220			1850	130	1430	1860
Corbilly/Overton													1000			70	910
Drumum Merse													250	30			
D36																	
D59																410	
IP05																190	
IP15																	
IP16																	
IP41																	
IP43																	
IP49															510		
IP50																	
KM01									9930								
KM02																	
KM03										380		620					
KM04																	
KM05																	
KM06				4300				310									2450
KM09																	
KM10																	
KM11																	
KM12					720			120								1670	
KM13																	
KM14																	
KM17															2100		
KM18																2800	
KM19																410	
KM20																	
KM22																	
KM23																	
KM24																	
KM30																	
KM31																	
KM33																	
KM35								240									
KM37								1450								570	
KM43							2110	2340									
KM44							920										
KM45							90										
KM47													3000				
KM49												1700					310
KM50												100					740
KM55																	
L14/15										470							
L20/21										150							
L26/27							400	310		250							
L30								140	50			1560					
L31							630										
L36								340									
L37								1440									
L38																	
L45									480		1600						1850
M01																	1200
M03					520	190											
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								310			700				47		
M45b					210		70	780									
N04																	
N05																	
N11																40	
N24														310	440		
N28							1620				380						
N29											380						
N32								230									
N34														1100			

[illegible]

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	
130			360				160			450						1100	A18
150	500															3010	O1
150			300	460				210								790	O2
				1420						1670				2300		2280	O3
		40										40		410		8165	O4/O5
														250		490	O6
160		80	40	60	360		140			1670			20			405	O7
																3865	O8
				1120	540	3740	520						390			5820	O9
				1960		820		1480				720				13500	O10/11
2400													510			12440	O12
2400				1360				90					10			10810	O13
						670			400				20			6830	O14
370							980		30		280					1800	O15
																4285	O16
				230						160		330				7	O17
		40						55		1200						1680	O19a
490								220								4635	O19b
		1160	70	620				7				1320				4040	O19c
		370		3460		35		540	90			35	25			3487	O20
910								100	140							5755	O21/22
60																1580	O23a
																60	O23b
																120	O24
																6940	O25/26
											95		710			2572	O27
																200	O28
																1060	O29
					1260		580			3150		280				11260	O30
										3150			570			4640	O31
																1470	O39
					530		250									3750	O40
																1500	O44
1640	120	2640	920	110	2550						3000		730			17520	O51/S71
1470		2440	1480	370	600	80	180				2000	520	2630		1400	26200	O52
																2630	Orbells/Overton
			290	1780	160		80	100		250	310	240	610			2320	Dunbar Mene
																1780	D36
																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														6350	KM01
												65				65	KM02
														980		1990	KM03
											185					185	KM04
												1160				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
																870	KM24
						720										720	KM30
							110									110	KM31
					110											110	KM33
																810	KM35
																1430	KM37
																4450	KM43
																920	KM44
																90	KM45
																6200	KM47
	3200								190							2980	KM49
780																1740	KM50
				900		1500										1500	KM55
																470	L14/15
																150	L20/21
			5													960	L26/27
																1755	L30
																630	L31
																340	L36
																1440	L37
								450		3150						3690	L38
							1450									5380	L43
																2178	M01
				840	18					120						990	M03
				920				280								1140	M07a
																2160	M07b
																40	M12
													10			2010	M14
									90			330		410		410	M15
														200		2920	M16
																400	M18
			530							850						5780	M19
		1850			65			750	330	50						3745	M20
		40			50		110		15	110						945	M21
										90						1110	M22
																3940	M23
																3760	M24
							70		40							605	M25
	260	640			180			20								3440	M26
630								230		1400		240		680	990	9990	M27
																450	M28
								530	890	420						5780	M29
				470	32							310		680		5347	M30
	830		310			2190	470	730	1250							12125	M31
1080					880					220						4940	M32
			2160		990						700		2610	250	220	10940	M33
							25		180							1915	M36/37/38/39
																4	M41
																3825	M43
																1530	M44
																3182	M45a
	1400			5	20			480	220							2310	M45b
									840	410						690	N04
																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 Mense																
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								260								
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													530	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 Mcc
																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
			30											20		50	KM03
8																8	KM06
												50	45			95	KM09
				465						170						635	KM10
												240				240	KM11
		60	40						100		50					150	KM12
						600	210	90								250	KM13
						920										900	KM14
																920	KM20
				440												440	KM22
		145										45				190	KM23
										850		820				820	KM25
																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	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												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					
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														35
																30
																20
																19
																12
																12
									1							1
																12
																1
10	0	35	3	12	0	10	0	0	1	0	0	0	0	0	0	628

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					2	40	15	45	62	40	15	20					
C17										30							
M16																	
M19							10										
M25							15	30									
M29							35		22								
M31							10										
P14																	
P41a														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
50	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

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	
G08									20						110		
C17				23	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
																42 A02
											8					8 A04/05
																2 A22
		50		170	166	220	40	20		6						802 G08
250	150	180	40	48		210	215	180	160	140	50	1	3			2923 C17
																6 C18
											9					9 C19a
																30 C19b
																36 C30
											11	25				8 KM11
																82 KM12
																30 KM23
																81 KM31
																96 KM36
																20 KM43
																90 KM45
																20 KM50
																32 L09
																1 M16
10		10														20 PR04
																10 PR09
																72 PR18
																83 PR29
																43 S33a
		10														10 SC20
																48 SC22/23
																106 SC26
									85			16				101 SC27
									45							45 SC28/29
																520 SC34
									5		90					95 SC44
260	200	200	210	214	220	250	235	180	295	146	168	42	3	0	0	5471 Total

3.6 Mute Swan counts for the Management Scheme area

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

Table 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
C52				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	C08
		4									2	2	2	2	2	14	C16
75	70	85	70	44	12	30	32	40	55	35	60	50	50	40	35	1537	C17
																24	C52
2																4	M16
																2	M25
		4														4	SC05
																6	SC06
77	70	93	75	44	12	34	35	40	57	45	62	52	52	42	37	1646	Total

3.7 Deliberate disturbance to geese in the Management Scheme area

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

- From 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	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
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	10:00	14:00	12:00	15:00	09:00	14:40	14:30	12:10	10:20	14:00	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	0	nc	0	0	0	0	0	0	0	0	0	0
Ruthwell to Cummertrees	0	0	0	500	100	0	2000	0	650	nc	0	820	0	30	0	3728	66	0	0	0
Langbriggemuir	0	0	0	0	0	0	0	0	0	nc	0	0	0	0	0	0	0	0	0	0
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	0	nc	0
Dundrennan to Wigtown	0	nc	nc	0	0	0	0	0	0	nc	nc	0	30	nc	75	501	192	750	nc	0
Rockcliffe Marsh	32	1950	6080	2380	8700	6720	6500	5020	5490	nc	670	3410	5920	1950	2855	9610	8240	7860	10410	11710
Burns Marsh	0	0	0	0	0	0	0	0	0	nc	5250	90	0	26	0	0	0	250	1700	3000
Bowness to Grune	0	0	75	1055	100	1790	3260	1060	2910	3180	3160	3445	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.

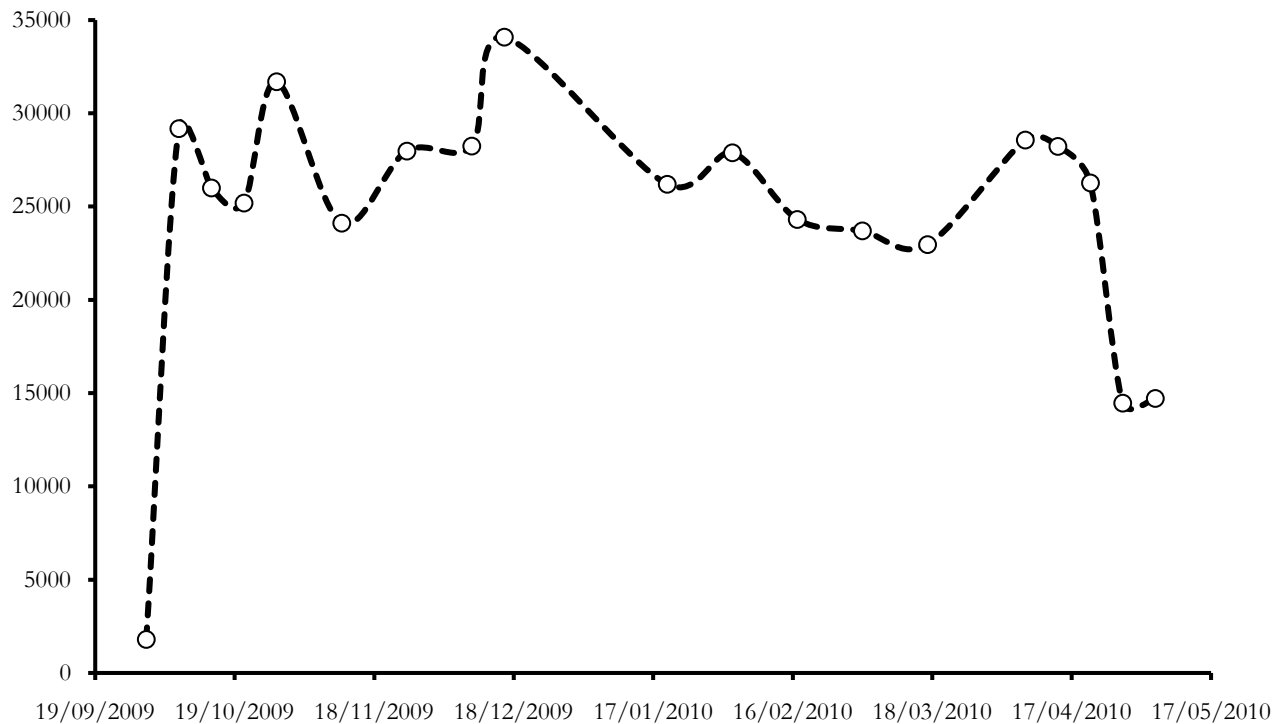


Figure 12. The total population of Svalbard Barnacle Geese recorded on the Inner Solway from October 2009 to May 2010.

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 ¹	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										
Overall juv%					Brood size totals:								
					38	41	20	0	0	0		Total broods	99
					Number of juveniles per brood size category:							Max %juvs	11.8
					38	82	60	0	0	0		Total juvs	180
												Mean brood	1.82

¹ 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.