

High-tide Waterbird Roost Mapping on the Solway Firth, Cumbria



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1. Introduction

Waterbirds are an integrated part of the global ecosystem. Many waterbirds migrate long distances, often in large numbers. This makes them “visible and charismatic” (1). Over the last decades a number of data collection schemes such as the International Waterbird Consensus (IWC) have made it possible to monitor and review the status of waterbirds across the globe. All data on waterbirds informs and supports the Ramsar Convention on Wetlands which sets the key targets of identifying wetlands of international importance, conservation and research priorities and knowledge gaps (2). On a European level, the EU Bird Directive provides a legal framework for the monitoring and protection of birds (3).

The five year trends show a slight decrease in numbers. While the Solway enjoys a high ratio of nature designations to population size and spread, the interest of private, commercial and governmental sectors for the purposes of recreation, tourism, energy or other is growing.

Various academic researchers (5, 6) have identified the impact of disturbance on high-tide roosts as a key factor influencing the quality of a particular waterbird habitat. While the frequency and type of disturbance need to be taken into consideration to decide how substantial a given case of disturbance is, it is also important to



Figure 1.1: Barnacle Geese

The Solway Firth Estuary is the 8th most important habitat for non-breeding waterbirds across the UK (4). The total sum, a five year average, of all waterbird species present in the Solway is 109,297 individual birds.

consider the number and composition of species and their abundance at a site. It is therefore of critical importance to identify avian biodiversity ‘hotspots’ to avoid cumulative and long-term damage to the natural intrinsic and commercial value of the Solway Coastline, its people, culture and heritage for generations to come.

1.1 Aims and Objectives

This section lists the aims set for this study which are hoped to be achieved through the following objectives.

Aim 1: To identify and highlight local avian 'hotspots' along the Solway Estuary on a small spatial scale by providing evidence of the location of peak high tide roost counts.

➤ **Objective 1.1:** Build relationships between local partners (SFP, RSPB and local WeBS counters)

➤ **Objective 1.2:** Compare surveyed sites to allow prioritisation.

Aim 2: To inform existing protection and management frameworks and measures.

➤ **Objective 2.1:** Identify presence, frequency and severity of disturbance.

➤ **Objective 2.2:** Identify knowledge gaps.

The information provided in this report has the potential to inform and support:

- The general public
- Key stakeholders in conservation, planning, management and development
 - Local Authority Planning
 - Local Nature Reserves
- Legislation and frameworks
 - SSSI Detailed Notification Review and condition monitoring
 - Implementation of Marine and Coastal Access Act (2009) - Coastal access and footpath networks
 - International Waterbird Consensus
 - Habitat Regulations Assessments



Figure 1.2: Ringed Plover

2. Study Site and Methods

2.1 Site

2.1.1 Brief Description

The Solway offers one of Britain's largest continuous intertidal habitats. The habitat consists of about 93% tidal flats, 6% salt marshes and 1% sand and shingle shores which include dune systems (7). The tidal flats, mud and sand are the habitat of many invertebrates. Key species, providing food for a large number of waterbirds are (7): ragworm (*Hediste diversicolor*), lungworm (*Arenicola marina*), various bivalves such as Baltic tellin (*Macoma balthica*), snails e.g. mudsnail (*Hydrobia ulvae*), and the amphipod mudshrimp (*Corophium volutator*). The prime food sources for waterbirds are common blue mussels (*Mytilus edulis*) and common cockles (*Cerastoderma edule*).



Figure 2.1: View towards Glasson Point with dog walker across saltmarsh

The tidal mudflats offer ideal place for roosting. Roosts are areas in which waders and other waterbirds can be found when pushed landwards away from their low tide feeding grounds at high tide (13). Roost sites such as the Solway are of great significance as they need to be safe from predation and allow the birds to save energy needed for moult, maintenance metabolism and migratory fuelling (13). As a result, roost sites are as important as feeding grounds. A high frequency of disturbance can thus strongly influence the health and breeding success of a species and in the worst case lead to population decline.

The South side of the Solway Firth estuary stretches from Rockcliffe Marsh to St Bees Head in Cumbria and provides habitats for a great variety of wildlife. Typical for this stretch of landscapes are saltmarshes, peatbogs, farmland and wet grassland. Besides various site designations (see section 2.1.2), the English side of the Solway hosts an Area of Outstanding Natural Beauty (Solway Coast AONB) and two RSPB Nature Reserves; RSPB Campfield Marsh and RSPB St Bees Head. Campfield Marsh is known for breeding lapwings and redshanks and wintering swans, ducks and geese in their thousands as well as large number of roosting waders at high tide (8).

2.1.2 Designated Sites

The Solway is subject to a large number of nature designations (9). Areas of the inner Solway Firth are designated both as a Special Area of Conservation (SAC) under the Habitats Directive (10) and a Special Protection Area (SPA) under the Birds Directive (11) – collectively known as the Solway Firth European Marine Site (EMS). The Solway Firth SAC designation reflects the importance

of the site's marine and coastal habitats including merse (saltmarsh), mudflats and reefs. The Upper Solway Flats and Marshes SPA designation recognises the large bird populations that these habitats support, particularly in winter (9). Important bird species include Svalbard Barnacle Goose (*Branta leucopsis*), Pink-footed Goose (*Anser brachyrhynchus*), Whooper Swan (*Cygnus cygnus*) and Pintail (*Anas acuta*) as well as waders such as Bar-tailed Godwit (*Limosa lapponica*), Golden Plover (*Pluvialis apricaria*), Oystercatcher (*Haematopus ostralegus*), Dunlin (*Calidris alpina*), Knot (*Calidris canutus*), Curlew (*Numenius arquata*) and Redshank (*Tringa totanus*).

There is currently a proposal under consideration to extend the boundary of the SPA designation (4). The qualifying bird species in the Solway Firth marine draft SPA include Annex 1 species: Red-throated diver (*Gavia stellate*); migratory species: Common Scoter (*Melanitta nigra*) and Goosander (*Mergus merganser*); and migratory species from the 2001 SPA Review: Ringed Plover (*Charadrius hiaticula*), Lapwing (*Vanellus vanellus*), Cormorant (*Phalacrocorax carbo*), Herring Gull (*Larus argentatus*), Common Gull (*Larus canus*) and Black-headed Gull (*Chroicocephalus ridibundus*). It is anticipated that the ministerial approval to formally consult on the draft SPA will be given in 2016.

Additionally, in English waters, the first tranche of Marine Conservation Zones (MCZs) were designated in November 2013 under the UK Marine and Coastal Access Act (12). This was a significant step towards creating a network of marine protected areas and an achievement for the conservation of important marine species and habitats. Within the surveyed area Allonby Bay, including Dubmill Scar and the offshore area of Maryport Roads, is

a candidate for designation in the second tranche. The Bay contains some of the best examples of honeycomb worm (*Sabellaria alveolata*) reef in the UK, see Figure 2.2.

The estuary is also a Ramsar site, as it is an important wetland habitat for overwintering birds, replicating its SPA interest, and the rare natterjack toad (*Epidalea calamita*), which is found here at the most northerly point in its range (7). Table 2.1 provides an overview of all existing and proposed designation for all 17 surveyed sections while Figure 2.3 illustrates the sites' locations.



Figure 2.2: Honeycomb Worm reef

Table 2.1: Overview of existing and proposed nature designations for the South Solway by surveyed sections.

Nature Designations in the South Solway										
Section \ Designation	European Marine Site (EMS)							England only		Impact risk zone for SSSIs/SACs/ SPAs & Ramsar sites
	Solway Firth SAC	Upper Solway Flats and Marshes SPA	Solway Firth draft SPA	Upper Solway Flats and Marshes SSSI	Silloth Dunes and Mawbray Bank SSSI	Maryport Harbour SSSI	Ramsar Site - Upper Solway Flats and Marshes	Solway Firth recommended MCZ	Allonby Bay MCZ	
1. Rockcliffe	X	X	X	X			X			X
2. Sandsfield to Dykesfield	X	X	X	X			X			X
3. Dykesfield to Glasson	X	X	X	X			X			X
4. Glasson to Herdhill Scar	X	X	X	X			X	X		X
5. Herdhill Scar	X	X	X	X			X	X		X
6. Herdhill Scar to Cardurnock	X	X	X	X			X	X		X
7. Anthorn to Newton	X	X	X	X			X	X		X
8. Moricambe (Newton Arlosh)	X	X	X	X			X	X		X
9. Calvo Marsh	X	X	X	X			X	X		X
10. Grune Point	X	X	X	X			X			X
11. Silloth West Beach to Skinburness	X	X	X				X			X
12. Beckfoot to Silloth	X	X	X	X			X			X
13. Mawbray to Beckfoot	X	X	X	X	X		X			X
14. Meolo to Mawbray			X						X	X
15. Bankend to Blue Dial			X						X	X
16. Maryport	X	X	X	X		X				X
17. Workington to Flimby	X		X							X

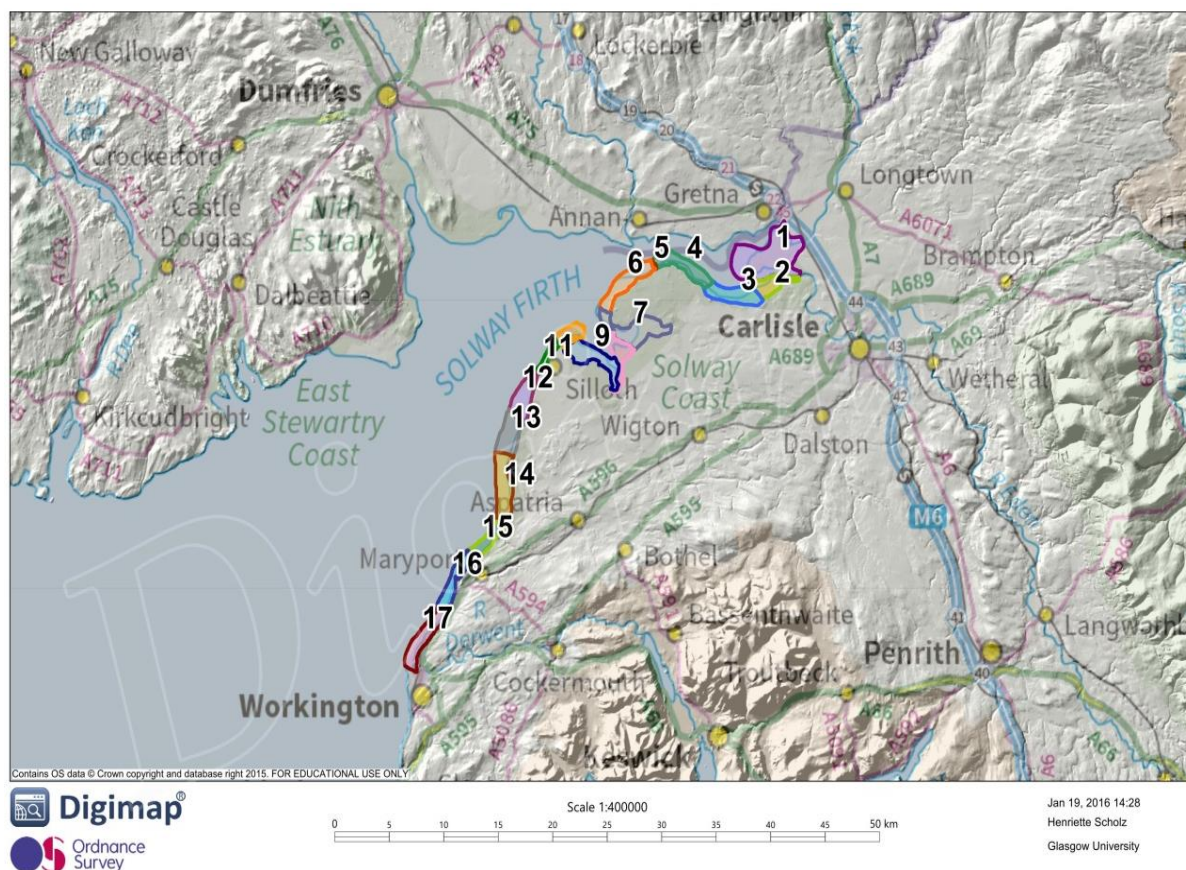


Figure 2.3: English Solway WeBS count sections (Source: Digimap) Key indicates designation for each site as summarised in Table 1.

EMS European Marine Conservation Sites, incl. SAC and SPA
 SAC Special Area of Conservation, part of EMS
 SPA Special Protected Area, part of EMS, 'd' stands for 'draft'
 SSSI Special Site of Scientific Interest
 MCZ Marine Conservation Zone, 'r' stands for 'recommended'

Key:

1. **Rockcliffe**
(EMS, dSPA, SSSI, Ramsar)
2. **Sandsfield to Dykesfield**
(EMS, dSPA, SSSI, Ramsar)
3. **Dykesfield to Glasson**
(EMS, dSPA, SSSI, rMCZ, Ramsar)
4. **Glasson to Herhill Scar**
(EMS, dSPA, SSSI, rMCZ, Ramsar)
5. **Herdhill Scar**
(EMS, dSPA, SSSI, rMCZ, Ramsar)
6. **Herdhill Scar to Cardurnock**
(EMS, dSPA, SSSI, rMCZ, Ramsar)
7. **Anthorn to Newton**
(EMS, dSPA, SSSI, rMCZ, Ramsar)
8. **Moricambe (Newton Arlosh)**
(EMS, dSPA, SSSI, rMCZ, Ramsar)
9. **Calvo Marsh**
(EMS, dSPA, SSSI, rMCZ, Ramsar)
10. **Grune Point**
(EMS, dSPA, SSSI, Ramsar)
11. **Silloth West Beach to Skinburness**
(EMS, dSPA, SSSI, Ramsar)
12. **Beckfoot to Silloth**
(EMS, dSPA, SSSI, Ramsar)
13. **Mawbray to Beckfoot**
(EMS, dSPA, SSSI, Ramsar)
14. **Meolo to Mawbray**
(dSPA)
15. **Bankend to Blue Dial**
(dSPA)
16. **Maryport**
(EMS, dSPA, SSSI, SSSI)
17. **Workington to Flimby**
SAC, dSPA

2.2 Methods

2.2.1 Target Species

The Species included in this report were selected according to their recorded presence in peak roost counts as reported by questioned WeBS counters. A total of 21 species were recorded as roosting along the South Solway high tide margins and flood plains plus one additional species south of Workington. Table 2.2 lists all target species with those of international importance highlighted blue and those of national importance highlighted green. The locations of individual sections are summarised in Figure 2.3 above. All target species were recorded throughout the year, not exclusively during the winter months. Within the WeBS counts, gull species are only recorded on a voluntary basis which lead to their exclusion from this study (except for Mediterranean Gulls).

2.2.2 Data Collection and Analysis

The data on bird counts and species importance thresholds was collated from the WeBS Online Report 2013/14 (4). Data on roost sites and sizes, freshwater outlets and disturbance was collected, with the assistance of RSPB Campfield Marsh, from individual WeBS counters responsible for counting the sections along the South Solway coast. All WeBS counters, familiar with the so-called 'look-see' methodology (14), were asked to provide information on peak roost counts, the species present and the roost locations.

The counters handed in maps with hand-drawn sketches highlighting roost locations and providing rough estimates of numbers. The maps were then translated into data points using grid references and entered into a spreadsheet, which was fed into a Geographical Information System (GIS) by the Cumbria Biodiversity Data Centre. As a final outcome, a GIS layer was created displaying all identified roost sites and points of interest with information such as disturbance and freshwater outlets.

The analysis of results allowed the interpretation of the collated data on major roost sites (Table 3.1), existing and planned designations (Table 2.1 and Figure 2.3), trends and thresholds of national and international importance (Table 2.2 and Figure 3.2). All accumulated information thus added to the compliance with the established aims and objectives stated in section 1.1. To test the validity of returned peak roost estimates, the data was compared to figures from the official WeBS count database. While figures were not expected to be identical, the evident similarities between the two data sets confidently point towards the roost records being representative of the total count.

Results of individual roost site peak estimates are presented and analysed in section 3.2. Standard BTO Species Codes (see Appendix 2) are employed throughout Tables 3.2 to 3.15.

Table 2.2: Target species - Solway population trends, national ranking of the Solway and thresholds of importance (4). Blue: International importance; Green: National importance

		WeBS Numbers– Solway Estuary (Scottish and English Side)					
		UK Rank of Site Importance	5yr avg (2009-2014)	GB threshold	% of GB threshold	International threshold	% of Int. threshold
Species	Whooper Swan	13	279	110	254%	270	103%
	Pink-footed Goose	16	16,107	3,600	447%	3,500	460%
	Oystercatcher	3	23,942	3,200	748%	8,200	292%
	Ringed Plover ^a	5	1,206	340	355%	730	165%
	Knot	11	9,553	3,200	299%	4,500	212%
	Bar-tailed Godwit	13	1,240	380	326%	1,200	103%
	Barnacle Goose (Svalbard) ^b	3	27,416	330	8,308%	300	9,139%
	Shelduck	15	1,529	610	251%	3,000	51%
	Goosander ^a	1	267	120	223%	2,700	10%
	Cormorant ^a	7	821	350	235%	1,200	68%
	Golden Plover	10	5,006	4,000	125%	9,300	54%
	Sanderling	13	558	160	349%	1,200	47%
	Dunlin	17	7,581	3,500	217%	13,300	57%
	Eurasian Curlew	6	3,336	1,400	238%	8,400	40%
	Redshank	11	2,252	1,200	188%	2,400	94%
	Turnstone	11	485	480	101%	1,400	35%
	Grey Plover	29	349	430	81%	2,500	14%
	Lapwing ^a	18	4,723	6,200	76%	20,000	24%
	Mediterranean Gull	94	2	18	11%	770	<0%
	Sandwich Tern	9	351	8,266	4%	1,700	21%
	Wigeon	46	2,183	4,400	50%	15,000	15%

^a Species qualified for protection under SPA (15)

^b Solway hosts entire Svalbard population of Barnacle Geese

3. Results and Discussion

3.1 Solway WeBS Data and Importance Thresholds

Table 2.2 shows the five-year Solway population averages (2009-2014) for all 21 target species (4). The table further displays information on UK and international thresholds of species' significance as well as the UK rank of the Solway as a habitat. According to the Ramsar Convention, a site qualifies as internationally important if it supports at least 1% of the species' population or more than 20,000 waterbirds in total. Similarly, a site is of national importance if it supports 1% of the UK waterbird population estimates. The seven species exceeding the threshold for international importance are highlighted blue, the nine species of national importance in green. According to the figures, the Solway is amongst the top five habitats for four species: Oystercatcher, Ringed Plover, Goosander and Barnacle Goose. As for the latter, the Solway hosts the entire Svalbard Barnacle Goose population during the winter months.

Figure 3.2 illustrates data presented in Table 2.2 comparing the five-year average of the waterbird species present in the Solway to national and international thresholds. The two species of greatest importance in this comparative context are: Oystercatcher, exceeding the national threshold by 748% and the international threshold by 292%; and Pink-footed Goose, exceeding the national threshold by 447% and the international threshold by 460%.

Also noteworthy are the numbers of Barnacle Geese which greatly exceed both thresholds.

Table 3.1 displays peak roost counts for the Solway, Cumbrian coast. The table reveals that the largest number of waterbirds, 20,500 individuals, was counted in section 8/9 - Moricambe (Newton Arlosh)/Calvo Marsh. The second and third most important sections in terms of total numbers are section 6 - Herdhill Scar to Cardurnock (12,510 individuals) and section 14 – Meolo to Mawbray (10,600 individuals).



Figure 3.1: Whooper Swans

Comparison of Species Present in the Solway Estuary Compared to National and International Thresholds

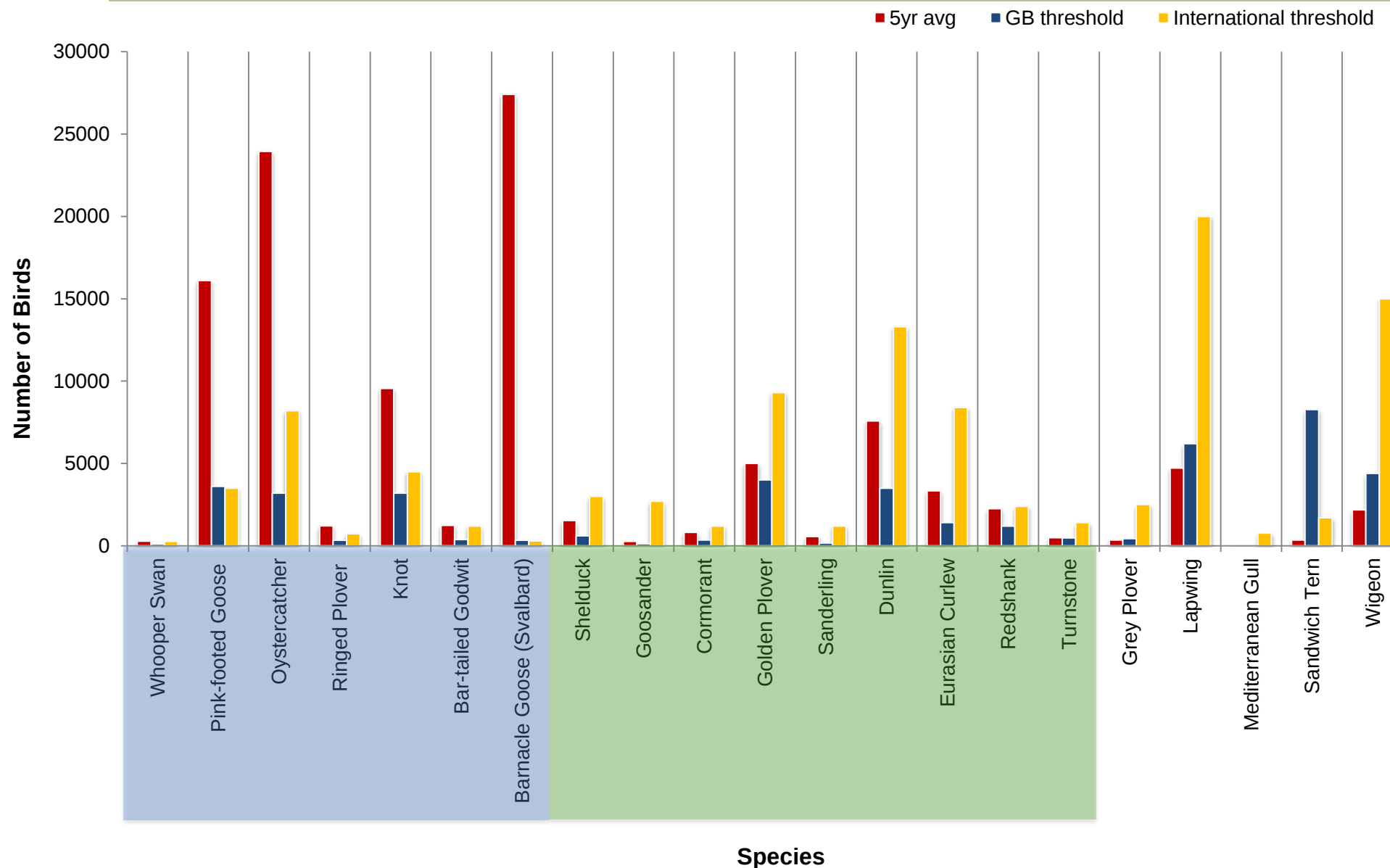


Figure 3.2: Five-year species average in the Solway compared to national (GB) and international thresholds based on Solway wide WeBS data; Blue: International importance; Green: National importance

Table 3.1: Estimation of peak numbers in individual roost sites in Solway Firth. Sections: **1.** Rockcliffe; **2.** Sandsfield to Dykesfield; **3.** Dykesfield to Glasson; **4.** Glasson to Herdhill Scar ; **5.** Herdhill Scar; **6.** Herdhill Scar to Cardurnock; **7.** Anthorn to Newton; **8.** Moricambe (Newton Arlosh); **9.** Calvo Marsh; **10.** Grune Point; **11.** Silloth West Beach to Skinburness; **12.** Beckfoot to Silloth; **13.** Mawbray to Beckfoot; **14.** Meolo to Mawbray; **15.** Bankend to Blue Dial; **16.** Maryport; **17.** Workington to Flimby.

		Estimation of Peak Numbers at Main Roosts (Solway Firth, England)														
		1.	2.	3.	4.	6.	7.	8. / 9.	10.	12.	13.	14.	15.	16.	17.	TOTAL
Species	Whooper Swan	-	-	-	-	-	100	-	-	-	-	-	-	-	-	100
	Pink-footed Goose	1,500	-	-	-	-	1,000	20,000	200	-	-	-	-	-	-	22,700
	Oystercatcher	-	-	100	220	6,000	1,500	-	1,000	5,000	1,000	10,000	250	100	300	25,470
	Ringed Plover	-	-	-	30	-	-	-	200	-	-	-	-	100	50	380
	Knot	-	-	-	-	-	-	Present	1,000	-	-	-	-	-	-	1,000
	Bar-tailed Godwit	-	-	-	-	-	-	-	500	-	-	-	-	-	-	500
	Barnacle Goose	8,000	-	-	-	2,000	2,500	Present	1,500	-	-	-	-	-	-	14,000
	Shelduck	-	-	-	-	-	-	200	-	-	-	-	-	-	-	200
	Goosander	-	20	-	-	-	-	-	-	-	-	-	-	-	-	20
	Cormorant	200	-	-	-	-	-	Present	-	100	-	-	-	-	500	800
	Golden Plover	-	-	-	-	-	3,000	Present	-	-	-	-	-	-	1100	4,100
	Sanderling	-	-	-	-	-	-	-	400	200	200	-	150	100	-	1,050
	Dunlin	-	-	600	400	3,500	-	300	1,400	-	200	-	50	-	-	6,450
	Curlew	300	400	250	100	270	400	Present	200	200	-	600	30	-	400	3,150
	Redshank	-	50	40	350	-	-	Present	200	-	-	-	-	200	-	840
	Turnstone	-	-	-	-	-	-	-	-	-	-	-	-	-	100	100
	Grey Plover	-	-	-	-	200	-	Present	-	-	-	-	-	-	-	200
	Lapwing	-	700	-	200	540	-	Present	200	-	-	-	-	-	-	1,640
	Mediterranean Gull	-	-	-	-	-	-	-	-	-	-	-	-	-	25	25
	Sandwich Tern	-	-	-	-	-	-	-	-	800	-	-	-	-	3,000	3,800
	Wigeon	-	-	300	-	-	-	-	600	-	-	-	-	-	-	900
	TOTAL	10,000	1,170	1,290	1,300	12,510	8,500	20,500	7,400	6,300	1,400	10,600	480	500	5,475	<u>87,425</u>

3.2 WeBS Data Broken Down into Sections

3.2.1 Section 1: Rockcliffe

Table 3.2: Individual Roost Site Peak Estimates – Section 1 (see Appendix 2 for species codes)

	Section 1 – Roost/ Point of Interest Grid Ref.	
	NY3235662575	NY3334261966
BY	5,000-8,000	-
CA	-	50-200
CU	-	300
PG	1,500	-
Disturbance	-	-
Freshwater	-	-
Comment	-	-



Figure 3.3: Solway counting sections with roost locations 1-6

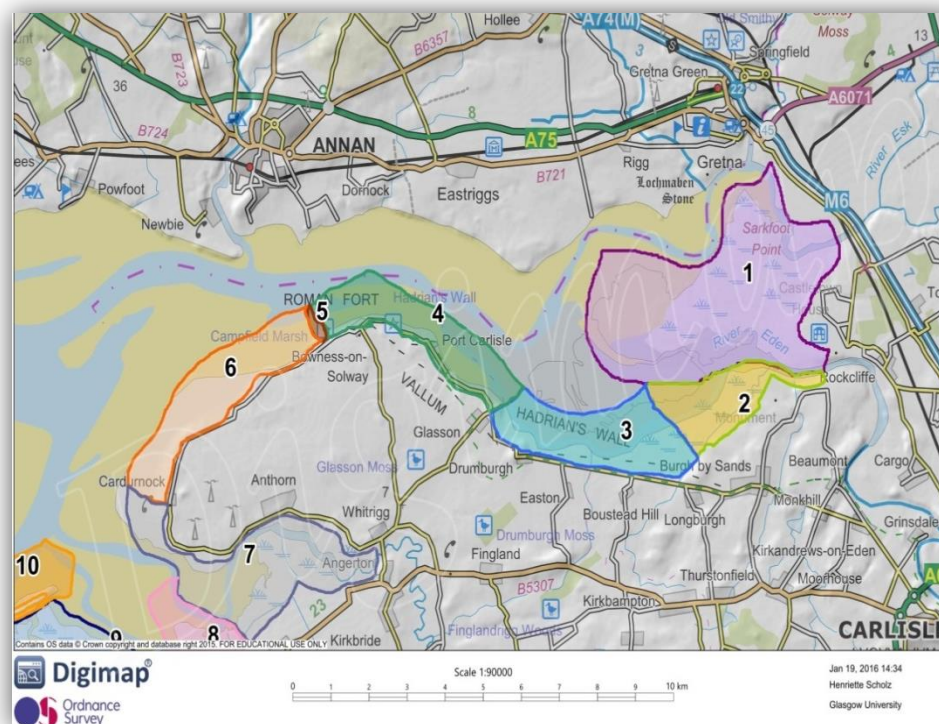


Figure 3.4: Solway counting sections 1-6

The Rockcliffe counting section, covering Rockcliffe Marsh including Sarkfoot Point, consists primarily of an extensive saltmarsh habitat which is grazed with cattle and sheep and offers limited access resulting in little disturbance. The site has two major roosts, locations details of which can be viewed on the supplied GIS layer or Figure 3.3. Roosting species are: Pink-footed Goose, Cormorant, Curlew and Barnacle Goose. No disturbance was recorded for the area. Overall the section ranks second as an important roosting side for Pink-footed Geese and Cormorants, and first for Barnacle Geese. Rockcliffe Marsh further hosts the fourth largest number of total waterbird individuals.

3.2.2 Section 2: Sandsfield to Dykesfield

Table 3.3: Individual Roost Site Peak Estimates – Section 2 (see Appendix 2 for species codes)

	Section 2 – Roost/ Point of Interest Grid Ref.			
	NY335466 1675	NY327086 1659	NY304766 0380*	NY312216 0185
CU	-	100	300	-
GD	20	-	-	-
L.	200	500	-	-
RK	-	50	-	-
Disturbance	Shooting	-	-	Dog Walkers
Freshwater	-	-	-	-
Comment	-	-	-	-

The Sandsfield to Dykesfield counting section, covering Burgh Marsh – a wide tract of open saltmarsh grazed with cattle and sheep - has three roosts, locations and details of which can be viewed on the supplied GIS layer or Figure 3.3. Roosting species are: Goosander, Curlew, Lapwing and Redshank. This section has the third lowest total number of roosting birds but the highest numbers of Lapwing, Curlew and Goosander according to field records. No species of international importance roost here. Disturbance in the form of shooting was recorded near the first roost site hosting Goosander and Lapwing. A second location of disturbance is marked as a red dot in Figure 3.3 and was described as a popular site for dog walkers. Even though the site might not be highly

frequented, a single dog can still cause significant disturbance and result in entire roosts shifting to different grounds.

3.3.3 Section 3: Dykesfield to Glasson

Table 3.4: Individual Roost Site Peak Estimates – Section 3 (see Appendix 2 for species codes)

	Section 3 – Roost/ Point of Interest Grid Ref.	
	NY3047660380*	NY2721459823
CU	300	50
DN	-	600
OC	-	100
RK	-	40
WN	-	300
Disturbance	-	-
Freshwater	-	-
Comment	-	-

The Dykesfield to Glasson counting section covers the remaining half of Burgh Marsh with a slightly more narrowing area of saltmarsh. Again, the site is grazed with cattle and sheep and has easy access from the road which makes it popular with dog walkers etc. Field WeBS records located two roosts in this site, one of which most likely overlaps with the final roost recorded in Section 2 (see Figure 3.3). This section is one out of two recorded sites hosting a roost of Wigeons. Other species roosting here are Oystercatcher, Dunlin, Curlew and Redshank. No disturbance was noted. Overall this section ranks low, Rank 14, for total number of individual birds present.

*NY3047660380 appears twice because this roost site stretches across the boundaries of counting sections 2 & 3 – titled Sandsfield to Glasson in GIS layer.

3.3.4 Section 4: Glasston to Herdhill Scar

Table 3.5: Individual Roost Site Peak Estimates – Section 4 (see Appendix 2 for species codes)

	Section 4 – Roost/ Point of Interest Grid Ref.			
	NY258826 1009	NY243886 2271	NY237446 2499	NY2270062 847
CU	-	50	50	-
DN	-	300	-	100
L.	-	200	-	-
OC	-	200	20	-
RK	-	350	-	-
RP	-	-	-	30
Disturbance	Fishing	-	-	-
Freshwater	-	-	-	-
Comment	-	-	-	-

The Glasston to Herdhill Scar section covers a small area of narrowing saltmarsh, Westfield Marsh, close to Port Carlisle including Kirkland Scar. The scar concentrates large numbers of feeding birds, giving it additional importance. Close to Glasston, the field records show a strip of coast which is heavily used for shore fishing at high tide as marked with a red dot in Figure 3.3 close to the border to Section 3. This results in few roosting birds in this area. Further towards Herdhill Scar three medium sized roost sites were recorded. Roosting species are: Oystercatcher, Ringed Plover, Dunlin, Curlew, Redshank and Lapwing. This section hosts the largest number of Redshanks within the surveyed Solway area.

3.3.5 Section 5: Herdhill Scar

There are currently no separate field counts for Herdhill Scar, however, records of counts within the WeBS data base exist.

3.3.6 Section 6: Herdhill Scar to Cardurnock

Table 3.6: Individual Roost Site Peak Estimates – Section 6 (see Appendix 2 for species codes)

	Section 6 – Roost/ Point of Interest Grid Ref.				
	NY206816 2017	NY190586 1285	NY187616 0987	NY182186 0799	NY170665 9653
BY	-	-	2000	-	-
CU	50	200	-	40	80
DN	500	1,000	-	-	2,000
GV	-	100	-	-	100
L.	-	500	-	40	-
OC	1,000	5,000	-	-	-
Disturbance	Very little	-	Intermittent grazing	-	Little even if walking on inner Marsh edge
Freshwater	-	-	-	-	-
Comment	Roosts Aug-March	Roosts move with tide, Aug-March	Dec- April	Birds scattered on Marsh	Birds move off when tides are high

The Herdhill Scar to Cardurnock section covers all of Campfield Marsh and is located right by the RSPB Campfield Marsh Nature Reserve. The habitat here consists of widening saltmarsh which is grazed with cattle only. This section has five roosts in total and ranks second for total number of individual birds. Roosting species are: Oystercatcher, Dunlin, Curlew, Barnacle Goose, Grey Plover and Lapwing. The second largest Oystercatcher number is located within this section alongside the greatest number of roosting Dunlin which is the same as the GB threshold for this species. One roost was recorded as experiencing intermittent grazing but overall disturbance was described as 'very low'. Further comments were made on the movement of roosts between seasons and depending on the tides.

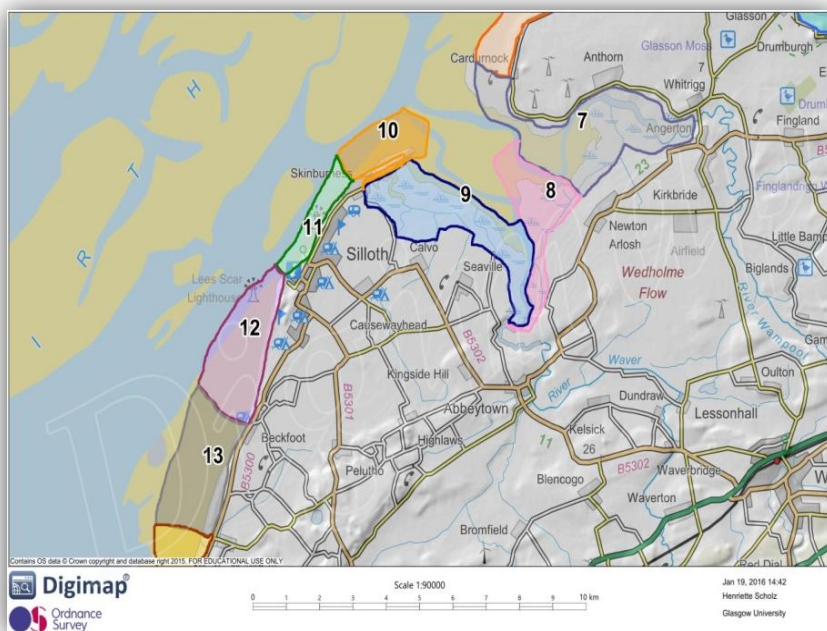


Figure 3.4: Solway counting sections close up 7-13

3.3.7 Section 7: Anthorn to Newton

Table 3.7: Individual Roost Site Peak Estimates – Section 7 (see Appendix 2 for species codes)

	Section 7 – Roost/ Point of Interest Grid Ref.				
	NY16549 58332	NY17085 57591	NY19537 57586	NY20882 57913	NY21312 56728
BY	-	-	2,500	-	-
CU	-	-	-	400	-
GP	-	-	3,000	-	-
OC	700-800	700	-	-	-
PG					1,000
Disturbance	Minimal	Minimal	Dog walkers if tide low, occasional boat and wind surfers	-	-
Freshwater	-	-	-	-	-
Comment	Likely to be affected by coastal foot path	Likely to be affected by coastal foot path	-	Likely to be affected by coastal foot path	WS not Yes every winter, PG March-April

The Anthorn to Newton section includes parts of Cardurnock Marsh and all of Anthorn Marsh and Newton Marsh, narrow saltmarshes adjacent to the river Wampool which are grazed with sheep and cattle. The section has five major roosts, the species present being: Whooper Swan, Pink-footed Goose, Oystercatcher, Golden Plover, Curlew and Barnacle Goose. The highest numbers of Golden

Plover roost here - 75% of all Golden Plover recorded as roosting on the Solway in Cumbria. The site also hosts the second largest number of Curlew and a high number of Barnacle Geese. Overall this section ranks as fifth most important in terms of total numbers of individual birds. Minimal disturbance from dog walkers, boats and wind surfers was noted.

3.3.8 Section 8: Newton Arlosh & 9. Calvo Marsh

Table 3.8: Individual Roost Site Peak Estimates – Section 8 & 9 (see Appendix 2 for species codes)

	Section 8 & 9 – Roost/ Point of Interest Grid Ref.						
	NY1730356134	NY1801855214	NY1808154004	NY1703454543	NY1677455166	NY1569755682	NY1594856263
BY	-	-	Yes	-	-	-	-
CA	-	-	-	-	-	Yes	Yes
CU	-	-	-	-	Yes	Yes	-
DN	-	Yes	-	-	-	300	-
GP	-	Yes	-	-	-	Yes	-
GV	-	Yes	-	-	-	-	-
KN	-	Yes	-	-	-	-	-
L.	-	-	-	-	-	Yes	-
PG	-	-	20,000	-	-	-	-
RK	-	-	-	Yes	-	Yes	-
SU	Yes	Yes	-	-	200	-	-
Disturbance	-	-	-	-	-	Irregular shooting	-
Freshwater	-	-	-	-	-	-	-
Comment	Currently no counts of Newton Point, dangerous on high tides	-	-	-	TW Nov-Dec along Marsh	-	-
General Comment: BY Oct-April, PG Feb-March/April, big flocks of L. and GP on some counts, GP with tide, small no. of RK in all locations on most winter counts, on very high tides roosting on Skinburness Marsh very difficult.							

The Moricambe and Calvo Marsh sections are very large and cover an extensive area of saltmarsh and deep, fast flowing creeks. It is for this reason that some areas such as Newton Point were noted to be inaccessible and too dangerous to count at present which does, however, account for little disturbance. A total of seven roosts were recorded in these sections although few specific numbers were provided, only presence or absence. Roosting species are: Pink-footed Goose, Knot, Shelduck, Cormorant, Golden Plover, Dunlin, Curlew, Redshank, Barnacle Goose, Grey Plover and Lapwing. The count of Pink-footed Geese appears very high and unlikely to be representative of mean counts but rather describes the maximum count experienced by the WeBS counter responsible for these sections. Should the estimate be accurate, it widely exceeds national and international thresholds. This site has the second highest diversity of species and ranks as most important in terms of total number of individual roosting waterbirds. Irregular shooting was noted along Skinburness Marsh close to Starry Hill.



Figure 3.5: Solway counting sections with roost locations 7-11

3.3.9 Section 10: Grune Point

Table 3.9: Individual Roost Site Peak Estimates – Section 10 (see Appendix 2 for species codes)

	Section 10 – Roost/ Point of Interest Grid Ref.			
	NY1475855 295	NY1478155 959	NY1399256 389	NY1407956 935
BY	1,500	-	-	-
BA	-	-	500	-
CU	-	-	200	-
DN	-	-	400	1,000
KN	-	1000	-	-
L.	-	200	-	-
OC	-	1000	-	-
PG	200	-	-	-
RK	-	200	-	-
RP	-	-	-	200
SS	-	-	-	400
WN	-	600	-	-
Disturbance	Occasional grazing, some wildfowling	Little disturbance	Little disturbance	Some disturbance
Freshwater	-	-	-	-
Comment	-	-	-	DN, RP, SS May-Aug

The Grune Point section appears to overlap with the Calvo Marsh section and includes parts of the Cumbria Coastal Way. The terrain consists mainly of shingle with grassland and scrub towards the centre. The site is popular with walkers. A total of four roosts were recorded in this area with the biggest numbers of Ringed Plover, Knot, Dunlin, Sanderling, Bar-tailed Godwit and Widgeon compared with the other sixteen counting sections. The record of Bar-tailed Godwits appears unusually high and would, if accurate, give the species a new status of national importance. Other roosting species are: Pink-footed Goose, Oystercatcher, Curlew, Redshank, Barnacle Goose and Lapwing. Grune Point also has the highest species diversity with twelve different waterbird species being present. The recorded numbers of Sanderlings counted in this section alone is over three times larger than the national threshold. In addition, this section ranks sixth for total number of individual roosting birds but first in terms of the number of internationally important species present. Little to some disturbance was noted including occasional gazing and wildfowling.

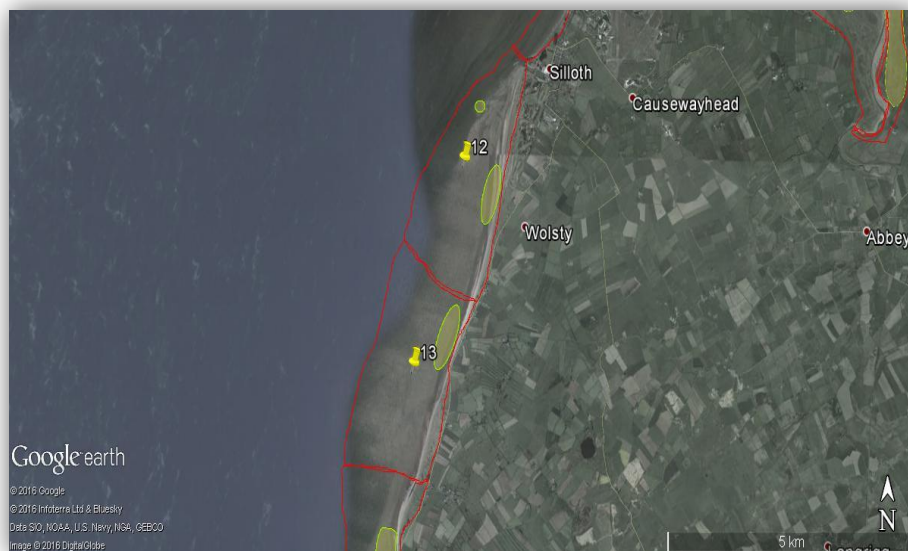


Figure 3.6: Solway counting sections with roost locations 12-13

3.3.10 Section 11: Sillioth West Beach to Skinburness

No roosts were recorded in Section 11.

3.3.11 Section 12: Beckfoot to Sillioth

Table 3.10: Individual Roost Site Peak Estimates – Section 12
(see Appendix 2 for species codes)

	Section 12 – Roost/ Point of Interest Grid Ref.	
	NY0947152940	NY0962751457
CA	100	-
CU	-	200
OC	-	5,000
SS	-	200
TE	-	800
Disturbance	-	-
Freshwater	-	-
Comment	-	-

The Beckfoot to Sillioth section, including the Lees Scar Lighthouse, has a sandy shore with dunes. Two roost sites with large numbers of Sandwich Terns and Oystercatchers were recorded in this section. Numbers of Oystercatchers rank third within the described surveyed area, Sanderlings as second, both species exceeding the national threshold. The total ranking for individual roosting birds is fifth.

3.3.12 Section 13: Mawbray to Beckfoot

Table 3.11: Individual Roost Site Peak Estimates – Section 13
(see Appendix 2 for species codes)

Section 13 – Roost/ Point of Interest Grid Ref	
	NY0855948849
DN	200
OC	1000
SS	200
Disturbance	-
Freshwater	-
Comment	-

The Mawbray to Beckfoot section is adjacent to Mawbray Bank - an area with a sandy shore and dunes - and has one roost site consisting of one species of international and two of national importance; Oystercatchers, Sanderling and Dunlin, all three in comparatively low numbers. Generally, this section has the fifth lowest number of roosting birds. The roosts' locations are illustrated in Figure 3.6.

3.3.13 Section 14: Meolo to Mawbray

Table 3.12: Individual Roost Site Peak Estimates – Section 14 (see Appendix 2 for species codes)

Section 14 – Roost/ Point of Interest Grid Ref					
	NY07537 45536	NY07760 44837	NY08007 43968	NY07869 42199	NY07648 41686
CU	600	-	-	-	-
OC	10000	-	-	-	-
Disturbance	-	-	-	-	-
Freshwater	-	Yes	Yes	Yes	Yes
Comment	-	Gull roosts	Gull roosts	Gull roosts	Gull roosts

The Meolo to Mawbray section includes only one waterbird roost but four gull roosts which are recorded on a voluntary basis through the WeBS counters. This site – consisting of a sandy shore with offshore scars – lies outside the current SPA boundary but has the largest roost of Oystercatchers and Curlew in the South Solway. Although this section only hosts two waterbird species - recorded and identified to be present in significant numbers - it ranks third in total numbers. The gull roosts were noted to be in relation to freshwater outflows providing bathing and drinking opportunities. No disturbance was recorded.

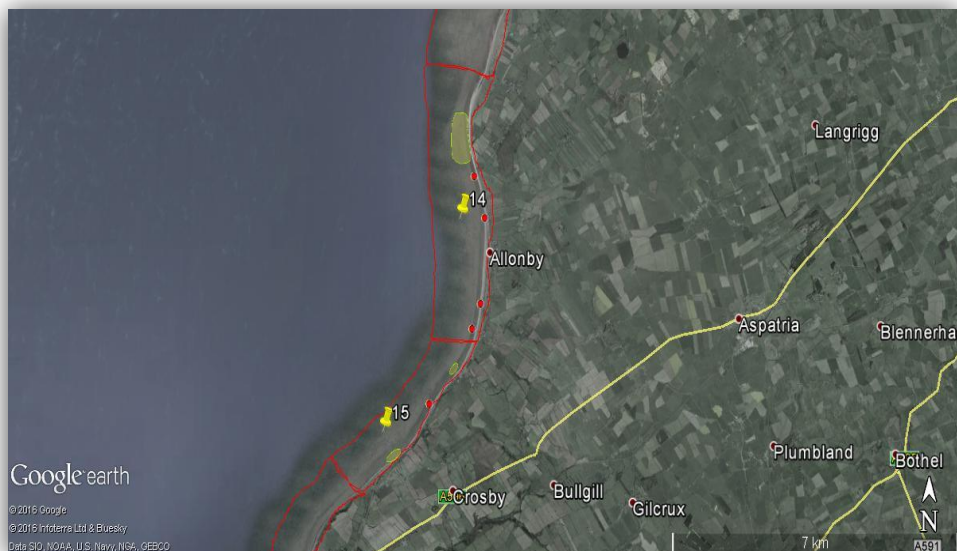


Figure 3.7: Solway counting sections with roost locations 14-15

3.3.14 Section 15: Bankend to Blue Dial

Table 3.13: Individual Roost Site Peak Estimates – Section 15 (see Appendix 2 for species codes)

	Section 15 – Roost/ Point of Interest Grid Ref.		
	NY07180 40868	NY06553 40171	NY05515 39023
CU	-	-	30
DN	-	-	50
OC	200	-	50
SS	150	-	-
Disturbance	-	-	-
Freshwater	Yes	Yes	-
Comment	Gull roosts	Gull roosts	-

This section has two roosts (see Figure 3.7) and one freshwater outlet (red dot in Figure 3.7). All numbers - Oystercatchers, Sanderling, Dunlin and Curlew - are low. The overall number is the lowest of all seventeen surveyed sections. No disturbance was recorded.

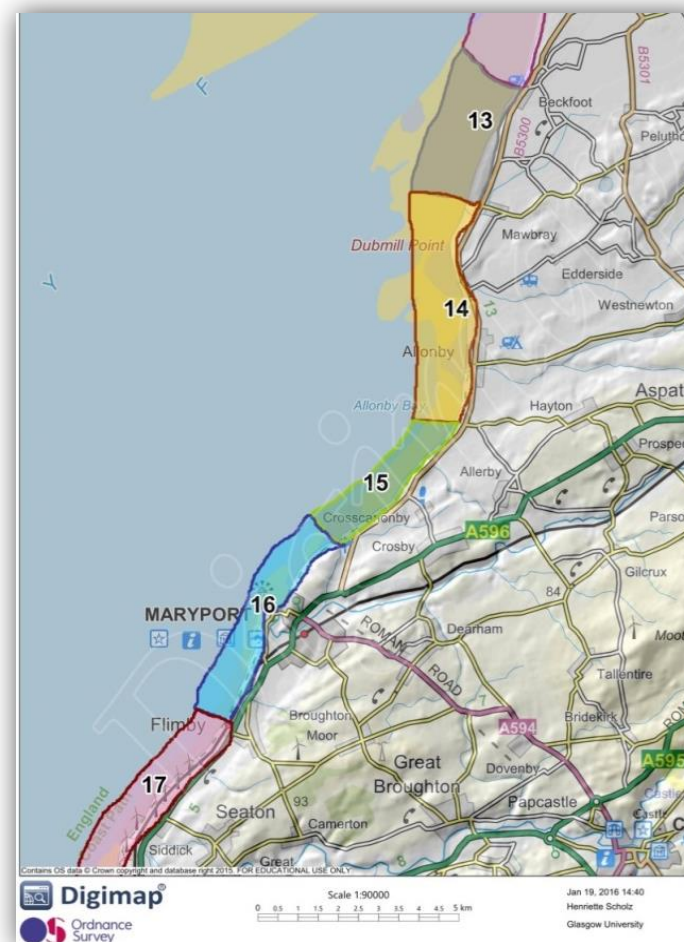


Figure 3.8: Solway Counting Sections 14-17

3.3.15 Section 16: Maryport

Table 3.14: Individual Roost Site Peak Estimates – Section 16 (see Appendix 2 for species codes)

	Section 16 – Roost/ Point of Interest Grid Ref.		
	NY0320336895	NY0281536494	NY0281536494
OC	-	-	100
RK	200	-	-
RP	-	100	-
TE	-	100	-
Disturbance	-	-	-
Freshwater	-	-	-
Comment	-	-	-

This section in the outer Solway is less sheltered and thus attracts fewer birds. Three roosts with low numbers of Oystercatcher, Ringed Plover, Sanderling and Redshank, two of which are located by the harbour, were noted here. No additional disturbance was recorded.

3.3.16 Section 17: Workington to Flimby

Table 3.15: Individual Roost Site Peak Estimates – Section 17 (see Appendix 2 for species codes)

	Section 17 – Roost/ Point of Interest Grid Ref.		
	NY0176633414	NY0028132139	NY0028132139
CA	-	500	-
CU	-	400	-
GP	-	100	-
MU	25	-	-
OC	50	200	50
RP	-	50	-
TE	-	3000	-
TT	-	100	-
Disturbance	-	-	-
Freshwater	-	-	-
Comment	-	-	-

The Workington to Flimby section, between the two towns, hosts eight different species including the largest Turnstone, the second biggest Golden Plover and the most important Cormorant, Sandwich Tern and Mediterranean Gull records. In total, the site ranks eighth for number of individuals.

4. Conclusion and Recommendations

- Counting sections vary strongly in the presence of roost sites. Prioritisation and ranking according to different criteria was thus possible (see Table 4.1 for species ranking summary and Appendix 1 for the differentiation of various categories).
- A total of 43 major roost sites are present along the Solway's South shore.
- The Cumbrian side of the Solway is a crucial habitat for roosting waterbirds of national and international importance.
- Counting sections vary strongly in size and area covered. It is recommended to divide the counting responsibility of sections 8. and 9., which also appear to be major avian hotspots, between two counters in the future.
- Herdhill Scar, as an individual section, does currently not have a WeBS counter. It is recommended to clarify the coverage of this section.
- There is some inconsistency in the division of sections between field counts and official WeBS data records.
- There is no ongoing evidence from this study about the impact of disturbance on roosts present in the Solway. However, notably, even little disturbance can have major impacts on roosting waterbirds which critically highlights the
 - need for further work. Overall, a correlation between undisturbed stretches of coast and high numbers of birds present was noted.
 - Sections along the inner, more sheltered part of the Solway seemed to host a higher number of waterbird roosts.
 - No major knowledge gaps were identified.

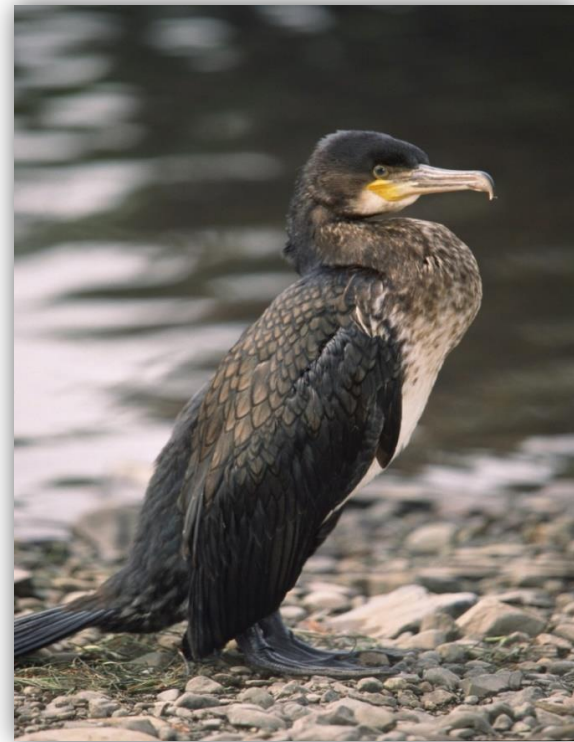


Figure 4.1: Juvenile Cormorant

Table 4.1: Summary of section rankings for Solway target species. Numbers indicate ranks; 1, 2 and 3

Key Sectors for Key Species in the Solway (England only)															
Section Species		1.	2.	3.	4.	6.	7.	8./ 9.	10.	12.	13.	14.	15.	16.	17.
		Rockcliffe	Sandsfield to Dykesfield	Dykesfield to Glasson	Glasson to Herdhill Scar	Herdhill Scar to Cardurnock	Anthorn to Newton	Moricambe (Newton (Arlosh) & Calvo Marsh	Grune Point	Beckfoot to Silloth	Mawbray to Beckfoot	Meolo to Mawbray	Bankend to Blue Dial	Maryport	Workington to Flimby
Whooper Swan							1								
Pink-footed Goose		2					3	1							
Oystercatcher						2				3		1			
Ringed Plover									1					2	3
Knot								2	1						
Bar-tailed Godwit									1						
Barnacle Goose		1				3	2								
Shelduck								1							
Goosander			1												
Cormorant		2								3					1
Golden Plover							1	3							2
Sanderling									1	2	2		3		
Dunlin				3		1			2						
Curlew		3	2				2					1			2
Redshank			3		1				2					2	
Turnstone															1
Grey Plover						1		2							
Lapwing			1		3	2			3						
Mediterranean Gull															1
Sandwich Tern										2					1
Wigeon				2					1						

5. References

- 1) Wetlands International (2012). *Waterbird Population Estimates, Fifth Edition - Summary Report*. Wageningen, The Netherlands: Wetlands International.
- 2) UNESCO (1994). *Convention on Wetlands of International Importance especially as Waterfowl Habitat*. Paris: UNESCO.
- 3) *Council Directive 2009/147/EC of 30 November 2009 on the conservation of wild birds (Bird Directive)*.
- 4) Holt, C.A., Austin, G.E., Calbrade, N.A., Mellan, H.J., Hearn, R.D., Stroud, D.A., Wotton, S.R., Musgrove, A.J. 2015. *Waterbirds in the UK 2013/14: The Wetland Bird Survey*. Thetford: BTO/RSPB/JNCC.
- 5) Burger, J. (1981). The effect of human activity on birds at a coastal bay. *Biological Conservation*, 21(3), 231-241.
- 6) Kirkby, J.S., Clee, C. & Seager, V. (1993). Impact and extent of recreational disturbance to wader roosts on the Dee estuary: some preliminary results. *Wader Study Group Bulletin*, 68, 53-58.
- 7) JNCC (2005). Information Sheet on Ramsar Wetlands (RIS) – Upper Solway Flats and Marshes. Gland, Switzerland: Ramsar Secretariat.
- 8) RSPB (2015). *About Campfield Marsh*. Online at: <http://www.rspb.org.uk/discoverandenjoynature/seenature/reserves/guide/c/campfieldmarsh/about.aspx> [accessed 28/10/15].
- 9) SFP (2015). *Solway Firth Partnership Business Plan 2015-2018*. Scotland: SFP.
- 10) JNCC (2015). Solway Firth. Online at: <http://jncc.defra.gov.uk/ProtectedSites/SACselection/sac.asp?EUCode=UK0013025> [accessed 15/02/16].
- 11) JNCC (2006). *Upper Solway Flats and Marshes – Standard Natura 2000 Data Form*. Online at: <http://jncc.defra.gov.uk/pdf/SPA/UK9005012.pdf> [accessed 04/02/15].
- 12) *Marine and Coastal Access Act 2009*. (c.23). UK: The Stationary Office.
- 13) Rogers, D.I. (2003). High-tide roost choice by coastal waders. *Wader Study Bulletin*, 100, 73-79.
- 14) Bibby CJ, Burgess ND, Hill DA & Mustoe S. 2000. *Bird Census Techniques. Second Edition*. Academic Press, London.
- 15) SNH & JNCC (2014). *The suit of Scottish marine dSPAs*. Available at: <http://www.snh.gov.uk/docs/A1350044.pdf> [accessed 21 April 2016].

Further Information:

International waterbird population estimates:

www.wpe.wetlands.org

Bird Life International Species information:

www.birdlife.org

BTO WeBS methodology:

www.bto.org/volunteer-surveys/web

6. Appendices

Appendix 1: Site Rankings

Ranking by Overall Number of Individual Waterbirds

1. Moricambe (Newton Arlosh) & Calvo Marsh
2. Herdhill Scar to Cardurnock
3. Meolo to Mawbray
4. Rockcliffe
5. Anthorn to Newton

Ranking by Overall Species Diversity

1. Grune Point
2. Moricambe (Newton Arlosh) & Calvo Marsh
3. Workington to Flimby
- 4./5./6. Glasson to Herdhill Scar
- 4./5./6. Herdhill Scar to Cardurnock
- 4./5./6. Anthorn to Newton

Ranking by Number of Oystercatchers

1. Meolo to Mawbray
2. Herdhill Scar to Cardurnock
3. Beckfoot to Silloth
- 4./ 5. Grune Point
- 4./ 5. Mawbray to Beckfoot

Ranking by Number of Pink-footed Geese

1. Moricambe (Newton Arlosh) & Calvo Marsh
2. Rockcliffe
3. Anthorn to Newton
4. Grune Point

Ranking by Number of Barnacle Geese (Svalbard)

1. Rockcliffe
2. Anthorn to Newton
3. Herdhill Scar to Cardurnock

Ranking by Recorded Disturbance in Field Counts

1. Grune Point
2. Sandsfield to Dykesfield
3. Anthorn to Newton

Recorded was 'Some' and 'Little' Disturbance. Site ranked as 1. experience the greatest disturbance.

Appendix 2: BTO Species Codes for Target Species

BTO Species Code	Species' Common Name
BY	Barnacle Goose
BA	Bar-tailed Godwit
CA	Cormorant
CU	Curlew
DN	Dunlin
GP	Golden Plover
GD	Goosander
GV	Grey Plover
KN	Knot
L.	Lapwing
MU	Mediterranean Gull
OC	Oystercatcher
PG	Pink-footed Goose
RK	Redshank
RP	Ringed Plover
SS	Sanderling
TE	Sandwich Tern
SU	Shelduck
TT	Turnstone
WS	Whooper Swan
WN	Wigeon

Appendix 3: Roost Sites with Grid References (1)

Grid Ref/ Species Code	Rockcliffe		Sandfield to Dykesfield			Sandfield to Glasson
	NY32356 62575	NY33342 61966	NY33546 61675	NY32708 61659	NY31221 60185	NY3047660380
BY	5000- 8000	-	-	-	-	-
BA	-	-	-	-	-	-
CA	-	50-200	-	-	-	-
CU	-	300	-	100	-	300
DN	-	-	-	-	-	-
GP	-	-	-	-	-	-
GD	-	-	20	-	-	-
GV	-	-	-	-	-	-
KN	-	-	-	-	-	-
L.	-	-	200	500	-	-
MU	-	-	-	-	-	-
OC	-	-	-	-	-	-
PG	1500	-	-	-	-	-
PS	-	-	-	-	-	-
RK	-	-	-	50	-	-
RP	-	-	-	-	-	-
SS	-	-	-	-	-	-
TE	-	-	-	-	-	-
SU	-	-	-	-	-	-
TT	-	-	-	-	-	-
WS	-	-	-	-	-	-
WN	-	-	-	-	-	-
Disturbance	-	-	Shooting	-	Dog Walkers	-
Freshwater	-	-	-	-	-	-
Comment	-	-	-	-	-	-

Appendix 3: Roost Sites with Grid References (2)

Grid Ref/ Species Code	Dykesfield to Glasson	Glasson to Herdhill Scar			
	NY27214 59823	NY25882 61009	NY24388 62271	NY23744 62499	NY22700 62847
BY	-	-	-	-	-
BA	-	-	-	-	-
CA	-	-	-	-	-
CU	50	-	50	50	-
DN	600	-	300	-	100
GP	-	-	-	-	-
GD	-	-	-	-	-
GV	-	-	-	-	-
KN	-	-	-	-	-
L.	-	-	200	-	-
MU	-	-	-	-	-
OC	100	-	200	20	-
PG	-	-	-	-	-
PS	-	-	-	-	-
RK	40	-	350	-	-
RP	-	-	-	-	30
SS	-	-	-	-	-
TE	-	-	-	-	-
SU	-	-	-	-	-
TT	-	-	-	-	-
WS	-	-	-	-	-
WN	300	-	-	-	-
Disturbance	-	Fishing	-	-	-
Freshwater	-	-	-	-	-
Comment	-	-	-	-	-

Appendix 3: Roost Sites with Grid References (3)

Grid Ref/ Species Code	Herdhill Scar to Cardurnock				
	NY20681 62017	NY19058 61285	NY18761 60987	NY18218 60799	NY17066 59653
BY	-	-	2000	-	-
BA	-	-	-	-	-
CA	-	-	-	-	-
CU	50	200	-	40	80
DN	500	1000	-	-	2000
GP	-	-	-	-	-
GD	-	-	-	-	-
GV	-	100	-	-	100
KN	-	-	-	-	-
L.	-	500	-	40	-
MU	-	-	-	-	-
OC	1000	5000	-	-	-
PG	-	-	-	-	-
PS	-	-	-	-	-
RK	-	-	-	-	-
RP	-	-	-	-	-
SS	-	-	-	-	-
TE	-	-	-	-	-
SU	-	-	-	-	-
TT	-	-	-	-	-
WS	-	-	-	-	-
WN	-	-	-	-	-
Disturbance	Very little	-	Intermittent grazing	-	Little even if walking on inner Marsh edge
Freshwater	-	-	-	-	-
Comment	Roosts Aug-March	Roosts move with tide, Aug-March	Dec- April	Birds scattered on Marsh	Birds move off when tides are high

Appendix 3: Roost Sites with Grid References (4)

Grid Ref/ Species Code	Anthorn to Newton				
	NY16549 58332	NY17085 57591	NY19537 57586	NY20882 57913	NY21312 56728
BY	-	-	2500	-	-
BA	-	-	-	-	-
CA	-	-	-	-	-
CU	-	-	-	400	-
DN	-	-	-	-	-
GP	-	-	3000	-	-
GD	-	-	-	-	-
GV	-	-	-	-	-
KN	-	-	-	-	-
L.	-	-	-	-	-
MU	-	-	-	-	-
OC	700-800	700	-	-	-
PG	-	-	-	-	1000
PS	-	-	-	-	-
RK	-	-	-	-	-
RP	-	-	-	-	-
SS	-	-	-	-	-
TE	-	-	-	-	-
SU	-	-	-	-	-
TT	-	-	-	-	-
WS	-	-	-	-	100
WN	-	-	-	-	-
Disturbance	Minimal	Minimal	Dog walkers if tide low, occasional boat and wind surfers	-	-
Freshwater	-	-	-	-	-
Comment	Likely to be affected by coastal foot path	Likely to be affected by coastal foot path	-	Likely to be affected by coastal foot path	WS not present every winter, PG March-April

Appendix 3: Roost Sites with Grid References (5)

Grid Ref/ Species Code	Moricambe (Newton Arlosh) & Calvo Marsh						
	NY17303 56134	NY18018 55214	NY18081 54004	NY17034 54543	NY16774 55166	NY15697 55682	NY15948 56263
BY	-	-	Present	-	-	-	-
BA	-	-	-	-	-	-	-
CA	-	-	-	-	-	Present	Present
CU	-	-	-	-	Present	Present	-
DN	-	Present	-	-	-	300	-
GP	-	Present	-	-	-	Present	-
GD	-	-	-	-	-	-	-
GV	-	Present	-	-	-	-	-
KN	-	Present	-	-	-	-	-
L.	-	-	-	-	-	Present	-
MU	-	-	-	-	-	-	-
OC	-	-	-	-	-	-	-
PG	-	-	20000	-	-	-	-
PS	-	-	-	-	-	-	-
RK	-	-	-	Present	-	Present	-
RP	-	-	-	-	-	-	-
SS	-	-	-	-	-	-	-
TE	-	-	-	-	-	-	-
SU	Present	Present	-	-	200	-	-
TT	-	-	-	-	-	-	-
WS	-	-	-	-	-	-	-
WN	-	-	-	-	-	-	-
Disturbance	-	-	-	-	-	Irregular shooting	-
Freshwater	-	-	-	-	-	-	-
Comment	Newton Point, lots of waders but currently no counts, dangerous on high tides	-	-	-	TW Nov-Dec along Marsh	-	-

Appendix 3: Roost Sites with Grid References (6)

Grid Ref/ Species Code	Grune Point				Beckfoot to Silloth		Mawbray to Beckfoot
	NY14758 55295	NY14781 55959	NY13992 56389	NY14079 56935	NY09471 52940	NY09627 51457	NY08559 48849
BY	1500	-	-	-	-	-	-
BA	-	-	500	-	-	-	-
CA	-	-	-	-	100	-	-
CU	-	-	200	-	-	200	-
DN	-	-	400	1000	-	-	200
GP	-	-	-	-	-	-	-
GD	-	-	-	-	-	-	-
GV	-	-	-	-	-	-	-
KN	-	1000	-	-	-	-	-
L.	-	200	-	-	-	-	-
MU	-	-	-	-	-	-	-
OC	-	1000	-	-	-	5000	1000
PG	200	-	-	-	-	-	-
PS	-	-	-	-	-	-	-
RK	-	200	-	-	-	-	-
RP	-	-	-	200	-	-	-
SS	-	-	-	400	-	200	200
TE	-	-	-	-	-	800	-
SU	-	-	-	-	-	-	-
TT	-	-	-	-	-	-	-
WS	-	-	-	-	-	-	-
WN	-	600	-	-	-	-	-
Disturbance	Occasional grazing, some wildfowling	Little disturbance	Little disturbance	Some disturbance	-	-	-
Freshwater	-	-	-	-	-	-	-
Comment	-	-	-	DN, RP, SS May-Aug	-	-	-

Appendix 3: Roost Sites with Grid References (7)

Grid Ref/ Species Code	Meolo to Mawbray					Bankend to Blue Dial		
	NY07537 45536	NY07760 44837	NY08007 43968	NY07869 42199	NY07648 41686	NY07180 40868	NY06553 40171	NY05515 39023
BY	-	-	-	-	-	-	-	-
BA	-	-	-	-	-	-	-	-
CA	-	-	-	-	-	-	-	-
CU	600	-	-	-	-	-	-	30
DN	-	-	-	-	-	-	-	50
GP	-	-	-	-	-	-	-	-
GD	-	-	-	-	-	-	-	-
GV	-	-	-	-	-	-	-	-
KN	-	-	-	-	-	-	-	-
L.	-	-	-	-	-	-	-	-
MU	-	-	-	-	-	-	-	-
OC	10000	-	-	-	-	200	-	50
PG	-	-	-	-	-	-	-	-
PS	-	-	-	-	-	-	-	-
RK	-	-	-	-	-	-	-	-
RP	-	-	-	-	-	-	-	-
SS	-	-	-	-	-	150	-	-
TE	-	-	-	-	-	-	-	-
SU	-	-	-	-	-	-	-	-
TT	-	-	-	-	-	-	-	-
WS	-	-	-	-	-	-	-	-
WN	-	-	-	-	-	-	-	-
Disturbance	-	-	-	-	-	-	-	-
Freshwater	-	Yes	Yes	Yes	Yes	Yes	Yes	-
Comment	-	Gull roosts	Gull roosts	Gull roosts	Gull roosts	Gull roosts	Gull roosts	-

Appendix 3: Roost Sites with Grid References (8)

Grid Ref/ Species Code	Maryport			Workington to Flimby		
	NY03203 36895	NY02815 36494	NY02815 36494	NY01766 33414	NY00281 32139	NY00281 32139
BY	-	-	-	-	-	-
BA	-	-	-	-	-	-
CA	-	-	-	-	500	-
CU	-	-	-	-	400	-
DN	-	-	-	-	-	-
GP	-	-	-	-	100	-
GD	-	-	-	-	-	-
GV	-	-	-	-	-	-
KN	-	-	-	-	-	-
L.	-	-	-	-	-	-
MU	-	-	-	25	-	-
OC	-	-	100	50	200	50
PG	-	-	-	-	-	-
PS	-	-	-	-	-	-
RK	200	-	-	-	-	-
RP	-	100	-	-	50	-
SS	-	100	-	-	-	-
TE	-	-	-	-	3000	-
SU	-	-	-	-	-	-
TT	-	-	-	-	100	-
WS	-	-	-	-	-	-
WN	-	-	-	-	-	-
Disturbance	-	-	-	-	-	-
Freshwater	-	-	-	-	-	-
Comment	-	-	-	-	-	-



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