WeBS Low Tide Counts

AIMS

Estuarine sites in the UK provide the most important habitat for non-breeding waterbirds, acting as wintering grounds for many migrants but also as stopover feeding locations for other waterbirds passing along the East Atlantic Flyway. Core Counts on estuaries tend to quantify birds present at high tide roosts. Although important, knowledge of roost sites provides only part of the picture, and does not elucidate the use that waterbirds make of a site for feeding.

The WeBS Low Tide Counts scheme has flourished since its inception in the winter of 1992/93, with most of the major estuaries covered. The scheme aims principally to monitor, assess and regularly update information on the relative importance of inter-tidal feeding areas of UK estuaries for wintering waterbirds and thus to complement the information gathered by WeBS Core Counts.

The data gathered contribute greatly to the conservation of waterbirds by providing supporting information for the establishment and management of UK Ramsar sites and Special Protection Areas (SPAs), other site designations and whole estuary conservation plans. In addition, WeBS Low Tide Counts enhance our knowledge of the low water distribution of waterbirds and provide data that highlight regional variations in habitat use, whilst also informing protection of the important foraging areas identified. WeBS Low Tide Counts provide valuable information needed to gauge the potential effects on waterbirds of a variety of human activities which affect the extent or value of inter-tidal habitats, such as proposals for dock developments, recreational activities, tidal power barrages, marinas and housing schemes. Designing mitigation or compensation for such activities can be assisted using data collected under the scheme. Furthermore, the effects on bird distributions of climate change and sea level rise can be assessed.

METHODS

The scheme provides information on the numbers of waterbirds feeding on subdivisions of the inter-tidal habitat within estuaries. Given the extra work that Low Tide Counts entail, often by the same counters that carry out the Core Counts, WeBS aims to cover most individual estuaries about once every six years, although on some sites more frequent counts are made. Co-ordinated counts of waterbirds are made by volunteers each month between November and February on pre-established subdivisions of the inter-tidal habitat in the period two hours either side of low tide.

DATA PRESENTATION

Tabulated Statistics

Tables 9. and 10. present three statistics for 18 of the more numerous waterbird species present on 18 estuaries covered during the 2005/06 winter: the peak number of a species over the whole site counted in any one month (with checks for count synchronicity made from assessing proximity of count dates and consultation with Local Organisers); an estimate of the mean number present over the winter for the whole site (obtained by summing the mean counts of each species for each count section) and the mean density over the site (in birds per hectare), which is the mean number divided by the total area surveyed (in hectares). The area value used for these calculations is the sum of the inter-tidal and non-tidal components of each count section but omits the sub-tidal areas (*i.e.* those parts of the count section which are under water on a mean low tide).

Dot Density Maps

WeBS Low Tide Count data are presented as dot density maps, with subdivision of count sections into basic habitat elements. The reason for such a subdivision is to ensure species are plotted on appropriate habitat areas and to improve the accuracy of density estimates. Each section for which a count has been made is divided into a maximum of three different habitat components:

Inter-tidal: Areas that lie between mean high water and mean low water.

Sub-tidal: Areas that lie below mean low water. In more 'open-coast'-type situations, a sub-tidal zone reaching 500 m out from the inter-tidal sections has been created arbitrarily, to indicate the approximate extent of visibility offshore from land-based counts.

Non-tidal: Areas that lie above mean high water (usually saltmarsh although some grazing marshes are also covered).

The mean count for the sector is then divided amongst a varying number of the different components, dependent on the usual habitat preferences of the species involved. For example, Dunlin dots are plotted exclusively on inter-tidal sections whereas Wigeon dots are spread across inter-tidal, sub-tidal and non-tidal areas (in proportion to the relative areas of these three components).

Currently, throughout all WeBS Low Tide Count analyses, mean low tide and mean high tide are taken from the most recent Ordnance Survey 1:25000 maps (in Scotland, the lines on the OS maps are mean low water springs and mean high water springs instead). It is recognised, unfortunately, that these maps represent the current real shape of the mudflats, water channels and saltmarshes to varying degrees of accuracy. However, in the interests of uniformity across the UK, the Ordnance Survey outlines are adhered to throughout the analyses.

The maps display the average number of birds in each count section as dots spread randomly across habitat components of count sections, thus providing an indication of both numbers and density. **It is important to note that individual dots do not represent the precise position of individual birds; dots have been assigned to habitat components proportionally and are then randomly placed within those areas. No information about the distribution of birds at a finer scale than the count sector level should be inferred from the dot density maps.** For all maps in the present report, one dot is equivalent to one bird, except where stated. The size of individual dots has no relevance other than for clarity.

As most estuaries have now been covered more than once at low tide, density maps show the relative distributions of species in the winter of 2005/06 compared to an earlier winter of survey. It is hoped that comparative dot density distributions will lead to an easier and fuller appreciation of low tide estuarine waterbird distribution, and changes therein. The following colour conventions apply to density maps: red dots = 2005/06 winter; blue dots = earlier winter; pale blue = water; yellow = inter-tidal habitat (*e.g*. mudflat, sandflat); pale green = non-tidal habitat (*e.g*. saltmarsh, reedbed); grey or brown = not covered in one survey winter; dark blue = sector never covered. More detailed information concerning analysis and presentation of WeBS Low Tide Counts can be obtained from the National Organiser (WeBS Low Tide Counts), or from the publication *Estuarine Waterbirds at Low Tide* (Musgrove *et al.* 2003)

ESTUARY ACCOUNTS

The main estuaries counted at low tide in the winter of 2005/06 are discussed, including comprehensive coverage of Morecambe Bay utilising aerial survey methods. WeBS Low Tide Counts were carried out on 24 different sites, with estuary accounts encompassing 18 of these. Other counts, usually on limited numbers of sectors, were made in the winter of 2005/06 on Adur Estuary, Burry Inlet, Duddon Estuary, Langstone Harbour, Medway Estuary and Swansea Bay. These sites are not included in the estuary accounts, but data can be obtained from the WeBS Low Tide Count National Organiser upon request.

For the main site accounts, data were collected during the period November to February. Assessment of national and international importance is based on five-year peak mean counts from the main species accounts in this volume of *Wildfowl & Wader Counts*. Figure 58. shows the location of the sites discussed, and a site description is presented for each estuary. Distribution maps are presented for selected species, which are those of international or national importance, or are known to be undergoing site-level changes, where possible. General bird distribution is described for the winter of 2005/06, focusing on species held in important numbers at the site in question.

Table 9. Sites with Estuary Accounts and important bird numbers held. Numbers in parentheses refer to the location in figure 58. For species codes see table 8.

	International Importance	**National Importance**
Auchencairn Bay *(16)*	YS	*None*
Belfast Lough *(18)*	BW	SU, SP, E., GN, RM, RH, BV, GG, OC, RP, PS, RK, TT
Blackwater Estuary *(5)*	DB, GP, GV, KN, DN, BW, RK	SU, WN, T., PT, SZ, CA, AV, RU, GK
Breydon Water *(3)*	PG, WN, T., SV, GP, BW, RK	BS, EW, PT, AV, RU
Chichester Harbour *(8)*	DB, DN, BW	SU, RM, LG, SZ, GP, GV, BA, CU, RK, GK
Cleddau Estuary *(12)*	*None*	WN, T., GP, GK
Lindisfarne *(2)*	PG, JI, YS, QS, WN, BA	WS, SU, PT, E., RX, SZ, GP, GV, KN, SS, DN, CU, RK
Mersey Estuary *(13)*	SU, T., DN, BW, RK	WS, CU
Montrose Basin *(1)*	PG	WS, SU, WN, E., KN, RK
Orwell Estuary *(4)*	*None*	DB, GA, PT, AV, KN, BW, RK
Morecambe Bay *(14)* *including Piel Channel Flats, Kent, Leven, Lune & Wyre Estuaries*	PG, SU, PT, OC, KN, DN, BW, BA, CU, RK	WS, WN, T., SV, E., GN, RM, RH, GG, CA, RP, GP, GV, SS, GK, TT
Stour Estuary *(4)*	BW	DB, SU, PT, AV, GV, DN, RU, RK, TT
Strangford Lough *(17)*	MS, WS, QN, SU, GP, KN, BA, RK	WN, T., MA, PT, SV, E., GN, RM, RH, BV, GG, CO, OC, RP, GV, L., DN, BW, CU, GK

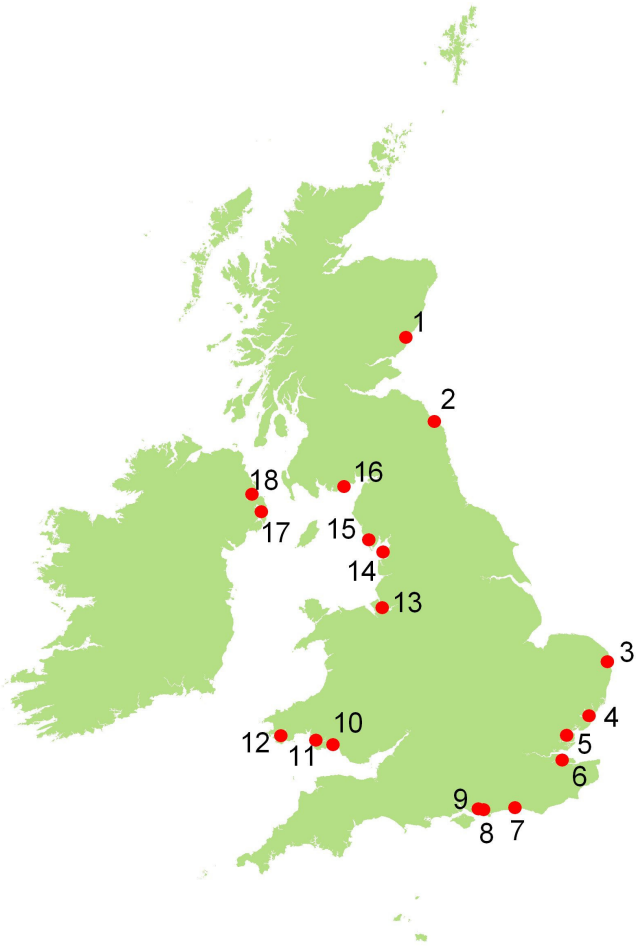

Figure 58. Map showing estuaries covered at low tide in the winter of 2005/06. 1: Montrose Basin; 2: Lindisfarne; 3: Breydon Water; 4: Stour & Orwell Estuaries; 5: Blackwater Estuary; 6: Medway Estuary; 7: Adur Estuary; 8: Chichester Harbour; 9: Langstone Harbour; 10: Swansea Bay; 11: Burry Inlet; 12: Cleddau Estuary; 13: Mersey Estuary; 14: Morecambe Bay (comprising aerial survey plus South Walney & Piel Channel Flats, Kent, Leven, Lune and Wyre Estuaries); 15: Duddon Estuary; 16: Auchencairn Bay; 17: Strangford Lough; 18: Belfast Lough.

Table 10. Peak and mean counts, and mean density (birds per ha) of 18 waterbird species across 18 estuaries covered by the 2005/06 WeBS Low Tide Counts. Orwell Estuary displayed by Stour Estuary. "+" indicates non-zero densities of <0.01 birds per ha.

	Adur Estuary			**Auchencairn Bay**			**Belfast Lough**		
	Peak	*Mean*	*Mean*	***Peak***	*Mean*	*Mean*	***Peak***	*Mean*	*Mean*
Species	***No.***	*No.*	*Dns.*	***No.***	*No.*	*Dns.*	***No.***	*No.*	*Dns.*
Brent Goose	2	1	0.01	0	0	0	91	49	0.11
Shelduck	0	0	0	75	49	0.12	347	242	0.53
Wigeon	6	3	0.04	1,000	522	1.26	262	185	0.41
Teal	111	95	1.28	2	1	+	573	431	0.95
Mallard	19	10	0.14	17	10	0.02	248	236	0.52
Pintail	0	0	0	0	0	0	0	0	0
Oystercatcher	6	4	0.05	530	408	0.99	4,546	3,935	8.63
Ringed Plover	73	44	0.59	11	24	0.03	121	168	0.27
Golden Plover	0	0	0	101	33	0.08	177	59	0.13
Grey Plover	11	7	0.09	0	0	0	0	0	0
Lapwing	1,047	633	8.55	552	138	0.33	1,710	912	2
Knot	0	0	0	0	0	0	109	44	0.1
Dunlin	256	172	2.32	2	1	+	908	583	1.28
Black-tailed Godwit	1	0	+	0	0	0	503	371	0.81
Bar-tailed Godwit	0	0	0	0	0	0	123	89	0.2
Curlew	0	0	0	98	55	0.13	494	469	1.03
Redshank	43	35	0.47	56	41	0.1	1,529	1,365	2.99
Turnstone	42	20	0.27	0	0	0	286	253	0.55

	Blackwater Estuary			**Breydon Water**			**Chichester Harbour**		
	Peak	*Mean*	*Mean*	***Peak***	*Mean*	*Mean*	***Peak***	*Mean*	*Mean*
Species	***No.***	*No.*	*Dns.*	***No.***	*No.*	*Dns.*	***No.***	*No.*	*Dns.*
Brent Goose	3,759	2,569	1.09	0	0	0	6,510	3,812	1.52
Shelduck	1,740	1,824	0.77	283	155	0.39	567	406	0.16
Wigeon	1,976	2,323	0.99	12,245	7,187	17.88	1,665	1,246	0.5
Teal	2,664	3,332	1.41	1,090	534	1.33	669	544	0.22
Mallard	79	80	0.03	278	179	0.45	64	51	0.02
Pintail	294	297	0.13	90	55	0.14	147	69	0.03
Oystercatcher	351	529	0.22	27	19	0.05	772	665	0.26
Ringed Plover	91	75	0.04	13	20	0.03	64	81	0.03
Golden Plover	8,783	7,390	3.14	14,300	11,251	27.99	1,910	1,253	0.5
Grey Plover	687	943	0.4	45	26	0.06	1,227	581	0.23
Lapwing	2,779	2,406	1.02	17,175	9,168	22.81	2,067	1,663	0.66
Knot	4,199	3,907	1.66	430	185	0.46	762	523	0.21
Dunlin	10,764	16,764	7.11	8,072	5,412	13.46	11,265	10,224	4.07
Black-tailed Godwit	624	720	0.31	1,298	1,055	2.62	472	434	0.17
Bar-tailed Godwit	163	142	0.06	0	0	0	463	328	0.13
Curlew	662	681	0.29	564	334	0.83	746	507	0.2
Redshank	2,131	2,627	1.11	1,663	1,400	3.48	751	664	0.26
Turnstone	103	168	0.07	5	2	+	117	82	0.03

	Cleddau Estuary			**Kent Estuary**			**Leven Estuary**		
	Peak	*Mean*	*Mean*	***Peak***	*Mean*	*Mean*	***Peak***	*Mean*	*Mean*
Species	***No.***	*No.*	*Dns.*	***No.***	*No.*	*Dns.*	***No.***	*No.*	*Dns.*
Brent Goose	7	4	+	0	0	0	0	0	0
Shelduck	721	607	0.46	215	329	0.19	191	84	0.06
Wigeon	2,724	2,239	1.69	157	414	0.14	537	234	0.17
Teal	1,782	1,510	1.14	86	243	0.08	77	42	0.03
Mallard	186	177	0.13	240	506	0.22	247	153	0.11
Pintail	1	0	+	497	1,080	0.45	24	8	0.01
Oystercatcher	442	300	0.23	401	451	0.36	322	222	0.17
Ringed Plover	42	37	0.03	11	22	0.01	3	11	+
Golden Plover	2,251	1,150	0.87	5	20	+	66	37	0.03
Grey Plover	12	11	0.01	0	0	0	3	1	+
Lapwing	4,531	2,997	2.27	19	40	0.02	348	148	0.11
Knot	1	0	+	30	80	0.03	173	58	0.04
Dunlin	2,736	2,409	1.82	1,524	4,422	1.38	308	221	0.16
Black-tailed Godwit	1	0	+	0	0	0	3	1	+
Bar-tailed Godwit	3	1	+	0	0	0	2	1	+
Curlew	1,092	986	0.75	440	628	0.4	243	118	0.09
Redshank	617	553	0.42	252	630	0.23	398	284	0.21
Turnstone	48	30	0.02	0	0	0	2	1	+

Table 10. continued

Species	Lindisfarne Peak No.	Lindisfarne Mean No.	Lindisfarne Mean Dns.	Lune Estuary Peak No.	Lune Estuary Mean No.	Lune Estuary Mean Dns.	Mersey Estuary Peak No.	Mersey Estuary Mean No.	Mersey Estuary Mean Dns.
Brent Goose	2,203	2,231	0.76	0	0	0	0	0	0
Shelduck	1,180	1,315	0.45	158	125	0.12	4,044	2,558	0.75
Wigeon	1,708	1,620	0.55	1,499	1,063	1.03	337	172	0.05
Teal	1,311	1,007	0.34	99	72	0.07	9,200	3,297	0.97
Mallard	494	450	0.15	368	221	0.21	273	231	0.07
Pintail	271	173	0.06	0	0	0	200	112	0.03
Oystercatcher	858	836	0.28	302	293	0.28	360	335	0.1
Ringed Plover	53	58	0.02	1	5	+	54	72	0.02
Golden Plover	1,255	880	0.3	2,600	1,280	1.23	1,500	1,290	0.38
Grey Plover	393	358	0.12	1	0	+	597	196	0.06
Lapwing	2,913	2,126	0.72	5,805	5,325	5.14	10,098	7,904	2.32
Knot	1,010	854	0.29	14,006	3,582	3.45	40	28	0.01
Dunlin	1,847	1,745	0.59	48	21	0.02	34,731	23,535	6.92
Black-tailed Godwit	4	4	+	0	0	0	312	267	0.08
Bar-tailed Godwit	1,787	1,223	0.41	738	288	0.28	2	2	+
Curlew	1,520	1,206	0.41	268	157	0.15	931	761	0.22
Redshank	853	692	0.23	568	334	0.32	2,283	1,549	0.46
Turnstone	61	62	0.02	4	2	+	414	167	0.05

Species	Montrose Basin Peak No.	Montrose Basin Mean No.	Montrose Basin Mean Dns.	S. Walney & Piel Channel Flats Peak No.	S. Walney & Piel Channel Flats Mean No.	S. Walney & Piel Channel Flats Mean Dns.	Orwell Estuary Peak No.	Orwell Estuary Mean No.	Orwell Estuary Mean Dns.
Brent Goose	22	5	0.01	29	27	0.01	1,357	920	0.75
Shelduck	1,239	900	1.12	836	833	0.37	659	450	0.37
Wigeon	4,849	3,551	4.43	260	337	0.15	1,642	1,523	1.24
Teal	263	109	0.14	6	2	+	949	578	0.47
Mallard	241	175	0.22	43	40	0.02	503	395	0.32
Pintail	112	74	0.09	4	1	+	308	249	0.2
Oystercatcher	1,140	882	1.1	5,117	5,146	2.31	1,490	1,232	1
Ringed Plover	0	0	0	44	44	0.02	162	330	0.13
Golden Plover	82	26	0.03	829	829	0.37	1,003	614	0.5
Grey Plover	0	0	0	8	8	+	268	223	0.18
Lapwing	464	219	0.27	1,249	1,369	0.61	2,438	1,512	1.23
Knot	942	537	0.67	557	293	0.13	3,569	1,691	1.38
Dunlin	20	10	0.01	1,470	721	0.32	3,468	2,878	2.35
Black-tailed Godwit	89	47	0.06	0	0	0	634	567	0.46
Bar-tailed Godwit	15	9	0.01	0	0	0	13	7	0.01
Curlew	353	196	0.24	1,185	1,102	0.49	782	708	0.58
Redshank	671	436	0.54	1,123	1,154	0.52	1,813	1,590	1.3
Turnstone	15	5	0.01	103	103	0.05	205	178	0.15

Species	Stour Estuary Peak No.	Stour Estuary Mean No.	Stour Estuary Mean Dns.	Stangford Lough Peak No.	Stangford Lough Mean No.	Stangford Lough Mean Dns.	Wyre Estuary Peak No.	Wyre Estuary Mean No.	Wyre Estuary Mean Dns.
Brent Goose	1,308	824	0.51	5,105	3,691	0.85	0	0	0
Shelduck	1,592	1,173	0.72	4,451	3,678	0.85	321	217	0.32
Wigeon	4,530	3,558	2.19	1,467	827	0.19	304	206	0.3
Teal	1,394	926	0.57	1,497	1,272	0.29	855	293	0.43
Mallard	303	259	0.16	339	265	0.06	408	254	0.37
Pintail	259	231	0.14	643	634	0.15	15	5	0.01
Oystercatcher	1,402	1,167	0.72	5,298	6,162	1.42	1,282	786	1.16
Ringed Plover	239	354	0.15	252	261	0.06	4	11	0.01
Golden Plover	911	644	0.4	7,489	4,827	1.12	855	337	0.5
Grey Plover	1,856	1,610	0.99	249	92	0.02	0	0	0
Lapwing	6,378	3,899	2.4	5,855	4,035	0.93	2,772	2,348	3.46
Knot	7,762	7,001	4.3	8,014	5,614	1.3	230	127	0.19
Dunlin	13,678	12,470	7.66	7,669	6,484	1.5	663	555	0.82
Black-tailed Godwit	1,123	771	0.47	717	400	0.09	221	85	0.13
Bar-tailed Godwit	66	46	0.03	652	646	0.15	7	4	0.01
Curlew	835	764	0.47	1,250	1,283	0.3	363	268	0.39
Redshank	1,940	1,789	1.1	2,679	2,705	0.63	849	490	0.72
Turnstone	481	443	0.27	219	184	0.04	21	11	0.02