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2007 Non-estuarine Coastal Waterbird Survey: Preparation & Stratification

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1. Background

In 1997-98 NEWS (Rehfisch *et al*. 2003b) repeated the first large-scale survey of the non-estuarine coasts of the UK, the 1984-85 Winter Shorebird Count (WSC).

The UK results showed that numbers of Ringed Plover, Sanderling, Purple Sandpiper, Bar-tailed Godwit and Turnstone had declined by over 15% between the WSC and NEWS, all species that occur in internationally important numbers on this habitat in the UK (Rehfisch *et al*. 2003b). Furthermore, the declines and changes in distribution were found to be associated with changes in weather between the two surveys (Rehfisch *et al*. 2004). Recent Wetland Bird Survey work suggests that the declines recorded in GB could be explained by increases in some northern European countries (Maclean, *et al*. in prep.). Wader distributions appear to be very sensitive to weather (Austin & Rehfisch 2005).

Following the nine-yearly cycle of surveys, the next survey of the UK's open coasts, NEWS II, will occur during the 2006-07 winter. NEWS II data will help revise wader population estimates and contribute towards reliable the non-breeding waterbird biodiversity indicators being developed with the assistance of Scottish Executive and Scottish Natural Heritage.

NEWS II has the following objectives:

(a) To contribute towards the revision of wader population estimates and non-breeding waterbird biodiversity indicators in the United Kingdom.

(b) To further increase international collaboration during counts of waterbirds on non-estuarine coasts.

(c) To collect the data to subsequently make it possible to determine whether the distributional shifts observed with warming winters have continued, and thus to test whether the scenarios of continuing decline with warming winters proposed by Rehfisch *et al*. (2004) are realistic.

(d) To contribute towards determining the randomised stratified approach that the Wetland Bird Survey could decide to use to gather annual count data from the non-estuarine coast. Unlike at present, a randomised stratified approach should make it possible to generate realistic annual population trends for these declining species (see Rehfisch *et al*. 2003a and 2003b for further details).

(e) To contribute data that will be fed into the "Natural Heritage Trends: Abundance of non-breeding waterbirds" indicators that are being developed by BTO for Scottish Executive and Scottish Natural Heritage.

This text reports back on the completion of the NEWS II stratification and survey documentation in advance of survey data collection during the 2006/07 winter.

2. Survey Preparation and Stratification

The 2007 Non-estuarine Coastal Waterbird Survey II (NEWSII 2007) preparation is going to plan.

The boundaries of the count stretches counted by the 1985 Winter Shorebird Count (WSC) and the 1998 Non-estuarine Coastal Waterbird Survey (NEWS 1998) are being updated on ArcView GIS using the Watsonian Vice County boundary data obtained from the National Biodiversity Network. Previously the boundaries had been digitised at a much lower level of resolution (Appendix 1).

The non-estuarine coastal stretches to be sampled during NEWSII 2007 have been selected (see Appendix 1 for further details). This has required the writing of programs to generate the pseudo-random stratification.

The NEWSII 2007 count methodology is a development of that used during the WSC and NEWS 1998 (Moser 1987, Rehfisch *et al*. 2003). It has been described and methods sheets produced for the counters (Appendix 2).

The NEWSII 2007 survey forms with count stretch maps are being completed (example in Appendix 3).

The basic data analysis programs have been produced.

3. Conclusions

No major impediments are foreseen for the collection of survey data from December 2006 to January 2007. However, funds are being actively sought to allow fieldworkers to be recruited to cover any gaps in the coverage obtained by volunteers, and further funds are being sought to write up the final survey results in a refereed journal.

The survey results should be ready for publication as planned during the 2007-08 financial year.

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Appendix 1 The stratification, random sampling, and GIS work carried out for NEWSII 2007

Standardising count stretch lengths

The random sample of non-estuarine stretches to be sampled during NEWS2007 has been drawn principally from the complete list of count stretches defined for the 1985 Winter Shorebird Count (WSC). However some of these were subdivided for NEWS 1998 to standardise the length of coastal stretches to below 4 km (aiming at average of 2 km). In general, the precise count stretch boundaries are aligned to habitat features to aid identification of stretch start and end. The random sample of stretches was selected after the WSC stretches had been subdivided into standardised lengths.

Stratification based on geographical location

Although habitat descriptions were recorded for WSC these were subjective and believed not to be consistent across the country. So for example what an observer on the east coast could call "sand" (i.e. less muddy than the local norm) an observer on the west coast could call "mud" (i.e. less sandy than the local norm). Similarly, what an observer on an exposed coastline wcuild consider a well vegetated substrate an observer on a sheltered coastline might consider largely unvegetated. We know of no objective description of the entire UK coastline, in a suitable electronic form for use in GIS. Therefore the stratification has been based on geographic location rather than habitat descriptions. This should ensure that the random selection is representative of all habitats along the UK coastline with the exception of the high cliffs that are inaccessible to observers, and that were excluded from both WSC and NEWS1998.

There are two tiers to the geographic stratification. The top tier relates to the county boundaries in force during WSC (1974 county definitions) to ensure a pseudo-random stratification. (The final population estimates will be produced for up to date county boundaries.) The second tier relates to areas within these counties. These areas represent contiguous stretches of coastline, originally defined by local survey organisers for reasons of survey management, that provide a means for subdividing larger counties in an unbiased manner.

Within each Region / Area the count stretches visited by WSC / NEWS 1998 have been sorted by pseudo-random stratification into a Region / Area list.

Local survey organisers will be requested to assign count stretches to observers in the order that the stretches have been randomly selected into the Region / Area list. The survey organisers can exclude a count stretch if it is inaccessible by practical means. In each area, the local survey organisers will aim to obtain a minimum coverage of all or 10 count stretches, whichever is the lesser value. Data from additional count stretches will be welcomed but these will be used selectively unless all stretches of higher priority have been visited. This will help to ensure that the final results are not biased by observers visiting known high density or "honey pot" waterbird locations and that differences in the degree of coverage obtained in the various regions can be allowed for in the final analyses. This method of allocating random count areas has previously been successfully used for surveys of naturalised geese and waterbirds of dispersed habitats (Rehfisch *et al*. 2002, Jackson *et al*. in press, Austin *et al*. in review).

GIS preparation

In order to allow the generation of customised count forms (i.e. map with count stretch boundaries defined) a definitive GIS based NEWS count stretch definition inventory (CSDI) (equating to CUDI for WeBS) has been generated. This new CSDI replaces a previous version that related to a much less precise GIS version of the UK coastline. The new CSDI is aligned to the lowtide mark (based on Watsonian Vice County boundary data obtained from the National Biodiversity Network) which is

more appropriate for the NEWS survey for which counts are focused on the period around low tide. This major task involves digitising 7399 count stretches.

Appendix 2 NEWSII 2007 Supplementary methodological information form

Supplementary Information for the Non-estuarine Coastal Waterbird Survey 2006/07

Please use the information on this sheet in conjunction with the instructions on the NEWS recording form.

When should the counts be made?

A *single* count of waterbirds (*i.e.* waders, wildfowl, divers, grebes, cormorants, shags, herons and egrets) on non-estuarine coasts should be made on any date between December 15th 2006 and 31st January 2007. However, ideally the counts should be made as close to mid-January as possible to coincide with the January International Waterbird Count. **Counts should be made at any time within a 7 hour period commencing 3.5 hours before the advertised time of low water and finishing 3.5 hours after low water.** Ideally, adjoining sections should be counted on the same day. If this is not possible, then counts on different dates are acceptable.

Where to count

Waterbirds should be recorded separately from the three habitats:

(a) The **intertidal** shore between the high and low tide marks (*essential).*
(b) The **sea** adjacent to the coast, as far as you can see (unless particularly difficult).
(c) The **inland** areas visible from or near the high water mark (unless particularly difficult).

What to count

Recording waders on the intertidal habitat is the priority for this survey. Please ensure that you cover the entire intertidal habitat and count all wader species within this area.

However, **whenever possible**, **in addition to waders** we would also encourage counters to record any other species of waterbirds (*i.e.* wildfowl, divers and grebes, cormorants, shags, herons and egrets) within the section.

- We do realise that for some areas of coastline, the sheer number and diversity of birds present, the weather conditions and the local geography will make the accurate recording of every species impracticable. **However, in these circumstances an approximate count would be better than no count, but please bracket the counts to indicate that they were a 'best guess'**. There are spaces on the recording form to write in any additional species of waterbird.

- Please write "NC" (No Count) in the appropriate space if a species was present, which you were unable to count. Please tick the box at the top of the each habitat section if you looked for waders or other waterbirds but none was present. ***This is very important*** because it is the only way we will be able to distinguish Nil Returns (no birds present) from No Counts (birds present but not counted).

Sections of Coastline to be counted

We are intending to retain a representative sample of the existing NEWS count sections, of which none will exceed 4 km in length.

The sections to be counted will be supplied to the Regional Organiser as a prioritised list of count sections based on the those covered in past surveys. It is therefore very important to stick to the coastal section indicated on the map on the recording form (*i.e*. please do not 'lump' sections together). The number of selected sections supplied to each Organiser will reflect the likely levels of coverage attainable in his or her region/area. The selected sections will be listed in descending order of importance, with the 'key' sections for coverage at the top of the list, and those of lesser importance at the end, and will include sections known to have held both large and small numbers of waterbirds during the previous survey. Therefore, we would like Regional Organisers to ensure that at the very least, the 'key' sections are covered, and to contact the BTO as soon as possible if this proves to be difficult or impossible.

Making the counts

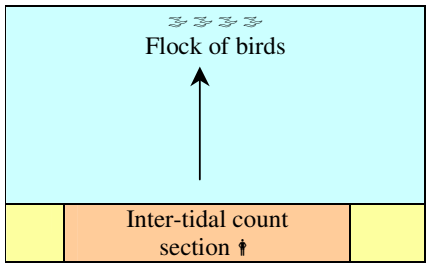
Intertidal Area: Wherever possible, where there is a wide shore, please try to walk well down the intertidal area as many waterbirds tend to feed at the water's edge, and might be difficult to count from higher up. Ideally, the counts should be carried out in good weather conditions, commencing on a falling tide. **Please ensure that you have read the pink 'General Health and Safety' form before commencing with any counts. Always be aware of the possibility of the tide cutting you off from the landward side. Take special care if traversing slippery rocks.**

To avoid missing or counting birds twice, **only count those waterbirds that you walk past**. Any waterbirds disturbed from the beach ahead of the counter that subsequently fly past (and therefore behind the observer), or inland/out to sea, or beyond the end of the section **should** be recorded. Any birds that fly past you from behind, and subsequently land in the section ahead of the observer should be ignored as they will probably already have been recorded. The exception to this would be if the species involved had not been previously recorded, thus ruling out the possibility of double recording. Any waterbirds observed merely flying along/over the section without actually landing in it **should not** be recorded.

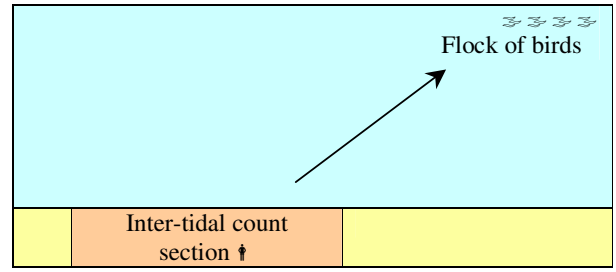
To prevent flushing the birds in front of you out of the count section, try to walk around flocks of birds. This is likely to be a major problem, as birds will tend to move ahead of the counter and often build up at a break in the substrate type *e.g.* at the point where rocks becomes sand. If there is a large concentration of several species, it is likely to be difficult to get an accurate count once they are airborne. Try and see if there is an apparent movement of birds ahead of you and try to minimise this by walking higher up the beach if you think that it will lessen the disturbance.

Offshore: Only those waterbirds actually offshore from a section should be included within the counts of that section (see example *a* below). **Please do not include birds when they are not directly opposite the count section** (see example *b* below). You may record birds as far offshore as you feel confident in being able to identify them.

a)



b)



Offshore birds flying past should not be recorded unless they were originally on the sea within the section, or they land offshore from the section being counted. Please record as far out to sea as you feel confident in being able to identify the birds.

Inland: Please only record waterbirds that are within 100 m of the high-water mark.

Birds flying inland of the high-water mark should not be counted, unless they have taken off from the section currently being counted or have landed in it.

If it is not possible to see inland from the beach because of cliffs, then no counts can be made, so please **do not** 'tick' the inland habitat box on the form. However, there may be sections where although it is possible to see inland from the intertidal area, the habitat is totally unsuitable for waterbirds, because of an urban environment *etc.* In these instances, please mark the inland habitat box with a cross (X)

General: It will probably be easiest to count birds on the sea and inland at regular intervals along the count section.

Any flocks of waterbirds in the intertidal area, inland or offshore that overlap two sections need to be counted carefully. Only record that portion of the flock that occurs within the relevant section.

NEWS 2006/07
COUNT FORM

INSTRUCTIONS FOR THE 2006/07 NON-ESTUARINE COUNTS RECORDING FORM

This form is for recording numbers of Waterbirds (i.e. Waders and Wildfowl) at LOW TIDE on open non-estuarine coasts, inland fields and adjacent areas of sea. Numbered sections below refer to those on the following pages. It is very important that you make counts within Coast Sections provided by the Regional Organiser so that direct comparisons can be made with the 1997/98 NEWS Survey. Please make all counts at any time WITHIN A 7 HOUR PERIOD COMMENCING 3 ½ HOURS BEFORE THE LOCAL ADVERTISED TIME OF LOW WATER AND FINISHING 3 ½ HOURS AFTER LOW WATER. The survey runs from December 15th 2006 to 31st January 2007.

Safety – coasts can be dangerous. Take great care. Please inform someone of when and where you are counting and your expected time home. Counts along the base of cliffs must be made on a FALLING TIDE.

Please ensure that you have read the PINK HEALTH AND SAFETY LEAFLET enclosed with this form BEFORE commencing any counts.

1 **COUNTER DETAILS:** Please provide all details requested.

2 **SITE AND AREA AND COUNT SECTION CODES:** these codes are already on the form, but if you have any questions please ask your Regional Count Organiser.

3 **DATE AND TIME:** Please enter the date and approximate start and finish times of the count for each coast section (e.g. 0900/1300).

4 **BIRD COUNTS:** Please enter the numbers of each species of waterbird counted BETWEEN THE HIGH AND LOW WATER MARK in the intertidal box.

Please also enter the numbers of waterbird on INLAND habitats which are visible from the shore in the Inland box.
Please enter the numbers of wildfowl and divers and grebes which are visible ON THE SEA in the Sea box.
Please record additional species of waterbird observed in the blank lines provided.

- Movements of birds might occur as you survey the Coast Section. Count only those birds which you walk past, or which fly behind you or fly inland. Birds which fly FROM BEHIND you should be ignored if there is a possibility they have been counted already. The exception to this are species not previously recorded during the count.
- Write "NC" (No Count) in the appropriate box if a species was present which you were unable to count.
- Birds flying overhead should be excluded unless obviously using your count area.
- Please tick the box at the top of the section if you looked for those species but none was present. This will allow us to distinguish Nil Returns (no birds present) from No Counts (birds present but not counted).

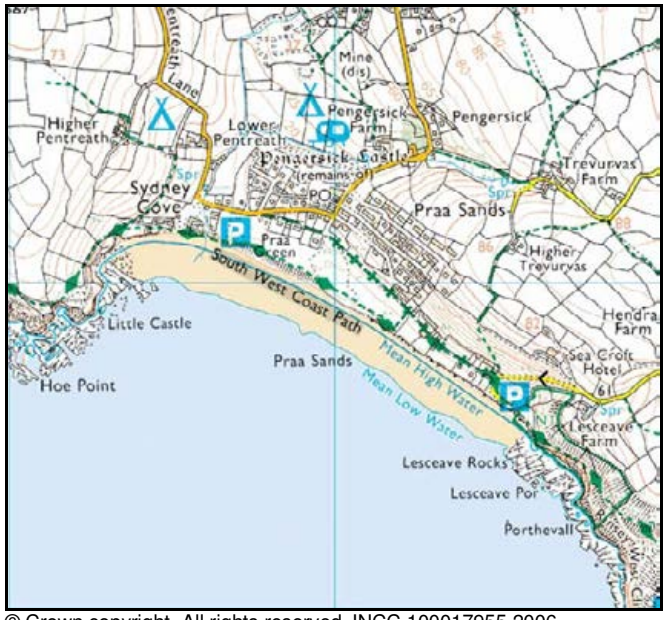
5 **COUNT CONDITIONS:** Using the key provided, please circle the appropriate number to indicate the state of the tide, if the site is tidal or close to tidal waters and give an approximate value for the percentage of your count area covered by ice.

6 **COVERAGE:** Recording of coverage is essential if we are to interpret your counts properly. Please circle the most appropriate answer to each question. This will enable us to deduce whether you were able to record a reasonably accurate count or whether your counts were low as a result of any problems you may have experienced.

7 **ADDITIONAL INFORMATION:** Please provide any other additional information you feel is relevant. ***Please mark on the map any location(s) within the Coast Section which held important concentrations of birds.***

Please do NOT use this form for any other section than the one detailed overleaf.

1 NAME AND ADDRESS / OR WeBS Counter Code:	2 SITE: SITE CODE: GRID REFERENCE: COVERAGE PRIORITY:
3 DATE: TIME (start/finish):	



5 COUNT CONDITIONS	
% of water area in count unit covered by ice	
State of tide: circle the appropriate number	1 2 3
KEY: 1 Rising 2 Falling 3 Low	

6 COVERAGE			
Do you feel your counts of waterbirds were reasonably accurate (circle 'OK') or did other factors (e.g. weather or disturbance) prevent you from recording a significant number of the birds present (circle 'LOW')?			
Count accuracy	OK / LOW		
If 'LOW', which of the following affected your count (please ✓ the appropriate box/boxes)?	IT	S	IN
I did not cover all of my count area	❑	❑	❑
Poor visibility (due to fog, glare, heavy rain etc.)	❑	❑	❑
High levels of disturbance	❑	❑	❑

7 ADDITIONAL INFORMATION

4 WADERS:		INTER-TIDAL	SEA	INLAND
Species	**Code**			
Please ✓ box if habitat counted		❑	❑	❑
Please ✓ box if no waders present	XS	❑	❑	❑
Oystercatcher	OC			
Ringed Plover	RP			
Golden Plover	GP			
Grey Plover	GV			
Lapwing	L.			
Knot	KN			
Sanderling	SS			
Purple Sandpiper	PS			
Dunlin	DN			
Bar-tailed Godwit	BA			
Curlew	CU			
Redshank	RK			
Turnstone	TT			

OTHER WATERBIRDS:		INTER-TIDAL	SEA	INLAND
Species	**Code**			
Please ✓ box if habitat counted		❑	❑	❑
Please ✓ box if no other waterbirds present	XW	❑	❑	❑
Red-throated Diver	RH			
Black-throated Diver	BV			
Great Northern Diver	ND			
Great Crested Grebe	GG			
Red-necked Grebe	RX			
Slavonian Grebe	SZ			
Black-necked Grebe	BN			
Cormorant	CA			
Shag	SA			
Little Egret	ET			
Grey Heron	H.			
Shelduck	SU			
Scaup	SP			
Eider	E.			
Common Scoter	CX			
Velvet Scoter	VS			
Goldeneye	GN			
Red-br. Merganser	RM			
Long-tailed Duck	LN			