JOINT NATURE CONSERVATION COMMITTEE

JNCC Report
No. 388

Recommendations for the selection of, and boundary options for, an SPA in Liverpool Bay

by

Webb A., McSorley C.A., Dean B.J. and Reid J.B.

Joint Nature Conservation Committee, Dunnet House, 7 Thistle Place, Aberdeen AB10 1UZ

For further information please contact:

Joint Nature Conservation Committee
Dunnet House
7 Thistle Place
Aberdeen
AB10 1UZ

This report should be cited as:

Webb A., McSorley C.A., Dean B.J. and Reid J.B.
Recommendations for the selection of, and boundary options for, an SPA in Liverpool Bay
JNCC Report, No. 388

Contents

1. Introduction

Webb *et al*. (2004) reported analyses of aerial survey data aimed at identifying likely numbers and distributions of waterbirds using Liverpool Bay in the non-breeding season. The results indicated that Liverpool Bay hosted populations of red-throated divers Gavia stellata andcommon scoter Melanitta nigra in numbers that exceeded thresholds that would qualify the site for SPA status. This report follows from Webb *et al*. (2004) and aims to identify options for boundaries for any possible SPA in Liverpool Bay; it must be read in conjunction with Webb *et al*. (2004), not least because of frequent reference to the latter herein.

In assessing Liverpool Bay for possible SPA qualification, Webb *et al*. (2004) recommended that it be considered a single site because aggregations of both red-throated divers and common scoter were relatively continuously distributed over the site, occurring at distances less than 10 km apart. If this recommendation is accepted, population assessments used in Stage 1 and 2 judgements (below) should therefore apply to Liverpool Bay as a whole rather than to any sub-areas or disjunct aggregations of birds.

1.1 Adequacy of potential data sources for Stage 1 and 2 judgements

The data presented in Webb *et al*. (2004) are the best available for red-throated divers *Gavia stellata* and common scoter *Melanitta nigra* in Liverpool Bay and the analyses those most likely to yield un-biased population estimates. However, the surveys covered only two seasons, while a minimum of three is required in order to assess whether qualifying numbers occur on a regular basis. Other data-sets are very unlikely to be of similar quality, and would yield population underestimates, in many cases serious underestimates.

In some areas, aggregations of divers extend over 15 km from the shore. These are not visible from land; land-based surveyors would rarely be able to count waterbirds effectively at distances over 2 km and never more than 4 km from land. Webb and Reid (in prep.) discuss issues of data adequacy in more detail.

Stage 1 judgements. In assessing whether a site qualifies as an SPA, the consideration of data that led to large population underestimates might undermine the value and efficacy of good quality data, such as those obtained from line-transect aerial surveys. However, it may prove necessary to use such data from one or more seasons when assessing qualification of the site at Stage 1 of the SPA selection guidelines. If more than one season of shore-based data are available to make this assessment, it would be inappropriate to choose only one of these; rather, data from all seasons would be necessary for an assessment of regularity (as defined for Ramsar purposes and adopted in the SPA selection guidelines).

For example, if only two seasons of best quality data are available for a site, it would be necessary to consider the best available data from other surveys in order to complete the Stage 1 selection. If data collected using the next best method were available from one other season, it would be possible to carry out the Stage 1 selection using the "two out of three seasons" rule for assessing regularity. If data were available from three or more other seasons, it would be necessary to apply the "five-year mean of peak count" rule using the three most recent data-sets other than those for which the best quality data exist.

Divers were not included in aerial surveys of Liverpool Bay in 2000/01 (Oliver *et al*. 2001). Consequently, other data-sets that allow a judgement of whether Liverpool Bay qualifies at Stage 1 of the SPA guidelines must be considered. Aerial surveys were carried out in Liverpool Bay by JNCC (then the Nature Conservancy Council) Seabirds at Sea Team in 1987 – 1989 (Webb *et al*. 1990; Barton *et al*. 1994). These were sporadic and neither targeted nor assessed total numbers of red-throated divers. Other data-sets for the area are likely to have been collected by shore-based observers over a number of seasons, such as the WeBS

survey database. The WeBS database includes count data for the estuaries in Liverpool Bay, but probably not for areas of open coastline nor other areas not visible from land. It should be treated as the least acceptable data source for use in Stage 1 judgements. If there is a data-set available that comprises systematic and comprehensive counts from land (but we are not aware of any) then it should be used in preference to WeBS data.

We recommend that in making a Stage 1 judgement of the suitability of Liverpool Bay as an SPA for red-throated divers, count data presented in Webb *et al*. (2004) be used in determining peak numbers in Liverpool Bay in (the non-breeding) seasons 2001/02 and 2002/03. In assessing regularity of the species at the site, peak counts from previous seasons should be taken from the next best available survey data, but no more than three most recent seasons.

If only one other season of "next best" data is available, the Stage 1 judgement should be based on whether the numbers in Liverpool Bay exceed 1% of the GB population of red-throated divers in two out of the three seasons.

If two other seasons of "next best" data are available, the Stage 1 judgements should be based on whether the numbers in Liverpool Bay exceed 1% of the GB population of red-throated divers in three out of the four seasons.

If three other seasons of "next best" data are available, the Stage 1 judgements should be based on whether the mean of the peak count of red-throated divers for five seasons in Liverpool Bay exceeds 1% of the GB population.

It is perhaps worth noting that if no red-throated divers were counted in Liverpool Bay from surveys in each of three seasons prior to 2001/02, peak numbers counted during the more recent aerial surveys are sufficiently high that the five year mean would still exceed 1% of the GB population for the species. However, application of the "five-year mean of peak count" rule for assessing regularity in such a case would be perverse given that the species had been recorded in only two seasons.

For common scoter in Liverpool Bay, aerial survey data exist for one season (2000/01) in addition to the two on which spatial analyses were performed (Oliver *et al*. 2001). Although not collected using the line transect methods of Webb *et al*. (2004), they are clearly superior to any alternative data that might exist.

We recommend that data contained in Oliver *et al*. (2001) be the only other data used in conjunction with those reported in Webb *et al*. (2004) in assessing whether Liverpool Bay hosts SPA qualifying numbers of common scoter on a regular basis. The site may be said to qualify at Stage 1.2 for this species if at least 1% of the biogeographical population is present in two out of the three seasons for which aerial survey data are available.

Other species might be judged for inclusion within a possible SPA such as great crested grebe *Podiceps cristatus*, common eider *Somateria mollissima*, red-breasted merganser *Mergus serrator* and little gull *Larus minutus*; where possible estimated numbers of these are presented in Table 5 of Webb *et al*. (2004). It is not possible to assess whether numbers of little gulls in Liverpool Bay would qualify the site as an SPA for this species as no GB population estimate exists. We recommend that none of these other species be considered for selection at Stages 1.1 and 1.2 of the SPA selection guidelines. Of course, selection at Stage 2 (Stage 1.4) might be appropriate for all of them.

Stage 2 judgements. Webb and Reid (in prep.) recommend that an assessment be made of the history of occupation of a site when making Stage 2 judgements of a site's suitability for SPA status, and that this assumes greater significance in sites for inshore waterbirds. When making such an assessment, due account should be taken of data quality issues.

Apart from red-throated divers and common scoter, other species might qualify a site using Stage 2 judgements in cases where insufficient sites for those species have been selected in the SPA suite as a whole. This might pertain most to the little gull, SPAs for which cannot

presently be selected at Stage 1.1 in the absence of a GB population estimate for the species. In this case, a Stage 2 judgement could be made when a full inventory of all GB wintering sites for little gulls had been compiled; Liverpool Bay might also qualify as an SPA for this species in due course.

1.2 Boundary selection for a possible SPA in Liverpool Bay

The most important areas for red-throated divers and common scoter in Liverpool Bay are presented in Figures 10 and 14 respectively in Webb *et al*. (2004); the regularity with which they were found to occur is presented in Figures 11 and 15. These form the basis for determining the seaward boundary if the whole site were to be selected as an SPA for these species, following guidelines laid out by Webb and Reid (in prep.; see above also). These guidelines were based on analyses of spatial distribution of inshore species in Carmarthen Bay and in the outer Tay area (McSorley *et al*. 2004.)

The type of analysis that proved necessary for red-throated divers in Liverpool Bay resulted in a complex distribution pattern comprising core areas in which aggregations occurred on more than one occasion, large sections of core area in which aggregations occurred only once, and also multiple satellites that occurred only once or more than once. McSorley *et al.* (2004) suggested that SPA boundaries for a site should include all core areas for qualifying species and that satellites should be included where these occur on a regular basis. They did not offer an operational definition of what constituted a satellite aggregation, and the frequency (regularity) with which a satellite need occur in order for it to be included within the boundary.

In defining a satellite aggregation, we suggest that the important (see Webb *et al*. 2004) grid cells of a satellite aggregation must be separated from the important grid cells of a core area by at least 500m. We suggest further that an extensive(precautionary) SPA boundary should include important cells of a satellite if they have been found to be important on more than one or more than 10% of occasions, whichever is the greater percentage. A more conservative boundary might be determined if it included important grid cells of satellites if they have been found to be important on more than two or more than 20% of occasions, whichever is the greater percentage.

We present two options for an SPA boundary in Liverpool Bay – an extensive one and a conservative one – independently for red-throated divers (Figure 1) and for common scoter (Figure 2). They are presented in the context of the frequency with which grid cells were found to be important in the aerial surveys. These boundaries are those that we would recommend if Liverpool Bay were to be selected as an SPA for one or the other species on its own. The extensive and conservative boundary options for common scoter do not differ markedly from each other, whereas there is a slightly greater difference between the two boundary options for red-throated diver.

The suggested boundary options for red-throated divers are based upon probability of occurrence rather than, as for common scoter, predicted density. It was possible to use data from only five individual surveys in making these predictions. In order to relate these suggested boundaries to the observed density of red-throated divers from all surveys, the recommended boundary is plotted in the context of the mean observed density of all divers in a 2 x 2 km grid (Figure 3). This shows that a few aggregations of red-throated divers occurred outside the recommended boundary in some of the surveys for which data did not allow geostatistical and spatial analyses. In a few cases, red-throated divers were recorded in distance bands that precluded geostatistical and spatial analyses, although most of the data from the same surveys did allow such analyses. In very few cases, a whole cluster of geostatistically analysed grid cells occurred in conjunction with a single or group of diver sightings, but all grid cells were excluded from the spatial analysis because the interpolated probability of occurrence fell below the *a priori* probability threshold. We recommend only very limited use of information contained in Figure 3 (mean observed density) in order to

adjust the red-throated diver boundary; its use should be limited to adjustment of the boundary location with respect to satellite aggregations identified from geostatistical and spatial analysis (Figure 1).

We recommend that the extensive options for boundaries be used because a) the extensive boundary option for common scoter differs little from the conservative option, and b) as highlighted above, the extensive boundary option for red-throated divers excludes a number of small aggregations observed in surveys not used for the geostatistical analysis.

Boundary options for Liverpool Bay suggested in Figures 1 and 2 are based on selection as an SPA for either red-throated diver or common scoter in isolation. Figure 4 presents a composite boundary if Liverpool were to be selected as an SPA for both species; this is defined by the outer (seaward) of the two species boundaries when they are not coincident when overlaid.

1.3 Further boundary considerations

We recommend that the final seaward boundary should be based on Figures 1, 2 or 4, depending on which species, if any pass Stages 1 and 2 of the SPA selection guidelines. Figures 1, 2 and 4 include little information about the landward extent of any boundary or any extension beyond the limits of the survey area. The recommended boundaries have been identified independently of any political considerations, such as shipping routes, offshore energy sites or locations of existing (mainly terrestrial) SPAs.

Extensions to land The landward extent of any SPA boundary would usually be taken to the MHWM (Webb and Reid, in prep.). We recommend that this be applied throughout the entire (potential) SPA, except where a) it can be established that the species used in site selection do(es) not occur in waters of the inter-tidal zone at high water and b) an SPA already exists (see below). However, final boundary determination needs to be considered carefully in the local context.

Interface with existing SPA boundaries Six, possibly seven, mainly terrestrial, SPAs have been classified or are in the process of being classified on the coast abutting the possible Liverpool Bay marine SPA. These are Ynys Seiriol/Puffin Island, Traeth Lafan/Lavan Sands (Conwy Bay), the Dee Estuary (which, in fact, extends below MLWM to the estuary mouth), perhaps the Mersey Estuary, Mersey Narrows and North Wirral Foreshore, Ribble and Alt Estuaries, and Morecambe Bay. These extend from land to, but not beyond, the MLWM. We recommend that where the landward boundary abuts an existing SPA, the existing SPA boundary be used as the boundary also of the marine SPA.

Extension beyond the limits of the survey Some modification to any final SPA boundary might be needed in areas not surveyed or only partially surveyed as part of the Liverpool Bay aerial survey programme. This might apply to Dulas and Lligwy Bays off Anglesey; possibly in Liverpool Bay itself, and also in Morecambe Bay.

The decision on extension into Dulas and Lligwy Bays should be based upon local information. If no WeBS count data exist for this area, then information might exist in local bird reports or other local ornithological resources. The nature of marine habitat in these bays suggests that they may hold small but regularly occurring aggregations of red-throated divers.

Similarly, a decision needs to be made regarding possible extension into Morecambe Bay. Some surveys were carried out in this area but recorded no common scoters and only a few, isolated occurrences of red-throated divers. Based solely on the information we have presented, we would recommend that any potential boundary does not extend further north of Rossall Point, Lancashire.

Major shipping routes Parts of the possible Liverpool Bay marine SPA are affected by major shipping routes. The most significant of these are from the Mersey Estuary and in the Lune

Deep off the coast of Lancashire. The latter serves ports such as Fleetwood and Heysham in Lancashire and follows a naturally occurring channel out of Morecambe Bay. The Mersey outfall follows a distinct channel, and in common with the Lune Deep, is marked with navigation buoys.

Additional consideration should be made of whether other species might be added to the qualifying species for a possible Liverpool Bay marine SPA. Of most relevance would be migrating terns (not surveyed), roosting gull assemblages, and feeding and resting little gulls. Little gulls in particular may occur in Liverpool Bay at or near qualifying numbers for future selection at Stage 1.1 of the SPA selection guidelines and are also known to feed around the outfall of the Mersey Estuary (Eades 1982) and in smaller numbers in Morecambe Bay (Webb *et al*. 1990). We recommend that as a precautionary measure, the buoyed channels in the Lune Deep and in the Mersey outfall should not be excluded from any possible Liverpool Bay marine SPA boundary, and that decisions be made only with regard to the qualifying interests of the site.

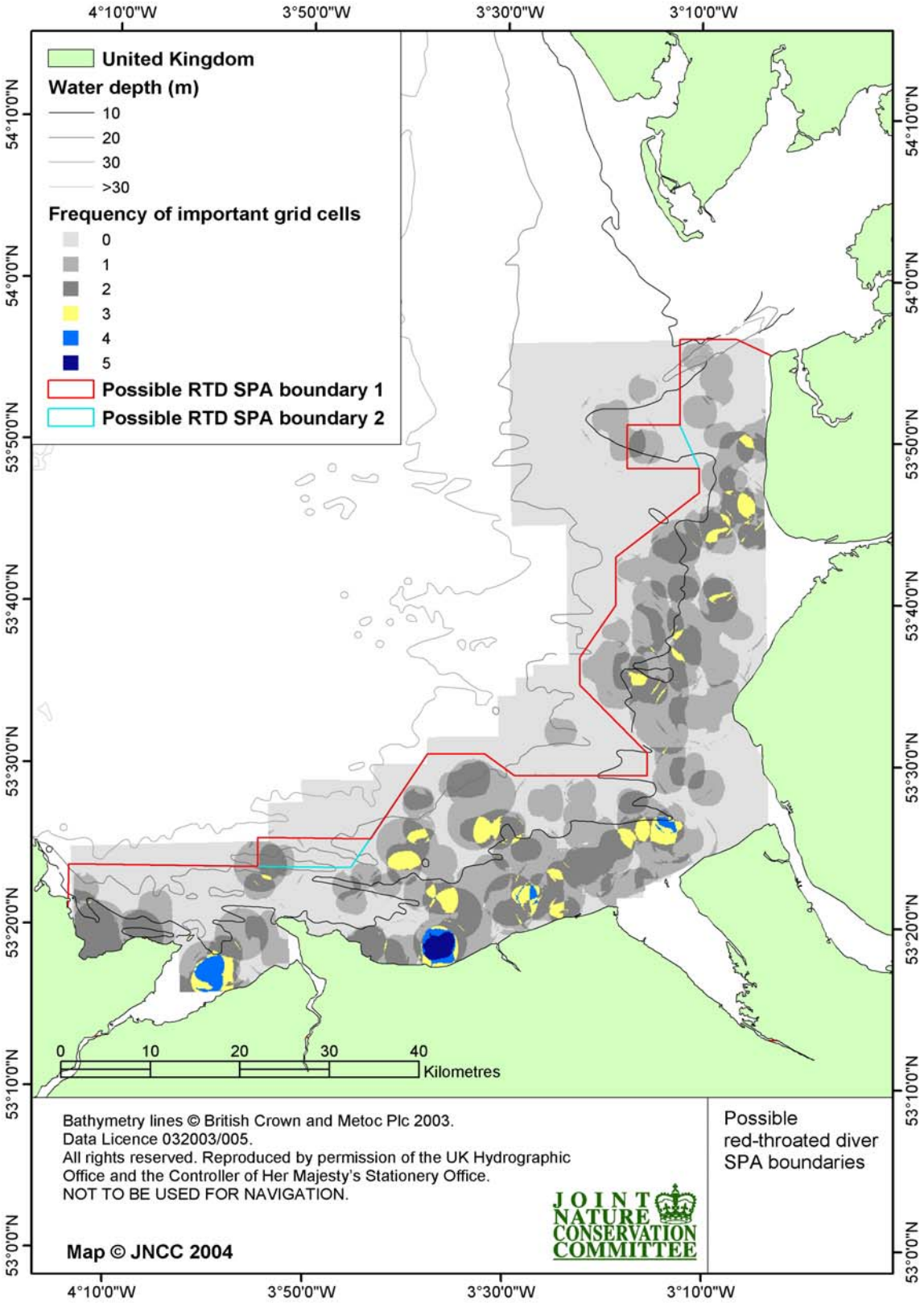

Figure 1. The location of possible conservative (blue/red) and extensive (red) SPA boundaries in Liverpool Bay if selected as a marine SPA for red-throated divers. Boundaries encompass the distribution and frequency of occurrence of important grid cells for red-throated divers (see text and Figure 11 in Webb *et al*. 2004). Co-ordinates of boundaries are presented in Appendix I.

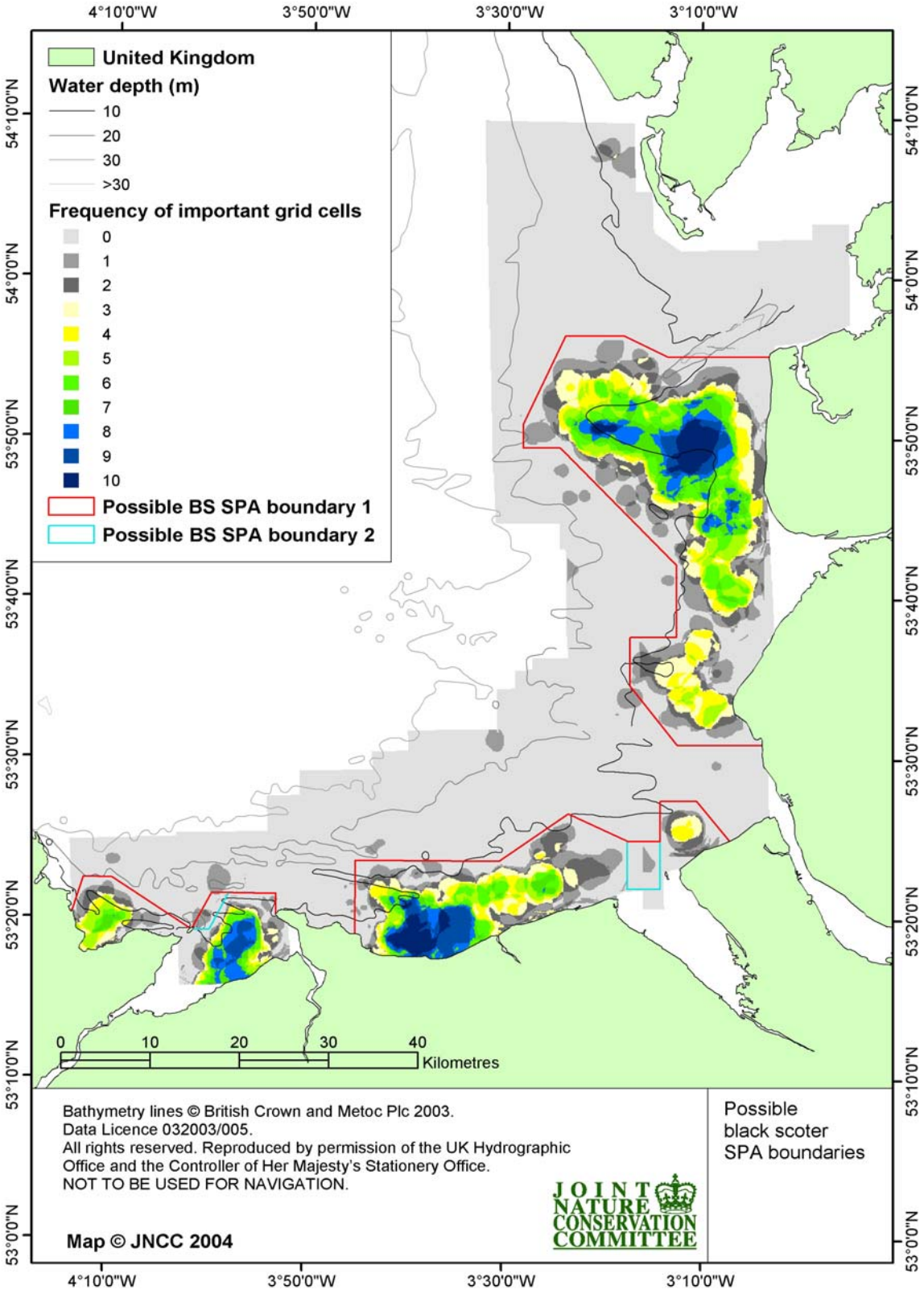

Figure 2. The location of possible conservative (blue/red) and extensive (red) SPA boundaries in Liverpool Bay if selected as a marine SPA for common scoter. Boundaries encompass the distribution and frequency of occurrence of important grid cells for common scoter (see text and Figure 15 in Webb *et al*. 2004). Co-ordinates of boundaries are presented in Appendix II.

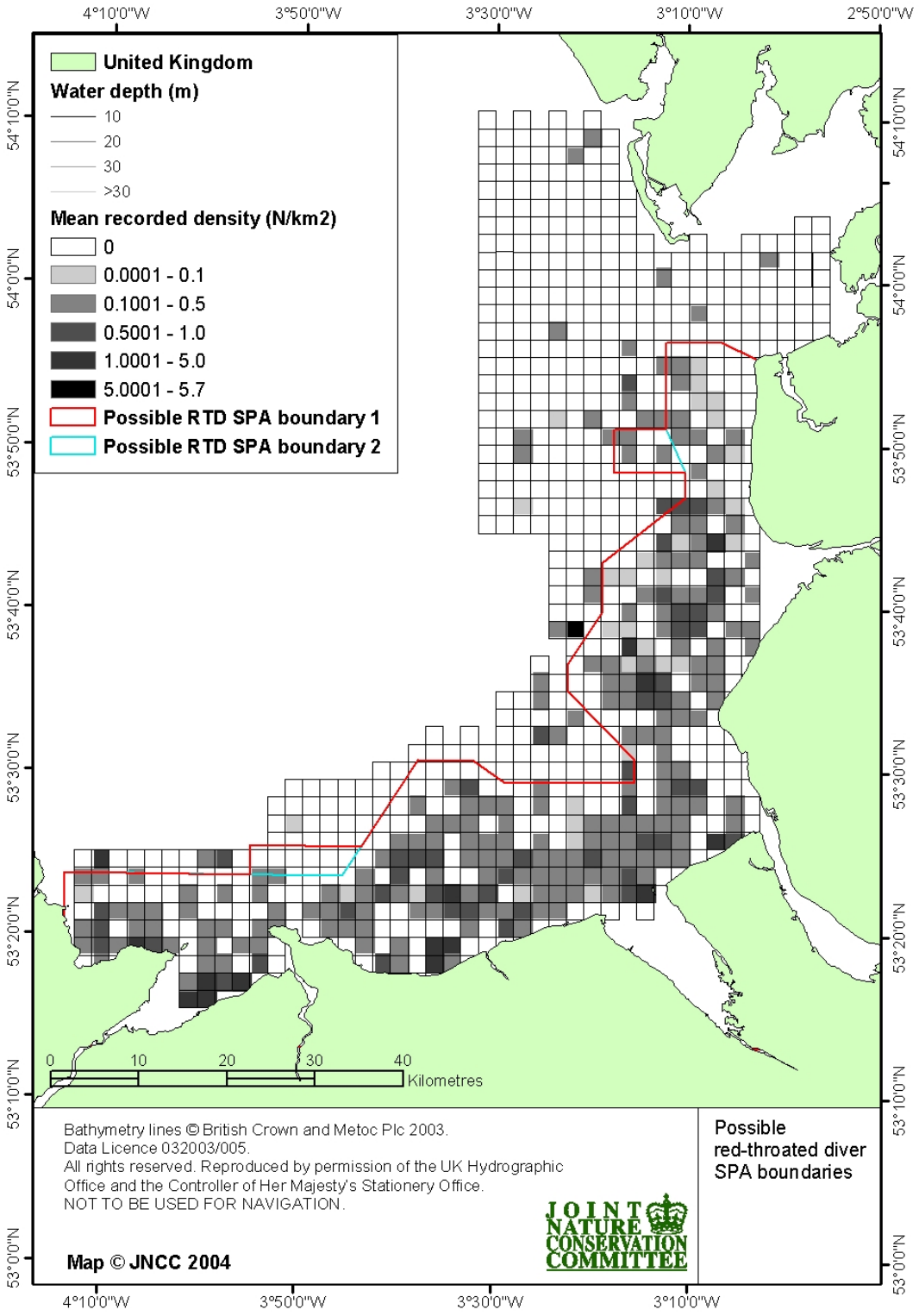

Figure 3. The location of possible conservative (blue/red) and extensive (red) SPA boundaries in Liverpool Bay if selected as a marine SPA for red-throated divers. Boundaries are placed in the context of the mean observed density of all divers in a 2 x 2 km grid (see text and Figure 2 in Webb *et al.* 2004).

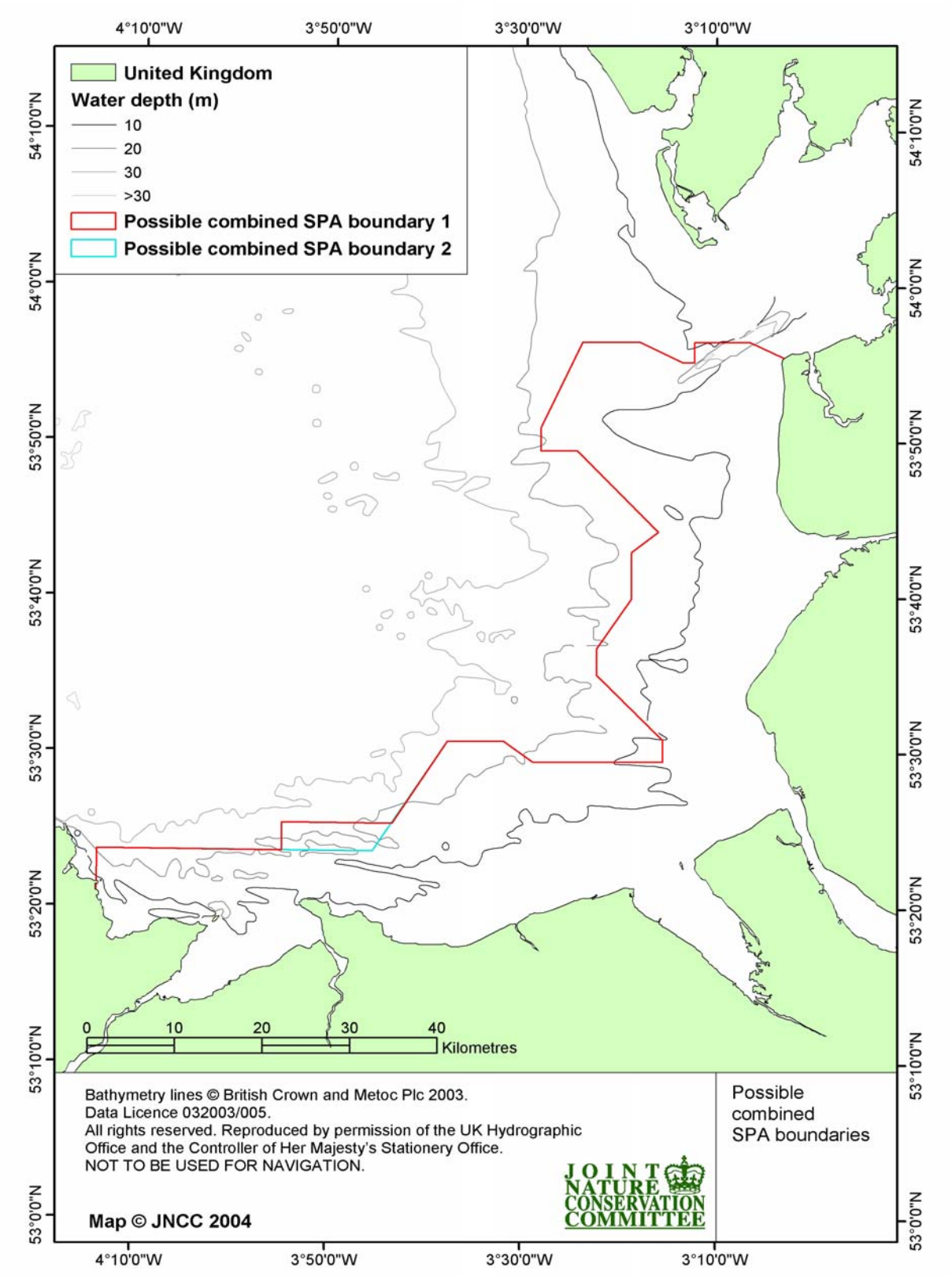

Figure 4. The location of possible conservative (blue/red) and extensive (red) SPA boundaries in Liverpool Bay if selected as a marine SPA for both red-throated divers and common scoter. Boundaries are defined by the outer (seaward) of the two species boundaries (Figures 1 and 2) when they are not coincident when overlaid (see text). Co-ordinates of boundaries are presented in Appendix III.

2. Acknowledgements

We thank Ravenair (Cheshire Flying Services) for aircraft provision and expert flying. Thanks also to those who read and commented on the report - Adam Cole-King (CCW), Sian Whitehead (CCW), Andy Brown (EN), and Allan Drewitt (EN), and to members of the UK SPA and Ramsar Scientific Working Group, and the JNCC Marine Natura Project Group for valuable advice and comment.

3. References

BARTON, T. R., BARTON, C., WEBB, A., & CARTER, I. C. 1994 Seabird distribution in inshore waters of the western United Kingdom between Wick and St. David's Head from aerial surveys in 1987-1991. 183. Joint Nature Conservation Committee Report.

EADES, R. A. 1982 Notes on the distribution and feeding of little gulls at sea in Liverpool Bay. Seabird Report 6, pp. 115-121.

McSORLEY C.A., WEBB A., DEAN B.J. & REID J.B. 2004. Inshore marine Special Protection Areas: a methodological evaluation of site selection and boundary determination. JNCC Report, No. 344.

OLIVER F., ROBINSON P & HARROD C. 2001. Common Scoter **Melanitta nigra** in Liverpool Bay. CCW contract science report no 470. Casella Stanger.

WEBB, A., HARRISON, N. M., LEAPER, G. M., STEELE, R. D., TASKER, M. L., & PIENKOWSKI, M. W. 1990 Seabird distribution west of Britain. Nature Conservancy Council, Peterborough.

WEBB A., McSORLEY C.A., DEAN B.J., REID J.B., CRANSWICK P.A., SMITH L. & HALL C. 2004. An assessment of the numbers and distributions of inshore aggregations of waterbirds using Liverpool Bay during the non-breeding season in support of possible SPA identification JNCC Report No. 373.

WEBB A. & REID J.B. IN PREP. Guidelines for the selection of marine SPAs for aggregations of inshore non-breeding waterbirds. Unpublished consultation paper, JNCC.

4. Appendix I

Table showing latitude and longitude (degrees, minutes and decimal minutes) co-ordinates of possible red-throated diver SPA boundaries. Parallels of latitude and meridians of longitude were used as far as possible, and diagonals were used where appropriate. Boundary vertices were located to one decimal place of minutes and to the nearest whole minute where possible. Boundaries 1 (extensive) and 2 (conservative) are shown separately.

Co-ordinates of possible red-throated diver SPA boundaries			
Boundary 1		Boundary 2	
Latitude	Longitude	Latitude	Longitude
53°20.0’	-4°14.0’	53°20.0’	-4°14.0’
53°23.7’	-4°14.0’	53°23.7’	-4°14.0’
53°23.7’	-3°54.9’	53°23.7’	-3°45.5’
53°25.5’	-3°54.9’	53°30.8’	-3°37.8’
53°25.5’	-3°43.5’	53°30.8’	-3°32.0’
53°30.8’	-3°37.8’	53°29.5’	-3°29.0’
53°30.8’	-3°32.0’	53°29.5’	-3°15.5’
53°29.5’	-3°29.0’	53°30.9’	-3°15.5’
53°29.5’	-3°15.5’	53°35.1’	-3°22.4’
53°30.9’	-3°15.5’	53°36.8’	-3°22.4’
53°35.1’	-3°22.4’	53°40.0’	-3°18.8’
53°36.8’	-3°22.4’	53°43.0’	-3°18.8’
53°40.0’	-3°18.8’	53°47.0’	-3°10.3’
53°43.0’	-3°18.8’	53°48.5’	-3°10.3’
53°47.0’	-3°10.3’	53°51.2’	-3°12.3’
53°48.5’	-3°10.3’	53°56.5’	-3°12.3’
53°48.5’	-3°17.7’	53°56.5’	-3°06.5’
53°51.2’	-3°17.7’	53°55.5’	-3°03.0’
53°51.2’	-3°12.3’		
53°56.5’	-3°12.3’		
53°56.5’	-3°06.5’		
53°55.5’	-3°03.0’		

5. Appendix II

Table showing latitude and longitude (degrees, minutes and decimal minutes) co-ordinates of possible common scoter SPA boundaries. Parallels of latitude and meridians of longitude were used as far as possible, and diagonals were used where appropriate. Boundary vertices were located to one decimal place of minutes and to the nearest whole minute where possible. Boundaries 1 (extensive) and 2 (conservative) are shown separately.

Co-ordinates of possible common scoter SPA boundaries			
Boundary 1		Boundary 2	
Latitude	Longitude	Latitude	Longitude
53°31.0’	-3°03.8’	53°31.0’	-3°03.8’
53°31.0’	-3°12.5’	53°31.0’	-3°12.5’
53°34.7’	-3°17.3’	53°34.7’	-3°17.3’
53°37.7’	-3°17.3’	53°37.7’	-3°17.3’
53°37.7’	-3°12.6’	53°37.7’	-3°12.6’
53°42.2’	-3°12.6’	53°42.2’	-3°12.6’
53°49.5’	-3°24.5’	53°49.5’	-3°24.5’
53°49.5’	-3°28.3’	53°49.5’	-3°28.3’
53°51.0’	-3°28.3’	53°51.0’	-3°28.3’
53°56.5’	-3°24.0’	53°56.5’	-3°24.0’
53°56.5’	-3°18.0’	53°56.5’	-3°18.0’
53°55.2’	-3°13.5’	53°55.2’	-3°13.5’
53°55.2’	-3°03.0’	53°55.2’	-3°03.0’
53°20.5’	-4°13.5’	53°20.5’	-4°13.5’
53°22.5’	-4°12.5’	53°22.5’	-4°12.5’
53°22.5’	-4°09.6’	53°22.5’	-4°09.6’
53°19.3’	-4°01.5’	53°19.3’	-4°01.5’
53°21.6’	-3°59.5’	53°19.3’	-3°59.7’
53°21.6’	-3°53.0’	53°21.6’	-3°57.8’
53°20.3’	-3°53.0’	53°21.6’	-3°53.0’
53°19.0’	-3°45.0’	53°20.3’	-3°53.0’
53°23.7’	-3°45.0’	53°19.0’	-3°45.0’
53°23.7’	-3°30.5’	53°23.7’	-3°45.0’
53°26.7’	-3°23.5’	53°23.7’	-3°30.5’
53°25.0’	-3°17.5’	53°26.7’	-3°23.5’
53°25.0’	-3°14.2’	53°25.0’	-3°17.5’
53°27.5’	-3°14.2’	53°22.0’	-3°17.5’
53°27.5’	-3°10.5’	53°22.0’	-3°14.2’
53°24.9’	-3°07.0’	53°27.5’	-3°14.2’
		53°27.5’	-3°10.5’
		53°24.9’	-3°07.0’

6. Appendix III

Table showing latitude and longitude (degrees, minutes and decimal minutes) co-ordinates of possible combined SPA boundaries. Parallels of latitude and meridians of longitude were used as far as possible, and diagonals were used where appropriate. Boundary vertices were located to one decimal place of minutes and to the nearest whole minute where possible. Boundaries 1 (extensive) and 2 (conservative) are shown separately.

Co-ordinates of possible combined SPA boundaries			
Boundary 1		Boundary 2	
Latitude	Longitude	Latitude	Longitude
53°20.0’	-4°14.0’	53°20.0’	-4°14.0’
53°23.7’	-4°14.0’	53°23.7’	-4°14.0’
53°23.7’	-3°54.9’	53°23.7’	-3°45.5’
53°25.5’	-3°54.9’	53°30.8’	-3°37.8’
53°25.5’	-3°43.5’	53°30.8’	-3°37.8’
53°30.8’	-3°37.8’	53°30.8’	-3°32.0’
53°30.8’	-3°32.0’	53°29.5’	-3°29.0’
53°29.5’	-3°29.0’	53°29.5’	-3°15.5’
53°29.5’	-3°15.5’	53°30.9’	-3°15.5’
53°30.9’	-3°15.5’	53°35.1’	-3°22.4’
53°35.1’	-3°22.4’	53°36.8’	-3°22.4’
53°36.8’	-3°22.4’	53°40.0’	-3°18.8’
53°40.0’	-3°18.8’	53°43.0’	-3°18.8’
53°43.0’	-3°18.8’	53°44.3’	-3°16.0’
53°44.3’	-3°16.0’	53°49.5’	-3°24.5’
53°49.5’	-3°24.5’	53°49.5’	-3°28.3’
53°49.5’	-3°28.3’	53°51.0’	-3°28.3’
53°51.0’	-3°28.3’	53°56.5’	-3°24.0’
53°56.5’	-3°24.0’	53°56.5’	-3°18.0’
53°56.5’	-3°18.0’	53°55.2’	-3°13.5’
53°55.2’	-3°13.5’	53°55.2’	-3°12.3’
53°55.2’	-3°12.3’	53°56.5’	-3°12.3’
53°56.5’	-3°12.3’	53°56.5’	-3°06.5’
53°56.5’	-3°06.5’	53°55.5’	-3°03.0’
53°55.5’	-3°03.0’		