Principles guiding the use of evidence in the identification of possible Special Protection Areas in Scotland

Questions on the document should be addressed to:
seabirds@jncc.gov.uk

For further information on marine SPAs visit: http://jncc.defra.gov.uk/page-1414

For further information on Joint Nature Conservation Committee visit:
http://jncc.defra.gov.uk/default.aspx?page=1729

Contents

1   Background

In 1979 the European Commission adopted the Birds Directive which, amongst other conservation measures, requires Member States to classify Special Protection Areas (SPAs) for birds listed on Annex I to the Directive and for regularly occurring migratory species.

In Scotland, Scottish Natural Heritage (SNH) and the Joint Nature Conservation Committee (JNCC) have worked jointly on the identification of possible SPAs in Scottish inshore and offshore waters for seabirds and waterbirds. Gathering evidence, including field data collection and analysis, was a key task in the SPA identification work undertaken by JNCC in offshore waters but also in inshore waters on behalf of SNH. The work was guided by an overarching principle to use the best available evidence. This present document describes the type of evidence used by JNCC during the identification of possible SPAs around Scotland, and sets out the standards followed to guide the way in which evidence was considered.

At a national Scottish SPA stakeholder workshop in March 2016, stakeholders enquired about the types of data, and in particular the age of data that was used to identify possible SPAs. This document aims to address those queries by providing the following information: the first part of the document outlines the principles used in the selection of suitable data and analytical methods, the second part describes in more detail the data used under the different strands of work with particular emphasis on their age.

2   Principles guiding the use of the best available evidence

The following principles formed a framework to guide the use of evidence as part of the identification of possible SPAs in Scottish inshore and offshore waters:

Principle 1: Use suitable data to provide the required evidence

The identification and delimitation of SPAs must be entirely based on scientific criteria. Accordingly, possible marine SPAs have been identified drawing upon data representing the best available scientific evidence on the abundance and distribution of seabirds and waterbirds in Scotland's marine environment. What constitutes 'data to provide best available evidence' will vary by species and the Area of Search[1]; for example, data are likely to be more detailed for areas closer to the coast than for offshore areas.

The key data requirement for an assessment whether an area is suitable as a marine SPA is being able to show whether a relatively high density of a species[2] occurs at a particular location on a regular basis, compared to a 'background' density for that species on a national scale. Consistent high number of individuals is used as an indication of the importance of that marine area for the birds.

Available data were used as much as possible to reduce the overall cost of the marine SPA identification process. Where available data were not suitable or did not exist, JNCC collected or commissioned further data collection for the marine SPA identification process.

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[1] To identify possible SPAs for wintering waterbirds around the UK, the existing data were used to assess which initial coastal areas might be important – the Areas of Search. These were then investigated in more detail during the full analysis (see this document for a more detailed explanation)
[2] Annex I or regularly occurring migratory species, as listed in the EC Birds Directive (Directive 2009/147/EC, codified version)

Depending on the ecology and the distribution of the different species of seabirds and waterbirds, the type of data collection varied. The species of interest, together with the corresponding data collection and analysis, were grouped into the strands of work set out in Table 1 below. These aimed to identify:

- waterbird aggregations during the winter,
- seabird aggregations throughout the year,
- feeding areas for breeding large terns ,
- feeding areas for breeding little terns ,
- feeding areas for breeding red-throated divers, and
- feeding areas for breeding European shag.

Table 1. Type of data used in the different strands of work used in Scotland.

Strand of work	Data type used	Period of data collection	Further information
Waterbirds (winter)	Aerial surveys	2001 - 2010	Exact age of data will depend on the Area of Search (Annex 1)
	Land-based counts	1998 - 2012	Exact age of data will depend on the Area of Search (Annex 1)
	Boat-based surveys	1998 - 2011	Exact age of data will depend on the Area of Search (Annex 1)
Seabirds (all seasons)	Boat transect data (ESAS)	1980 - 2004	Based on one overarching analysis, hence for all species equal
Large terns (breeding)	Tracking data	2006 - 2011	Exact age of data will depend on colony and species
Little terns (breeding)	Boat transect data	2011	
	Land-based counts	2009 - 2011	Exact age of data will depend on the colony
Red-throated (breeding) divers		2003 - 2007	Based on generic model, hence for all breeding sites equal
European shag (breeding)	Tracking data	1980 - 2010	Exact age of data will depend on Area of Search
	Boat transect data (ESAS)	1980 - 2004	Exact age of data will depend on Area of Search
	Land-based and boat-based counts	1998 - 2007	Exact age of data will depend on Area of Search

In cases where more than one data set is available, JNCC aimed to select the best data for each species and season, that is, those data that provided a good coverage of the entire Area of Search, data that were not biased by external factors - e.g. adverse weather conditions, and data that were as recent as possible. The selection and filtering of data are described in detail in the reports available for the different types of analysis.

The analysis aimed to identify aggregations and feeding areas that are used consistently across years. For this purpose the use of recent data is important to warrant that observed bird aggregations remain to be present, however, the age of the data is less important than having sets of data that are comparable over several years and are therefore able to show the presence of an important area over a longer period of time; if an area is used consistently across the several years for which data were available it was assumed the area will remain to be an important area[3].

Principle 2: Peer review of data and methods

JNCC have an evidence quality assurance policy[4] which sets out principles for providing scientific advice and evidence. These principles include consideration of the suitability of the evidence for its intended use, robustness of analysis, and peer review of evidence and scientific advice.

All of the evidence upon which JNCC's marine SPA advice is based on, has been peer reviewed. There are several stages of peer review identified in JNCC's evidence quality assurance guidance, from level 1: self assessment, up to level 4: external independent peer review. The evidence used in the marine SPA identification process has received external independent peer review; the highest level of peer review. Peer review was sought at key stages during the process of identifying data sources, designing surveys for further data collection, data analysis and interpretation, and the final evidence based advice.

In summary, JNCC's marine SPA advice is extensively quality assured, making extensive use of external independent peer review.

Principle 3: Communication and publication of data and methods

All evidence used to identify possible SPAs is available through a series of reports and other background material. When presenting the scientific evidence, any uncertainties in the knowledge and confidence in the evidence is acknowledged.

More general information on the identification of marine SPAs can be found on the website http://jncc.defra.gov.uk/page-4560. Rather than provide an exhaustive list, the key publications for the SPA identification work are listed below.

Waterbird aggregations during the winter

JNCC Report 567, Lawson, J., Kober, K., Win, I., Bingham, C., Buxton, N.E., Mudge, G., Webb, A., Reid, J.B., Black, J., Way, L. & O'Brien, S., (2015), An assessment of numbers of wintering divers, seaduck and grebes in inshore marine areas of Scotland, JNCC Report 567, ISSN 0963 8901

Seabird aggregations throughout the year

JNCC Report 461, Kober, K., Wilson, L.J., Black, J., O'Brien, S., Allen, S., Win, I., Bingham, C. & Reid, J.B., (2012), The identification of possible marine SPAs for seabirds in the UK: The

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[3] Note that developers are required to collect data over a multi-year period that is in close proximity to the date that the application is submitted to Regulators. Whilst this requirement appears to be at odds with the use of older data for the SPA identification, the purpose of the evidence is different in these two processes. While the SPA identification aims to identify areas that are *consistently* used by high densities of seabirds, assessments of the impact of a development need to use contemporary data to understand the likely impact *when the development is happening*.

[4] Available at: http://jncc.defra.gov.uk/default.aspx?page=6675

application of Stage 1.1-1.4 of the SPA selection guidelines, JNCC Report 461, A4, 85pp, ISSN 0963 8901

JNCC Report 537, Cook, Aonghais S.C.P., Still, David A., Humphreys, Elizabeth M. & Wright, Lucy J., (2015), Review of evidence for identified seabird aggregations, JNCC Report 537, ISSN 0963 8901

<u>Feeding areas for breeding large terns</u>

JNCC report 500, Wilson L. J., Black J., Brewer, M. J., Potts, J. M., Kuepfer, A., Win I., Kober K., Bingham C., Mavor R. & Webb A., (2014), Quantifying usage of the marine environment by terns Sterna sp. around their breeding colony SPAs, JNCC Report 500, ISSN 0963 8901

<u>Feeding areas for breeding little terns</u>

JNCC Report 548, Parsons, M., Lawson, J., Lewis, M., Lawrence, R. & Kuepfer, A., (2015), Quantifying foraging areas of little tern around its breeding colony SPA during chick-rearing, JNCC Report 548, ISSN 0963 8901

<u>Feeding areas for breeding red-throated divers</u>

JNCC Report 541, Black, J., Dean B.J., Webb A., Lewis, M., Okill D. and Reid J.B., (2015), Identification of important marine areas in the UK for red-throated divers (Gavia stellata) during the breeding season, JNCC Report 541, ISSN 0963 8091

<u>Feeding areas for breeding European shag</u>

JNCC Report 556, Daunt, F., Bogdanova, M., McDonald, C. & Wanless, S., (2015), Determining important marine areas used by European shag breeding on the Isle of May that might merit consideration as additional SPAs, JNCC Report 556, ISSN 0963 8901

All JNCC reports can be found on the website: JNCC reports can be found on the website http://jncc.defra.gov.uk/page-2132.

3   Evidence used under the different strands of work

3.1   Important areas for wintering waterbird aggregations

In the UK, waterbirds aggregate mainly during the non-breeding season at specific coastal areas such as bays, firths and estuaries. To focus survey effort, existing survey data and ornithological literature were consulted to identify areas that could potentially contain qualifying aggregations of waterfowl; these are the 'Areas of Search'. An extensive programme of visual aerial surveys has then been undertaken within the Areas of Search, supported by shore-based and boat-based counts, aiming to identify important aggregations of waterbirds within these Areas of Search during the winter season. Depending on how the 17 different species were distributed within the Areas of Search, data used for the identification of the most important areas[5] were either derived from a number of years of aerial surveys (species with distributions further offshore), land-based counts (species with distributions very close to the coast) or boat-based surveys (species with distributions further offshore but not well detected from aeroplanes). Timings of these surveys varied between the Areas of search. In Scotland aerial surveys took place between 2001 – 2010, boat-based surveys took place between 1998 and 2011, and land-based counts were conducted

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[5] See:
http://jncc.defra.gov.uk/pdf/SAS_Identification_of_important_marine_areas_for_inshore_wintering_waterbird_aggregations%20.pdf

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between 1998 and 2012 (see Annex 1 for more details). Further information is available in JNCC report 567[6].

3.2 Important areas for seabirds throughout the year

A single all incorporating analysis identified important areas for 31 seabird species which use UK waters on a regular basis. The analysis[7] used data derived from the European Seabirds at Sea (ESAS) database[8], which stores observations of seabirds from boat or aircraft in European waters. The boat-based data extracted from the database for the analysis covers the period 1980 to 2004. To allow for the best available data coverage, all years of data were combined to produce individual maps per species and season. Consequently, the maps present an 'average' distribution of the respective species observed between 1980 and 2004. The subsequent identification of possible SPAs for these species was based on these distribution maps and their underlying ESAS data. Further details on this analysis are presented in JNCC Report 431[9].

3.3 Important areas for breeding large terns

The study aimed to identify the most important marine feeding areas to complement existing colony SPAs throughout the UK that had been classified for large terns. The analysis[10] covered four species of tern that breed in the UK: Arctic, common, roseate and Sandwich terns. Since there are many colony SPAs for terns, it was prohibitive to collect data at all sites and a statistical modelling approach was taken to characterise the types of marine environment used by foraging terns; the modelling used data collected from a sub-sample of colonies. The modelling outputs were used to identify potential feeding areas around all colony SPAs around the UK where terns were present. The work included the collection of up to three years of visual tracking data at 12 tern colonies between 2009 and 2011, combined with data collected between 2006 and 2008 that was made available to JNCC under a data sharing agreement. Colony specific models were developed for three Scottish colonies where sufficient data were available.. For colonies where no data were collected, a generic model was developed from the data collected elsewhere in the UK; these generic models were used at the remaining 10 Scottish tern colonies. Accordingly, data collection periods differed between colonies, depending on when site-specific data were collected or which model was used (see Annex 2 for details). Further information is available in JNCC report 500[11].

3.4 Important areas for breeding little terns

Based on available literature, little terns do not forage far from the breeding colony and do not travel more than 5km out to sea. JNCC itself undertook and externally commissioned, shore-based and boat-based surveys to assess the rate at which little terns were found at increasing distances along the shore and out to sea from the colony. These data were analysed[12] to identify important feeding areas to complement existing colony SPAs for little terns. The Ythan Estuary, Sands of Forvie & Meikle Loch SPA is the only Scottish SPA where little terns occur regularly. Here, data were collected from boats in 2011, and shore-

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[6] Available at: http://jncc.defra.gov.uk/pdf/Report_567_web.pdf
[7] Available at:
http://jncc.defra.gov.uk/pdf/SAS_Identification_of_important_marine_areas_for_seabirds.pdf
[8] For further information, see: http://jncc.defra.gov.uk/page-4469
[9] See: http://jncc.defra.gov.uk/page-5622
[10] Available at
http://jncc.defra.gov.uk/pdf/SAS_Identification_of_important_marine_areas_for_larger_terns.pdf
[11] Available at: http://jncc.defra.gov.uk/page-6644
[12] See: http://jncc.defra.gov.uk/pdf/SAS_Identification_of_important_marine_areas_for_little_terns.pdf

based counts took place between 2009 and 2011. Further information is available in JNCC report 548[13].

3.5 Important areas for breeding red-throated diver

Red-throated divers breed close to small lochans around Scotland's coastal areas and islands. They forage in marine inshore waters with limited foraging ranges. Boat-based surveys collected data that were used to identify the most important at-sea foraging areas[14] around important red-throated diver breeding areas. The data were collected between 2003 – 2007 around breeding sites at Shetland (2003 – 2006), Orkney (2005), and the Outer Hebrides (2007). The data were combined in a generic model to predict important feeding areas around all known breeding sites in Scotland. Further information is available in JNCC report 541[15].

3.6 Important areas for breeding European shag

The approach to identify important areas for shag was based on existing data from a variety of sources: at the Moray Firth the analysis of ESAS data to identify important areas for seabirds (see above) was used to determine possible SPAs for shags; in the Firth of Forth (Isle of May) existing telemetry data, compass logger data, and GPS logger data were used to identify important areas[16] for shags; and at Scapa Flow and North Orkney the analysis of shore-based and boat-based count data to identify important areas for wintering waterbirds (see above) was used to identified important areas for shags. Further information is available in JNCC report 556[17].

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[13] See: http://jncc.defra.gov.uk/pdf/Report_548_web.pdf
[14] See: http://jncc.defra.gov.uk/pdf/SAS_Identification_of_important_marine_areas_for_breeding_red-throated_divers.pdf
[15] See: http://jncc.defra.gov.uk/PDF/Report_541_web.pdf
[16] See: http://jncc.defra.gov.uk/pdf/SAS_Identification_of_important_marine_areas_for_European_shags.pdf
[17] See: http://jncc.defra.gov.uk/pdf/Report_556_web.pdf

Annex 1. Data collection periods for wintering waterbirds

Table A1 provides the calendar years when data were available on wintering waterbird distributions. Data collection did not necessarily take place during all years in the given range. Some boat-based survey and land-based counts were obtained from different sources, the range given incorporates all sources. The suitability of data collection types and/or years of data collection can vary for different species, hence not all years of data generally available were used for each species. For more details refer to [JNCC report 567](#)[18].

Table A1. Periods of data collection for aerial surveys

Area of Search	Period of data collection
Firth of Forth	2001 - 2005
Firth of Tay	2001 - 2005
Aberdeen Bay	2003 - 2006
Moray Firth	2002 - 2007
Scapa Flow	2002 - 2006
North Orkney	2006 - 2008
West Shetland	2008 - 2010
East Shetland	2008 - 2010
Unst	2008 - 2009
Loch Eriboll	-
Wester Ross	2008 - 2009
Broad Bay	2009 - 2010
Outer Hebrides	2003 - 2007
Coll and Tiree	2004 - 2008
Mull	2004 - 2007
Loch Indaal	2008 - 2009
Sound of Gigha	2005 - 2008
Firth of Clyde	2006 - 2007
Loch Ryan	2006 - 2007
Luce Bay	2006 - 2008
Solway Firth	2001 - 2006

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[18] See http://jncc.defra.gov.uk/pdf/Report_567_web.pdf

Table A2. Periods of data collection for boat-based surveys[19]

Area of Search	Period of data collection
Firth of Forth	1998
Firth of Tay	1998
Aberdeen Bay	-
Moray Firth	-
Scapa Flow	-
North Orkney	-
West Shetland	2000 - 2011
East Shetland	2000 - 2011
Unst	-
Loch Eriboll	-
Wester Ross	-
Broad Bay	-
Outer Hebrides	-
Coll and Tiree	-
Mull	-
Loch Indaal	-
Sound of Gigha	2000 - 2007
Firth of Clyde	-
Loch Ryan	-
Luce Bay	-
Solway Firth	-

Table A3. Periods of data collection for land-based counts[19]

Area of Search	Period of data collection
Firth of Forth	2006 - 2011
Firth of Tay	2006 - 2011
Aberdeen Bay	2004 - 2007
Moray Firth	2001 – 2011
Scapa Flow	1998 – 2007
North Orkney	2006 – 2011
West Shetland	2005 - 2011
East Shetland	-
Unst	2005 - 2010
Loch Eriboll	2005 - 2010
Wester Ross	2006-2011
Broad Bay	2006 - 2011
Outer Hebrides	2006 - 2011
Coll and Tiree	-
Mull	2006 - 2011
Loch Indaal	2005 - 2010
Sound of Gigha	2008 - 2013
Firth of Clyde	2006 - 2011
Loch Ryan	2005 - 2010

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[19] Where a range of different sources is available, the overall time frame of the combined sources is provided.

Area of Search	Period of data collection
Luce Bay	2009 - 2012
Solway Firth	2006 - 2011

Annex 2. Data collection periods for large terns

Colony	Period of data collection
Fetlar	Arctic tern, generic model, 2009 - 2011
Mousa	Arctic tern, generic model, 2009 - 2011
Papa Stour	Arctic tern, generic model, 2009 - 2011
Foula	Arctic tern, generic model, 2009 - 2011
Fair Isle	Arctic tern, generic model, 2009 - 2011
Auskerry	Arctic tern, generic model, 2009 - 2011
Papa Westray (North Hill and Holm)	Arctic tern, generic model, 2009 - 2011
Rousay	Arctic tern, generic model, 2009 - 2011
Pentland Firth Islands	Arctic tern, generic model, 2009 - 2011
Ythan Estuary, Sands of Forvie and Meikle Loch	Sandwich tern, site specific model: 2011
Imperial Dock Lock	Common tern, site specific model: 2009 - 2010
Forth Islands	Arctic tern, generic model, 2009 - 2011 Common tern, generic model, 2008 - 2011
Glas Eileanan	Common tern, site specific model: 2011

Annex 3. Data collection periods for little terns

Colony	Period of data collection (shore based)	Period of data collection (boat based)
Ythan Estuary, Sands of Forvie & Meikle Loch	2009-2011	2011

Annex 4. Data collection periods for European shag

Colony	Period of data collection
Firth of Forth (Isle of May)	Telemetry data, 1987 - 2001
	Compass logger, 2002
	GPS, 2003 - 2010
Moray Firth	ESAS data, 1980 - 2004
Scapa Flow	Shore-based and boat-based count, 1998 - 2007
North Orkney	Shore-based counts, 2007- 2009

Version	Date	Amendments made	Includes comments from
1.0	12/02/2016	First draft	Internal JNCC comments
2.0	16/02/2016	Addressed comments	Internal JNCC comments, SNH for comments, Marine Scotland for comments
3.0	09/06/2016	Amended to include data quality paragraphs requested by Marine Scotland, and changes proposed by SNH.	High level internal JNCC QA
3.1	16/06/2016	Addressed comments	