

OSPAR CEMP Guideline

Common Indicator: Marine bird breeding success/failure (B3)

(OSPAR Agreement 2016-10)¹

This OSPAR biodiversity indicator is still in the early stages of implementation and as a result of iteration and learning, it is anticipated that there will be evolution of the methods and approaches documented in the CEMP guidelines. Version updates will be clearly indicated and be managed in a phased approach via ICG-COBAM through its expert groups and with the oversight and steer of BDC.

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¹ This document exists in English only

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1 Introduction

The OSPAR Common Indicator: B3 – Marine bird breeding success/failure will contribute to assessments of the state of marine bird populations and assessments of Good Environmental Status under the Marine Strategy Framework Directive: MSFD criterion: 1.3 Population Condition; MSFD indicator: 1.3.1 Demographic characteristics (superseded in Comm. Dec. (EU) 2017/848 by Primary Criterion D1C3 - The population demographic characteristics (e.g. body size or age class structure, sex ratio, fecundity, and survival rates) of the species are indicative of a healthy population which is not adversely affected due to anthropogenic pressures.)

This indicator describes changes in breeding failure rates in marine birds, defined as the failure of a colony to produce on average at least 0.1 chicks per breeding pair, clutch or nest per year. The indicator is derived from annual data on mean breeding success (number chicks fledged per pair, clutch or nest) of marine bird species at colonies throughout the NE Atlantic.

As long-lived species with delayed maturity, changes in productivity of marine birds are expected to reflect changes in environmental conditions long before they are evident as changes in population size.

The failure rate of seabirds could be a valuable indicator of GES achievement, especially in areas where fisheries and seabirds target the same prey. The indicator could also provide evidence of other impacts, from e.g. human disturbance, contaminants and predation by invasive species.

This assessment will determine how frequently widespread breeding failures in marine birds occur. The spatial extent of failure will be assessed for each species and year by the proportion of colonies that fail. If widespread failures occur in four years or more out of six, the cumulative effect of successive failures is likely to have a significant impact on recruitment into the regional population.

The indicator is derived from data on annual mean breeding success (number chicks fledged per pair, clutch or nest) of marine bird species at colonies and in survey plots throughout the NE Atlantic.

In this context, 'marine birds' include the following taxonomic groups that are commonly aggregated as 'waterbirds' and 'seabirds':

Waterbirds: shorebirds (order Charadriiformes); ducks, geese and swans (Anseriformes); divers (Gaviiformes); and grebes (Podicipediformes);

Seabirds: petrels and shearwaters (Procellariiformes); gannets and cormorants (Pelecaniformes); skuas, gulls, terns and auks (Charadriiformes).

Shorebirds, some duck species and some gulls, feed on benthic invertebrates in soft intertidal sediments and on rocky shores. Geese mostly graze on exposed eelgrass beds (i.e. *Zostera* spp.). Diving duck species feed on invertebrate benthos in shallow inshore waters. All other marine birds, including some gulls, spend the majority of their lives at sea, feeding on prey living within the water column (i.e. plankton, fish and squid) or picking detritus from the surface. Divers, piscivorous ducks, grebes, cormorants, gulls and terns tend to be confined to inshore waters; whereas petrels, shearwaters, gannets, skuas and auks venture much further offshore and beyond the shelf break.

2 Monitoring

2.1 Purpose

As long-lived species, changes in productivity of marine birds might be expected to reflect changes in environmental conditions before they are evident in changes in population size. A recent analysis of the breeding failure indicator for nine species in UK North Sea waters (Cook et al., 2014b) provides evidence of link to fishing pressure. The results of Cook et al. (2014b) suggest that failure rate of seabirds could be an indicator of GES in parts of the North Sea where fisheries and seabirds target the same prey. The indicator could also provide evidence of other impacts, from e.g. human disturbance, contaminants and predation by invasive species. There are strong links to management, especially with regard to food availability, human disturbance and predation.

2.2 Quantitative Objectives

Temporal trend and spatial distribution for the monitoring programme

The monitoring required for indicator B3 is on the annual mean breeding success (number chicks fledged per pair, clutch or nest) of marine bird species at colonies and in survey plots throughout the NE Atlantic. A separate indicator should be constructed for each species in each OSPAR Region or sub-division, thereof. Depending in species and area, the indicator B3 could also be derived from monitoring of hatching success (i.e. number of eggs hatched per pair, clutch or nest).

Monitoring should be conducted on a site by site basis but needs to be representative of each sub-region and sub-division therein.

Marine birds are highly mobile and cross between sub-regions within a year. Monitoring should be representative of all sub-regions in order to identify impacts and threats.

2.3 Monitoring Strategy

Data collection is currently carried out and funded by national monitoring schemes. The contribution of monitoring data by Contracting Parties for the assessment of indicator B3 in the Intermediate Assessment 2017 is described in Annex 1. It also identifies gaps in data availability (see Table A1-1) and describes the potential for an operational indicator B3 in each OSPAR Region.

Most schemes have a central data storage mechanism (e.g. national database). Most countries monitor a sample of their colonies, with some but not all are monitored annually.

2.4 Monitoring Methods

Monitoring breeding success is more straightforward in some species than others, so species-specific methods have been designed and are widely used (see e.g. Walsh et al. 1995). Generally monitoring is conducted by observing a sample of breeding-territories or nests within a colony and recording progress from laying, hatching and fledging. This requires one or two observers visiting a colony several times during the breeding season (i.e. usually May-Aug, but varies with species).

The time required for data collection depends on the number of sites and types of marine bird being surveyed (e.g. breeding seabird at colonies on remote offshore islands or wintering waders along mainland stretches of coast). Each national monitoring programme currently manages time allocations. The minimum

amount of monitoring locations depends on species and the inherent variability in trends between locations.

Monitoring costs in most countries are minimised by using volunteer observers, but professional observers are sometimes used to monitor the less accessible colonies –especially in the north. Hence, monitoring costs will vary between countries depending on the number of colonies to be monitored, the accessibility of these colonies and on how much of the monitoring can be done by volunteers. During colony visits for productivity monitoring, some data on abundance for common indicator B-1 (marine bird abundance) can also be collected. Monitoring costs for both indicators are thus not necessarily additive.

2.5 Quality assurance/ Quality Control

Each national monitoring scheme has QA/QC protocols, but European standards should be developed. A minimum standard should be to follow internationally recognised monitoring methods (e.g. Walsh et. al. 1995; Koffijberg et. al. 2011).

2.6 Data reporting, handling and management

Each CP has its own data storage mechanism. Within each sub-region and sub-division therein, indicator B3 is constructed from all available data from constituent CPs. CPs are asked to submit their data in response to data-calls issued to OSPAR HoDs via written procedure.

The frequency of OSPAR data-calls is to be decided, but will be no more frequent than annually.

Data are stored in the OSPAR Marine Bird Database hosted by ICES Data Centre via the ICES Biodiversity Data Portal at <http://www.ices.dk/marine-data/data-portals/Pages/Biodiversity.aspx>.

Data undergoes a series of validation checks during the uploading process.

The following data were requested from contracting parties: counts of young fledged (preferably or fail that counts of young hatched), per species per colony per year.

Data entry forms can be downloaded from <http://www.ices.dk/marine-data/data-portals/Pages/Biodiversity.aspx>

Guidance for submitting data is available at http://www.ices.dk/marine-data/Documents/biodiversity/Birds_Reporting_Format_Guidance.pdf

3 Assessment

This indicator is generated using time-series of annual mean breeding success (no. chicks fledged per pair) of marine bird species at colonies and in survey plots throughout the NE Atlantic. A separate indicator should be constructed for each species in each subregion. Depending in species and area, the parameter may be derived from data hatching success (i.e. number of eggs hatched per pair).

The indicators for each species are constructed from a time-series of annual estimates of breeding success at a sample of colonies. Not all the colonies in the sample will have been observed every year in the time-series. Missing annual observations can be predicted by models – see section 3.4 below.

Construction of indicators and their assessment against thresholds will be conducted by the use of a bespoke data tool (see above). The tool will enable non-specialists to produce quickly and easily indicators and assessments at a variety of geographical scales (e.g. country, sub-division, sub-region, region). The tool will ensure consistent employment of QA on data products and will negate the use of expensive data analysis contracts.

The data analysis tool described above will provide bespoke outputs for reporting. It will enable easy, quick and inexpensive updates on an annual or periodic basis.

3.1 Preparation of data

Spatial aggregation of data

This indicator is assessed for each OSPAR Region and sub-divisions therein (see Figure 1).

The smaller sub-divisions may help to interpret the assessment results. The sub-divisional boundaries are based on a coarse assessment of the main oceanographic features such as currents and depth, and some relatively clear-cut differences in seabird / waterbird community structure and population trends (ICES, 2013c,d; Cook et al., 2011). OSPAR Region II – the Greater North Sea is divided into five subdivisions (Figure 1), defined as follows:

- a) Northeast coast of Britain: Duncansby Head (in the north) to Staithes (in the south);
- b) West coast of Norway: Northwest from Lindesnes;
- c) Skagerrak/Kattegat area: all coasts east of Lindesnes (NO) and Hanstholm (DK), i.e. the Skagerrak and the Kattegat; equals ICES Area IIIa;
- d) Southern North Sea: all coasts south of Teesmouth (UK) and Hanstholm (DK), and north of the Channel subdivision (e);
- e) The Channel: all coasts of OSPAR II south of Dover (UK) and Calais (FR).
- f) North coast of Scotland and the Northern Isles: OSPAR II/III North Boundary to Duncansby Head, plus Orkney and Shetland.

OSPAR Region I – Arctic Waters, encompasses several very different ecosystems in terms of key species and trophic interactions. It would be very difficult to set appropriate thresholds and reference levels for the population of a seabird species across such a large area, because in different ecosystems it may respond very differently to pressures and environmental factors. In the IA2017, the assessment of this indicator in the Arctic was restricted to Norwegian waters only, because no data were available from elsewhere in the Region. In Figure 1, Norwegian Arctic waters were divided into the Barents Sea (North and South) and Norwegian Sea. As data become available from other parts of the arctic, further subdivisions could be added which could be similar to the large marine ecosystems (LMEs) that have been recommended for the Arctic Council, and are implemented for various assessment purposes in the work of CAFF. Separate assessments were not completed for each Arctic subdivision in IA2017 as there were too few colonies sampled in each sub-division.

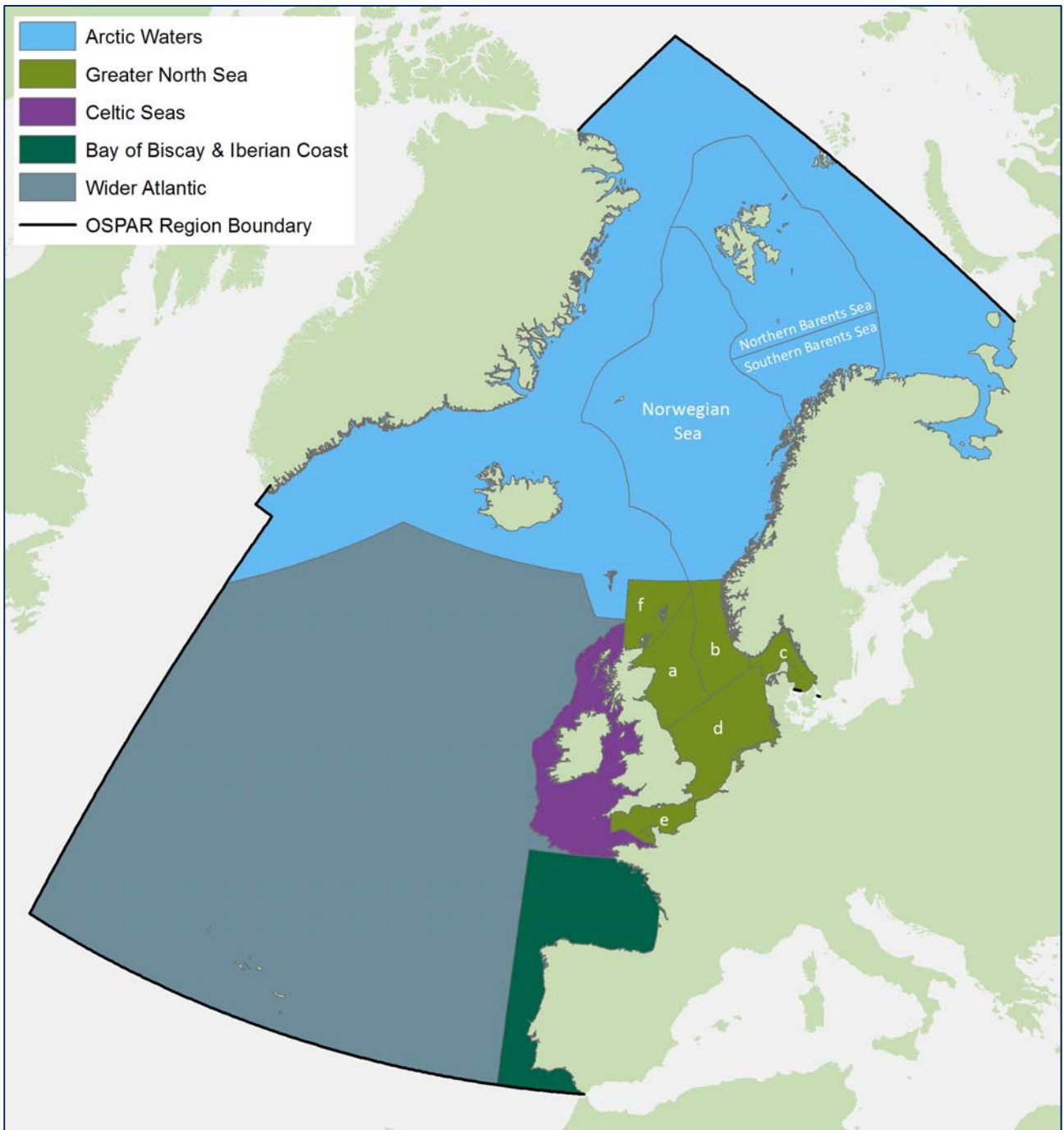


Figure 1. Marine Bird assessment units.

3.2 Species aggregation – functional groups

Species were assigned to the functional groups given in the table 1. The species assessed during the testing and the functional groups to which they were assigned, are given in the table in Annex 2. The table also lists additional species which could be brought into the indicator following inclusion of additional OSPAR subregions and/or if existing monitoring programmes were extended.

These functional groups were proposed by JWGBIRD (ICES 2014) and have been adopted in the EU Commission Decision (2017/848)²²

Table 1: Marine bird functional groups

Functional group	Typical feeding behaviour	Typical food types	Additional guidance
Wading feeders	Walk/wade in shallow waters	Invertebrates (molluscs, polychaetes, etc.)	
Surface feeders	Feed within the surface layer (within 1–2 m of the surface)	Small fish, zooplankton and other invertebrates	“Surface layer” defined in relation to normal diving depth of plunge-divers (except gannets)
Water column feeders	Feed at a broad depth range in the water column	Pelagic and demersal fish and invertebrates (e.g. squid, zooplankton)	Include only spp. that usually dive by actively swimming underwater; but including gannets. Includes species feeding on benthic fish (e.g. flatfish).
Benthic feeders	Feed on the seafloor	Invertebrates (e.g. molluscs, echinoderms)	
Grazing feeders	Grazing in intertidal areas and in shallow waters	Plants (e.g. eelgrass, saltmarsh plants), algae	Geese, swans and dabbling ducks, coot

3.3 Assessment criteria

Parameter/metric

‘**Annual colony failure rate**’ i.e. the percentage of colonies failing per year, per species (from Cook *et al.*, 2014a).

The definition of ‘failure’ proposed by Cook *et al.* (2014a) was 0.1 chicks per pair, clutch or nest. But failure could be interpreted as an unusual deviation from ‘normal’ levels of breeding success and therefore the precise threshold below which a colony is defined as failing may be different at some colonies, even for the same species. The threshold used for determining failure can be adjusted according to experience of the colonies in question. The threshold should be taken from any clear step functions in response to important environmental factors such as low food availability (e.g. Cury *et al.*, 2011). The threshold of 0.1 chicks per pair should be used as a default threshold, unless there is good evidence to show that ‘failure’ of some species in some areas is defined as something different.

3.4 Spatial Analysis and / or trend analysis

The assessments for each species are constructed from a time series of annual estimates of breeding success at a sample of colonies. Not all colonies in the sample will have been observed every year in the

²² EU Commission Decision (2017/848) - laying down criteria and methodological standards on good environmental status of marine waters and specifications and standardised methods for monitoring and assessment, and repealing Decision 2010/477/EU

time series. Missing annual observations were predicted using a Generalised Linear Model (GLM) framework with a binomial error structure (after Cook et al. 2014a and 2014b). Breeding success for each colony in each year was calculated, and where this value was 0.1 or less chicks per pair, clutch or nest, the colony was assessed as having failed in that year. Breeding success or failure was modelled in relation to year and site, because not all sites were covered in all years. The coefficient for each year was then taken to represent the probability of breeding failure occurring at any given site within that calendar year. The parameter 'Year' was included in the GLM as a fixed effect factor, rather than a random effect, so that the coefficients would not be constrained to follow a normal distribution. To minimise the impact of differences in sampling rate, and to ensure that breeding success was likely to be representative of the colony as a whole, minimum criteria were set for inclusion of data within the model. Only those colonies at which a mean of ten nests were monitored for at least three years were considered. To prevent any individual site having an undue influence over the value of the coefficients, a jack-knife statistical approach was used, dropping each site from the model in turn. Models were run for each species in each sub-region in turn. The final indicator value presented for each species, in each sub-region, in each year is the mean probability of breeding failure calculated from each run of the jack-knife analysis.

3.5 Assessment values

Breeding failure for each species was assessed in two stages:

1. Assessing if colony failure is widespread - the annual colony failure rate (the percentage of colonies experiencing breeding failure) can be considered to be 'widespread' if it exceeds the assessment values set for each species (see below).
2. Assessing the frequency of widespread breeding failure occurrence. Widespread breeding failure will be considered to be frequently occurring if it occurs in four years or more out of six.

Assessing if colony failure rate is widespread

The annual colony failure rate (the percentage of colonies failing) of each species was assessed against one of the two upper assessment values below, depending on the species (see examples in Figure 2). This was done for each region:

- a) terns: mean percentage of colonies failing per year, over the preceding 15 years;
- b) all species except terns: 5% of colonies failing per year.

The aim of the assessment values for annual colony failure rate is to identify widespread breeding failures and to differentiate large-scale impacts from local problems, where only a small proportion of colonies fail per year. The above assessment values were taken from Cook et al. (2014a), who tested various assessment values for each species.

A different assessment value was applied to the breeding failure rate of terns because they often desert colonies, sometimes before laying eggs, in response to local disturbances or impacts on food supply (Shealer and Kress 1991; Holt 1994; Cook et al. 2011). The assessment value for terns is designed to identify years of unusually high rates of breeding colony failure.

A fixed assessment value of 5% was appropriate for all other species that do not tend to desert colonies all at once. Cook et al. (2014a) found that years in which colony failure rate is more than 5% are much rarer in other species and they therefore provide a good indicator that pressures may be impacting on the population.

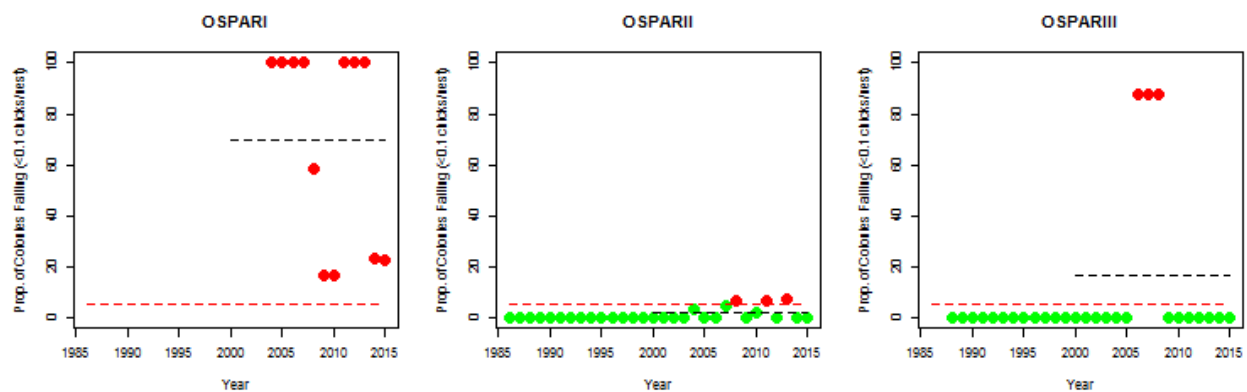
Assessing the frequency of widespread colony failure

For each species, the frequency of widespread colony failure was assessed over the most recent six-year period from 2010 to 2015, inclusive. A six-year period was chosen because it equals the length of the EU's MSFD reporting cycle. To carry out an assessment of a species over a certain time period, there needed to be some observed data of breeding success at some colonies during the most recent year in the period (2015).

One or two years of widespread colony failure were considered as 'acceptable', given the wide range of possible natural and anthropogenic factors that could cause breeding failure in some species. The cumulative effect of widespread colony failure in four or more years out of six, was considered most likely to have a significant impact on recruitment into the regional population (Cook et al. 2014a). Low recruitment could lead to declines in population size and to affect the assessments of the OSPAR indicator on marine bird abundance.

Breeding failure is a 'life history' strategy for some species such as Arctic tern which, if conditions are sub-optimal, will desert a colony all at the same time, rather than remaining and trying, but failing, to raise young. Therefore, the definition of failure used in this indicator assessment (i.e. <0.1 chicks fledged per pair, clutch or nest) may provide an overly pessimistic indication of breeding performance in such species. However, this approach of assessing the frequency of widespread failure could reduce the chance of false negative assessments being made (ICES 2015).

a) Common guillemot



b) Common tern

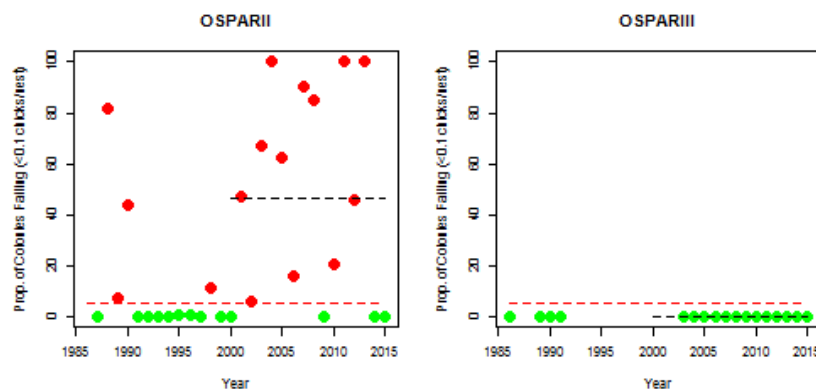


Figure 2: Examples of species-specific indicators of annual colony failure in relation to different thresholds, for a) Common guillemot and b) Common tern in the Greater North Sea 1986-2015. Thresholds are shown as red dotted lines. The assessment value for tern species is the mean percentage of colonies failing per year, over the preceding 15 years. The assessment value for all other species (except terns) is 5% of colonies failing per year. The black dotted line denotes the mean percentage of colonies failing per year, over the preceding 15 years, where this is not used as the assessment value. All values below the threshold are coloured green and all those above are coloured red and indicate 'widespread breeding failure'.

3.6 Development of assessment methods

The ICES / OSPAR / HELCOM Joint Working Group on Marine Birds (JWGIRD) developed this indicator assessment but has acknowledged some limitations (ICES 2015). The assessment methods for the marine bird breeding success / failure indicator currently focus on the extreme events of almost no chicks being produced by a colony, on average, per year. In doing so, they fail to identify other years where poor breeding success could still have significant negative impacts on the population in the longer term.

However, it is not straightforward to categorise annual breeding success as 'good' or 'poor'. The reason breeding has not been directly assessed as 'good' or 'poor' in this indicator is because the number of chicks that need to be produced each year to sustain a population or cause it to grow, varies substantially as other demographic parameters (e.g. survival rates) also vary in space and time. Information on demographics such as survival rate, age at first breeding and immature survival rates are more resource demanding to measure owing to the need to monitor individual birds from year to year. For well-studied species and at a few intensively studied sites these data do exist.

A possible step forward towards setting accurate and objective thresholds for annual breeding success rates would be to collate an inventory of ongoing monitoring of survival rates in the North-East Atlantic and conduct a review of published estimates. Once survival estimates and other demographics have been collated, some simple population modelling could be undertaken to produce some preliminary estimates of the levels of breeding success required to sustain or increase the population.

The above work will take several years to complete. In the meantime, the existing approach for setting an assessment value for B3 should be used and assessed for IA2017, because it will identify populations in poor condition in terms of productivity, before these changes will be identified by indicator B1 – marine bird abundance.

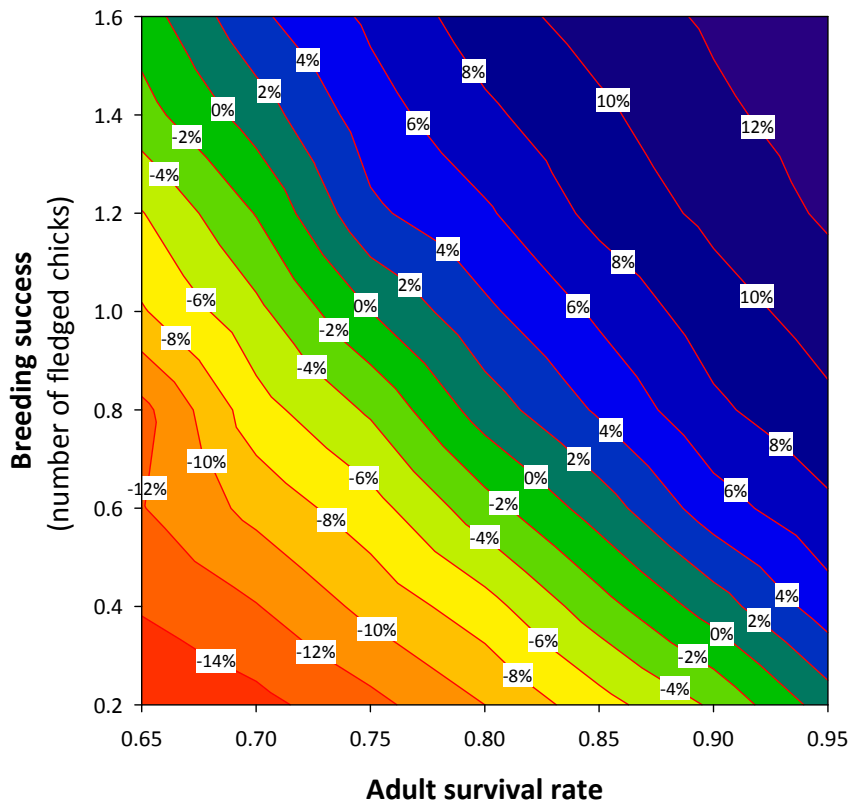


Figure 3. Annual population trends (% change) for kittiwake populations that would result from different combinations of adult survival rates and annual breeding success rates (contour lines). This plot illustrates that if survival rate falls from 0.9 to 0.85, the level of breeding success requires to maintain population size (i.e. 0% change) would have to increase from 0.38 to 0.58 chicks per pair. The model assumes that the kittiwake starts to breed at 3 years of age, that the survival rate of young birds from fledging to first breeding is 0.7, and that the sex ratio at fledging is 0.5. (From Erikstad & Systad 2009)

3.7 Presentation of assessment results

In addition to the species-specific plots of annual monitoring failure in Figure 2, the following methods of presentation are recommended:

Species Traffic lights (see Figure 4)

Cook *et al.* (2014a) suggested a colour-coded alerts system, which enables an early warning that assessment values may not be met in subsequent years and may enable pre-emptive measures to be applied. Colours cells indicate the number of years during the 6 year MSFD assessment period that annual colony failure rate was widespread (i.e. exceeded species-specific assessment values – see Figure 2): green = two years or less; orange cells = three years; red = four years or more.



Figure 4. Frequency of widespread breeding failure for seabird species in the North-East Atlantic area (2010–2015 inclusive). Source: IA2017

Maps (see Figure 5)

Maps showing for each species showing the spatial distribution of colony failure. There are pie charts marking the location of each colony used in the assessment. The pie charts show the proportion of years in the six-year period of the assessment in which the colony in which breeding success was more than 0.1 chicks per pair (green), or less than 0.1 chicks per pair (red). Grey indicates number of years in which breeding success was not measured.

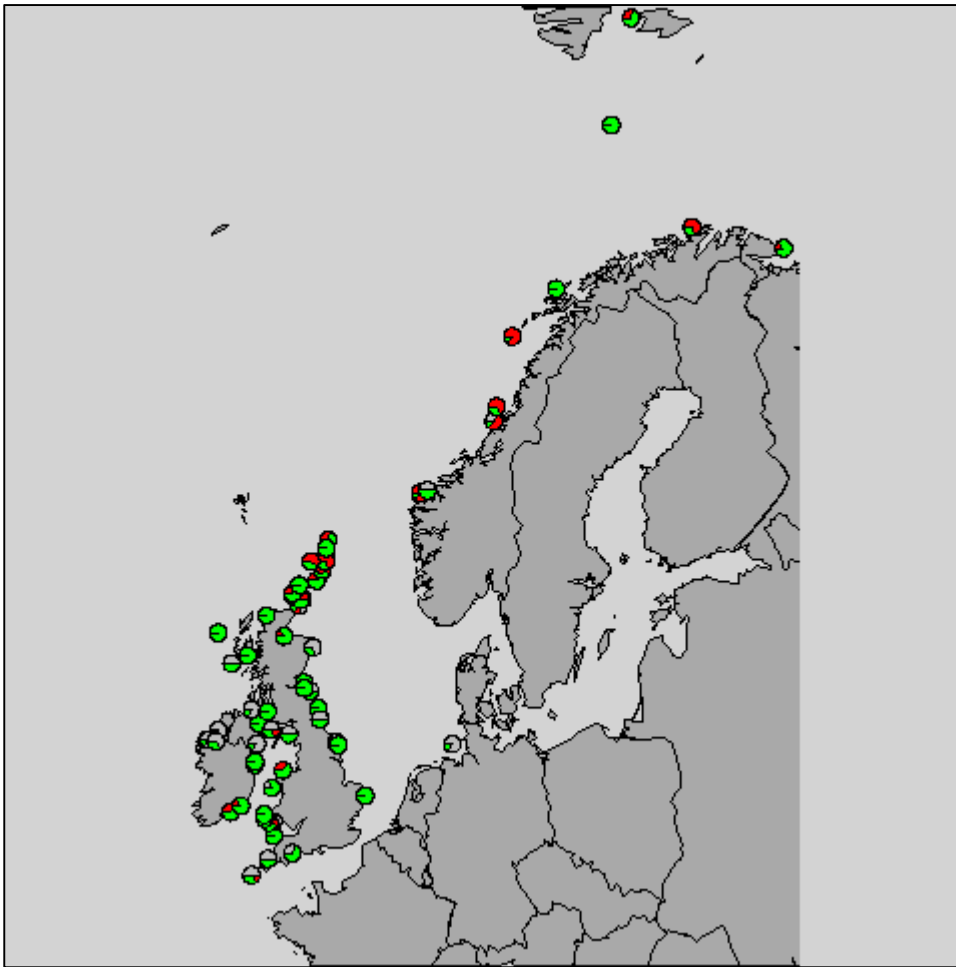


Figure 5: An example of a map showing spatial distribution in breeding colony failures of Black-legged kittiwake. Pie charts show proportion of years during 2010-2015 in which breeding success was more than 0.1 chicks per pair (green), or less than 0.1 chicks per pair (red). Grey indicates number of years in which breeding success was not measured. Source: IA2017.

Multispecies assessments (see Figure 6)

Bar charts representing the interannual changes in the proportion of marine bird species have not experienced widespread annual colony failures in more than 3 of the previous 6 years. The proportion of species achieving the assessment value that breeding failure rates should not exceed 5% or the mean over the previous 15 years, whichever is greater, in more than three of the previous six years. This enables multispecies assessments e.g. for all species or for functional groups.

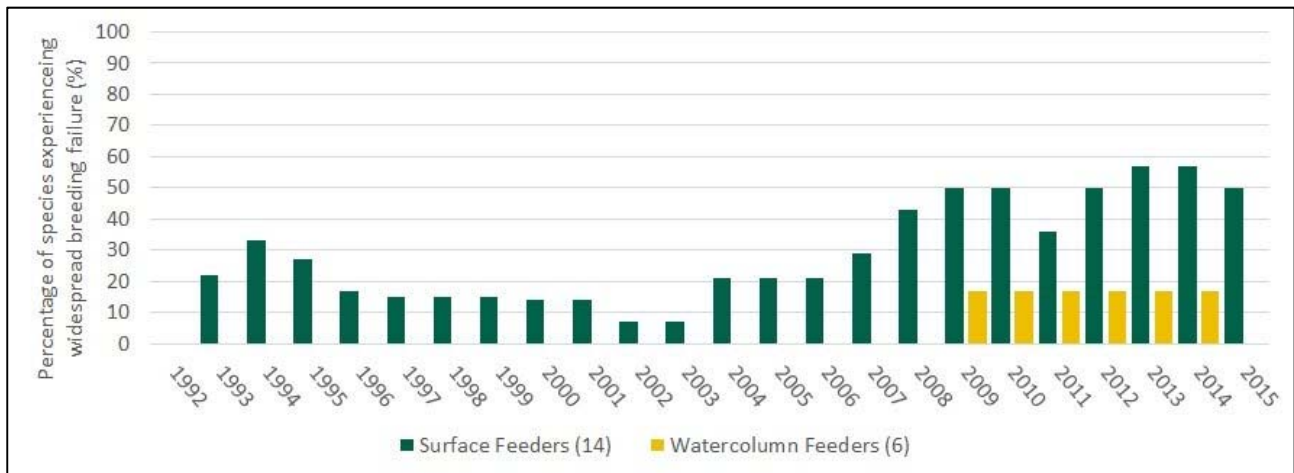


Figure 6. Changes in the proportion of marine bird species assessed, which have experienced widespread annual colony failures in each year in the Greater North Sea. Maximum number of species included per year in each group shown in brackets in the figure legend. Number of species varied each year depending on data availability. Source: IA2017

4 Change Management

Change management of the indicator and the document is carried out by JWG BIRD which reports to ICG-COBAM that in turn is a group under BDC.

5 References

- Cook, A. S. C. P., Parsons, M., Mitchell, I., and Robinson, R. A. 2011. Reconciling policy with ecological requirements in biodiversity monitoring. *Marine Ecology Progress Series*, 434: 267–277.
- Cook, A.S.C.P., Robinson, R.A. & Ross-Smith, V.H., 2014a. Development of MSFD Indicators, Baselines and Target for Seabird Breeding Failure Occurrence in the UK (2012), JNCC Report 539, ISSN 0963 8901.
- Cook A.S. C. P., Dadam, D., Mitchell, I., Ross-Smith, V.H. and Robinson, R.A.. 2014b. Indicators of seabird reproductive performance demonstrate the impact of commercial fisheries on seabird populations in the North Sea. *Ecological Indicators* 38: 1–11.
- Cury P.M., Boyd I.L., Bonhommeau S., Anker-Nilssen T., Crawford R.J.M, Furness R.W., Mills J.A., Murphy E.J., Österblom H., Paleczny M., Piatt P.F., Roux J.-P., Shannon L. and Sydeman W.J. 2011. Global seabird response to forage fish depletion – one-third for the birds. *Science* 334: 1703–1706.
- Holt, D.W. 1994. Effects of short-eared owls on common tern colony desertion, reproduction, and mortality. *Colonial Waterbirds*, 17, 1-6.
- ICES. 2007. Report of the Working Group on Seabird Ecology (WGSE), 19–23 March 2007, Barcelona, Spain. ICES CM 2007/LRC:05. 123 pp.

ICES. 2008. Report of the Workshop on Seabird Ecological Quality Indicator, 8–9 March 2008, Lisbon, Portugal. ICES CM 2008/LRC:06. 60 pp.

ICES 2014. Report on the Joint ICES/OSPAR Working Group on Seabirds (JWGBIRD), 17-21 November 2014, Copenhagen, Denmark. ICES CM 2014/ACOM:30, 115 pp.

ICES 2015. Report of the Joint ICES/OSPAR/HELCOM Working Group on Seabirds (JWGBIRD), 9–13 November 2015, Copenhagen, Denmark. ICES CM 2015/ACOM:XX. XX pp.

Koffijberg, K., Stefan Schrader and Veit Hennig. 2011: Monitoring Breeding Success of Coastal Breeding Birds in the Wadden Sea - Methodological Guidelines and Field Manual. Joint Monitoring Group for Breeding Birds Common Wadden Sea Secretariat April 2011.

Shealer, D.A. & Kress, S.W. 1991. Nocturnal abandonment response to black-crowned night-heron disturbance in a common tern colony. *Colonial Waterbirds*, 14, 51-56.

Walsh, P. M., Halley, D. J., Harris, M. P., del Nevo, A., Sim, I. M. W. and Tasker, M. L. 1995. Seabird monitoring handbook for Britain and Ireland. JNCC / RSPB / ITE / Seabird Group, Peterborough.

OSPAR CEMP guidelines

Common Biodiversity Indicators: Marine bird breeding success/failure (B3)

Technical Specifications

Annex 1: Data availability and utilisation

Annex 1:

Data availability and utilisation

This Annex describes the contribution of Contracting Parties to provide data for the assessment of indicator B1 in the Intermediate Assessment 2017. It also identifies gaps in data availability (see Table A2-1) and describes the potential for an operational indicator B1 in each OSPAR Region.

Arctic (OSPAR I)

There are sufficient monitoring of seabird productivity along the Norwegian coasts of the Norwegian and Barents seas to construct an indicator of B3 there. It is uncertain whether monitoring in other countries in the Arctic sub-region is sufficient to generate data for B3. The arctic sub-region contains the highest concentrations of marine birds in the NE Atlantic. None of the contracting Parties in the sub-region are implementing the MSFD there. Norway intend to construct indicators (similar to OSPAR common indicators) in their seas within the Arctic. It would be beneficial if other CPs in the sub-region would mobilise their monitoring data in a similar way. The Arctic sub-region encompasses several very different ecosystems in terms of key species and trophic interactions. It would be very difficult to set appropriate target and reference levels for the population of a seabird species across such a large area, because in different ecosystems it may respond very differently to pressures and environmental factors. ICES (2008) suggested that the EcoQO on seabird population trends should be based on trends within sub-divisions of OSPAR I. They recommended sub-divisions similar to the eco-regions for Greenland and Iceland Seas, Barents Sea, Faroes and Norwegian Sea that were proposed to ICES (and subsequently rejected) as part of the ecosystem approach in European waters (ICES 2004): i) Barents Sea, ii) Norwegian Sea, iii) Greenland and Iceland Seas, iv) Faroes.

Greater North Sea (OSPAR II)

Most countries in the Celtic Seas and Greater North Sea collect breeding productivity data on marine bird species. More species of seabirds are monitored in comparison to waterbirds (see Table 1). The main gap in monitoring is in the Skagerak/Kattegat (sub-division IIc in Figure 4) where breeding success is measured along the Norwegian coast, possibly along the Swedish coast, but not along the Danish coast. There is a co-ordinated scheme of annual monitoring of breeding success within the Waddensea (Netherlands, Denmark and Germany) but it was only initiated in 2009. Data from this monitoring was not used in the current because it was only available up to 2011, which would not have allowed an assessment of the indicator B3's target that is assessed over a 6-year period. However, sufficient data should be available from the Waddensea to include in an assessment of B3 during IA2017.

Celtic Seas (OSPAR III)

The Republic of Ireland gave the UK permission to supply data on breeding success at seabird colonies that had previously been submitted to the Seabird Monitoring Programme Database. The future availability of these data will depend on whether seabird colony monitoring in Ireland is continued. Data on breeding

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Technical Specifications

Annex 1: Data availability and utilisation

waterbirds were not accessible due to lack engagement in bird indicator development by experts from Ireland.

Bay of Biscay and Iberian Coast (OSPAR IV)

In the Bay of Biscay & Iberian coast sub-region (OSPAR IV), monitoring of productivity in France and Spain has created time-series of data suitable for constructing B3, but in Spain this is restricted to a single species – the European shag. It is uncertain what productivity monitoring is carried out along the Portuguese mainland coast (OSPAR IV) and on the Azores (OSPAR V- Macaronesia).

Macaronesia (OSPAR V)

The main barrier to the inclusion of data from Portugal and the Azores has been the lack of engagement by experts from Portugal in the Bird indicator development process. It is uncertain what productivity monitoring data are available and accessible.

Table A1-1: Utilisation of data from each Contracting Party in the assessment of B1 for the IA2017, indicated by 'Y' or 'N'. 'A' indicates data have been collected and are potentially available, but were not used in the assessment. '?' denotes no information obtained.

Contracting Party	OSPAR Region	Country Region	Seabird Breeding success	Waterbird Breeding success
Norway	I (Barents Sea)	Barents Sea coasts, including Svalbard and Jan Mayen	Y	N
Russia	I (Barents Sea)		?	?
Denmark	I (Greenland and Iceland Seas)	Greenland	?	?
Iceland	I (Greenland and Iceland Seas)		?	?
Denmark	I (Faroes)	Faroe Islands	?	?
Norway	I (Norwegian Sea)	Norwegian Sea coast	Y	N
UK	II-a		Y	N
Norway	II-b	Coast of western Norway	Y	N
Denmark	II-c	Skagerrak/Kattegat coast	N	N
Norway	II-c	Norwegian Skagerrak coast	Y	N
Sweden	II-c		N	N
Belgium	II-d		Y	N
Germany	II-d	Wadden Sea	Y	Y
Germany	II-d	Helgoland	A	N
Denmark	II-d	Wadden Sea	N	N

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Annex 1: Data availability and utilisation

Denmark	II-d	North Sea coast Jutland	N	N
Netherlands	II-d		Y	Y
UK	II-d		Y	N
France	II-e	Nord Pas de Calais & Picardie	A	N
France	II-e	Normandy	A	N
UK	II-e		Y	N
France	II-e	Brittany	A	N
France	III	Brittany	A	N
UK	III		Y	N
Rep. Ireland	III		Y	?
France	IV	Pays de Loire, Poitou Charente, Aquitaine	A	N
Portugal	IV		?	?
Spain	IV		A	N
Portugal	V	Azores	?	N

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Annex 2: Species list

Annex 2:

Species List – B3 Marine bird breeding success/failure

The species assessed during the IA2017 and the functional groups to which they were assigned are given in the table below. The table also lists additional species which could be brought into the indicator following inclusion of additional OSPAR subregions and/or if existing monitoring programmes were extended.

Species		Functional groups				Included in indicator assessment			
English Name	Scientific Name	Grazing feeders	Wading feeders	Surface feeders	Water column feeders	Benthic feeders	Arctic	Greater North Sea	Celtic Seas
Red-throated diver	<i>Gavia stellata</i>				X				
Black-throated diver	<i>Gavia arctica</i>				X				
Great Northern diver	<i>Gavia immer</i>				X				
White-billed diver	<i>Gavia adamsii</i>				X				
Great crested grebe	<i>Podiceps cristatus</i>				X				
Red-necked Grebe	<i>Podiceps grisegena</i>				X				
Slavonian grebe	<i>Podiceps auritus</i>				X				
Northern Fulmar	<i>Fulmarus glacialis</i>			X	(X)		X	X	X
Sooty Shearwater	<i>Puffinus griseus</i>			X	(X)				
Manx Shearwater	<i>Puffinus puffinus</i>			X	(X)				X
Balearic shearwater	<i>Puffinus mauretanicus</i>			X	(X)				
Cory's Shearwater	<i>Calonectris diomedea</i>			X	(X)				
European Storm-petrel	<i>Hydrobates pelagicus</i>			X	(X)				
Leach's Storm-petrel	<i>Oceanodroma leucorhoa</i>			X	(X)				
Northern gannet	<i>Morus bassanus</i>			(X)	X		X	X	X
Great Cormorant	<i>Phalacrocorax carbo</i>				(X)	X	X	X	
European shag	<i>Phalacrocorax aristotelis</i>				X	(X)	X	X	X
Eurasian spoonbill	<i>Platalea leucorodia</i>		X					a	
Mute Swan	<i>Cygnus olor</i>	X							

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Annex 2: Species list

Species			Functional groups				Included in indicator assessment			
English Name	Scientific Name	Grazing feeders	Wading feeders	Surface feeders	Water column feeders	Benthic feeders	Arctic	Greater North Sea	Celtic Seas	
Bewick's Swan	<i>Cygnus bewickii</i>	X								
Whooper Swan	<i>Cygnus cygnus</i>	X								
Greylag goose	<i>Anser anser</i>	X								
Greenland white-fronted goose	<i>Anser albifrons flavirostris</i>	X								
Canada Goose	<i>Branta canadensis</i>	X								
Barnacle Goose	<i>Branta leucopsis</i>	X								
Brent Goose	<i>Branta bernicla</i>	X								
Shelduck	<i>Tadorna tadorna</i>		X							
Wigeon	<i>Anas penelope</i>	X								
Teal	<i>Anas crecca</i>		X							
Mallard	<i>Anas platyrhynchos</i>	X	X							
Pintail	<i>Anas acuta</i>	X	X							
Shoveler	<i>Anas clypeata</i>	X								
Pochard	<i>Aythya ferina</i>					X				
Tufted Duck	<i>Aythya fuligula</i>					X				
Greater Scaup	<i>Aythya marila</i>					X				
Common Eider	<i>Somateria mollissima</i>					X		a		
King eider	<i>Somateria spectabilis</i>					X				
Steller's eider	<i>Polysticta stelleri</i>					X				
Long-tailed Duck	<i>Clangula hyemalis</i>					X				
Common Scoter	<i>Melanitta nigra</i>					X				
Velvet Scoter	<i>Melanitta fusca</i>					X				
Goldeneye	<i>Bucephala clangula</i>					X				
Common merganser	<i>Mergus merganser</i>				X					
Red-breasted Merganser	<i>Mergus serrator</i>				X					

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Annex 2: Species list

Species		Functional groups				Included in indicator assessment			
English Name	Scientific Name	Grazing feeders	Wading feeders	Surface feeders	Water column feeders	Benthic feeders	Arctic	Greater North Sea	Celtic Seas
Smew	Mergellus albellus				X				
Coot	Fulica atra	X							
Oystercatcher	Haematopus ostralegus		X					a	
Black-winged Stilt	Himantopus himantopus		X						
Pied avocet	Recurvirostra avosetta		X					a	
Lapwing	Vanellus vanellus		X						
Golden plover	Pluvialis apricaria		X						
Grey Plover	Pluvialis squatarola		X						
Ringed plover	Charadrius hiaticula		X						
Kentish Plover	Charadrius alexandrinus		X						
Bar-tailed Godwit	Limosa lapponica		X						
Whimbrel	Numenius phaeopus		X						
Curlew	Numenius arquata		X						
Spotted Redshank	Tringa erythropus		X						
Redshank	Tringa totanus		X						
Greenshank	Tringa nebularia		X						
Wood Sandpiper	Tringa glareola		X						
Turnstone	Arenaria interpres		X						
Red-necked Phalarope	Phalaropus lobatus			X					
Grey Phalarope	Phalaropus fulicarius			X					
Red Knot	Calidris canutus		X						
Sanderling	Calidris alba		X						
Little Stint	Calidris minuta		X						
Curlew Sandpiper	Calidris ferruginea		X						

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Annex 2: Species list

Species		Functional groups				Included in indicator assessment			
English Name	Scientific Name	Grazing feeders	Wading feeders	Surface feeders	Water column feeders	Benthic feeders	Arctic	Greater North Sea	Celtic Seas
Purple sandpiper	<i>Calidris maritima</i>		X						
Dunlin	<i>Calidris alpina schinzii & arctica</i>		X						
Ruff	<i>Philomachus pugnax</i>		X						
Arctic skua	<i>Stercorarius parasiticus</i>			X				X	X
Long-tailed Skua	<i>Stercorarius longicaudus</i>			X					
Pomarine Skua	<i>Stercorarius pomarinus</i>			X					
Great Skua	<i>Stercorarius skua</i>			X			X	X	X
Glaucous gull	<i>Larus hyperboreus</i>			X			X		
Great Black-backed Gull	<i>Larus marinus</i>			X			X	X	X
Herring gull	<i>Larus argentatus</i>		X	X			X	X	X
Lesser black-backed gull	<i>Larus fuscus intermedius/graellsii</i>		X	X			X	X	X
Common Gull	<i>Larus canus</i>		X	X				X	X
Mediterranean Gull	<i>Larus melanocephalus</i>			X					a
Black-headed Gull	<i>Croicocephalus ridibundus</i>		X	X				X	X
Little Gull	<i>Larus minutus</i>			X					
Black-legged kittiwake	<i>Rissa tridactyla</i>			X			X	X	X
Ivory gull	<i>Pagophila eburnea</i>			X					
Little Tern	<i>Sternula albifrons</i>			X				X	X
Roseate tern	<i>Sterna dougallii</i>			X				X	
Common tern	<i>Sterna hirundo</i>			X				X	X
Arctic tern	<i>Sterna paradisaea</i>			X				X	X
Sandwich tern	<i>Sterna sandvicensis</i>			X				X	X
Black Tern	<i>Chlidonias niger</i>			X					

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Annex 2: Species list

Species		Functional groups				Included in indicator assessment			
English Name	Scientific Name	Grazing feeders	Wading feeders	Surface feeders	Water column feeders	Benthic feeders	Arctic	Greater North Sea	Celtic Seas
Razorbill	<i>Alca torda</i>				X		X	X	X
Common Guillemot	<i>Uria aalge</i>				X		X	X	X
Brünnich's guillemot	<i>Uria lomvia</i>				X		X		
Black Guillemot	<i>Cephus grylle</i>				X		X		X
Little Auk	<i>Alle alle</i>				X		X		
Puffin	<i>Fratercula arctica</i>				X		X	X	X

^a denotes species that were omitted from the regional assessments because the time series did not contain an estimate of breeding success in 2015.