Marine Bird Breeding Success / Failure

MSFD Descriptors: 1 - Biological diversity
MSFD Criterion: 1.3 - Population condition

OSPAR COMMISSION

Key Message Seabird species have experienced frequent and widespread breeding failure over the period assessed (2010 to 2015 inclusive) in Norwegian parts of Arctic Waters, the Greater North Sea and in the Celtic Seas. The surface feeding birds in the Greater North Sea and Celtic Seas frequently failed to raise young

Background

Breeding failure is the extreme event of almost no chicks being produced by a seabird colony in a single breeding season. This assessment describes changes in breeding failure rates in seabird colonies throughout the North-East Atlantic. The assessment is based on how many chicks are fledged (having wing feathers that are large enough for flight) annually, per pair, clutch or nest.

For tern species, widespread breeding failure occurs when the percentage of colonies failing per year exceeds the mean percentage for the preceding 15 years. For all other species, widespread breeding failure occurs when the percentage of colonies failing per year exceeds 5%. Frequent breeding failure is when breeding failure occurs for four years or more out of six (2010-2015 inclusive).

As long-lived species with delayed maturity, changes in the productivity (number of fledged young per nesting pair) of seabirds are expected to reflect changes in environmental conditions long before these are evident as changes in population size.
Breeding success or failure in marine birds can be a valuable indicator of population health, especially in areas where commercial fisheries and seabirds target the same prey. Therefore, results of this assessment should be viewed as an early warning of changes in the environment.

This Indicator Assessment has relevance to some of the seabird species included in the OSPAR List of Threatened and / or Declining Species and Habitats.

The seabirds in this assessment can be divided into two species groups based on how and where they feed at sea. Surface feeders forage on small fish, zooplankton and other invertebrates at or within the surface layer (the upper 1–2 m), whereas water column feeders dive below the surface to feed on fish and invertebrates (e.g. squid, zooplankton) at a broad range of depths or close to the seabed.

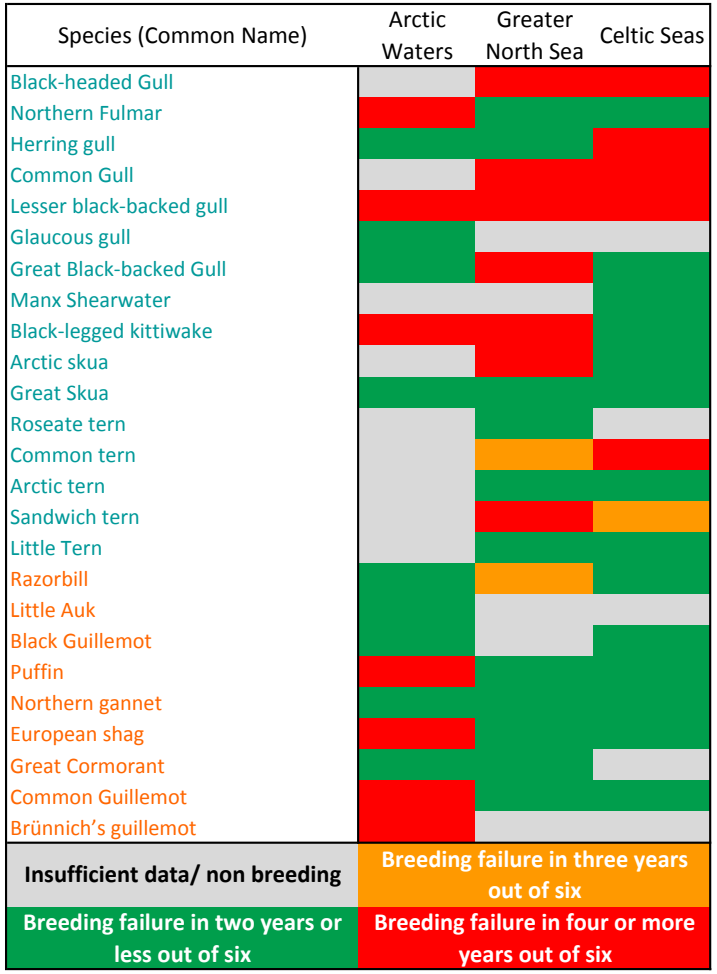

Figure 1: Frequency of widespread breeding failure for seabird species in the North-east Atlantic area (2010–2015 inclusive).

Image (right): Kittiwake ©Parsons

Results

For the six year period (2010 to 2015 inclusive), widespread seabird breeding failures frequently occurred in 35% of species assessed in the Greater North Sea, 25% in the Celtic Seas and 44% in the Norwegian parts of the Arctic Waters (**Figure 1**).

In the Celtic Seas and Greater North Sea, none of the six water column feeders showed frequent and widespread breeding failure during this period (**Figure 1**). In contrast, a third of surface feeders in the Celtic Seas and half the surface feeders in the Greater North Sea showed frequent and widespread breeding failure during the six year study period (**Figure 1**).

In the Norwegian parts of Arctic Waters, there was little difference between surface feeders and water column feeders, with up to 44% of species in each group showing frequent and widespread breeding failure during the six year study period (**Figure 1**).

The proportion of surface feeders experiencing widespread breeding failure has exceeded 25% in every year since 2007 in the Greater North Sea (**Figure 3, overleaf**) and in every year since 2010 in the Celtic Seas (**Figure 4, overleaf**) and in the Norwegian parts of Arctic Waters (except for 2012) (**Figure 2, overleaf**).

There is moderate / low confidence in the methodology used and moderate confidence in the data.

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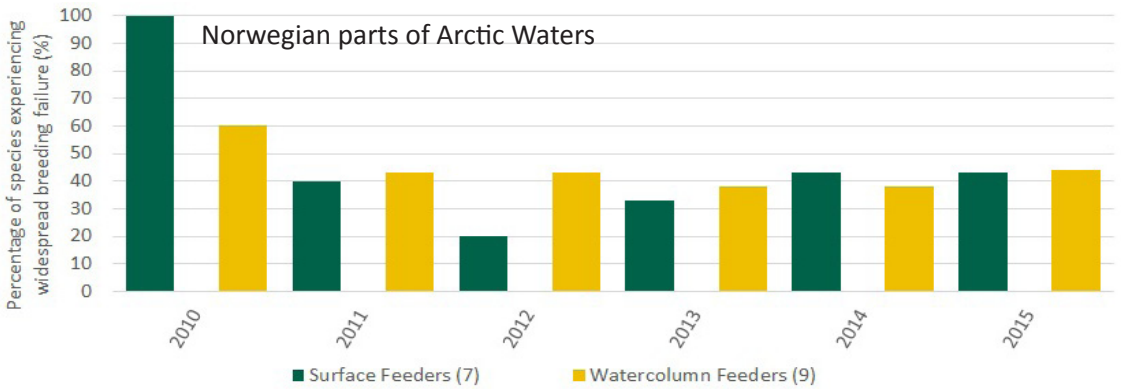

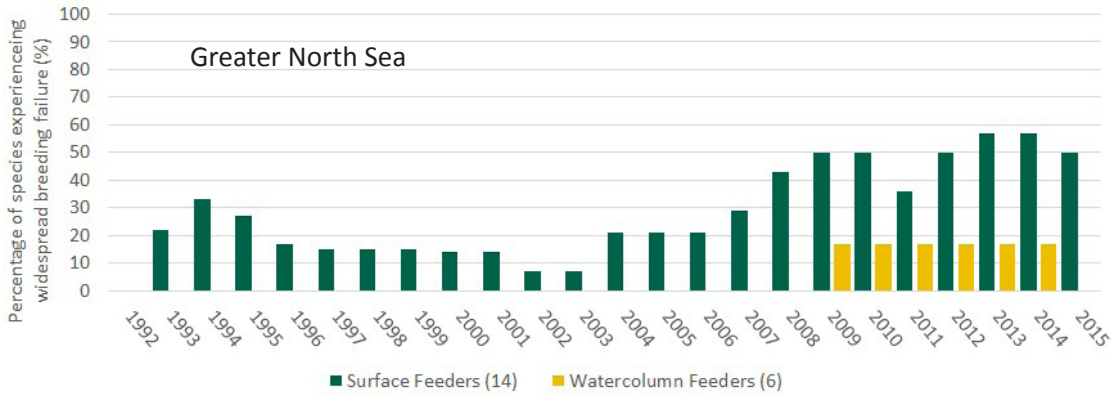

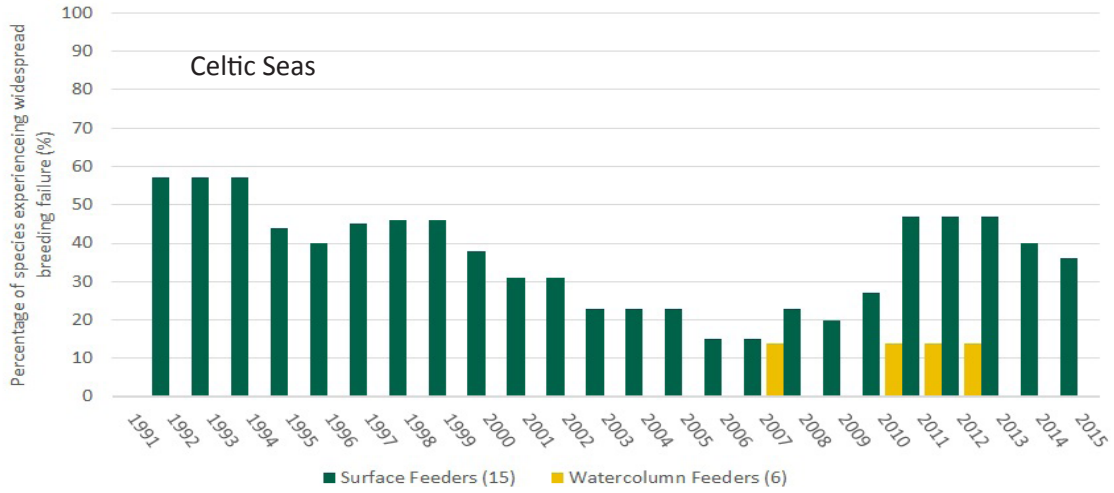

Conclusion

In the Greater North Sea and Celtic Seas, all seabird species that frequently failed to raise young feed on small fish in surface waters. Widespread breeding failure in seabird species feeding in deeper waters or at the seabed was far less frequent. This difference could be linked to the availability of small forage fish species at the surface (e.g. lesser sandeel and sprat) that are typical prey for various surface feeding species (e.g. black-legged kittiwake). In the Norwegian parts of the Arctic Waters, an equal proportion of surface feeders and water column feeders exhibited widespread breeding failure. This suggests the availability of prey fish may be low throughout the water column in some areas (from the surface to the seabed), for example sandeel and young herring. Prey availability is likely to be driven by ecosystem specific changes, possibly initiated by commercial fisheries (past and present) in combination with climate change.

In all regions, breeding failure (especially for ground nesting terns and gulls and cliff nesting guillemots on open ledges) will reflect the combined result of factors such as predation and disturbance from native and non-native mammalian predators and by other birds. Likewise, disturbance by humans may also have an impact.

Figures 2-4: Changes in the proportion of marine bird species assessed, which have experienced widespread annual colony failures in each year, in the Norwegian parts of Arctic Waters (top), Greater North Sea (centre) and Celtic Seas (bottom).

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.

Knowledge Gaps

This indicator assessment does not include the Bay of Biscay and Iberian Coast or the Wider Atlantic, because data were not available for France, Spain and Portugal. The assessment for Arctic Waters was confined to Norwegian coasts (including High-Arctic islands) owing to a wider lack of data; other OSPAR Countries in the Arctic are encouraged to make data available for future assessments. In the Greater North Sea, areas outside the UK, Norway, the Netherlands and Belgium were not assessed due to lack of data. Data collected since 2012 in the Danish and German Wadden Sea were not available and these areas were therefore not included in the assessment.

This document was published as part of OSPAR's Intermediate Assessment 2017.

The full assessment can be found at www.ospar.org/assessments