OSPAR COMMISSION

Background document on the Ecological Quality Objective (EcoQO) on Seabird Population Trends

Biodiversity Series

2012

OSPAR Convention

The Convention for the Protection of the Marine Environment of the North-East Atlantic (the “OSPAR Convention”) was opened for signature at the Ministerial Meeting of the former Oslo and Paris Commissions in Paris on 22 September 1992. The Convention entered into force on 25 March 1998. The Contracting Parties are Belgium, Denmark, the European Union, Finland, France, Germany, Iceland, Ireland, Luxembourg, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

Convention OSPAR

La Convention pour la protection du milieu marin de l'Atlantique du Nord-Est, dite Convention OSPAR, a été ouverte à la signature à la réunion ministérielle des anciennes Commissions d'Oslo et de Paris, à Paris le 22 septembre 1992. La Convention est entrée en vigueur le 25 mars 1998. Les Parties contractantes sont l'Allemagne, la Belgique, le Danemark, l’Espagne, la Finlande, la France, l’Irlande, l’Islande, le Luxembourg, la Norvège, les Pays-Bas, le Portugal, le Royaume-Uni de Grande Bretagne et d’Irlande du Nord, la Suède, la Suisse et l’Union européenne.

NOTE

This background document should be read in conjunction with the following report: ICES. 2008. Report of the Workshop on Seabird Ecological Quality Indicator, 8-9 March 2008, Lisbon, Portugal. ICES CM 2008/LRC:06. 60 pp), which was used as the basis to draft the Background Document. This report has been published by ICES and is available online at http://www.ices.dk/reports/lrc/2008/WKSEQUIN/WKSEQUIN2008.pdf

Acknowledgement

This report has been developed under the lead of Germany (Stefan Garthe/FTZ and Tim Packeiser/BfN) based on the ICES 2008 Report of the Workshop on Seabird Ecological Quality Indicator (WKSQUIN) with contributions from Contracting Parties in OSPAR Regions II and III.”

Cover Photo: Black-legged Kittiwake and Chicks © Wikipedia

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Executive Summary

This background document reports on the development of an ecological quality objective (EcoQO) on seabird population trends.

The 5th North Sea Conference had identified seabird population trends to be an adequate index of seabird community health. As a consequence, work was undertaken in the context of OSPAR to develop this EcoQO. A workshop co-funded by ICES and in collaboration with the UKs Joint Nature Conservation Committee (JNCC) and the German Federal Agency for Nature Conservation (BfN) to develop an indicator was conducted by ICES at the request of OSPAR, bringing together seabird monitoring data from across the OSPAR maritime area.

Seabirds are an important part of the marine ecosystem of the North-East Atlantic. The OSPAR maritime area is one of the richest areas in the world for seabirds in terms of the number of birds and the number of species. Seabirds are typically at the top of the marine food web: changes in their populations are indicative of changes elsewhere in the ecosystem, as related to both natural processes and anthropogenic pressures. The changing state of seabird populations can provide a simple indicator of change within the structure and functioning of marine ecosystems.

The document proposes and evaluates the background for the following formulation for the EcoQO:

> *Changes in breeding seabird abundance should be within target levels for 75 % of the species monitored in any of the OSPAR Regions or their sub-divisions.*

The aims of the EcoQO are:

a) to provide an adequate EcoQO for the intrinsic health of seabird communities;

b) to provide triggers for appropriate action, where ‘appropriate action’ would be either:

   i) management of a known cause as long as the nature of the management required is fully understood; or

   ii) research to determine the cause and to recommend the most appropriate management response.

The EcoQO can be applied in all of the OSPAR Regions where data on seabird trends are available and can be assessed annually.

EcoQ Issue

Seabirds[1]

EcoQ Element

Seabird population trends as an index of seabird community health

EcoQ Objective

Changes in breeding seabird abundance should be within target levels for 75% of the species monitored in any of the OSPAR Regions or their sub-divisions.

Justification for the development of the EcoQO

Seabirds are an important part of the marine ecosystem of the North-East Atlantic. The OSPAR maritime area is one of the richest areas in the world for seabirds in terms of the number of birds and the number of species. Seabirds are typically at the top of the marine food web: changes in their populations are indicative of changes elsewhere in the ecosystem, as related to both natural processes and anthropogenic pressures. The changing state of seabird populations can provide a simple indicator of change within the structure and functioning of marine ecosystems. The aims of the EcoQO are:

a) To provide an adequate EcoQO for the intrinsic health of seabird communities;

b) To provide triggers for appropriate action.

In this case 'appropriate action' would be either:

i) management of a known cause as long as the nature of the management required is fully understood; or

ii) research to determine the cause and to recommend the most appropriate management response.

Technical evaluation considering the following elements:

ICES criteria for a good EcoQO:

Relatively easy to understand by non-scientists and those who will decide on their use

The EcoQO is very simple to understand. The EcoQO is designed to 'flag up' unusual changes in the seabird community that may also indicate significant changes elsewhere within the marine ecosystem. The EcoQO is not met if the abundance of more than one quarter of species being monitored has deviated from pre-set target levels. Failure to meet the EcoQO should stimulate appropriate action.

Sensitive to a manageable human activity

This EcoQO may not be met because of significant impacts of human activities on seabird populations. Seabird populations are known to be significantly affected (positively or negatively) by certain human activities. The EcoQO is more likely not to be met the more species are affected by an activity.

[1] In principle, this EcoQO can be applied to all seabird species for which data can be collected. A few species that are difficult to census may be excluded should the data not be reliable.

Relatively tightly linked in time to that activity

This EcoQO is based mostly on trends in numbers of breeding adults. Seabirds mature slowly, so there may be lag of several years before the number of breeding adults changes significantly in response to pressure from human activities that only affect the rate of recruitment of immature birds to the breeding population (*i.e.* those that mainly affect breeding success and/or immature survival). However, if breeding adults are directly affected by mortality and are thus removed from the population, the number of breeding adults will change quickly in response to the pressure causing mortality.

Easily and accurately measured, with a low error rate

Seabird breeding numbers are relatively straightforward and inexpensive to count. The required data for this EcoQO are collected as part of well-established, long-running national surveys in most OSPAR Contracting Parties. They are typically measured with a low error rate and capable of detecting change against background noise and variation.

Responsive primarily to a human activity, with low responsiveness to other causes of change

Seabirds are affected by several human activities (*e.g.* fishing, offshore renewable energy production, and discharge of petrochemicals at sea) that may have corresponding specific and/or cumulative pressures. For example, the food supply of some seabirds in the North Sea is thought to be altered by anthropogenically-induced climate change and by fishing. The abundance, survival and breeding success of certain species has been significantly reduced by these food shortages, yet it is difficult to separate how much of the impact is due to climate change and how much is due to fishing.

Measurable over a large proportion of the area to which the EcoQ metric is to apply

This EcoQO in general is applicable throughout the OSPAR Maritime Area and can therefore be adopted in any of the OSPAR Regions. Any seabird species can be included in the indicator for the EcoQO as long as the data on the abundance of breeding adults are sufficient to produce nationally representative trends within every country in the respective Region.

Based on an existing body or time-series of data to allow a realistic setting of objectives

Species are only included in the indicator for this EcoQO if there are at least 20 years of corresponding data on abundance of breeding seabirds available.

Ecological relevance/basis for the metric

The EcoQO indicator is based on intraspecific trends in abundance of breeding seabirds. Abundance is measured widely and relatively easily; but is a poor short-term indicator of environmental change due to a lag effect of delayed breeding. Nevertheless, it is a valuable indicator of important long-term changes in seabird community structure, where density dependent effects may easily reduce the usability of other population parameters (*e.g*. breeding success, survival rates). Seabirds are generally long-lived and reproduce slowly. Consequently, rapid changes in their numbers are not expected and might indicate that some human-induced factor(s) is (are) affecting the population to an extent that is not associated with a healthy seabird community and require(s) immediate management actions.

Current and historic levels (including geographical areas)

Data for the Greater North Sea Region (OSPAR Region II) has been collated to construct an indicator for this EcoQO The indicator is shown in Figure 1 and is based on trends in abundance of sixteen species. The proportions of species in each year during 1991-2010 that did not exceed the upper or lower target levels are plotted in Figure 1. The EcoQO was not achieved when the plotted proportion dropped below 75% (= 12 species). The figure shows that the EcoQO was not achieved in 8 out of 20

years: during 1991 – 1993, 2004, 2006 and 2008 – 2010. Appropriate action (*i.e.* research and/or management) would have been triggered in those years.

Data for the Celtic Seas (OSPAR Region III) has previously been collated to construct an indicator for this EcoQO. The indicator is shown in Figure 2 and is based on trends in abundance of twelve species. The proportions of species in each year during 1986-2009 that did not exceed either the upper or lower target levels are plotted in Figure 2. The EcoQO was not achieved when the plotted proportion dropped below 75% (= 9 species). The figure shows that the EcoQO was not achieved in 12 out of 24 years: during 1986, 1988-1990, 1992 an 2003-2009. Appropriate action (*i.e.* research and/or management) would have been triggered in those years.

Reference level

The reference level for each seabird population should be set at a population size that is considered desirable for each individual species within each geographical area. This should be set for each species based on expert judgement of when population levels were considered to be least impacted by human activities.

Limit point

Target levels used within this EcoQO are based on the magnitude of change in population size compared to preset reference levels (see above). Target levels were set to trigger an action about one-third of the time. This occurs when the indicator is beyond approximately one standard deviation of the mean. This led to an upper bound of 130% of the reference level for all species, while a lower bound of 80% of the reference level was set for species that lay one egg, and a separate lower bound of 70% for species that lay more than one egg. These different lower levels were set according to the resilience of populations to decline. These target levels could easily be changed or set individually for each of the species-specific trends without altering the EcoQO.

Time frames

This EcoQO can be assessed annually.

Advice on EcoQO options (scenarios)[2]

Monitoring methods and reporting requirements

Abundance data would have to be collected by seabird monitoring schemes within each country of the Region concerned. Each national scheme is responsible for standardising methods of data collection.

Data from each country can be collated annually. The ICES WGSE could analyse the data and report annually to OSPAR on whether or not the EcoQO has been achieved. Where appropriate, ICES could recommend actions to reverse those trends. In years when the EcoQO has been achieved, ICES will take note of any species-specific trend that is outside target levels and consider recommending remedial action to OSPAR. ICES would use demographic parameters, such as breeding success, to provide interpretation of changes in seabird abundance.

Management measures required to achieve the EcoQO

Applicability of the EcoQO in each of the OSPAR Regions

The EcoQO can be applied in all of the OSPAR Regions where data on seabird trends are available.

2 At the time of publication no information was provided for this section.

Data collation is complete in OSPAR Regions II[3], III and V. Trend models, target levels and reference levels have been formulated for OSPAR Region II and III.

For OSPAR Region IV, collation of further data is required before an indicator could be constructed.

Expansion of monitoring and the subdivision of OSPAR Region I is required before sufficient data will be available to construct an effective indicator.

Further considerations (including costs)

In OSPAR Region II resources might be needed to complete data for the non-Wadden Sea area in Denmark.

Data collation is incomplete in OSPAR Region IV. Resources are needed to properly collate data from Portugal and may be needed to secure data supply from Spain.

A depository for data needs to be nominated within OSPAR Regions II, IV and V. The same centre will be required to analyse regional trends and to work with participating countries to set reference levels and target levels for each individual regional species-specific trend. Resources may be required to formulate regional trend models.

It is uncertain if resources will need to be secured to ensure data analysis is carried out annually to update the species-specific trends of each regional indicator.

The work will be taken forwards through the annual contribution of data by Contracting Parties to the Working Group on Seabird Ecology, via the ICES Secretariat by the 1st October each year. The Working Group on Seabird Ecology will provide annual updates for the EcoQO to the annual meeting of the Biodiversity Committee.

Conclusions

The EcoQO on seabird population trends has been demonstrated to work in OSPAR Region II and III.

Further work is required to collate data in OSPAR IV.

Further work is required in OSPAR Regions IV and V to set up analytical models for estimating trends in each species and to set reference and target levels for each regional species trend.

References

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

3 At the time of publication additional data was to be provided for France (and was being processed) and for the non-Wadden Sea area of Denmark.

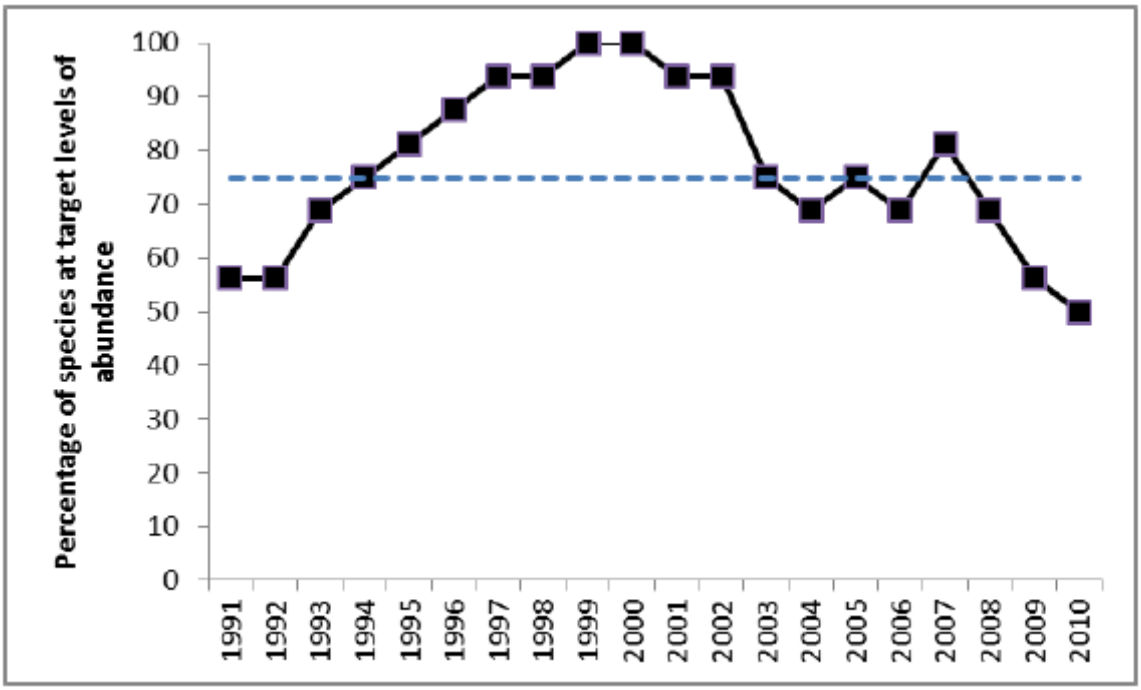

Figure 1: The proportion of species (n=16) in OSPAR Region II (Great North Sea) that were within target levels of abundance during 1991 – 2010. The EcoQO was not achieved in years when the proportion dropped below 75%.

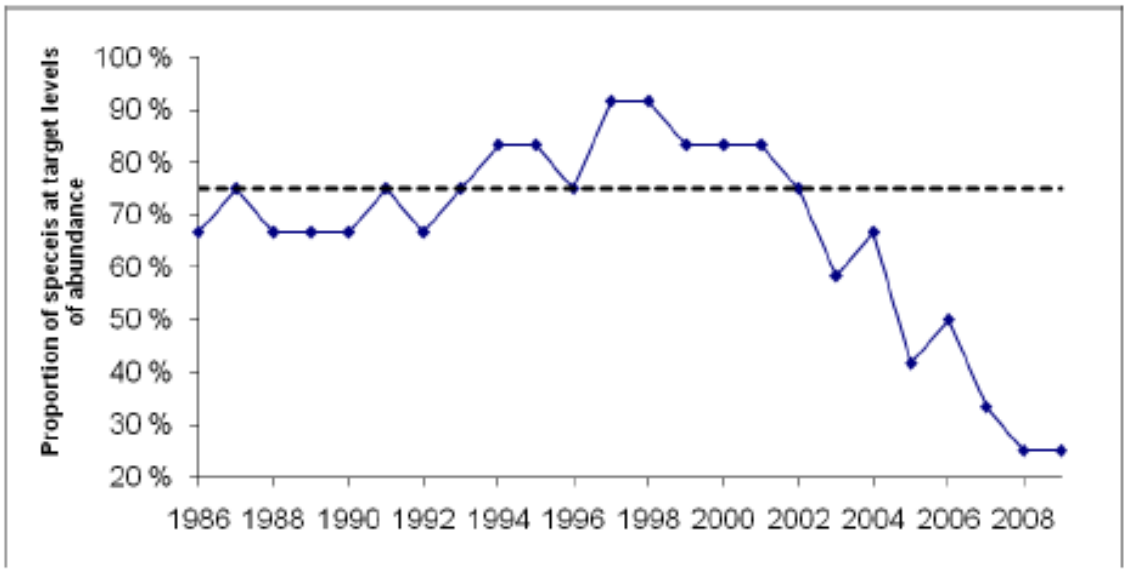

Figure 2: The proportion of species (n=12) in OSPAR Region III (Celtic Seas) that were within target levels of abundance during 1986 – 2009. The EcoQO was not achieved in years when the proportion dropped below 75%.

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OSPAR's vision is of a clean, healthy and biologically diverse North-East Atlantic used sustainably

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