

# Litter in the Marine Environment - Plastic Particles in Fulmar Stomachs 2011



© Jan van Franeker, IMARES

Policy Issue: Litter in the marine environment

Policy Objective: There should be less than 10% of northern fulmars having more than 0,1g plastic particles in the stomach samples of 50 to 100 beach-washed fulmars found from each of the 4 to 5 areas of the North Sea over a period of at least five years.

## Findings

The northern fulmar (*Fulmarus glacialis*) has its distribution in the northern part of the OSPAR area, including the greater North Sea. Fulmars forage exclusively at sea, capturing prey from the sea surface. They frequently ingest floating marine litter, including plastic objects presumably confusing them with food. Unlike most seabirds, fulmars do not regurgitate plastic particles but accumulate them. The content of plastic particles in their stomachs can therefore be used as an indicator for the abundance of litter encountered at sea. Ingested plastics may reduce food intake and the ability to process food, leading to a deteriorated body condition associated with increased mortality and reduced breeding success.

In all areas of the North sea the Ecological Quality Objective (EcoQO) is not being met. Stomach contents of fulmars for the combined SE North Sea region indicate that the marine litter situation is stable (BE, DE, NL). Data for other North Sea regions indicate lightly increasing (though not significant) trends. Highest plastic abundance is seen in fulmars from the Channel (86%).

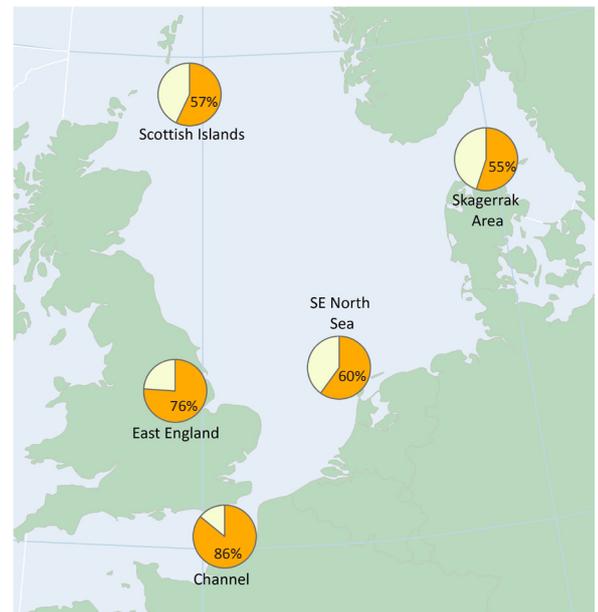


Figure 1. Percentage of Fulmars exceeding the 0,1g objective 2007 - 2011

## Quality Status Report Conclusion

Marine litter is a persistent problem that affects the entire marine environment and its ecological effects are not fully understood. The QSR conclusions are based upon the 2002-2006 data which highlighted that 94% of fulmars had at least one piece of plastic in their stomachs and on average 57% had greater than 0,1g of plastic in their stomach; well above the 10% target.

## What has been done?

Sampling programmes of beached dead fulmars have been established in a number of locations around the North Sea. Most of these are conducted as a part of existing long-term Beached Bird Surveys. Collected birds are identified (age, sex, etc), dissected and their stomachs are opened for analysis. All litter items are sorted out and categorised, counted and weighed.

## Observed Status

During the 2007-2011 period 796 fulmars were analysed. Averaged over the whole North Sea 95% had plastic in their stomach and 62% exceeded the 0,1 gram objective. The average stomach contained 33 particles of plastic, weighing 0,38g. Underlying this average for the recent 5 year period is a consistent regional pattern, in which highest plastic abundance is seen in fulmars from the Channel, with decreasing levels further to the north both along the western and eastern shores of the North Sea. The regional differences are strong, but not statistically significant. Regional percentages range for this period from 55% to 86%, all far above the objective of 10%. In the North Atlantic stepwise decreases can be seen towards higher latitudes, with lowered levels visible in the Faroes (40%) and in Iceland (28% in 2011) and the lowest levels in the Canadian Arctic (14% in 2002-2008).



© John Dunn

# Litter in the Marine Environment - Plastic Particles in Fulmar Stomachs 2011



Compared to the period 2002-2006, most North Sea regions suggest small increased amounts of litter ingested by fulmars, the situation in the South-East North is stable or slightly decreasing, but there is no significant trend.

A longer monitoring series for the Netherlands shows a sharp increase of marine plastic litter from the early 1980s to the mid-1990s, followed by a similar sharp decline, but stabilisation and lack of significant improvement after the turn of the century. The composition of ingested plastic has changed significantly since the 1980s with a strongly reduced proportion of industrial plastic and increased proportion of consumer waste.

## Does it work?

Over the last decade no significant decrease has been detected in plastic particles in fulmars' stomachs. This is not in line with the OSPAR strategy "to substantially reduce marine litter in the OSPAR maritime area to levels where properties and quantities do not cause harm to the marine environment". This does not mean that existing waste and maritime policy have been without effect, considering the increase in shipping and the use of plastics in the last decade. Recognising this lack of improvement OSPAR has adopted a Regional Action Plan on marine litter to take actions to reduce marine litter and highlight the problems to other competent authorities.

Location	2002-2006	2005-2009	2007-2011
Scottish Islands	48%	59%	57%
East England	59%	77%	76%
Channel	61%	86%	86%
SE North Sea	57%	57%	60%
Skagerrak area	49%	53%	55%
Faroe Islands	43%	46%	40%

## Implications/What happens next?

In order to meet the objective additional efforts are needed to stop litter entering the marine environment both from sea-based and land-based sources. Further refinements of the implementation of the EU Directive on Port Reception Facilities and MARPOL Annex V may be needed.

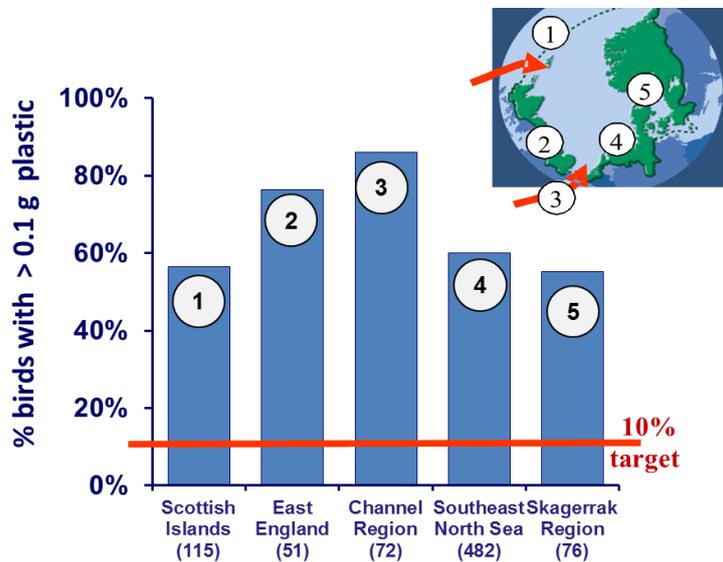


Figure 2. Regional variation in average plastic mass in fulmar stomachs in the North Sea regions 2007-2011, by EcoQO performance (% of birds with > 0,1g plastic).

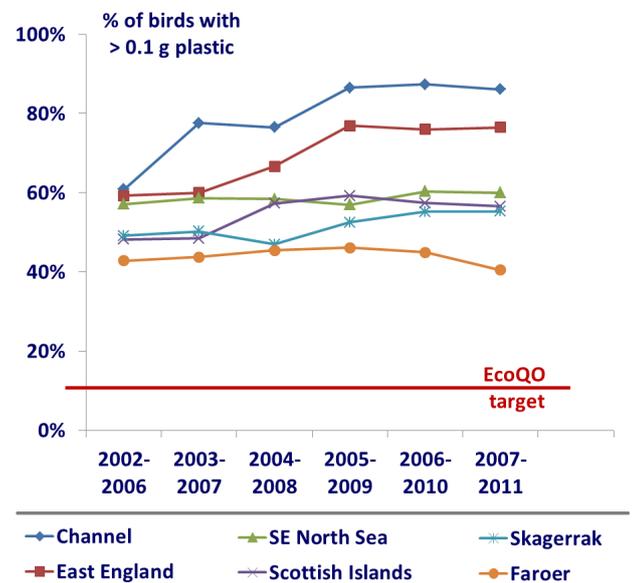


Figure 3. Trends in EcoQO performance in different regions of the North Sea since 2002 (by running 5-year average data).

### Sources of data and information:

#### OSPAR sources

- Background document for the EcoQO on plastic particles in stomachs of seabirds. OSPAR Commission, London, 2008. Publication 355/2007.
- EcoQO Handbook - Handbook for the application of Ecological Quality Objectives in the North Sea - 2nd edition. OSPAR Commission, London, 2009. Publication 307/2009.
- The OSPAR system of Ecological Quality Objectives for the North Sea, a contribution to OSPAR's Quality Status Report 2010. OSPAR Commission, London, 2009. Publication 404/2009.
- Evaluation of the OSPAR system of Ecological Quality Objectives for the North Sea. OSPAR Commission, London, 2009. Publication 406/2009.
- OSPAR QSR 2010

#### Other sources

- Van Franeker, J.A. & the SNS Fulmar study group (2013) Fulmar Litter EcoQO monitoring along Dutch and North Sea coasts – Update 2010 and 2011. IMARES report C076/13, IMARES, Texel