

Van Franeker, J.A.; & the Save the North Sea Fulmar Study Group 2009. Foolish Fulmars and their contribution to ecological quality.. pp 227-253 in Arthur, C.; Baker, J.; & Bamford, H. (eds) Proceedings of the International Research Workshop on the Occurrence, Effects and Fate of Microplastic Marine Debris. Sep 9-11, 2008. NOAA Technical Memorandum NOS-OR&R-30.

PROCEEDINGS OF THE INTERNATIONAL RESEARCH WORKSHOP ON THE OCCURRENCE, EFFECTS, AND FATE OF MICROPLASTIC MARINE DEBRIS

September 9-11, 2008

University of Washington Tacoma, Tacoma, WA, USA

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Technical Memorandum NOS-OR&R-30
January 2009

The suggested citation for this document is as follows:

Arthur, C., J. Baker and H. Bamford (eds). 2009. Proceedings of the International Research Workshop on the Occurrence, Effects and Fate of Microplastic Marine Debris. Sept 9-11, 2008. NOAA Technical Memorandum NOS-OR&R-30.

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FOOLISH FULMARS AND THEIR CONTRIBUTION TO ECOLOGICAL QUALITY

Dr. Jan A. van Franeker, Wageningen IMARES, Den Berg (Texel), THE NETHERLANDS

& the Save the North Sea Fulmar Study Group




Abstract: Indiscriminate foraging enables the Northern Fulmar (*Fulmarus glacialis*) to successfully exploit variable food resources in changing marine environments. But flexibility can be taken too far. Like most tubenosed seabirds, Fulmars ingest a wide variety of man-made litter. Ingested plastics resist digestion and mechanical breakdown in the stomach and accumulate over time. Unlike gulls, Fulmars normally do not regurgitate indigested stomach contents and need to 'process' them slowly in the digestive system. Ingested materials sometimes cause direct mortality but more importantly, indirect sublethal effects will occur in almost all individuals in many populations. However, the accumulated plastics also represent a convenient monitoring instrument for the litter situation in the offshore environment. Stomach contents integrate probably up to several weeks of 'sampling' of the marine litter situation in their foraging area.

In 2002 the North Sea Ministerial Conference decided to tackle marine problems through the concept of 'Ecological Quality Objectives (EcoQO's)'. An EcoQO provides a monitoring system as well as a target for 'acceptable ecological quality'. For the marine litter issue, an EcoQO based on the amount of plastic in stomachs of beached Fulmars was selected. The preliminary political target for acceptable ecological quality was worded as "*less than 10% of Fulmars having more than 0.1 gram of plastic in the stomach*". Implementation of this 'Fulmar-Litter-EcoQO' started in 2002 in the EU project 'Save the North Sea'. Data show that 40% to 60% of Fulmars in the North Sea currently exceed the critical value of 0.1 gram of plastic in the stomach. In addition of being a valuable policy instrument, the image of 'birds with plastic in their stomach' attracts much public attention and stimulates awareness and changed behaviour among stakeholders. Fulmars are foolish foragers, but by being 'quantifiable fools', they can contribute to improved ecological quality for the benefit of all.


Jan van Franeker, PhD, is a senior scientist at the Ecology department on Texel of the Netherlands Institute for Marine Resources and Ecosystem Studies (IMARES). Van Franeker is a marine biologist and has his main expertise in seabirds and other marine top predators, with a focus on their functioning in polar marine ecosystems, especially the Southern Ocean. Since 1986 is project leader for the Antarctic Research conducted by IMARES. Throughout his career, pollution issues in relation to marine wildlife have been a recurrent phenomenon. In recent years he has guided important projects on monitoring the ingestion rates of litter by seabirds. Formerly a government research institute for the Ministry of Agriculture, Nature and Food Quality, IMARES is now a privatised marine research organisation working under the umbrella of Wageningen University and Research (WUR).

Foolish Fulmars and their contribution to ecological quality

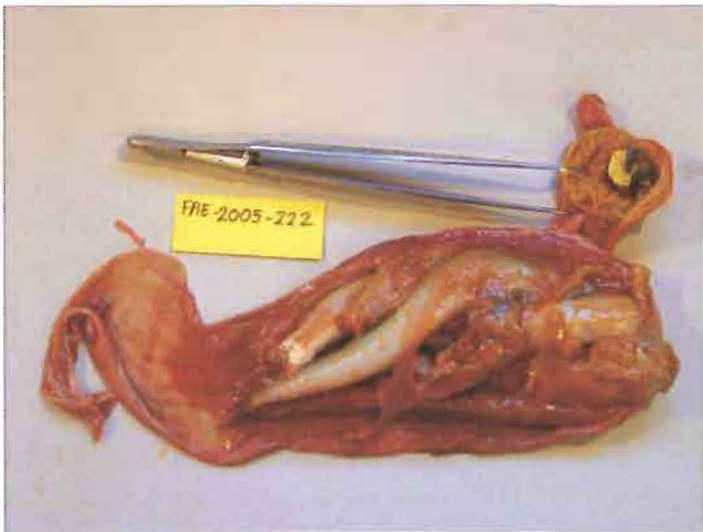
Jan van Franeker and the 'Save the North Sea' Fulmar study group

Martin Heubeck
 Mick Meiler
 Eric Mevik
 Keith Fairclough
 Dan Turner
 Mark Grantham
 Stuart Newson
 Jane Gillan
 Nicole Girard
 Gilles le Guillou
 Christine Blazé
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 Kåre Olav Olsen
 Berge Olsen
 Johannes Danielsen
 Jens-Peter Jensen
 Maria Dam

Wageningen IMARES 





Fulmars are fools

....
but because of that
they may be

...
**a convenient 'tool'
for monitoring:**

- numerous, widely distributed, beached birds available
- consumes all sorts of litter
- feeds exclusively at sea
- retains litter in stomach
- integrates pollution levels over its oceanic foraging range

'North Sea'
Fulmar Study
2002-2006....

Netherlands
Fulmar-Litter
monitoring
1982 - 2004

Litter types in Fulmar stomachs

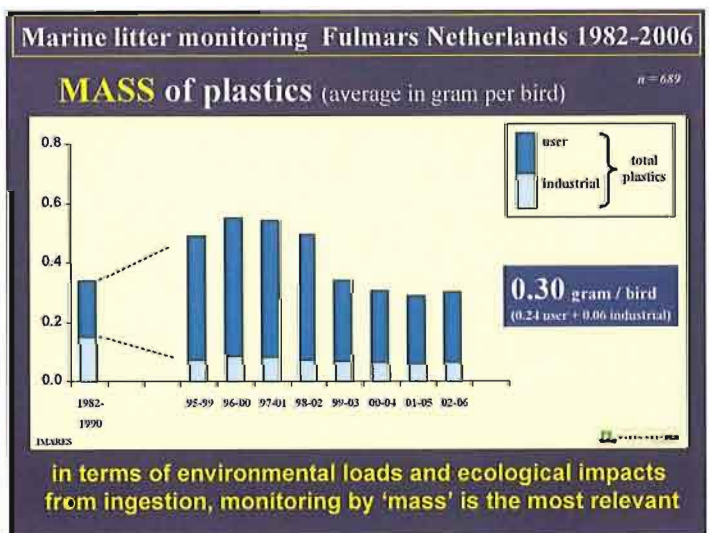
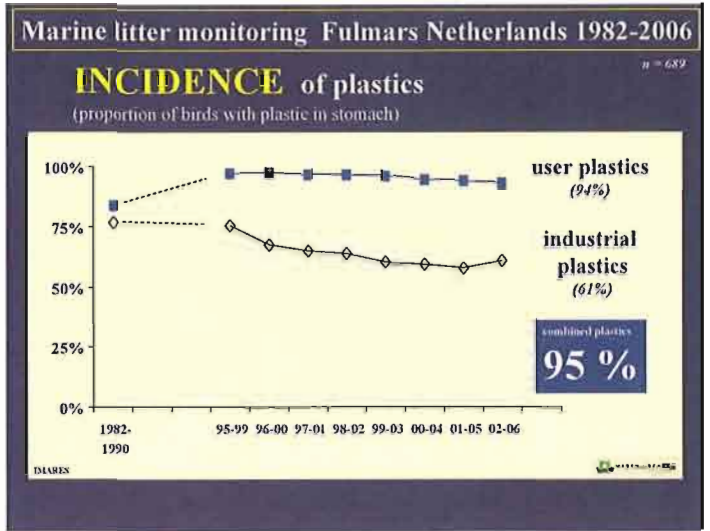
pollutants,
chemical?

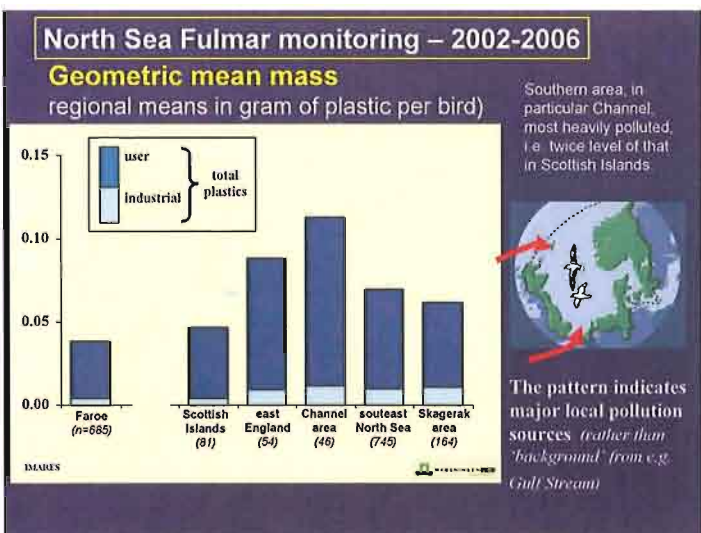
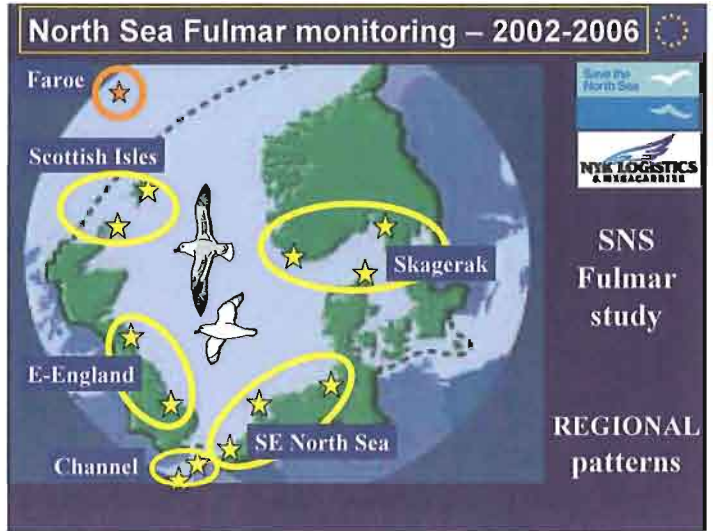
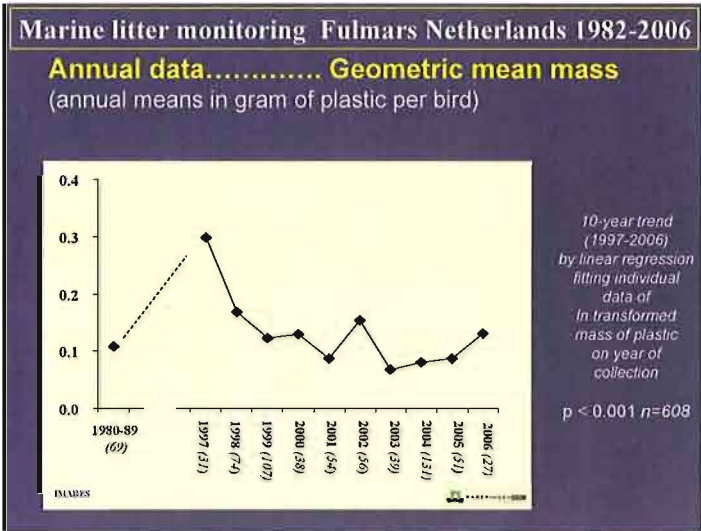
industrial
plastic

non plastic
rubbish

user
plastic

- sheet
- thread
- foam
- fragment
- other





North Sea Ministerial Conference Declaration

(Bergen; March 2002):

Ecological Quality Objectives for the North Sea

“EcoQO’s”

(= monitoring systems with well defined political target)



OSPAR

EcoQO example:

EcoQO on oil pollution in the North Sea

Quality element

Beached Guillemots

Objective

the proportion of Guillemots with oil must be 10% or less of the total found

(all regions, for at least 5 years)



EcoQO on litter pollution in the North Sea

Quality element

beached Northern Fulmars

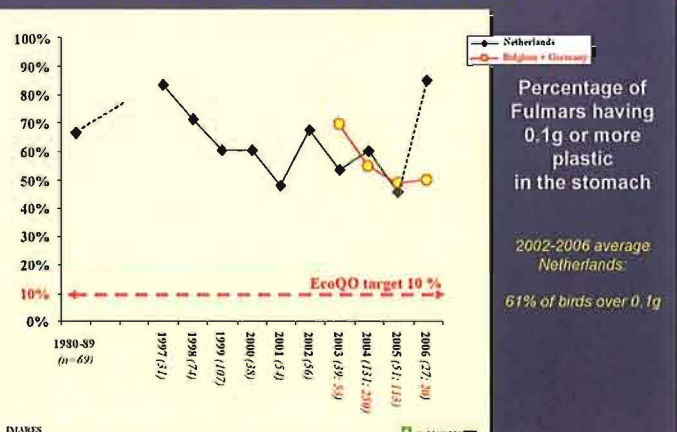
Objective (preliminary)

the proportion of Fulmars with more than 0.1g of plastic in the stomach must be 10% or less of the total found

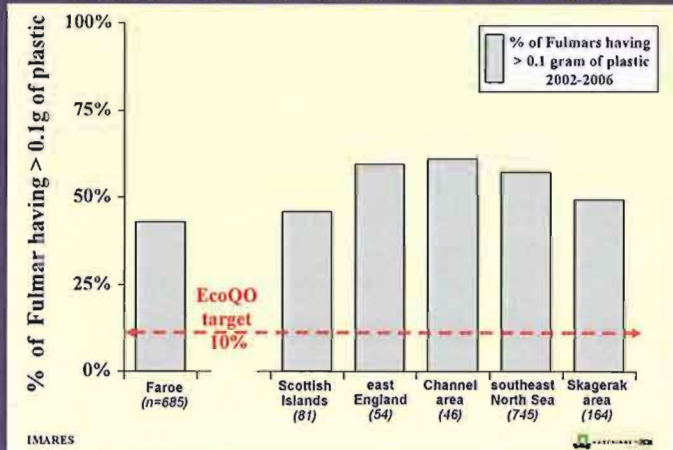
(all regions, for at least 5 years)



OSPAR EcoQO target for marine litter in the North Sea Trend and current level in the Netherlands



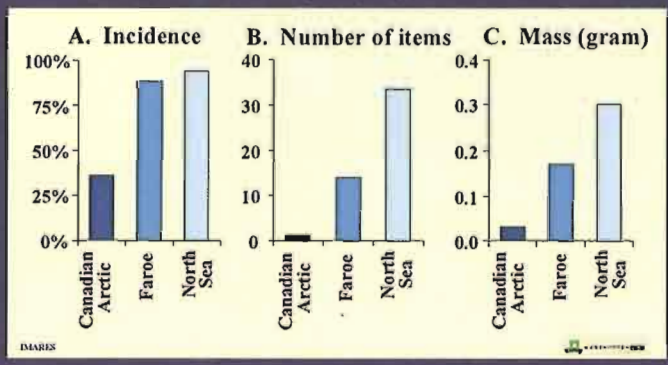
OSPAR EcoQO target for marine litter in the North Sea
current levels (5 year averages) in different regions



Scope for improvement ?

North Atlantic comparison

Data Canadian Arctic from Mallory et al. (2006), Mar Pollut. Bul. 52: 813-815



John Maudslayi, Rik Wouda, and Sabine Schüttler-Haagen
The North Sea Oceanic Campaign

Fulmar
= attractive and convincing fool and tool for policy and general public in working towards improved ecological quality in the North Sea

Fulmar - symbol of the Save the North Sea marine litter campaign

to the benefit of all marine life

G. Møller - GECC

Fulmars in the North Sea
contribute to ecological quality
also, by "digesting" per year an estimated *

- 750 million plastic particles
- representing over 6 ton of plastic
- plus a wide range of other waste products

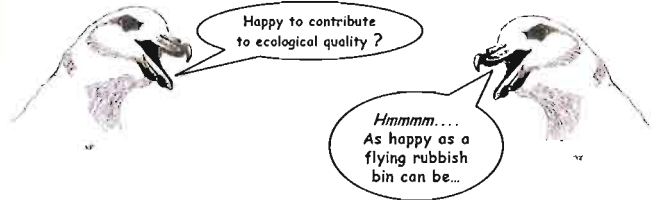


* Approximately 2 million Fulmars live within the North Sea area, seasonally fluctuating between 1 and 3 million (Skov et al 1995). During a year, there are about 24 million 'Fulmar months' in the North Sea.

The average stomach load of plastics of Fulmars in the North Sea is ± 40 particles weighing ± 0.3 gram (van Franeker et al. 2005). Thus, at any moment over 80 million plastic particles, or 670 kg plastic is "flying around" inside Fulmars. A conservative estimate is that $\pm 75\%$ of such a stomach load is "digested" and excreted within a month time (observations on Antarctic species: van Franeker et al 2001).

reports and info:
www.zeevogelgroep.nl

click downloads



Thank you for listening

Wageningen IMARES

