

# PLASTIC SOEP IS OVERAL

*27e NIBI Onderwijsconferentie,  
12-jan-2013, Lunteren*

*pdf copy of conference presentation  
to be used only  
in school classrooms*

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

Martin Heubeck  
Mick Mellor  
Eric Meek  
Keith Fairclough  
Dan Turner  
Jane Gollan  
Nicole Girard  
Gilles le Guillou  
Christine Blaize  
Eric Stienen  
Wouter Courtens  
Marc vd Walle  
Elisa Bravo Rebolledo  
Susanne Kühn  
Kees Camphuysen  
André Meijboom  
David Fleet  
Nils Guse  
Stefan Garthe  
John Pedersen  
Helle Schulz  
Poul Lindhard Hansen  
Kare Olav Olsen  
Bergur Olsen  
Johannes Danielsen  
Jens-Kjeld Jensen



The Netherlands Ministry of  
Infrastructure and the  
Environment





**“a day at sea” as an introduction to marine litter types**





ΑΓΝΟΣ ΕΛΛΗΝΙΚΟΣ ΚΑΦΕΣ

PURE GROUND GREEK COFFEE  
CAFÉ GREC PURE MOULIN  
HEISS GEMAHLEN GRIECHISCHER KAFFEE

**BRAVO**

Μπράβο, ο αγνός ελληνικός καφές!



ΚΑΦΕΣ ΒΑΡΟΣ  
NET WEIGHT

982 grams

ΜΠ. ΒΑΡΟΣ  
GROSS WEIGHT  
POIDS BRUT

982 grams  
NETTOWICHT

ΑΓΝΟΣ ΕΛΛΗΝΙΚΟΣ ΚΑΦΕΣ

**BRAVO**

Γεύση από Ελλάδα

Είναι ένα μιλκ-μακ  
καφέ BRAVO. Το  
καφέ που στη  
Κυριάκη  
τα τραπεζο  
σου, το  
θαυρά για  
Αθήνησεν  
Ελλάδα

Είναι  
καφέ  
BRAVO  
αλου  
από  
Εται  
Ελλάδα

*thee*













offshore oil and gas industry





# CARECLEAN HD DESCALEX L

MARINE CARE  
HOLLAND

Inhibited heavy duty acid cleaner for removal of scale with anti-foaming properties

Removes heavy deposits of scale and iron oxides.

Inhibited to protect metal services from acidic attack.

Can not be used on stainless steel, cast iron, zinc, aluminium and galvanized materials.

Flashpoint : None.

pH (1% solution) : 1.0.

UN 1789 HYDROCHLORIC ACID

ADR: 8 / II

IMO: 8 / II

Causes burns. Irritating to respiratory system.  
When using do not eat or drink. In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. Wear suitable protective clothing, gloves and eye/face protection. In case of accident or if you feel ill, seek medical advice immediately (show the label where possible). This material and its container must be disposed of as hazardous waste.

Batch no.: 0D0369



MARINE CARE B.V. - Mozartlaan 3 - NL-3144 NA Maassluis - The Netherlands  
Tel.: +31 (0)10 - 29 50 342 - Fax: +31 (0) - 29 50 345 - E-mail: info@marinecare.nl







# TRO-MAR SR 30

Skibsmotorolie

Oplyder til specifikationer Sert. 1,  
SNC-L-42100B og API Service CD

Viskositet SAE 30

Produktet er udviklet og fremstillet af TRO-MAR A/S, 2600 Lyngby, Danmark.  
Alle rettigheder forbeholdes. For yderligere oplysninger kontakt os på telefon 44 44 44.  
© 1998 TRO-MAR A/S













ТІМОТЕІ

Апельсиновый с Мятой



2 в 1

Оживляющий шампунь и бальзам-ополаскиватель

ДЛЯ ТОНКИХ И ОСЛАБЛЕННЫХ ВОЛОС

энергия и объем































**Coastal recreation**



**Shore-based industries**



agriculture

**coastal  
dump  
sites**



*Punta Arenas, Chile*



*Faroe Islands (2009)*



*Los Angeles river, USA*





**small  
marine  
litter**



## INDUSTRIAL PLASTICS



colourants, fillers, softeners, anti-oxidants, flame-retardants, uv-protectors, biocides,.....



## USER PLASTICS





# Plastic soup... garbage patches



Day # 3650

Year # 10

70%

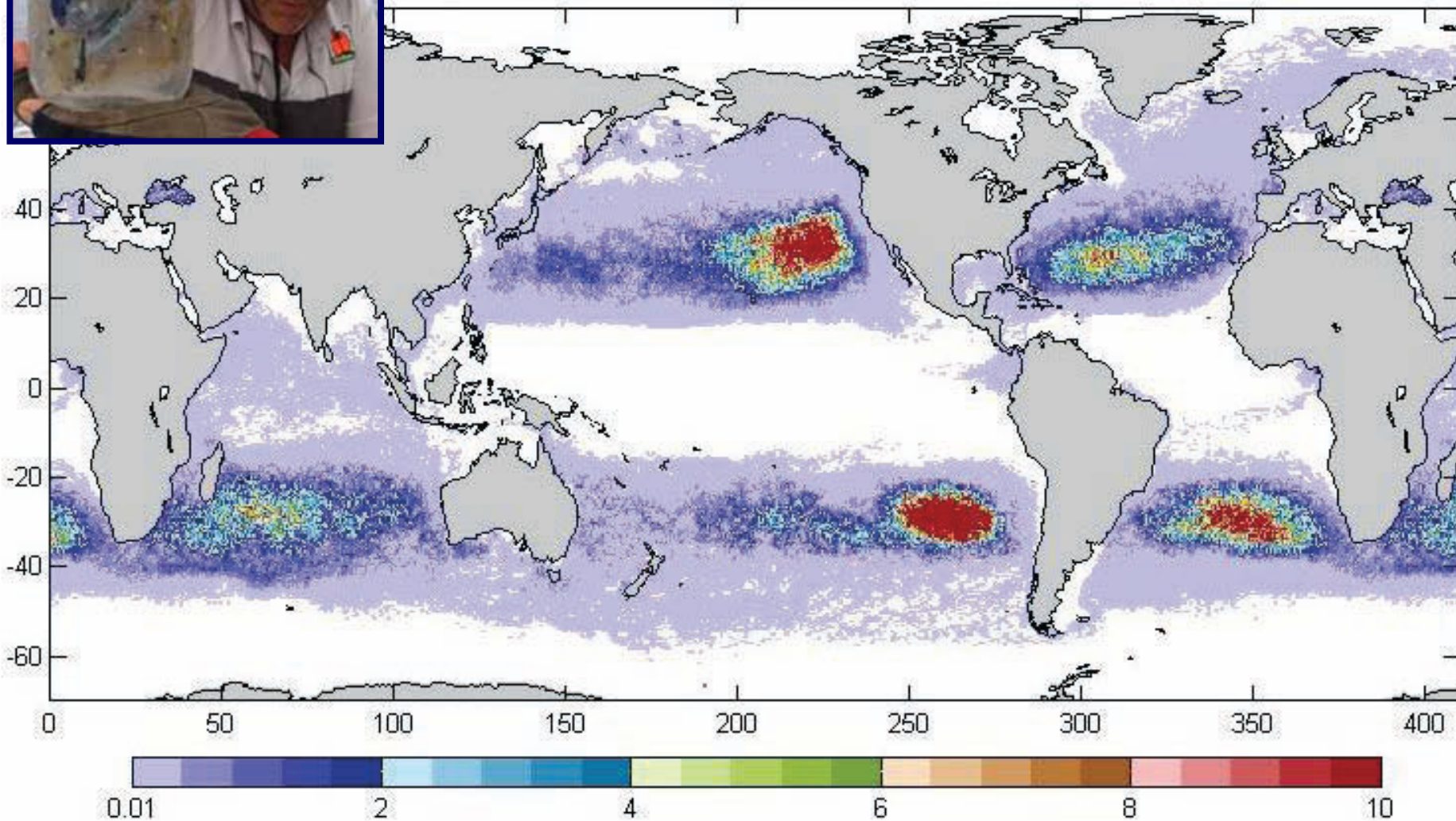


photo: Nicole Janinhoff

**Plastic soup in  
Texel Ferry Harbour**

**Grey  
Phalarope**  
*Phalaropus  
fulicaria*





**PLASTIC  
SOUP  
is not  
a 'distant' problem,  
it's  
EVERYWHERE**

*Corsica, April 2011*

*For short film on this picture see:*

**<http://youtu.be/nuHpjKHEsx8>**



**why worry about marine litter ?**





# DAMAGE economic







Foto G Timmerman (TC)





**economical damage from litter: possibly over 1.000.000.000 Euro per year !**

**DAMAGE** ecological



**Entanglement**









<http://marine-litter.gpa.unep.org/>



# INGESTION

















## Minke Whale

*Balaenoptera acutorostrata*

stomach contents of young  
Minke Whale  
beachwashed in France



*Photo: G.Mauger, Groupe d'Étude des Cétacés du Cotentin - GECC*

# GEVOLGEN VAN HET ETEN VAN PLASTIC :

## Directe doodsoorzaak

## Indirecte effecten

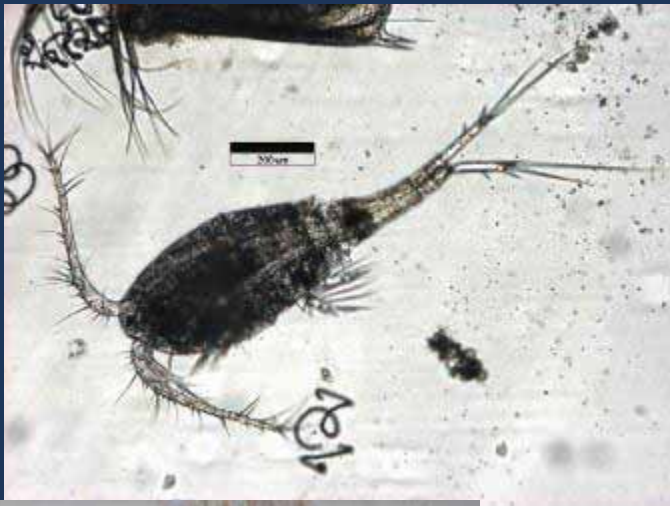
- schade maagwand
- verminderde maagfunctie
- onderdrukt hongergevoel
- kleinere maaginhoud
- opname giftige chemicaliën

➔ *afname conditie* ➔ *toename sterfte*  
➔ *afname broedsucces*



# ***“Plastic Soup”***

**effects microscopic  
plastics on  
filter feeders and  
on food web ???**



# marine litter = problem



**DAMAGE** economical



**DAMAGE** ecological



# measuring marine litter



<http://zeevogelgroep.nl/SchoonStrandTexel2005/>

# measuring marine litter





**Northern Fulmar – *Fulmarus glacialis***



*Lesser Black-backed Gull*



*Northern Fulmar*





## Stormvogels zijn dom

*maar juist daarom  
misschien ...*

**een handige  
graadmeter voor  
afval op zee**

- talrijk, wijdverspreid, dode vogels op strand
- eet allerlei soorten afval
- fourageert alléén maar op open zee
- hoopt plastic afval op in de maag
- *integreert vervuilingsniveaus in zijn voedselgebied op zee*

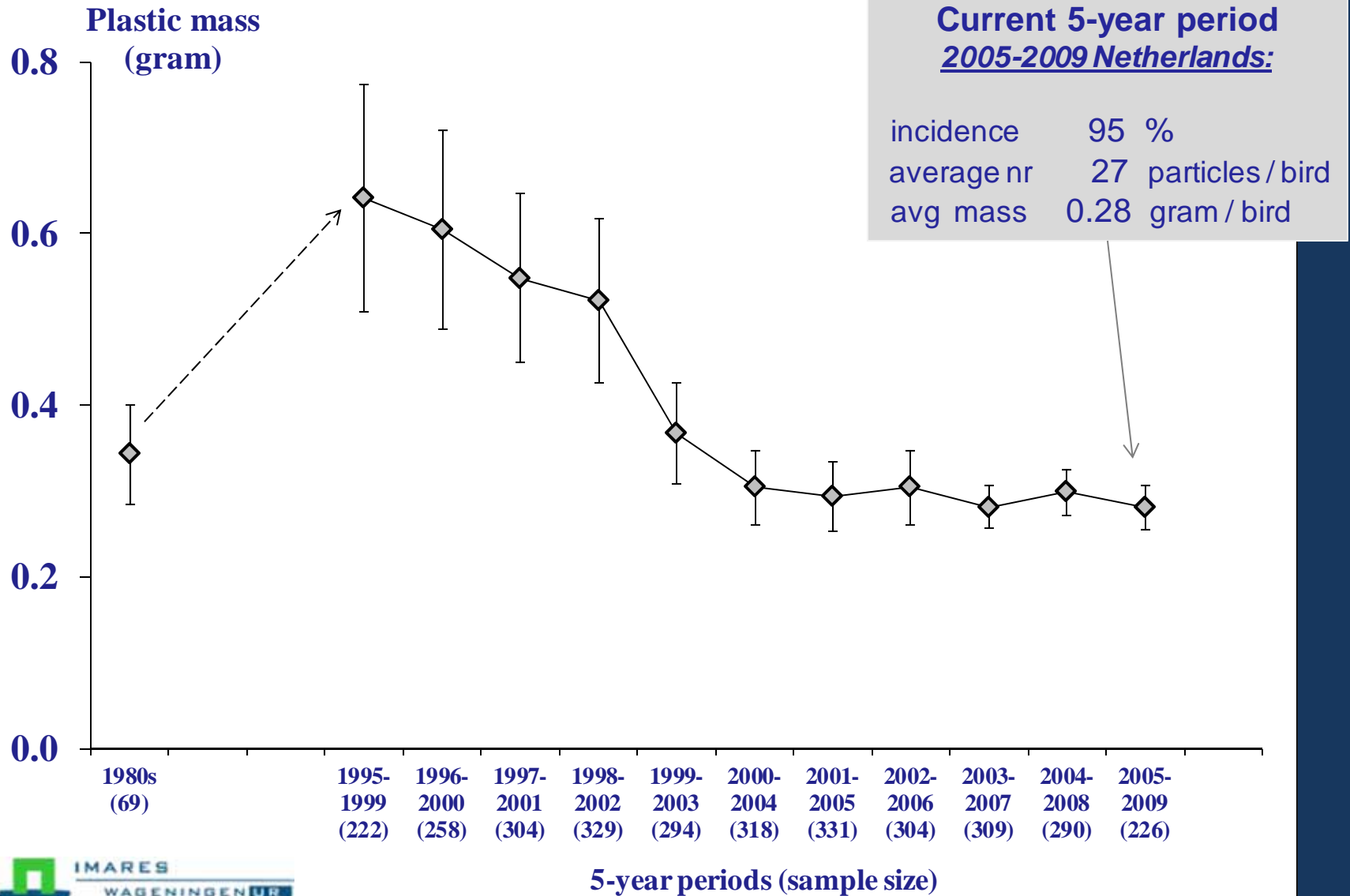


**‘North Sea’  
Fulmar Study  
2002-20....**

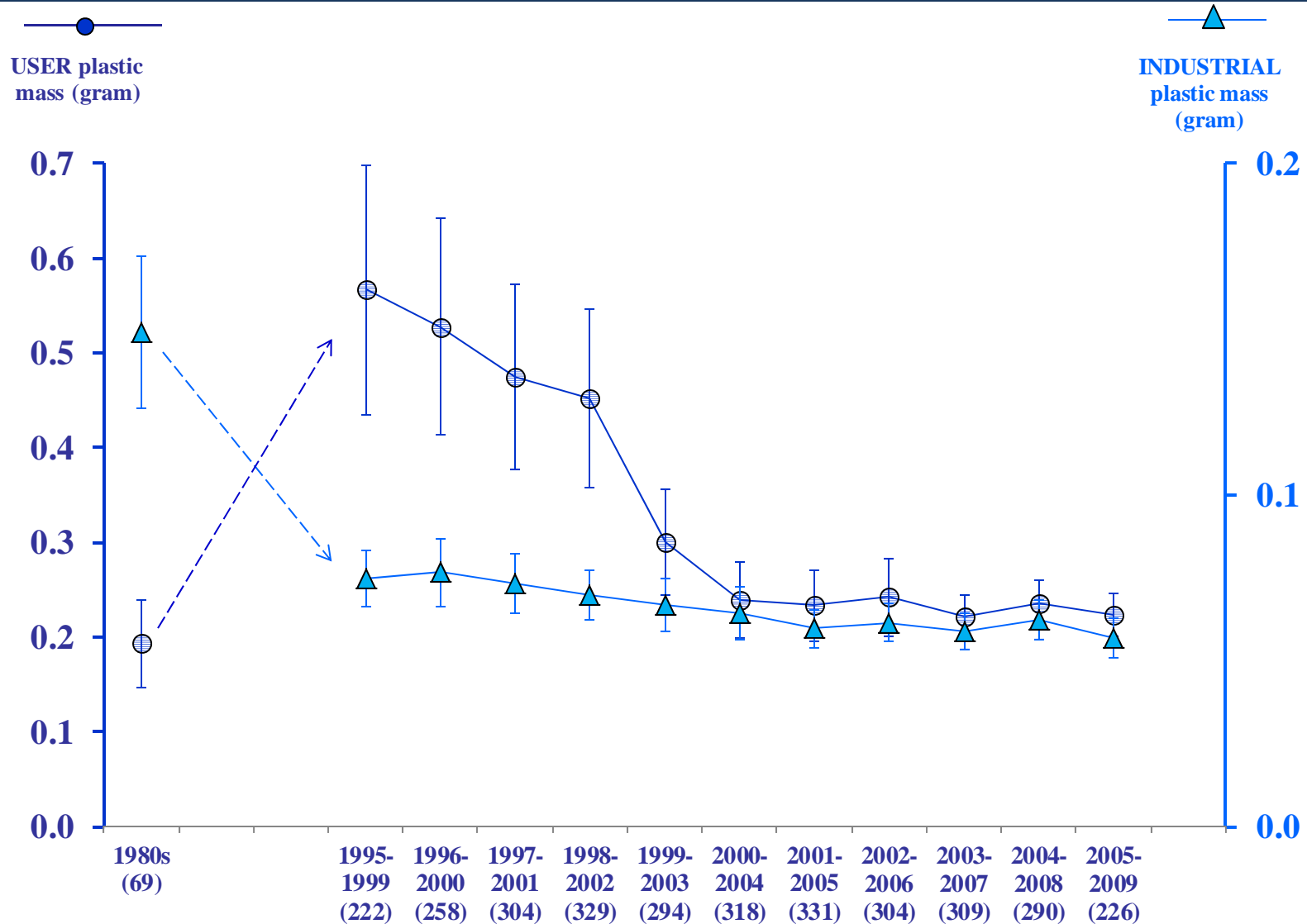
**Netherlands  
Fulmar-Litter  
monitoring  
1982 – 20...**



# Average mass $\pm$ se of plastics in stomachs of fulmars in the Netherlands (running 5-year arithmetic average for all ages, all plastics)



# Average mass $\pm$ se of **industrial** and **user plastics** in stomachs of fulmars in the Netherlands (*running 5-year arithmetic average for all ages*)



# Kwaliteitsdoelstelling (*Ecological Quality Objective 'EcoQO'*) voor ZWERFVUIL in de Noordzee

## *Kwaliteits meter*

dood aangespoelde  
Noordse Stormvogels

## *Doelstelling*

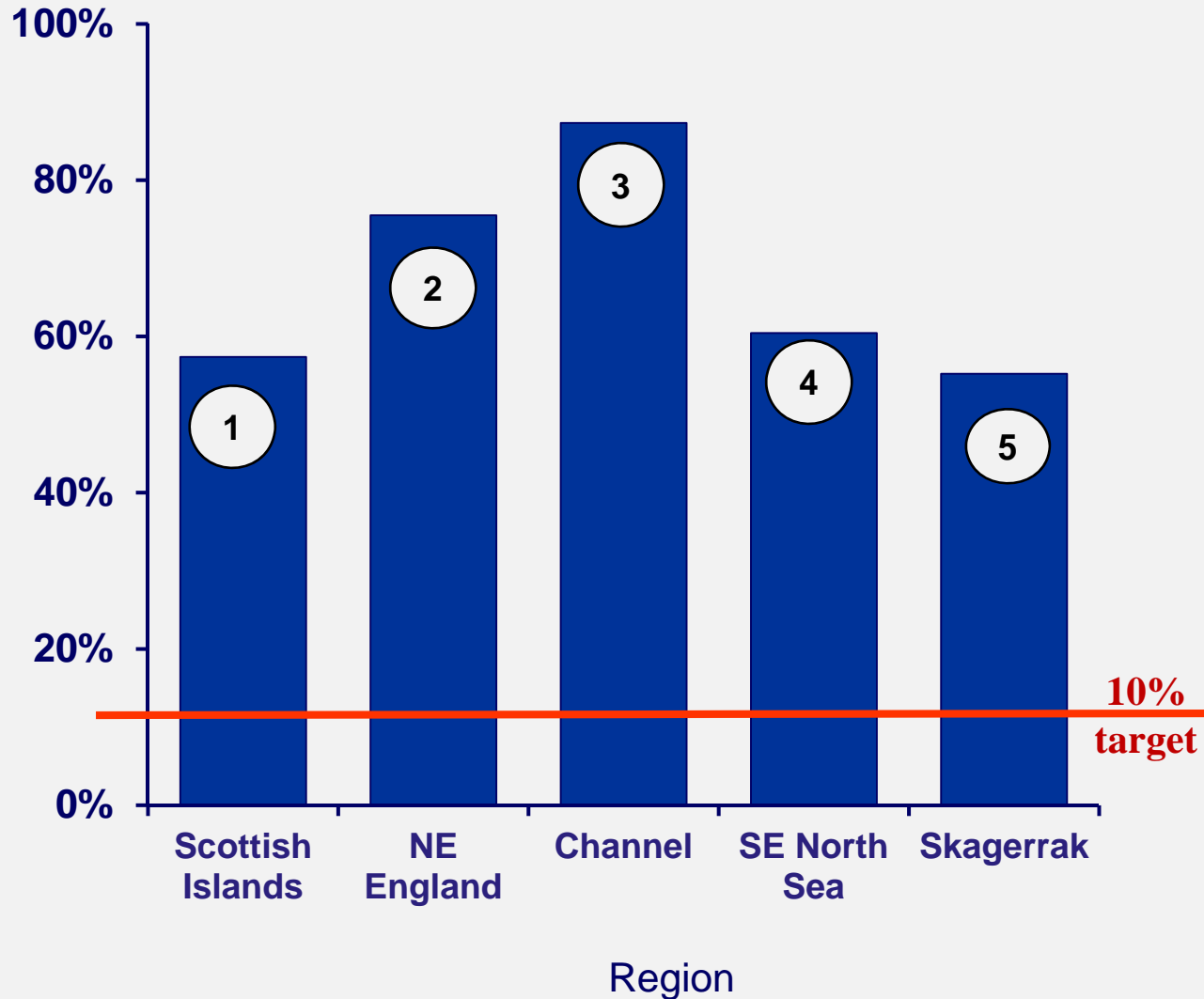
< 10 % van de vogels  
heeft  
> 0.1 gram plastic  
in de maag

(alle deelgebieden; voor aaneengesloten  
periode van tenminste 5 jaar)



# North Sea Regional Pattern (EcoQO performance 2005-2009)

% of birds with > 0.1 g plastic



The southern area, in particular the Channel, is most heavily polluted:  $\pm$  twice the level of that in the Scottish Islands

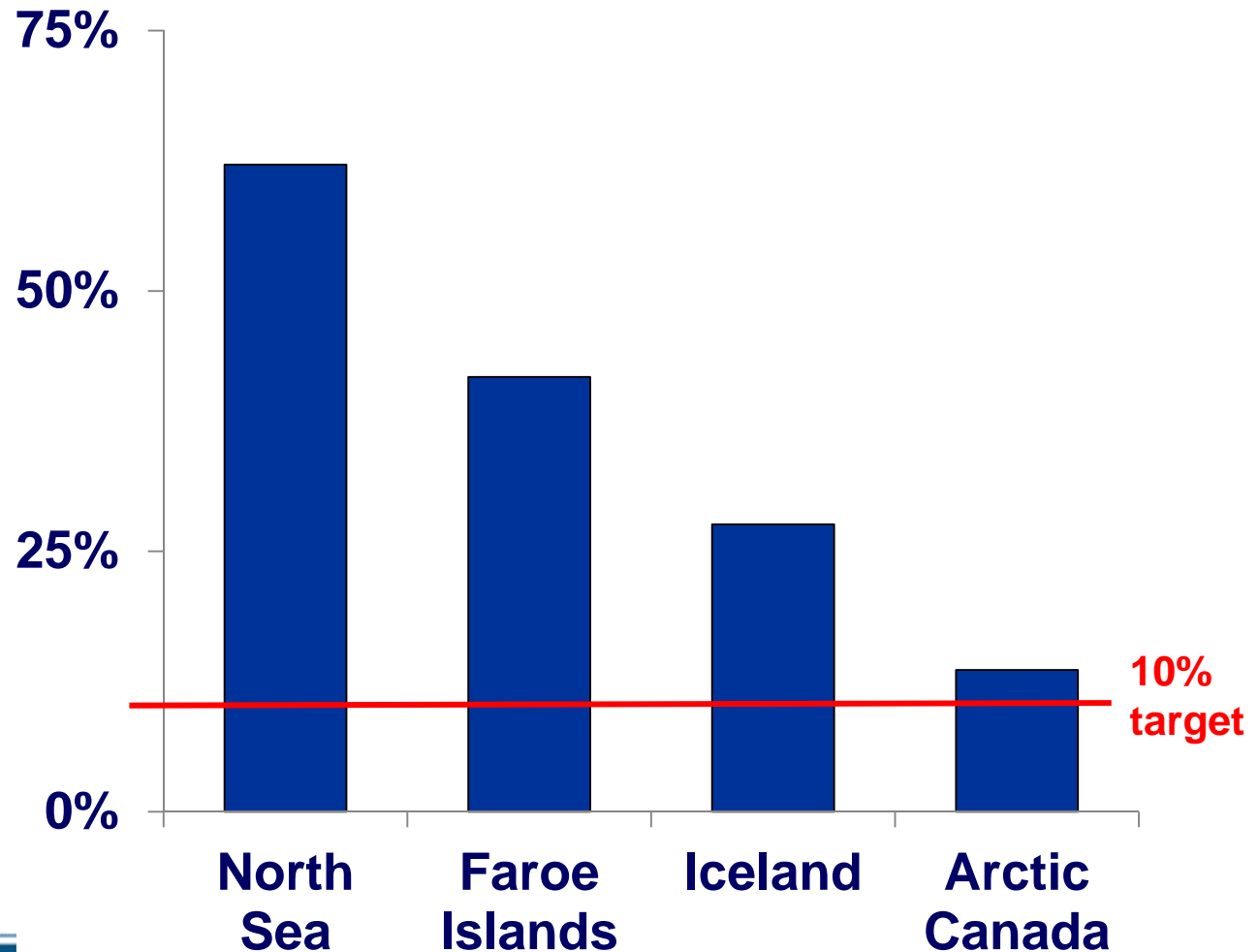


The pattern indicates major local sources of pollution (*rather than 'background' from e.g. Gulf Stream*)

# North Atlantic comparison

## EcoQO performance

(% birds with more than 0.1g plastic in stomach)



# Europese KaderRichtlijn Marien

(KRM 2008) :

*“Goede MilieuToestand (GMT) in 2020*

---

## **doelstelling:**

*Zwerfvuil veroorzaakt “geen schade” aan kust en zeemilieu*

## **Graadmeters :**

*trends in*

*hoeveelheid vuil op kust en in het water, ook voor microplastics,  
en ‘invloeden van zwerfvuil op het leven in zee’ \**

\* = gemeten aan het eten van plastics door zeedieren,  
naar het voorbeeld van de stormvogel EcoQO in de Noordzee



# European Marine Strategy Framework Directive :

*in regions where fulmar sampling is not possible  
other options for bio-monitoring have to be explored*



Other birds ?



Photo: G.Mauger, Groupe d'Étude des Cétacés du Cotentin - GECC  
mammals ?



turtles ?



fishes ?

# Harm ?



scaled to  
human size  
60 g



Fulmar  
0.6 g

# North Sea 2003-2007

95% plastic incidence;  
0.31 gram per bird



HUMAN SIZE  
COMPARISON



FULMAR  
0.31g

# HARM?

## Fulmar wreck 2004:

- highly unusual sex & age composition
- serious deficiencies in down plumage
- illogical reproductive decisions

## Suggesting a disturbed endocrine hormonal system !

Hormonal disruptions are a known effect of the types of contaminants accumulated by fulmars through food and/or plastic ingestion



Foto: Johan Kroll

From Honolulu 2011 5IMDC presentation: Chemicals in marine plastics and risks: a mass mortality incident among fulmars in 2004 showed many characters of hormonal disturbance, potentially related to plastic ingestion



John Mouat

Rick Nickerson

Melanie Schultz van Haegen  
(NL North Sea Deputy Minister)

Fulmar is a  
high quality scientific tool  
*plus a*  
strong public relations tool  
to create the political and public  
awareness that is essential to  
accept and support measures  
aimed at the reduction of litter in  
the marine environment

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





Plastic fragments found in 5-week old rainbow runner caught at 23°05.35N, 147°12.86W on August 13, 2008



to the benefit of  
**all** marine life



Salko de Wolf, EcoMare



G.Mauger, - GECC



Shipping (*incl. fisheries*) considered as the main source of marine litter.

(*measures:*  
*e.g. EU Directive on*  
*Port Reception Facilities*)





**remains of balloons**  
**average 6 per km**  
*(Texel, april 2005)*



# [www.imares.nl](http://www.imares.nl)

*click dossiers.. plastic ...*

*direct:*

[www.wageningenur.nl/plastics-stormvogels](http://www.wageningenur.nl/plastics-stormvogels)  
[/plastics-fulmars](http://www.wageningenur.nl/plastics-fulmars)

[www.zeevogelgroep.nl](http://www.zeevogelgroep.nl)

*click downloads fulmar study*

Thank you  
for  
listening !



---

**IMARES**



IMARES

WAGENINGEN UR