

# Seabirds in the North Atlantic

## How many are there, and how much do they eat?

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Atlantic puffin with capelin and gadids. Photo: Rob Barrett

### Aim

On the request of ICES, we, members of the ICES Working Group on Seabird Ecology (WGSE), compared seasonal composition, abundance and biomass of seabirds within and between the north-east (ICES) and north-west (NAFO) Atlantic fisheries regions to identify differences in community assemblages and prey consumption.

### Numbers

Based on breeding population data provided by the WGSE national representatives and on our estimates of numbers of seabirds visiting the North Atlantic at certain times of the year, we estimated that between 220-290 million seabirds feed in the North Atlantic throughout the year.

There are more birds in the north-west Atlantic, but their biomass is greater in the north-east. This disparity is due to enormous numbers of little auks *Alle alle* breeding in West Greenland and of Leach's storm-petrels *Oceanodroma leucorhoa* breeding in Newfoundland, plus large numbers of non-breeding shearwaters *Puffinus* spp. entering southern NAFO areas in summer. The north-east Atlantic communities are dominated numerically by northern fulmars *Fulmarus glacialis*, guillemots *Uria* spp. and the Atlantic puffin *Fratercula arctica*.

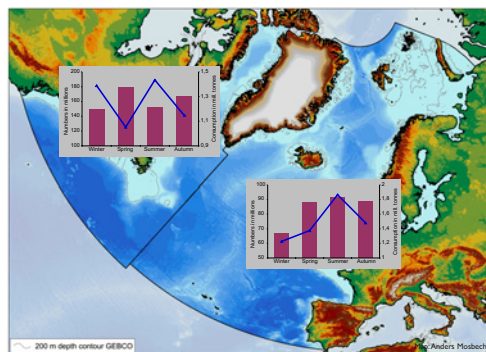
### Consumption

We estimated the annual consumption by seabirds in a given area using calculated species-specific energy demands, numbers of individuals of that species within the area, number of days present and a mean energy density of food of 5.5 kJ g<sup>-1</sup>. In our calculations, we included estimates of numbers of non-breeding seabirds moving into, out of and between the areas. Inland-breeding gulls and ducks which move to the sea for the winter were also added. Consumption was modelled separately for each season of the year and then summed to give an annual total.

### Short answers:

In the NW Atlantic there are 150-180 million seabirds weighing 40-50 000 tonnes. They eat approximately 5 million tonnes of food a year.

In the NE Atlantic there are 70-90 million seabirds weighing 55-65 000 tonnes. They eat approximately 6 million tonnes of food a year.



Seasonal changes in numbers of (columns) and consumption (lines) by seabirds in the west (NAFO) and east (ICES) North Atlantic.

### How much?

Seabirds occupying the North Atlantic consume approximately 11 million tonnes of food annually with a peak during summer. This is approximately 10-20% of the estimated consumption by the world's seabirds (Brooke 2004, Proc. Roy. Soc. London B 271: 246-248).

The resident populations consume 8 million tonnes per year. Non-breeding visitors consume a further 3 million tonnes.

The inclusion of visiting birds in the model increased the totals in the NAFO areas by 63% (from 2.9 million to 5.0 million tonnes) and in the

ICES areas by 15% (from 5.2 million to 6.0 million tonnes). In ICES areas, this was most evident in the Baltic, Skagerrak and Kattegat where adding the population of wintering seabirds nearly doubled the annual consumption estimate for that region.

The most striking differences in the NAFO areas were due to the huge seasonal influx of birds from the southern oceans into the southern areas in spring, and the movements of birds from the north-east Atlantic and the eastern Canadian Arctic into the northern waters south to Newfoundland in winter.



Grey shearwaters. Photo: Wayne R. Peterson

### East-west comparison

Due to the higher biomass of birds in the north-east, consumption (mainly by piscivores) in ICES areas is approximately 20% higher than in NAFO areas where planktivores dominate the seabird community. NAFO areas have, however, a consumption rate per unit area (0.8 t km<sup>-2</sup>) that is almost double that in ICES areas (0.4 t km<sup>-2</sup>). The highest harvest rate (2.0 t km<sup>-2</sup>) was calculated for the area off western Greenland where the planktivorous little auks dominate the community, and rates more than 1.0 t km<sup>-2</sup> are also apparent off Labrador and Newfoundland, around Iceland and in the North and Baltic Seas. The lowest rates (0.03 t km<sup>-2</sup>) prevail in the deep seas off France, Iberia and around the Azores.

More details can be found in Barrett et al. 2006. Seabird numbers and prey consumption in the North Atlantic. ICES J. Mar. Sci. 63: 1145-1158. PDF from robb@tmu.uit.no

Little auks in Greenland. Photo: Flemming Merkel