

## Demographic structure and mortality rate of a Baltic grey seal population at different stages of population change, judged on the basis of the hunting bag in Finland

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We examined the demographic structure and mortality rate of the Baltic grey seal (*Halichoerus grypus*) population from the early 2000s when the population increased rapidly to the late 2000s when the growth rate slowed down. We calculated life tables based on the age structure of hunted grey seals in the Finnish sea area. The catch was treated as a sample of the dying part of the population. The catch was male biased and the proportions of female pups and mature males in the catch increased from the early to late 2000s. Annual mortality rate of the youngest age classes was high and higher among males than females, which resulted in low sex ratio (males to females) of the population. Sex ratio was, however, higher in the latter years due to the increased mortality rate of females, especially those < 10 years of age. Accordingly, the proportion of mature females in the population decreased and relatively fewer pups were produced during the late 2000s than in the early 2000s.

### Introduction

The grey seal (*Halichoerus grypus*) is a top predator in the Baltic Sea ecosystem and its numbers have fluctuated during the past 100 years. The estimates of population size in the beginning of the 20th century vary from 80 000–100 000 (even 200 000) individuals (Harding & Härkönen 1999, Kokko *et al.* 1999). In the 1940s, high hunting pressure caused a sharp decline of the population to about 20 000 seals (e.g. Kokko *et al.* 1997, Harding & Härkönen 1999, Harding *et al.* 2007). Thereafter population decline continued due to environmental pollution by organochlorines, such as PCBs and

DDT, and in the 1970s there probably were only 2000–3000 Baltic grey seals (Jensen *et al.* 1969, Almkvist 1978, Bergman & Olsson 1986, Kokko *et al.* 1997, Bergman 1999, Harding & Härkönen 1999). Most likely due to environmental toxins, Baltic grey and ringed seal (*Phoca hispida botnica*) females suffered from severe reproductive disturbances in the 1960s and 1970s (Bergman & Olsson 1986, Bergman 1999, Harding & Härkönen 1999, Nyman 2000, Bäcklin *et al.* 2003, Nyman *et al.* 2003, Bergman 2007) and productivity of the seal populations was low during several decades. Due to the decreased levels of organochlorines in the Baltic Sea during recent decades reproductive health of