Common Eiders *Somateria mollissima* in the Netherlands: The rise and fall of breeding and wintering populations in relation to the stocks of shellfish

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1. The Baltic/Wadden Sea population of the Common Eider is in decline, but basic demographic data are still patchy. A first prerequisite in undertaking remedial action is to implement an international monitoring programme to track changes of the winter concentrations when the entire population can be assessed. Recent cooperation points the way, but formal international agreement is needed to ensure coordination of the aerial census and the adoption of stringent common standards.

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2. The Common Eider is a highly adaptive and flexible consumer of shellfish at both spatial and temporal scales, and can exploit many different prey items. The mussel is still the most important prey item in the Dutch Wadden Sea despite this dietary flexibility.


3. *Ensis* has successfully colonized the eastern seaboard of the North Sea, including the Dutch Wadden Sea. Both Common Eiders and Scoters *Melanitta fusca* have now learned to utilize this rather awkwardly shaped shellfish to their advantage. The sustainability of this relationship remains to be seen.


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5. The stocks of sublittoral mussels, including those on culture plots, are of paramount importance to the survival of the Common Eiders that winter in the Dutch Wadden Sea. These findings should not be taken as evidence that mussel culture benefits Common Eiders, because nearly all mussel seed used to stock the culture plots was fished from wild mussel beds in the sublittoral of the western Dutch Wadden Sea. Moreover mussel seed fishery in the sublittoral was so intense that most mussels on wild beds were fished before they could grow to a size large enough to be exploited by Eiders.

6. Population trajectories were calculated for the Common Eider colony on Vlieland and revealed the existence of widespread non-breeding in adult females of the Vlieland population (up to 60%). Non-breeding coincided with mass-mortality in the beach surveys and colony declines during two periods (1988-1992, 2000-2003), but the current decline in the breeding population (starting 2000) has not yet been reversed.

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7. Recently Phillipart et al. (2007) have collated long-term data sets on coastal communities in the western sector of the Netherlands Wadden Sea and concluded that the summed biomass of estuarine birds did not change significantly during recent decades. Unfortunately the data set for birds relied on does not include the Common Eider, which on account of its body mass and abundance is the major shellfish consumer among estuarine birds in the Wadden Sea. Aerial census data presented in this thesis document a marked decline in Eider populations in the Wadden Sea towards the end of the period considered and invite a re-assessment regarding the avian component in the system.


8. Adult survival is a key parameter in the population dynamics of long-lived organisms such as the Common Eider. Tracking changes in adult survival of the Eider has provided crucial evidence in the assessment of perturbations in the Wadden Sea ecosystem. This modelling was only possible because of the existence of a long-term ringing programme (breeding population of Vlieland). To safeguard the future well-being of the resident population of the Common Eider in the Dutch Wadden Sea monitoring of adult survival is essential and hence there is an urgent need to continue ringing.

This thesis and Boyd, I.L., Wanless, S. & Camphuysen, C.J. 2006. Top predators in Marine Ecosystems: Their role in Monitoring and Management. Cambridge Univ. Press.

9. Bij privatisering van lange termijn voorzieningen trekt uiteindelijk de consument aan het kortste eind.

10. Omdat in de huidige samenleving de mens steeds verder vervreemd raakt van zichzelf en zijn of haar habitat, lijkt biologisch onderwijs in de vrije natuur totaal onbelangrijk.

11. Comes a time when you're driftin', Comes a time when you settle down.