

Consequences

Vincent M. van den Berk,
National Reference Center,
Netherlands Ministry of
Agriculture, Nature
Management and Fisheries,
Wageningen, NL, Sjoerd
Dirksen & Martin J.M.
Poot, Bureau Waardenburg
bv, Culemborg, NL

Mortality of Eiders in the Dutch Wadden Sea 1999/2000: The Search for the Cause of Mass Mortality of Eiders in the Dutch Wadden Sea

During the winter of 1999–2000, large numbers of dead Eider were found in the Dutch Wadden Sea. The birds were very lean and large numbers of parasites were found in their stomachs and intestines. This led to a lot of speculation as to the cause of death, as well as publicity, letters from nature conservation associations and questions raised in Parliament. The Minister of State, Mrs. G. Faber, who is responsible for nature management and fisheries' issues, promised the Parliament that an investigation into the cause of the mass mortality would be conducted before the onset of the cockle fishing season.

The National Reference Center, which is part of the Netherlands Ministry of Agriculture, Nature Management and Fisheries, was asked to co-ordinate this two-month investigation. In short, its function is to liaise between all aspects of government policy, as well as policy implementation, and also includes research. The center is not, however, a research institute itself. Bureau Waardenburg was contracted to support the investigation.

Given the sensitivity and complexity of the subject, the large number of parties and organizations involved, the conflicting interests that the issue raises and the short time available, the organization of the investigation process was as important as the investigation itself. For the same reason, organizations representing both nature conservation and fishery interests were not invited to take part in this investigation phase.

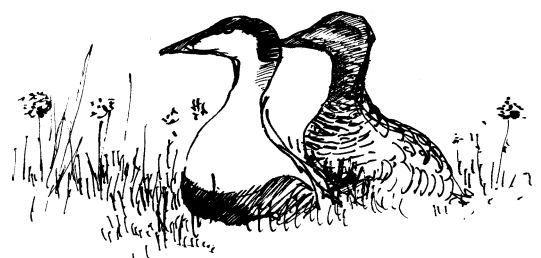
Unfortunately, knowledge on the ecological trade-offs concerning the necessary food intake of shellfish in relation to energetic demands of the Eider are poorly known and the crucial food related aspects of the investigation could only be derived indirectly by analyzing different sets of comparable existing data and desk-studies. These additional analyses were run by the different research institutes and agencies involved in managing these monitoring schemes (Alterra Green World Research, CSR Consultancy, National Institute for Coastal and Marine Management (RIKZ), Netherlands Institute for Fisheries Research (RIVO), Dutch Center for Ornithological Research (SOVON)). A large group of

experts in different fields of research also contributed to the project (Erasmus University, Bird Rehabilitation Center Fûgelpits Anjum, Institute for Animal Science and Health (ID-Lelystad), Netherlands Institute for Sea Research (NIOZ), University of Utrecht and several foreign institutes and organizations elsewhere in NW-Europe).

Most of the findings are described in detail elsewhere in this special issue.

The findings of the investigation, including the supporting reports of the research institutes and other agencies, were submitted to an independent scientific audit commission chaired by Prof. Dr. W.J. Wolff, University of Groningen.

In the report (Van den Berk et al., 2000), it is concluded that several hypotheses could in fact be rejected. The only hypothesis which can be supported by evidence from existing data is the following: The mass mortality of Eiders in the Dutch Wadden Sea in 1999/2000 occurred after large numbers of birds could not survive an infection carried by regularly occurring parasites (the intestine parasite *Profilicollis botulus*, which is contracted by the birds while eating the host, namely the Shore Crabs *Carcinus maenas*, and probably also the stomach parasite *Amidostomum spec.*). The birds subsequently starved to death because large enough food quantities could not be consumed. This implies that there was a food availability shortage for the birds. The results from analyses of the available data on the four most important prey species (mussel, cockle, *Spisula* and Shore Crab) showed it to be likely that in 1999/2000, the food situation highlighted various differences when compared to preceding winters. These differences led to a combination of circumstances



which did not occur in the years before (at least not since 1994): Mussels were less attractive, *Spisula* was not available as a prey alternative, cockles were at best a partial alternative and Shore Crabs were available. Based on the data for prey species, the changes in shellfish populations are likely to have led to an unfavorable food situation for Eiders, which in combination with parasite infections caused the mass mortality of Eiders.

A clear relationship between the shellfish fisheries and availability of mussels and cockles as food could not be found. Such a relationship is, however, likely for the prey species *Spisula*. It has been concluded that mechanical shellfish fisheries, which focus on *Spisula*, were fully or partially responsible for the lack of *Spisula* of the right size classes for Eiders in the winter of 1999-2000.

The audit commission endorsed the conclusions of the report in broad outline.

The report and the conclusions of the audit commission were submitted to the policy departments of the Ministry responsible for the Wadden Sea, Fisheries and Nature Management. They organized a hearing with the interest groups to discuss the findings on which the Minister of State based her reply, conclusions and recommendations to the Parliament. Conclusions and recommendations were in line with those described in our report.

The Most Important Findings of the Project

Extent and pattern of the mortality in The Netherlands

1. In the Dutch part of the Wadden Sea, a total of 7,271 dead Eiders were found between November 1999 and June 2000. Based on the numbers found on different transects, the total number is estimated to have been 21,000 birds. In both absolute and estimated figures, this is by far the highest mortality recorded since 1980.
2. From November onwards, the number of dead Eiders gradually increased. The highest numbers were found in March/April after a first peak in December.

Extent of the mortality in bordering countries

3. An exceptionally high mortality of Eiders was also observed in the German Wadden Sea (both in Lower Saxony and in Schleswig-Holstein). The symptoms of the birds were similar, but the numbers (both in absolute and in relative numbers) were lower than in The Netherlands. Clear differences were found in both spatial and temporal patterns in comparison with the Dutch situation.
4. No elevated mortality was observed in Great Britain and Denmark.

Causes of mortality that could be rejected

5. Based on the data from analyses and the discussion with researchers, the following possible causes could be excluded or said to be very unlikely: oil pollution, poisoning with contaminants, infection with bacteria, infection with a virus or chronic stress/deficiency of the immune system.

Reference

Berk, V.M. van den, S. Dirksen & M.J.M. Poot, 2000. Sterfte onder Eidereenden in de Waddenzee 1999 - 2000: een zoektocht naar de oorzaak van massale sterfte van Eidereenden in de Waddenzee. Werkdocument EC-LNV nr 186. EC-LNV, Wageningen. 71 pp.

V.M. van den Berk
Expertisecentrum LNV
P.O. Box 30
NL - 6700 AA Wageningen
v.m.van.den.berk@eclnv.agro.nl

S. Dirksen & M.J.M. Poot
Bureau Waardenburg bv
P.O. Box 365
NL - 4100 AJ Culemborg
m.j.j.poot@buwa.nl