

Status of the Danish breeding population of Eiders *Somateria mollissima* 1988-93

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(Med et dansk resumé: Status over den danske ynglebestand af Ederfugl *Somateria mollissima* 1988-93)

Introduction

The Danish breeding population of Eiders *Somateria mollissima* has been increasing since the start of the 20th century. Nationwide surveys suggest that the population numbered 1500 nesting females around 1935 (Spärck 1936), 3500 around 1960 (Paludan 1962), 7500 around 1970 (Joensen 1973) and 19000-20000 around 1980 (Franzmann 1989).

This paper presents a status of the breeding population around 1990 and concludes that the population at this time numbered at least 25000 nesting females. Thus the growth continued during the 1980s, although at a slower rate than in the preceding two decades.

Material and methods

A nationwide survey of nesting Eiders was carried out during 1988-93. Data from wildlife and nature reserves were received from the National Forest and Nature Agency, the Wildlife Reserve Bureau and the National Environmental Research Institute. Local ornithologists and the Danish Ornithological Society supplied data for all other parts of the country.

Generally, most breeding sites - including Stavns Fjord (Samsø), but excluding the two largest colonies, Saltholm (Øresund) and Ertholmene (Græsholm, Christiansø and Frederiksø, Bornholm) - were visited once during early May and the number of nests/nesting females counted. On Saltholm the number of nesting females was

calculated from counts of nests made during early May 1993 in seven transects covering 5.4% of the colony (Noer & Christensen 1993); the counts were timed so that the maximum number of nests in use were recorded. A detailed survey, including mapping of nests and trapping of practically all nesting females, was carried out at Ertholmene during April-June 1992 (Lyngs 1993). At all sites, counts of nests included empty (hatched or deserted) nests. If counts from several years were available from a site, the most detailed count among those closest to 1990 was chosen.

In the following, 1980 refers to the survey carried out during 1980-83, while 1990 refers to the 1988-93 survey.

Results

A list of known breeding sites 1980 and 1990 are given in Appendix 1; see also Fig. 1 and Table 1-2. The few sites where no information was available assumingly held only small numbers of breeding Eiders. According to Appendix 1 the 1990 survey produced a sum of 23 094-23 193 nesting females at 135-150 sites, implying an annual growth rate of 2.3% between 1980 and 1990 (Table 1). A total of 57-61 new breeding sites holding 1553-1637 nesting females (7% of the total population) were established during the period, while only 4 sites (holding 9 nesting females) were abandoned. The highest growth rates occurred around Fyn, in northern Sjælland, in Nakskov Fjord and in southern Lolland (Table 1, Fig. 2).

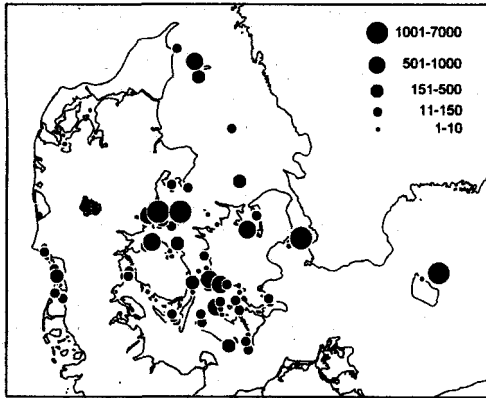


Fig. 1. Distribution of breeding Eiders in Denmark 1988-93.

Ederfuglens yngleudbredelse i Danmark 1988-93.

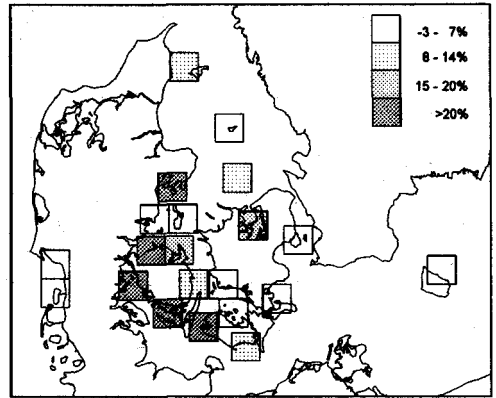


Fig. 2. Annual growth (%) 1980-90 of the breeding Eider population in various regions of Denmark.

Procentvis årlig tilvækst i antallet af ynglende Ederfugle i forskellige områder af Danmark.

Discussion

Censusing Eiders is difficult. Investigations on Ertholmene have shown that due to a spread of 2-2.5 months in laying dates a maximum of 75-80% of the nests would be recorded at a single count around 1 May. Furthermore, some 5% of all nests may be overlooked at any single visit, especially in

densely bush-grown areas (Lyngs 1993). N. O. Preuss (in litt.) found that as little as 50% of all nests may be recorded during a single count in May in the colony at Rågåø in Smålandshavet.

The methods used at most sites during the Danish countrywide surveys obviously have produced underestimates, although more informa-

Table 1. Numbers of breeding Eiders counted in different regions of Denmark 1980-83 and 1988-93 and the corresponding annual growth rate. Only the highest figures for both periods are presented.

Antal optalte ynglende Ederfugle i forskellige områder af Danmark 1980-83 og 1988-93 sammen med den tilsvarende bestandsvækst. Kun de højeste tællinger per periode er vist.

Area <i>Område</i>	1980-83	1988-93	Years <i>Antal år</i>	Annual growth (%) <i>Årlig tilvækst (%)</i>
Vadehavet	611	457	9	-3.2
Limfjorden	0	2	10	
Kattegat	675	1274	9	7.3
N Sjælland	200	925	9	18.6
Østjylland	4597	4412	10	-0.4
N Fyn	266	1588	9	22.0
Lillebælt	34	244	10	21.8
Sydfynske Øhav	3	113	10	43.8
Storebælt	1724	2321	9	3.4
Smålandshavet	802	1092	9	3.5
Nakskov Fjord	0	118	8	
S Lolland	140	487	11	12.0
Øresund	6906	7160	13	0.3
Bornholm	2600	3000	12	1.2
Total	18558	23193	10	2.3

Table 2. Population size (breeding females) and annual growth rates of the Danish breeding population of Eiders 1935-90.

Bestandsstørrelse (ynglende hunner) og tilvækstrater hos den danske bestand af ynglende Ederfugle 1935-90.

Year Ar	Population size Bestandsstørrelse	Annual growth rate (%) Årlig tilvækst (%)	References
1935	1200-1500		Spärck 1936, Joensen 1973
1960	3000-3500	3.5 - 3.7	Paludan 1962, Joensen 1973
1970	7500	7.9 - 9.6	Joensen 1973
1980	19000-20000	9.7 - 10.3	Franzmann 1989
1990	25000	2.3 - 2.8	This study

tion is needed before the accuracy and reliability of the counts can be assessed in quantitative terms - e.g. on observer efficiency, timing and methods used to census each breeding site, and the rate of non-breeding (see Coulson 1984) and relaying after predation. Franzmann (1989) corrected the 1980 figures by a factor 1.06-1.08 to obtain a total of 19000-20000 nesting females. A corresponding adjustment of the 1990 total produces a figure of 25000 (24500-25000) nesting females. Thorough counts on Ertholmene in 1980 and 1990, however, suggest that a correction factor of 1.15-1.30 is more appropriate when trying to assess the size of the breeding population. Making such a correction (except for the already corrected figures from Ertholmene) yields a possible range for the total Danish Eider population of 20 300-23 300 nesting females in 1980 and 26100-29 200 in 1990.

The Danish population of breeding Eiders continued to increase between 1980 and 1990, but the growth rate was lower than in the preceding twenty years (8-10% annually in 1960-1980 versus 2-3% in 1980-1990; Table 2). The development of the population also differed in other ways between the periods. In the 1970s more than 65% of the total growth occurred in the three largest colonies (Stavns Fjord, Saltholm and Ertholmene) with the highest growth rates outside these colonies (>20% annually) occurring in southern Storebælt and in Smålandsfarvandet (SW and S of Sjælland). Low growth rates (<4% annually) or declines during the 1980s were noted in six regions (Table 1) of which five showed high growth rates in the 1970s. The population on Samsø (Stavns Fjord) were almost halved due to the presence of foxes *Vulpes vulpes*. The apparent decline in the Wadden Sea, however, is likely to be an artifact,

caused by a crude and probably low estimate from the main colony at Mandø (L. Maltha Rasmussen, pers. comm.); the Wadden Sea population generally remained stable during the 1980s (Fleet et al. 1994). One third of the net growth during the 1980s occurred in Storebælt, Smålandshavet, Øresund and on Ertholmene, but the growth rates were 4-50 times lower than in the preceding decade. On the other hand, almost three times as many new breeding sites were established as during the 1970s; most new sites were in sheltered areas such as Odense Fjord, Sydfynske Øhav, Nakskov Fjord and N Sjælland which account for one third of the total growth, the remainder being localised to Lillebælt, N Fyn (Æbelø/Mågeøerne), the area between Samsø and E Jylland, Kattégat, and S Lolland. Most of the latter regions had virtually stable growth rates throughout the 1970s and 1980s.

Franzmann (1989) argued that the primary cause of the high growth rates observed in the 1960s and 1970s was an increased eutrophication of the Danish waters, leading to an increasing production of phytoplankton and, in turn, of the principal food for Eiders and their ducklings (mussels, small snails and crustaceans). This explanation fitted well with the observed population development in Denmark, and has also been generally accepted as the main reason behind the widespread population increase of Eiders observed elsewhere in northern Europe since around 1950 (e.g. Hagemeyer & Blair 1997). Suggested contributing factors include the establishment of many reserves on islands used by breeding Eiders and a better overall protection during the breeding season.

Around 1990 it seems that some Danish regions (e.g. Ertholmene, Øresund and Storebælt) were



reaching their carrying capacity for Eiders (using the term in a broad sense), implying that eutrophication no longer provided a surplus of food in these areas. Up to around 1980 the population growth mostly occurred at sites in rather open waters around old, well-established colonies. The fiords and other sheltered, shallow areas, where much of the growth took place during the 1980s, mostly had few or no breeding Eiders until recently, although these areas must have been eutrophicated earlier than areas in more open waters. A possible explanation for their late occupation is that the sheltered waters in Denmark are rather unstable environments where, for example, periods of ice cover result in reduced food supplies for Eiders in spring. Annual growth rates exceeding 20-35% must involve immigration (cf. population parameters presented by Franzmann (1980) and Coulson (1984)). It thus appears that immigration of Eiders to the sheltered waters showing markedly increasing populations after 1980 did not occur until many open water areas were reaching their carrying capacity.

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Resumé

Status over den danske ynglebestand af Ederfugl *Somateria mollissima* 1988-93

Denne artikel beskriver kort resultaterne af en landsdækkende optælling af ynglende Ederfugle foretaget i 1988-1993. I ti-året mellem 1980 og 1990 steg den danske bestand fra 20300-23300 til 26100-29200 ynglende hunner, svarende til en stigning på omkring 2% om året. Denne stigningstakt er væsentlig lavere end i de foregående tyve år, hvor den danske bestand steg med 8-10% om året. I disse år var det især bestanden i de tre store kolonier (Saltholm, Ertholmene og Stavns Fjord) samt i Storebælt og Smålandshavet, der steg. I 1980'erne stagnerede eller faldt bestanden i disse områder, og to tredjedele af den samlede vækst fandt sted andre steder. Antal-

let af nyetablerede ynglelokaliteter var desuden tre gange højere i 1980'erne end i 1970'erne. I Odense Fjord, Nakskov Fjord og det Sydfynske Øhav, hvor der i 1970'erne kun yngede få Ederfugle, steg bestanden med over 20% om året, hvilket kun er muligt hvis der sker en indvandring fra andre steder. Høje vækstrater fandtes også i for eksempel Roskilde Fjord og på Nordfyn. Tilsyneladende nåede flere områder, der tidligere havde været vækstcentre, deres mætningspunkt i 1980'erne, mens der stadig var basis for en vækst i andre områder. Det er bemærkelsesværdigt, at lavvandede fjordsystemer som Roskilde Fjord, Nakskov Fjord, Odense Fjord og det Sydfynske Øhav først er blevet koloniseret i 1970'erne og 1980'erne. Årsagen hertil er ikke klarlagt, men øjensynlig foretrækker Ederfuglene at yngle i områder med dybere vand, måske fordi disse har en mere stabil fødetilgang, der ikke i så høj grad er påvirket af isvintre.

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Appendix 1

Breeding sites for Eiders in Denmark 1980-83 (Franzmann 1989) and 1988-93 and the total number of nesting females.

Ynglesteder for Ederfugl i Danmark 1980-83 (Franzmann 1989) og 1988-93 med angivelse af det totale antal rugende hunner,

- ? No information *Ingen information*
Probably not breeding *Ynglede sandsynligvis ikke*
- + Known to breed, but only few pairs *Ynglede, men kun få par*

Vadehavet

Højer, Ballum & Ribe Forland	1980	15-20	1991	15
Rømø	1980	35-50	1991	23
Jordsand	1981	2	1991	
Mandø	1981-83	400-500	1991	300
Fanø	1982	5-6	1991	2-3
Keldsand	1983	25-30	1991	100
Langli	1982	2	1991	15
Skallingen	1980	1	1991	
Total		485-611		456-457

Limfjorden

Nørskov Vig, Venø	1980	-	1990	2
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Kattegat

Hirsholmene	1983	87	1989	126
Deget	1981	+	1988	?
Nordre Rønner	1980	220	1989	533
Læsø	1980	200	1987-90	360
Anholt	1980	50-60	1988	15-25
Hjelm	1980	6-8	1990	15-30
Hesselø	1980	50-100	1990	200
Total		613-675		1249-1274

N Sjælland*Isefjord & Roskilde Fjord*

Øksneholm	1980-82	-	1991	15
Rønne	1980-82	-	1991	2
Marsvineholme	1980-82	-	1991	6
Rønø	1980-82	-	1991	850
Lindholt & Langø	1982	150-200	1991	7
Eskilsholt	1980-82	-	1991	45

Sejerøbugten

Sejerø	1980	+	1990	+
Nekselø	1980	+	1990	+
Total		150-200		925

E Jylland & Samsø

Helgenæs	1980	-	1990	1-3
Tved& Dejret Øhoved	1980	15	1990	?
Begtrup Røn	1980	30	1990	100
Stavns Fjord, Samsø	1980	3000	1990	1575
Tunø	1980	?	1991	2
Hov Røn	1981	828	1990	1800
Søby Rev	1981-83	350-375	1990	9
Hjarnø	1981	23	1991	50
Alrø & Polderne	1980-83	150-190	1991	547
Møllegunden	1980	?	1990	5-10
Endelave	1981	11	1990	13
Svanegrunden	1980-83	75-125	1990	303
Total		4482-4597		4405-4412

N Fyn

Mågeøerne	1980	69	1990	206
Æbelø & Holmene	1980	42-88	1990	850
Tornen	1980	2	1989	15
Mejlø/Enø	1980	63	1990	250
Ægø	1981	5	1989	1
Bogø	1980	18	1990	100
Vejlø	1981	10	1989	5
VejløKalv	1981	5	1989	5
Flintholt	1980	3	1989	7
Roholt	1980	-	1989	4
Vigelsø	1980	-	1991	85
Dørholm	1980	1-2	1991	29
Kyholm	1980	-	1989	11
Mågeø & Sorteø	1980	-	1989	4
Esbechholme	1980	-	1989	10
Pludderholt	1980	-	1988	1
Stenøerne	1980	2	1989	3
Trindelen	1980	-	1988	2
Total		219-266		1588

Lillebælt

Egholt	1980	24	1988	110
Bågeø	1980	2	1988	2
Bastholt	1980	-	1991	59
Småholme	1980	2	1991	19
Årø	1980	5	1990	6
Linderum	1980	1	1990	43
Illumø	1980	-	1990	3-4
Horsehoved	1980	-	1991	0-1
Total		34		242-244

Sydfynske Øhav

Mejlholt	1980	-	1989	1
Græsholt v. Drejø	1980	-	1992	1
Hjelmshoved	1980	-	1992	2
Odden	1980	-	1989	1
Buddiken	1980	-	1989	2
Birkholt	1980	+	1988	1
Nyland	1980	-	1988	3
Store Egholt	1980	-	1990	3
Lille Egholt	1980	-	1989	4
Halmø	1980	-	1990	1
Lille Græsholt	1980	-	1988	15
Bredholt	1980	-	1991	46
Grensholt	1980	-	1991	16
Bondeholt	1980	-	1989	1
Vogterholt	1980	-	1989	2
StrynøKalv	1980	-	1991	2
Storeholt	1980	3	1989	11
Monnet	1980	-	1990	0-1
Total		3		112-113

Storebælt

Romsø	1980	-	1990	
Musholt&Nordholt	1980	12	1994	60
Sprogø	1980	1	1995	8
Lejodden	1980	-	1992	10
Vresen	1980	300	1991	326
Smørstakken	1980	-	1990	10
Egholt	1983	200	1990	500
Kidholt	1980	-	1991	2
Skælskør Yderfjord	1980	-	1990	6
Mindeshoved	1980	-	1990	8
Agersø	1983	630	1990	620
Omø	1980	50	1990	1-5
Halten, Sylten, Stignæs, Vejle, Dragnet & Sevedø	1980	40	1990	26
SevedøFed	1983	25	1990	20
Næbbet, Stenfed & Basnæs Nor	1983	360	1990	>525
Glænø Vesterfed	1980	58	1990	20
Sandholt	1983	35	1990	130
Glænø Østerfed	1983	13	1990	45
Total		1724		>2321

Smålandshavet

Knudshoved	1980	-	1988	2
Suderø	1980	?	1988	35
Enø Overdrev	1980	-	1988	1
Vigsø	1980	-	1990	66
Femø	1980	-	1988	+
Avernakke Hage & Fejø	1980	1	1988	10
Skalø	1980	?	1988	3
Rågå Kalv & Rågå Sand	1981	700	1990	973
Vejrø	1980	51-100	1990	+
Onsevig Sand	1980	-	1988	2
Total		752-802		1092

Nakskov Fjord

Vensholm	1980	-	1988	58
Albuen	1980	-	1988	10
Enehøje	1980	-	1988	5
Vejlø	1980	-	1988	1
Rommerholm	1980	-	1988	9
Slotø	1980	-	1988	2
Munkeholm	1980	-	1988	8
Dueholm	1980	-	1990	21
Smedeholm	1980	-	1990	3
Kåreholm	1980	-	1988	1
Total		0		118

S Lolland

Hyllekrog	1980	40-100	1988	150
Drummeholm	1980	-	1991	1
Storeager	1980	18	1991	105-130
Lilleager	1980	-	1991	57-60
Hylleholm	1980	5-10	1991	9-15
Tjørneholm	1980	?	1991	56-70
Kalveholm	1980	1	1991	7-15
Store Skåne	1980	1	1991	12
Lindholm	1980	-	1991	1-3
Rødsand	1980	10	1991	30
Kalvø	1980	-	1988	1
Total		75-140		429-487

Øresund

Ægholm	1980	30	1989	120
Nyord	1981	15-40	1990	8
Tyreholm	1980	-	1992	49
Ulvshale	1980	4-5	1989	4-5
Ølsemagle Revle	1980	?	1990	-
Aflandshage	1980	5	1990	-
Det Inddæmmede	1980	25	1990	1
Dragør Sydstrand	1980	1	1990	-
Saltholm	1981	6800	1993	6977
Total		6880-6906		7159-7160

Bornholm**Ertholmene:**

Græsholm	1982	600	1992	420
Christiansø & Frederiksø	1980	2000	1992	2580
Coasts of Bornholm	1980	?	1992	+
Total		2600		3000

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