

# Status of the Danish breeding population of Eiders *Somateria mollissima* 2010

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(Med et dansk resumé: Status over den danske ynglebestand af Ederfugl *Somateria mollissima* 2010)

## Introduction

The Danish breeding population of Eiders *Somateria mollissima* has increased considerably during the 20th century. Around 1935 there was an estimated 1500 nesting females (Spärck 1936), whereas nationwide surveys around 1990 and 2000 revealed totals of c. 25 000 breeding pairs (Lyngs 2000, 2008). As also evident in the Baltic (cf. Desholm et al. 2002), the increase in the Danish Eider population was most marked during the 1970s, with national estimates of 7500 around 1970 (Joensen 1973) and 19000–20000 around 1980 (Franzmann 1989). During the 1990s, the total number of breeding Eiders in Denmark remained stable, whereas changes in colony distribution and dynamics occurred, with relatively high growth rates observed in fjords and sheltered, shallow water areas, while declines were

found in open-water areas, where the majority of the Danish breeding population was found during the previous decades (see Lyngs 2000, 2008).

During the 1990s the total Baltic/Wadden Sea flyway population of Eiders has shown a marked decline of approx. 35% when assessed from surveys of the wintering population (Desholm et al. 2002). However, apparently the total breeding numbers throughout this flyway remained unchanged during the same period, which led Desholm et al. (op. cit.) to suggest, as one among other hypotheses, that the breeding population upheld its numbers owing to supplementary recruitment from a hitherto non-breeding population segment, which as a special case could also include earlier first-time breeding. However, in a continuously declining population, depletion of a non-breeding segment

would eventually lead to declines in breeding numbers. Such declines in breeding numbers seem to have occurred recently in both Sweden (M. Gren unpub. data) and Finland (Ekroos et al. in press). As a segment of the Baltic/Wadden Sea flyway population, the Danish Eider population would potentially be subject to a similar developmental pattern following the stable situation.

The present paper presents a status of the Danish breeding population in 2010 and discusses the most recent changes in distribution and breeding numbers at selected sites. It also addresses the national status in relation to the recent changes in the flyway population in general.

## Material and methods

A nationwide survey covering (almost all) known and potential breeding sites of Eiders was organised by the Danish National Environmental Research Institute, Aarhus University (NERI) in 2010. For practical reasons, some sites were surveyed before 2010. The two important breeding sites Stavns Fjord at Samsø, and Saltholm, were covered in 2007 and 2008, respectively. For the majority of sites in Sydfynske Øhav we use data collected during a survey in 2009 (Bisschop-Larsen 2009). The vast majority of other localities were covered in 2010. The surveys in 2009-2010 involved counts carried out by voluntary ornithologists, the Danish Hunters Association (Christensen 2010) and personnel from the National Forest and Nature Agency (see Acknowledgements), who all reported their results back to NERI. For a few additional sites, supplementary data from 2009-2010 were extracted from the observation database, DOFbasen, hosted by BirdLife Denmark. In the following, 2010 refers to the present survey covering the period 2007-2010, while 1990 refers to the survey carried out during 1988-1993, and 2000 refers to the 2000-2002 survey.

The number of breeding Eider females was estimated for each site based on either nest counts or male counts. Nest counts were performed by visiting breeding sites during the breeding season, and included recordings of the number of incubating females and nests that were either hatched or deserted. Field personnel were asked to describe site coverage and to make on-site assessments of the minimum and maximum number of breeding Eiders in the total area. Notes should likewise be made on the presence/absence of predators, e.g., fox, martens and mink, which could influence the number of breeding birds.

Male counts were applied at several sites with the aim of estimating breeding numbers from the number of (paired) adult males observed attending breeding colonies during the prebreeding or early incubation period. Male counts allowed collection of data from sites sensitive to disturbance from nest counting activity, and from sites where access permits could not be obtained, e.g., some privately owned islands. Male counts were made from small boats or from adjacent mainland coasts and included all adult males present within a 200-300 m zone around known or potential breeding sites (islands, islets, peninsulas). Immature males and groups of males recorded at larger distances from the breeding sites were counted separately, and were not included in the estimates of breeding numbers. Male counts were generally performed in April or early in May; in parts of Sydfynske Øhav, Kattegat and Smålandsfarvandet they were conducted as aerial surveys, performed from a twin-engine aircraft flying at an altitude of 250 feet.

A total of 223 sites (covering 229 single localities) were surveyed for breeding Eiders (2 in 2007, 6 in 2008, 26 in 2009, 188 in 2010, and a single site – Nordre Rønner (Kattegat) – in 2011). A total of 49 sites were covered only by male counts, 154 sites were covered only by nest counts, while 20 sites were covered both by nest and male counts. Male counts were performed between 13 April and 16 May, with the majority ( $n = 47$ ) carried out between 13 April and 3 May (Fig. 2). Nest counts covered a longer time period than male counts, ranging from 24 April to 22 June. Some sites do not have a count date, as they were covered several times during April and May, while a few counts were reported without dating. The present survey included 64 localities that had not been covered by the surveys in 1990 and 2000, whereas 13 previously surveyed sites were not covered.

In calculating the number of breeding Eiders at a given site, we used the most recent and robust counts, with nest counts taking precedence over male counts. At sites covered by nest counts more than once in the same year, we used data collected in May, preferentially in early May.

To calculate nest numbers from male counts, we used a correction factor to adjust for the expected presence of non-paired adult males around the breeding colonies. This factor was obtained from analysing the relationship between male counts and nest counts carried out separately at 20 sites in 2010. These data showed a highly significant relationship between numbers of adult males and nests

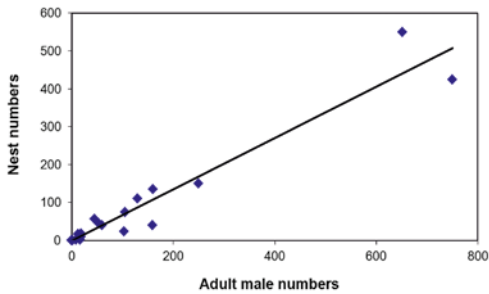


Fig. 1. Relationship between nest numbers and numbers of adult males recorded at separate counts at 20 breeding sites in 2010.

*Forholdet mellem antallet af voksne ederfuglehanner og antallet af reder registreret ved separate tællinger på 20 ynglelokaliteter i 2010.*

( $r^2 = 0.931$ ,  $F_{18,1} = 242$ ,  $P < 0.0001$ ), revealing an average of 0.68 nest per recorded male (95% confidence interval 0.59-0.77; Fig. 1).

At a few sites the number of breeding Eiders was assessed from observations of females accompanying young. In each case, it was assessed whether the group could come from other colonies in the region, and hence not represent local breeding birds. For some observations reported to DOFbasen it could not be excluded that the birds originated from other known breeding sites in the region, and such observations were not included in the population estimate.

In general nest counts were performed as total counts, but for a few sites the total number of nests was obtained by correcting counted numbers according to the observer's notes on site coverage. More than half (52%) of the nest counts were performed during the optimal time period between 1 and 15 May, and 78% were counted at some time during this month (Fig. 2). On the 13.5 km<sup>2</sup> large island of Saltholm (Øresund), nest counts were performed as special transect counts: a total of seven evenly spaced east-west oriented transects (45 m wide) was fully surveyed, covering 5.4% of the total area, and total nest numbers were obtained by extrapolation to the entire island. The method is described in detail by Noer & Christensen (1993) and Christensen & Noer (2001).

Since the available techniques for surveying breeding Eiders tend to underestimate true numbers, recorded numbers were multiplied by a factor of 1.15-1.30 in two previous surveys in Denmark (Lyngs 2000, 2008). However, as this type of correction relates to nest counts only, its use in the present

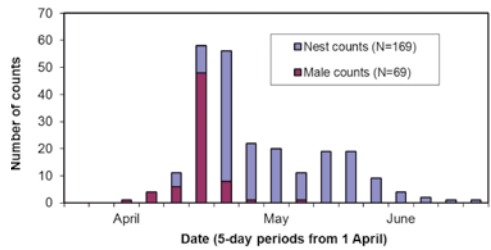


Fig. 2. The temporal distribution of male and nest counts. The male counts include the counts at 20 sites also covered by nest counts.

*Den tidsmæssige fordeling af han-tællinger og rede-tællinger. Han-tællingerne omfatter 20 lokaliteter, hvor der også blev optalt reder.*

survey – with the inclusion of male counts – could lead to an overestimation of the actual population. Consequently, the correction was applied solely to the numbers obtained from nest counts, using the conservative factor of 1.15.

## Results

Calculated from the maximum breeding numbers assessed by observers, the total number of breeding Eider pairs recorded during the 2010 survey was 22 185 (18 589 nest recordings and 3 596 [95% c.i. 3 110-4 082] nests estimated from male counts). The corresponding total based on the minimum number of directly observed nests was 21 561. Nests recordings constituted c. 83% of the total, while the remaining 17% were based on male counts.

The result of the 2010 survey is similar to the estimates from 1990 and 2000 (Table 1), indicating that the Eider population has been stable during the past two decades. In accordance with this stability, the calculated growth rate of the population is very small (-0.3% for 1990-2000, -0.2% for 2000-2010; see Table 1). During the 2010 survey, breeding Eiders were recorded at 188 sites, of which 45 had no previous record of the species. Conversely, 13 previously known breeding sites did not support breeding birds in 2010. As in 2000, the single largest colony was Saltholm in Øresund, with an estimated 4 350 breeding pairs. A complete list of breeding numbers recorded at each site is given in Appendix 1.

When correcting for overlooked nests by a factor of 1.15, the total number of breeding Eiders in Denmark in 2010 is estimated at 24 973 pairs. Including the statistical variation in male counts, the 95%

Table 1. Number of breeding Eiders (maximum estimates) counted in different regions of Denmark 1988-1993, 2000-2002 and 2007-2010. In addition the table shows the average number of years between regional counts, and the regional and overall annual growth rates between surveys.

*Antal optalte ynglende Ederfugle (maximum-tal) i forskellige regioner af Danmark 1988-1993, 2000-2002 og 2007-2010. Desuden vises det gennemsnitlige antal år og den årlige tilsvækst (%) mellem optællingerne.*

	No. nests			No. years		Growth rate (%)	
	1990	2000	2010	1990-2000	2000-2010	1990-2000	2000-2010
Vadehavet	457	644	244	10	9	3.5	-10.20
Limfjorden	2	25	113	11	9	25.8	18.20
Kattegat	1274	1098	1001	12	9	-1.2	-1.00
N Sjælland	925	1615	1700	9	10	6.4	0.50
Østjylland	4412	2220	2461	11	8	-6.1	1.30
N Fyn	1588	3266	1765	11	10	6.8	-6.00
Lillebælt	244	466	974	9	10	7.5	7.70
Sydfynske Øhav	113	1690	3098	11	8	27.9	7.90
Storebælt	2321	1936	1997	10	9	-1.8	0.30
Smålandshavet	1092	931	767	11	9	-1.4	-2.10
Nakskov Fjord	118	600	767	12	10	14.5	2.50
S Lolland	487	774	661	9	10	5.3	-1.60
Øresund	7160	4770	4787	10	8	-3.9	0.04
Bornholm	3000	2503	1850	8	10	-2.2	-3.00
Total	23193	22538	22185	10	10	-0.3	-0.20

confidence interval becomes 24487–25459, which could reasonably be rounded to a range of 24500–25500 Eider pairs, similar to the 23000–25000 estimated both in 1990 and 2000 (Table 2).

Assessed from regional and local records of breeding Eiders (cf. Table 1 and 2), the geographical distribution of breeding Eiders in 2010 did not show any marked changes relative to 2000. Regional growth rates (Table 1) indicate some decline in the Wadden Sea and Nordfyn regions, while rather marked increases occurred in the regions Limfjorden, Lillebælt and Sydfynske Øhav. The growth rate for Nordfyn, however, is certainly influenced by the presence of foxes on the island of Vigelsø in Odense Fjord (75 breeding Eiders in 2010, compared to 600-800 in normal years; Lars Erlandsen Brun pers. comm.).

## Discussion

Based on both nest and male counts, the 2010 survey of breeding Eiders revealed a total of 22185 breeding pairs in Denmark. Correcting this number for unrecorded nests gives an estimate of about 25000 pairs. It is the most comprehensive survey ever made of breeding Eiders in Denmark, covering 223 known and potential breeding sites; assessed from previous counts at uncovered sites, and accounting for the possibility that small numbers may have bred at new sites, the survey probably missed fewer than 300-400 breeding pairs.

Compared to previous population surveys, male counts were used more frequently in 2010, covering large areas especially in Sydfynske Øhav and Limfjorden. Male counts may lead to overestimates in spite of the application of a correction factor. For example, present males may be attending females that fail to breed (e.g., due to the presence of mammalian predators). In contrast, nest counts may underestimate actual breeding numbers if some nests are missed.

A number of difficulties in censusing breeding Eiders exist that were not addressed above. The proportion of potential breeders that skip breeding can vary among sites and years (cf. Coulson 1984), for example because foraging conditions vary (Kats 2007). In Denmark, non-breeding has only been documented at Saltholm where c. 20% of the females skipped breeding in 1994 (Noer & Christensen 1994). No indications were found during the present survey that extensive non-breeding took place anywhere, except that the presence of predators had an effect at a few sites. The island of Rønø in the Isefjord supported 279 breeding pairs in 2007 but only 93 in 2010, owing to presence of foxes; 389 male Eiders were recorded off the island, so potential breeders seem to have been present in normal numbers, although most abstained from breeding. It is possible that similar cases were more common at the 2010 survey than previously – predators were reported from 26 sites, compared to 11 sites during the 2000 survey. However, male counts provide esti-

Table 2. Populations size of breeding Eiders (females), and annual growth rates, in Denmark, 1935-2010.

*Bestandsstørrelse af Ederfugl i Danmark 1935-2010 (ynglende hunner), samt den årlige tilvækst.*

Year År	Population size Bestandsstørrelse	Annual growth rate (%) Årlig tilvækst (%)	References Referencer
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	23000-25000	2.3-2.8	Lyngs 2000
2000	23000-25000	-0.3	Lyngs 2008
2010	24500-25500	-0.2	This study

mates of potential breeding numbers at a given site even when predators are present, so the 2010 result would probably be slightly affected only, even if predators occurred more frequently at the sites than normally (owing to the extensive ice cover in Danish waters during the winter of 2009/2010).

The result of the survey in 2010 was almost equal to the figures recorded during the 1990 and 2000 surveys (cf. Table 1 and 2), so the Danish Eider population has apparently been stable for the past two decades. Some local changes have been quite significant, however. In the Hindsholm area, Nordfyn, Eider numbers increased markedly between 2000 and 2006-2007, from c. 1000 to 2500 breeding pairs; during the following years several outbreaks of avian cholera reduced the population to its present size of c. 650 pairs (L. Hansen pers. com.). Avian cholera has also occurred on Rønø in 2001 (Pedersen et al. 2003), cf. the reduction of this colony from c. 1000 to c. 300 pairs. Outbreaks of avian cholera have previously occurred in the Kattegat region (Christensen et al. 1997).

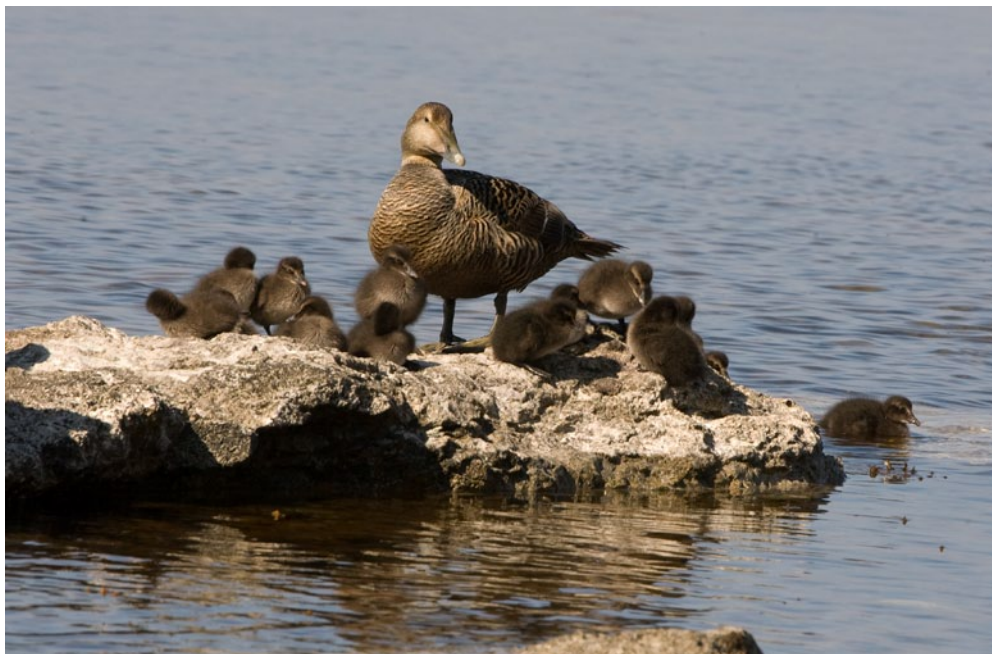
There is no obvious explanation for the marked decline in the Vadehavet region (cf. Table 1). The decline here is mainly the result of a dramatic decline on the island of Mandø where breeding numbers were estimated from male counts. Male counts were also used at this island in 2000, but the proportion of males staying close to the island may for some reason have differed between the two surveys.

At several sites in the present study we estimated breeding numbers from male counts during the prebreeding and early incubation period. Counts of colony-attending Eider males just before breeding have previously been used as an indication of breeding numbers (e.g. Lyngs 2008). However, Eider males normally outnumber females, so some factor has generally been applied to correct for this imbalance, and the correction factor has often been based on the sex-ratio at the population level

(e.g. Lyngs op.cit.). Sex-ratio estimates are normally obtained from surveys of wintering populations or from surveys of shot birds collected outside the breeding season, and may not reflect the sex-ratio among colony-attending birds. At the colony of Saltholm, studied during the 1990s, the sex-ratio was close to parity at the arrival to the breeding site, although with a slight male dominance (Noer & Christensen 1996, Christensen & Noer 1999); at the same time, the sex-ratio in the population was 60% male and 40% females (cf. Lehtikoinen et al. 2008). This indicates that not all unpaired males will turn up at breeding sites. Since the 1990s, the sex-ratio in the Eider population has changed towards 70% males and 30% females (Lehtikoinen et al. op.cit.). However, to which extent this change has affected the proportion of colony-attending non-paired males is unknown.

In the present study we found a highly significant relationship between male numbers and nest numbers, leading to a correction factor of 0.68. The corresponding correction factor for a population with a 60:40 male:female ratio would have been 0.67, and with the present 70:30 sex-ratio it would be 0.43. Using these alternative factors, the estimated (uncorrected) population total would have been 22 126 and 20 863, respectively, compared to the 22 185 here reported. However, we believe that our approach more reliably estimate nest numbers from male numbers, because it is based on the male:female ratio of colony-attending Eiders. Given the non-disturbing nature of male counts, they could be employed in future surveys at a higher frequency than the current 10-year routine, or perhaps entirely replace counts of nests. Male counts at breeding sites could even be done from the air.

The Danish segment of the Baltic-Wadden Sea flyway population shows an extraordinary stability, considering the marked decline reported for the Baltic segment (Sweden and Finland, approaching



*Den samlede ynglebestand af Ederfugl i Danmark har været stabil de seneste 20 år, men regionalt har der været store udsving.*

50% since 2000, Ekroos et al. in press). The females in that segment seem to experience a higher mortality than the males, judged from the changing sex ratio (from 60:40 to 70:30) in the winter population (Christensen 2008, Lehikoinen et al. 2008). A similar change is not recognizable in the stable Danish population, and the apparent stability in the Danish population vs the marked decline in the Baltic region suggests a difference in mortality related to breeding location, although such a difference needs further documentation.

### Acknowledgements

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### Resumé

#### **Status over den danske ynglebestand af Ederfugl *Somateria mollissima* 2010**

Denne artikel beskriver resultaterne af en landsdækkende optælling af ynglende Ederfugl foretaget i 2010. Enkelte kolonier kunne ikke dækkes, og for disse blev der anvendt oplysninger fra optællinger foretaget i 2007-2009. Der blev anvendt to forskellige metoder til opgørelse af de lokale bestande. Størstedelen (78%) blev registreret ved at optælle reder og rugende hunner (i alt 174 lokaliteter), mens

den resterende del (22%) blev estimeret ud fra antallet af adulte hanner nær ynglekolonierne (i alt 49 lokaliteter). På 20 af de 174 optalte lokaliteter blev der også gennemført separate tællinger af hanner.

Det samlede antal af ynglende hunner blev opgjort til mellem 21 561 og 22 185 (Tabel 1). Efter at have korrigeret for de usikkerheder, som er forbundet med de anvendte metoder, og for at ikke alle lokaliteter blev dækket, anslås ynglebestanden i Danmark at have omfattet mellem 24 500 og 25 500 rugende hunner i 2010. Sammenlignet med monitoreringen i 2000-2002 fandtes arten i 2010 ynglende på 40-45 nye lokaliteter, mens den manglede på 13 lokaliteter med ynglende Ederfugl i 2000-2002. Danmarks største koloni er stadig Saltholm med 4351 ynglepar.

Den samlede ynglebestand i Danmark har været stabil fra 1990 til 2010, selv om der har været betydelige regionale udsving. Siden 2000 har bestandene i Vadehavet og ved Nordfyn haft en relativt kraftig tilbagegang (se Tabel 1). For Nordfyn skyldes det lave antal ynglefugle sandsynligvis, at der forekom ræve på Vigelsø i Odense Fjord, hvilket har medført, at kun 75 reder blev registreret her, mod normalt 600-800. Mens der i 1990'erne var udbrud af fuglekolera i kolonier omkring Horsens Fjord og Samsø, har der efter 2000 været udbrud i kolonier i Isefjord, Nordsjælland og på Hindsholm, Nordfyn. På sidstnævnte lokalitet har udbruddet af kolera betydet, at bestanden efter en markant fremgang 2000-2007 fra 1000 til 2500 par er reduceret til 650 par i 2010. De mest markante fremgange er registreret i Limfjorden, Lillebælt og det Sydfynske Øhav.

Motsat tidligere nationale tællinger blev der i 2010 hyppigt anvendt tællinger af adulte hanner ved ynglepladserne til bestemmelse af antallet af ynglepar. Da antallet af hanner normalt er større end antallet af hunner, må der korrigeres ved beregningen af antal ynglepar. For 2010-tællingen er den anvendte korrektionsfaktor baseret på det fundne antal reder og hanner på 20 lokaliteter, hvor der blev gennemført separate tællinger af begge. Resultatet var 0,68 reder pr han, en værdi der skønnes at være bedre end tidligere anvendte faktorer baseret på kønsratioen registreret i vinterperioden eller ud fra jagt-udbyttet.

Bestandsudviklingen i Danmark afviger markant fra udviklingen i de baltiske bestande, idet de nyeste rapporter angiver tilbagegange på op til 50% i de sidste ti år i de svenske og finske ynglebestande. Da kønsfordelingen samtidig er ændret fra 60% til 70% hanner, indikerer den stabile danske bestand en forskel i overlevelsen af specielt hunner mellem de pågældende yngleområder. Udviklingen i de baltiske bestande, som har vist en tilbagegang i vinterbestandene i 1990-2000 og i ynglebestandene i 2000-2010, bekræfter en tidligere fremsat teori om, at en øget dødelighed i første omgang er blevet kompenseret ved rekruttering fra en pulje af ikke-ynglende fugle til ynglebestanden, men at en forsat tilbagegang har udtømt denne pulje, hvorved ynglebestandene er blevet tilsvarende reduceret. Om en lignende udvikling kan forventes i Danmark, eller om regionale forskelle mellem Baltikum og Danmark betyder, at den samlede danske ynglebestand vil fortsætte med at være stabil i de næste år, vides ikke. Den meget markante tilbagegang i den baltiske bestand har imidlertid medført en øget opmærksomhed på ederfuglebestandens udvikling, og det bør overvejes, om bestandsopgørelser skal gennemføres hyppigere end med de hidtil anvendte 10 års intervaller.

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## Appendix 1

### Breeding sites for Eiders in Denmark in 1990 (1988-1993, Lyngs 2000); 2000 (2000-2002, Lyngs 2008); and 2010 (2007-2010, this study), with population size indicated (breeding females).

*Ynglelokaliteter for Ederfugl i Danmark 1990 (1988-1993, Lyngs 2000), 2000 (2000-2002, Lyngs 2008), og 2010 (2007-2011, denne undersøgelse), samt antallet af ynglende hunner.*

- <sup>1</sup> Sites covered both by male counts and nest counts in 2010. *Lokaliteter dækket både med han- og rede tælling i 2010.*
- <sup>2</sup> Localities covered by male counts in 2010. *Lokaliteter dækket med hantælling i 2010.*
- ? Sites not covered in the 2010 survey. *Lokaliteter ikke dækket i 2010.*
- Probably no breeding Eiders on site. *Sandsynligvis ingen ynglende Ederfugle.*
- (F) Fox noted on the site. *Ræv registreret på lokaliteten.*

Storebælt	1990	2000	2010	Øresund	1990	2000	2010
Agersø syd <sup>1</sup>	620	385	550	Barholm Bogø <sup>2</sup>			0
Agersø, nord <sup>1</sup>	500	350	425	Degneholm	-	95	50
Asnæs <sup>2</sup>			11	Lilleholm, Præstø Fjord	-	3	30
Glænø Vesterfed	20	5	(F) 0	Lilleø, Ulvsund	-	1	6
Glænø Østerfed	45	50	250	Lindholm, Stege Bugt	-	2	35
Holsteinsborg Nor			0	Maderne, Præstø Fjord <sup>2</sup>	-	13	1
Knudshoved v. Nyborg			0	Malurtholm, Fane-fjord <sup>2</sup>	-	3	27
Lejodden	10	0	?	Nivå bugt og strand			2
Musholm & Nordholm	>60	235-375	100	Nyord	8	29	3
Næbbet <sup>2</sup>	>525	300	(F) 119	Pindholm, Møn <sup>2</sup>			3
Omø	1-5	5-10	19	Saltholm	6977	4343	4351
Reersø <sup>2</sup>			20	Skovby Holme <sup>2</sup>			0
Romsø	-	1	0	Små Ægholme			7
Sandholm, Basnæs Nor <sup>2</sup>	130	?	123	Storeholm, Præstø Fjord			75
Sevedø			(F) 60	Sækkesand	-	16	17
Sevedø Fed			(F) 3	Tyreholm	49	131	70
Skælskør Fjord <sup>2</sup>	16	?	37	Tærø			(F) 0
Smørstakken	10	?	?	Ulvshale	4-5	-	3
Sprogø	8	15-18	224	Vestamager	1	-	?
Stenfed			(F) 0	Ægholm	120	134	107
Vresen	326	280	51	Total	7159-7160	4770	4787
Total	1685	1781-1936	1992				



Smålandshavet	1990	2000	2010
Avernakke Hage & Fejø	10	5	9
Avnø Røn, Avnø Fjord	(+)	17	25
Avnø, Svinø			6
Dybsø Røn, Dybsø Fjord			1
Dybsø, Dybsø Fjord	-	5	(F) 1
Dyrefod, Storstrømmen	-	7	35
Enø Overdrev	1	-	2
Femø	(+)	22	45
Havneø <sup>2</sup>			6
Kaløgrå			0
Knudshoved Odde	2	10	6
Lilleø v. Askø			10
Lindholm, Karrebæk fjord	-	1	40
Lindholm, Nordlolland			(F) 8
Masnød & Kalv, Storstrømmen <sup>2</sup>	-	6-10	6
Masnød, Storstrømmen <sup>2</sup>			8
Onsevig Sand	2	0	?
Rågø Kalv & Rågø Sand	973	215 (F)	110
Skalø	3	1	3
Suderø	35	340	95
Vejrø <sup>2</sup>	(+)	140	150
Vigsø	66	158	200
Total	1092	727-931	767

Sydjylland	1990	2000	2010
Barholme	-	8	43
Drummeholm	1	(+)	?
Hjelm ø <sup>2</sup>			0
Hylleholm	9-15	21	72
Hyllekrog	150	38	(F) 40
Kalveholm	7-15	89	45
Kalvø <sup>1</sup>	1	25	18
Kejlsø-Lilleø, Guldborg Sund	-	16	60
Lilleager	57-60	72	25
Lindholm, Rødsand	1-3	63	65
Rødsand	30	70	70
Skejtholmene, Guldborgsund			4
Store Skåne	12	92	9
Storeager	105-130	180	35
Tjørneholm	56-70	100	175
Total	429-487	774	661

Sydfynske Øhav	1990	2000	2010
Avernakø <sup>2</sup>			14
Birkholm <sup>2</sup>	1	5	163
Bondeholm <sup>2</sup>	1	140	95
Bredholm <sup>2</sup>	46	123	369
Buddiken	2	-	?
Bukø, Lindelse Nor			2
Dejrø <sup>2</sup>			115
Drejø <sup>2</sup>	-	35	77
Eskildsø, Lindelse Nor			29
Flæskholm <sup>2</sup>			10
Grensholm	16	125	71
Græsholm v. Drejø	1	22	35
Halmø <sup>2</sup>	1	45	143
Hjelmshoved	2	94	50
Hjørtø			136
Langholm	-	12	15
Langholmshoved			28
Lille Græsholm v. Bredholm	15	100	27
Lille Rallen <sup>2</sup>	-	30	92
Lilleø <sup>2</sup>	-	30	117
Lyø <sup>2</sup>			35
Mejlholm	1	82	200
Monnet <sup>2</sup>	0-1	5	16
Nyland	3	26	31
Odden	1	150	216
Siø	-	68	71
Skarø <sup>2</sup>			70
Store Egholm/Lille Egholm	7	310	609
Storeholm	11	183	54
Strynø Kalv <sup>2</sup>	2	90	115
Svelmø, St.+Ll. <sup>2</sup>			7
Tryggelev Nor	-	5	?
Vogterholm <sup>2</sup>	2	10	81
Ærøskøbing			4
Total	112-113	1690	3098

Kattegat	1990	2000	2010
Anholt <sup>2</sup>	15-20	20	67
Deget <sup>2</sup>	?	20	21
Hesselø	200	100	90
Hirsholmene <sup>2</sup>	126	75	131
Hjelm <sup>1</sup>	15-30	176-233	40
Læsø	360	200-250	278
Nordre Rønner	533	400	374
Total	1249-1274	991-1098	1001

Vadehavet	1990	2000	2010
Fanø	2-3	7	0
Højer, Ballum & Ribe Forland	15	35	(F) 2
Keldsand	100	20	?
Langli <sup>2</sup>	15	131	157
Mandø <sup>2</sup>	300	425	81
Margrethekog			(F) 2
Rømø	23	26	(F) 0
Skallingen			(F) 2
Total	456-457	644	244

Limfjorden	1990	2000	2010
Ejerslev Røn <sup>1</sup>			17
Feggerøn			(F) 1
Fur & Livø <sup>2</sup>			1
Nibe-Gjøl Bredning vildreservat <sup>1</sup>		9	57
Nørskov Vig, Venø <sup>1</sup>	2	15	(F) 23
Rotholme, Hvalpsund <sup>2</sup>	-	1	12
Rønland Sandø <sup>1</sup>			1
Rotholme v. vestmors, Munkholm odde, Fuglholm <sup>2</sup>			1
Blinde Røn <sup>2</sup>			0
Borreholm <sup>2</sup>			0
Buskør Odde <sup>2</sup>			(F) 0
Stenklipperne og Lindholm <sup>2</sup>			(F) 0
Total	2	25	113

Lillebælt	1990	2000	2010
Bastholm	59	200	225
Brandsø	-	20	40
Bågø	2	2	20
Egholm v. Bågø	110	175	120
Fiskeholm, Helnæs bugt			0
Flægen & Eskør Inddæmning	-	6	?
Føns Vang (ø i sø)			0
Horsehoved & Vigø <sup>2</sup>	0-1	?	16
Illum <sup>1</sup>	3-4	40	75
Katholm, Kettinge nor, Als			40
Linderum	43	?	387
Småholme	19	23	50
Årø Kalv	6	(F)	(F) 1
Total	242-244	>466	974

Nakskov Fjord	1990	2000	2010
Albuen	10	-	0
Barneholm <sup>2</sup>	-	2	6
Dueholm	21	48	95
Enehøje	5	(F)	(F) 0
Kåreholm	1	41	35
Munkeholm	8	19	12
Rømmerholm	9	74	65
Slotø	2	8	78
Smedeholm	3	34	37
Vejlø	1	8	7
Vensholm	58	366	432
Total	118	600	767

Nordsjælland	1990	2000	2010
Isefjord			
Eskilsholm	45	1	8
Lindholm & Langeø <sup>2</sup>	7	325	800
Marsvineholme mv. (Tempelkrog) <sup>2</sup>	6	65	210
Rønne <sup>2</sup>	-	3	33
Rønø	850	1000	(F) 93
Sømmerholme <sup>2</sup>			27
Roskilde Fjord			
Blak	-	5	10
Elleøre <sup>1</sup>	-	3	10
Eskilsø <sup>1</sup>	-	1	0
Hyldeholm & Langholm, Lejre Vig <sup>1</sup>	-	2	45
Jyllinge Holme <sup>1</sup>	-	40	110
Køholm & Hyldeholm <sup>1</sup>	-	10	135
Ringøen <sup>1</sup>			10
Sivholm <sup>1</sup>			0
Skovholmene <sup>1</sup>			2
Stenø nord <sup>1</sup>			2
Ægholm <sup>1</sup>	-	10	40
Øksneholm <sup>1</sup>	15	75	150
Sejerøbugten			
Krageø, Saltbækvig			10
Nekselø	(+)	(+)	?
Sejerø	(+)	75	?
Ægholm v. Havnsø			5
Total	925	1615	1700

Nordfyn	1990	2000	2010
Hindsholm			
Bogensø			0
Bogø	100	(F)	265
Mejlø/Enø	250	1000	372
Tornen/Fællesstrand	15	10	4
Vejlø	5	-	(F) -
Vejlø Kalv	5	1	5
Nordfyn			
Dræet	-	550	(F) 0
Drættegrund & Drætlingen	-	29	32
Ejlinge	-	2	(F) -
Kerteminde	-	100	100
Mågeøerne	206	123	150
Nørre Næså Strand/ Agernæs	-	10	-
Æbelø Holm	850	37	(F) 0
Æbleø			(F) 0
Odense Fjord, Nordfyn			
Alø v. Midskov			6
Dørholm	29	74	242
Esbechholme	10	28	15
Flintholm	7	62	25
Hasseløre	-	138	182
Hennings Holm	-	14	33
Hvenegaards Holm	-	28	34
Kyholm	11	3	0
Lammesø Inddæmning			1
Lindø Værft Øerne	-	3	0
Mågeø	4	135	89
Pludderholm	1	39	13
Roholm	4	19	13
Sandøen	-	18	6
Sorteø			78
Stenøerne	3	27	25
Sylten v. Midskov			0
Trindelen	2	(F)	0
Vigelsø	85	816	(F) 75
Vigelsø Kalv			0
Ægø (Ægholm)	1	(F)	0
Total	1588	3266	1765

Østjylland og Samsø	1990	2000	2010
Samsø			
Stavns Fjord -samlet	1575	520-700	1397
Vejrø			2
Østjylland			
Alrø & Polderne	547	315	36
Begtrup Røn	100	96	40
Endelave	13	25	8
Helgenæs	1-3	0-5	?
Hjarnø	50	175	310
Hov Røn	1800	825	492
Møllegunden	5-10	20	35
Svanegrunden	303	54	135
Søby Rev	9	5	5
Tunø + Tunø Knob	2	?	?
Vorsø			1
Total	4405-4412	2035-2220	2461

Bornholm	1990	2000	2010
Bornholms kyster	(+)	60-80	150
Christiansø & Frederiksø	2580	2028	1525
Græsholm	420	400	175
Total	3000	2503	1850