

SPECIES INFORMATION SHEET

Somateria mollissima

English name: Common eider	Scientific name: <i>Somateria mollissima</i>	
Taxonomical group: Class: Aves Order: Anseriformes Family: Anatidae	Species authority: Linnaeus, 1758	
Subspecies,Variations,Synonyms: <i>Somateria mollissima mollissima</i>	Generation length: 7 years	
Past and current threats (Habitats Directive article 17 codes): Breeding: Epidemics/Diseases (K03.02, K03.03), Alien species (I01), Climate change (M01, M02), Competition and predation (K03.04, I02) Wintering: Bycatch (F03.02.05), Oil spills (H03.01), Hunting (F03.01), Extra-regional threats (food shortage in North Sea, XO), Human disturbance (G01.01), Mining and quarrying (C01.01), Construction (C03.03, D03.03), Water traffic (D03.02)	Future threats (Habitats Directive article 17 codes): Breeding: Epidemics/Diseases (K03.02, K03.03), Alien species (I01), Climate change (M01, M02), Competition and predation (K03.04, I02) Wintering: Bycatch (F03.02.05), Oil spills (H03.01), Hunting (F03.01), Extra-regional threats (food shortage in North Sea, XO), Human disturbance (G01.01), Mining and quarrying (C01.01), Construction (C03.03, D03.03), Water traffic (D03.02)	
IUCN Criteria breeding: A2abe	HELCOM Red List Category breeding:	VU Vulnerable
IUCN Criteria wintering: A2b	HELCOM Red List Category wintering:	EN Endangered
Global / European IUCN Red List Category LC / LC	EU Birds Directive: Annex II B (DK, EE, FR, IE, FI, SE), Annex III B	
Protection and Red List status in HELCOM countries: <i>Hunting not allowed in all EU Member States (Annex II B).</i>		
Denmark: LC (on the 1997 Danish Amber List as a species of national responsibility outside the breeding season), Estonia: NT, Finland: NT, Germany: "particularly protected" under Federal Species Protection Decree (Bundesartenschutzverordnung)/*(Not threatened), Latvia: –, Lithuania: –, Poland: –, Russia: –, Sweden: NT (breeding)		

Range description and general trends

The common eider (*Somateria mollissima*) breeds in coastal areas of north-west and northern Europe. The population has increased almost throughout the 20th century until the 1990s. Simultaneously, the species has also extended its breeding range southwards along the European Atlantic coast. However, since the mid-1990s a considerable decline of the breeding population has been observed in the northern Baltic (Finland, Sweden, Estonia). Common eiders are partially migratory and dispersive and winter mainly in marine or brackish areas. Successful adaptation to arctic conditions enables wintering displacement mostly within the breeding range. In Central Europe, common eiders overwinter in their breeding areas or show various migration patterns, depending on the area of origin (BWPI 2004, Mendel et al. 2008). The main wintering areas are in the Baltic Sea, along the west coast of Norway and in the Wadden Sea. The Baltic/Wadden Sea flyway population that mainly breeds in Finland, Sweden, Denmark and Estonia winters in the Inner Danish waters, the German Baltic Sea areas and in the Wadden Sea. The winter population has undergone a considerable decline of 36% from c. 1.2 million birds in 1990 to c. 760 000 birds in 2000, but was currently estimated at c. 976 000 individuals (Ekroos et al. 2012, Wetlands International 2012).

SPECIES INFORMATION SHEET

Somateria mollissima

Somateria mollissima. Photos by Ritzel Lutz (left) and Nicole Sonntag (right).

Distribution and status in the Baltic Sea region

Breeding

The **Swedish** breeding population was estimated at 170 000 breeding females in 1973 and increased to 270 000 in 1983–1984 (Desholm et al. 2002). Since the end of the 1990s, the population has been declining. Currently, it is estimated at 120 000–200 000 breeding females (bf). Within the last 20 years the decline has been estimated to 25%.

In **Finland**, the common eider was few in numbers in the 1910s and 1920s, but in the late 1930s the population was already estimated at 12 000 pairs. During World War II the population collapsed due to intensified hunting, egg collection, oil disasters as well as severe winters. After the war the population started to grow again with high growth rates.

The increase was most rapid during the 1970s and 1980s, averaging 7–10% per year. In 2001, the total Finnish population was estimated at 150 000–180 000 breeding females, of which about 150 000 bred in the south-western archipelago, 10 000–20 000 in the Gulf of Finland, and less than 10 000 in the Bay of Bothnia.

During the late 1980s and 1990s, no further increase occurred in the Gulf of Finland, and since the mid-1990s the entire Finnish population is estimated to decline. For 2010, the population number was estimated at 103 000 breeding females, and the recent decline (2000–2010) to 2.3% p.a.

In the **St Petersburg region of Russia** the species recovered during the 1970–90s. However, the population is still small and is estimated at 200 breeding females on the islands of the eastern part of the Gulf of Finland (A. Kondratyev, *in litt.*). At Lake Ladoga, the eider breeds in the Valaam archipelago and on small islands in the northern part of the lake. However, these areas belong to Karelia, not to St Petersburg region.

In **Estonia**, the common eider is the second numerous duck species, breeding all over the archipelago. The population increased from the beginning of the century until 1940. During World War II and the post-war period the population decreased, but began to recover and expand its range in the mid-1950s. In the mid-1960s, the population was estimated at 3 000–3 500 breeding females, until the beginning of the 1980s it had increased to about 8 000, and c. 15 000 in 1995. However, after this peak it decreased to 12 000 in 2001 (Desholm et al. 2002, Elts et al. 2003; Fig. 5), and 3 000–7 000 breeding females in 2003–2008 (Elts et al. 2009).

In the **Kaliningrad region of Russia, Lithuania and Latvia** the eider has not yet been recorded as a breeding bird.

In **Poland**, the breeding of eiders is exceptional, there has been only one breeding record near Gdańsk in 1997 (Tomiałojc & Stawarczyk 2003).

In **Germany**, the eider mainly breeds at the North Sea (1 100–1 300 bf in 2005, Südbeck et al. 2009). The

German Baltic Sea coast was not colonized before 1985. Since then, the eider breeds regularly there with increasing numbers in both Baltic coastal federal states, Mecklenburg-Western Pomerania and Schleswig-Holstein. In 2011, the population in Mecklenburg-Western Pomerania was 85–100 bf.

In **Denmark**, the eider has shown a long-term increase during the 20th century. The breeding population was about 1 200–1 500 nesting females around 1935, 3 000–3 500 around 1960, 19 000–20 000 around 1980, and 23 000–25 000 around 1990. The annual growth rate was as high as 8–10% during the period 1960–1980, but slowed down to 2–3% in 1980–1990 (Lyngs 2000). During the 1990s until 2010, the population was about stagnant, giving an estimate of 24 000–25 000 breeding females in 2010 (Christensen & Bregnballe 2011; Fig. 5). However, the stability of total numbers does not reflect a stable situation, since some old, large colonies decreased considerably, whereas increases occurred on a number of small and newly established breeding sites. On Ertholmene (Bornholm), for instance, one of the largest and oldest eider colonies in Denmark, the number of nesting females dropped down from 3 000 in 1992 to 1 650 in 2007 (http://www.chnf.dk/lister/yffugle_chroe.html).

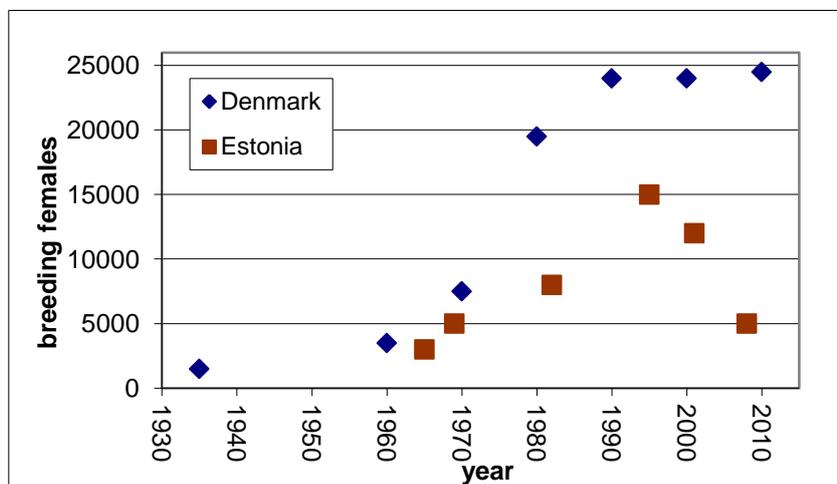


Fig. 5. The development of the eider population in Denmark and Estonia during the 20th century. Data from Desholm et al. (2002) and Christensen & Bregnballe (2011).

Between 1990 and 2000, the Baltic/Wadden Sea flyway population has undergone a considerable decline. In the Danish waters, the second most important wintering area of the flyway population, the number of wintering birds has declined from c. 800 000 to 370 000 during this time. Mid-winter counts suggest that the total population could have fallen from c. 1.2 million birds in 1991 to c. 760 000 in 2000, which means a reduction of 36% (Desholm et al. 2002)

However, although reductions in breeding numbers are evident for some sites, the decline of the breeding population along the flyway seems to be less pronounced compared to the winter population. Shortcomings of the monitoring of breeding and wintering numbers, as well as an unknown buffering effect of non-breeders (*i.e.* earlier debut breeding attempt of subadults) are probably the reasons for the difference (Desholm et al. 2002). However, Finnish ringing data indicate no age-related buffering effect, whereas there was a true shortcoming of subadults in the south due to exceedingly small cohorts on the northern breeding grounds preceding the low winter counts in Denmark (Hario & Rintala 2009).

Table 1: Population numbers of the common eider in the Baltic Sea area (numbers refer to breeding

SPECIES INFORMATION SHEET

Somateria mollissima

females). For population trends 0=stable, -=decreasing, +=increasing, ?=unknown.

Country	Population size		Short-term population trend (10 years)	Long-term population trend (50 years)
	Breeding females	Year		
Sweden	120 000–200 000 ¹	2010	-	+
Finland	103 000	2010	-	+
Russia, PET	200	2010	?	+
Estonia	3 000–7 000	2003–2008	-	+
Poland	One breeding record	1997		
Germany, SH	70	2005–2009	+	+
Germany, MV	85–100	2011	+	+
Denmark	24 000–25 000	2010	0	+
Baltic Sea	250 000–335 000			

Wintering

Birds breeding in the Baltic region winter mostly in the western parts of the Baltic Sea. Autumn migration from the breeding grounds in the northern and central parts of the Baltic Sea to Danish and German waters begins in late September and lasts through December. Some of these birds spend the first part of the winter in the Wadden Sea, but return to the Baltic in February and March. Spring migration to the breeding grounds begins in late March. Only local breeders remain in Danish and German waters (Skov et al. 2011). At the beginning of the 1990s, the north-western Kattegat was the most important wintering area in the Baltic Sea. Besides, the sea between Funen and the north-east coast of Germany as well as the shallow parts of SW Kattegat were important wintering areas for common eiders (Durinck et al. 1994). Since then, a relocation of wintering birds has taken place. The importance of the north-western and south-western Kattegat declined dramatically, while numbers in the region between Funen and Germany increased. This area is now the most important wintering site in the Baltic Sea (Fig. 6). Thus, a contraction of the distribution of common eiders to the south-western corner of the Baltic Sea has apparently taken place. The total number wintering in the Baltic Sea has declined from 1 048 000 to 515 000 birds, equivalent to 51% over 16 years (Skov et al. 2011).

¹ Numbers include birds breeding in in Bohuslän, Skagerrak.

SPECIES INFORMATION SHEET

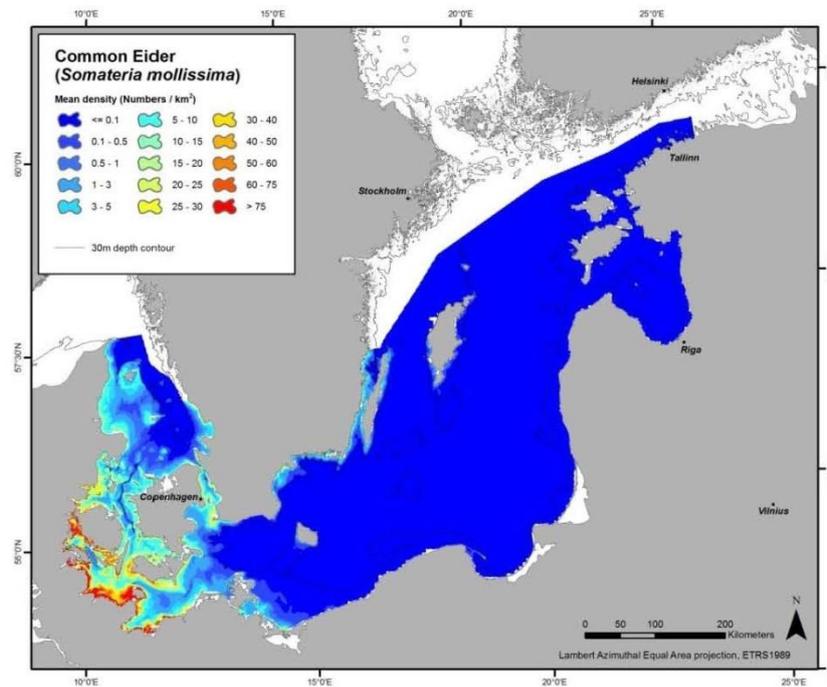
Somateria mollissima

Fig. 6. Distribution and density of wintering common eider *Somateria mollissima* in the Baltic Sea, 2007–2009. From Skov et al. (2011).

Habitat and ecology

The common eider is the most numerous and widespread duck in the Baltic archipelagos. It inhabits a wide range of island types along the entire zonation. In Finland, it takes an intermediate position in maritimity among breeding species in the vast South Western Archipelago (Numers 1995), being a generalist rather than a strictly marine species. However, its distribution is basically dependent on the occurrence of the blue mussel (*Mytilus trossulus*), although also other bivalves may serve as a basic food resource. Females show a high degree of natal philopatry, whereas males disperse widely. The eider breeds colonially, often with larids, although true association may be weak (Hildén 1964). The northern Baltic population is strictly migratory, but overwintering takes place within the Baltic range.

During the non-breeding season, common eiders are highly gregarious and sometimes form flocks of several tens of thousands individuals. Winter distribution patterns at sea vary between years, presumably due to fluctuations in food availability. In the Wadden Sea, both sublittoral and eulittoral areas are commonly used, but birds seem to generally favour sublittoral areas during winter (Nehls 1991). In the western part of the Baltic Sea, common eiders occur preferably in areas of a water depth between 5 and 15 m (Skov et al. 2011) and mostly above coarse sediments like gravel or stone. Such hard substrates offer good conditions for blue mussels, the major food source for common eiders.

Description of major threats

There are several factors known to impact the species, but their significance for the observed decline is not well understood.

Diseases and infections can have an impact on common eider populations. Avian cholera, caused by the bacteria *Pasteurella multocida*, has caused mass fatalities in common eiders breeding in the Baltic Sea area, e.g. in Denmark, where an outbreak of avian pasteurellosis in 1996 and in 2001 among wintering and breeding birds caused high mortality in the colonies in SW Kattegat. In Stavns Fjord, more than 85% of the potential breeders were estimated to have died during the outbreak (Christensen et al. 1997).

SPECIES INFORMATION SHEET

Somateria mollissima

Besides, common eiders are affected by viral infections and intestinal infections with acanthocephalan parasites. Recently, a lack of thiamine (vitamin B1) was found to cause lethal paralytic syndrome which may contribute to adult mortality and breeding failures in several species. Balk et al. (2009) suspected thiamine deficiency to be an important cause of the observed population declines of common eider in Northern Europe. **Climate change** probably also has an increasing effect through decreasing salinity in the Baltic Sea, which affects food availability (bivalves). However, Baltic winter climate has not shown an impact on adult mortality so far, *i.e.* there is no association between the North Atlantic Oscillation (NAO) index and the annual variation in female survival of the Gulf of Finland birds (Hario *et al.* 2009). Fledgling production bears the highest population regulatory effect in a 48-year-long time series in the Gulf of Finland, whereas female survival only explains 2% of the population growth rate (Hario & Rintala 2006, 2009). In 1996 and 1999, viral infections have caused mass mortality among ducklings within the first weeks after hatching. Similar mortalities have occurred in accelerating pace since then, but the causes have not always been identified. Yet, high duckling mortality decreases the subsequent recruitment rate so that it cannot compensate the normal adult mortality (10–15%). The total Baltic – Wadden Sea population shows currently a clear male-biased sex ratio (Kilpi *et al.* 2003, Lehtikoinen *et al.* 2008a). This is thought to be due to a long-term and gradual decrease in female survival resulting from complex interactions with increasing **predation** pressure by the recovering population of White-tailed Eagle and by American mink on breeding females (Kilpi & Öst 2002) and elevated susceptibility to pathogens and starvation among female ducklings (Lehtikoinen *et al.* 2008b). As common eiders are listed under Annex II of the European Birds Directive, **hunting** is allowed in certain EU countries, and several tens of thousands of birds are shot around the Baltic Sea each year. In Denmark, the estimated annual bag of eiders has partly reflected population trends, increasing to c. 140 000 birds in 1970, after which the number of shot birds fluctuated until the 1990s and then declined to 69 000 individuals in 2004/2005. This decline probably also reflects the continuously decreasing number of hunters since the early 1980s (Bregnballe *et al.* 2006). Furthermore, Bregnballe *et al.* (2006) suppose that, by taking high numbers of female birds, the overall impact of hunting on the population might have changed from reducing the rate of annual increase to potentially contributing directly to the decline in breeding numbers in Denmark. Seaducks are among the species most seriously affected by **mortality in gillnets**, as the nets are mainly set in coastal areas and on shallow offshore banks, which are also the most important habitats for species like common eiders. More than 73 000 birds are annually caught in gill nets in the Baltic Sea, with sea ducks forming the majority of victims. Common eiders are amongst the most frequent victims of entanglement in the southwestern part of the Baltic Sea, *e.g.* in Sweden, Germany and Poland (Žydelis *et al.* 2009). In the early 1980s the estimated yearly loss of eiders was 9 400 birds for the Baltic coast of Schleswig-Holstein only (Kirchhoff 1982). Common eiders spend large amounts of time swimming on the water and usually form large flocks and concentrate in certain sea areas. Thus, they are highly vulnerable to **oil pollution**. Oiling has been identified as one of the most important threats to seabirds and waterbirds in several Baltic Sea countries and wintering and moulting sea ducks are among the species most seriously affected (Žydelis & Dagys 1997, Mendel *et al.* 2008). Common eiders mainly feed on benthic molluscs and thus depend on areas where bivalves are abundant and accessible to them. Many important habitats of common eiders have already been affected by activities that lead to a **reduction of food supply**, *e.g.* sand and gravel extraction or sediment dredging. In the Wadden Sea, overexploitations by commercial **mussel fisheries** has caused food shortages for common eiders (*e.g.* Scheiffarth & Frank 2005), which can cause mass starvation under unfavourable weather conditions or lead to poor body condition. In Denmark, the amount of body reserves acquired at the wintering quarters was found to be a significant predictor of female condition when ducklings hatch (Lehtikoinen *et al.* 2008a). Thus, winter feeding condition is an important aspect to be considered in the interpretation of the underlying causes of reduced breeding success. Besides, increasing water temperatures during winter due to climate change effects and changes in phytoplankton communities due to decreasing nutrient levels can lead to a lower quality of mussels in spring and might thus reduce the possibilities of common eiders to increase their body reserves before migration and breeding. In the Baltic Sea, water temperatures have increased over the last two decades while nutrient levels have dropped at least in some areas (Bellebaum *et al.* 2012). In the Netherlands, high fishing pressure on the

SPECIES INFORMATION SHEET

Somateria mollissima

major prey species, combined with a series of mild winters leading to low spatfall and reduced quality of mussels and cockles, and followed by a near-complete elimination of a secondary food source for eiders due to overfishing, presumably resulted in the mass mortality event of Common of 25 000 eiders in the winter of 1999/2000 (Camphuysen et al. 2002). Common eiders have a large flight distance with regard to vessels and usually take flight when a ship is approaching. Thus they are very sensitive to **disturbance by ship traffic**, but may show habituation effects in areas with regular and predicted ship movements (Schwemmer et al. 2011). Studies in the Wadden Sea revealed that common eiders are seriously disturbed by recreational boat traffic, causing birds to abandon suitable feeding sites and shift to other, undisturbed areas (Ketzenberg 1993). Particularly during the energy-consuming phase of moult, common eiders are highly vulnerable to disturbance caused by ship traffic or tourism and are dependent on undisturbed sea areas with sufficient food resources (Nehls 1991). Common eiders migrate in low flight altitudes and also during night and have only moderate flight manoeuvrability. Furthermore, they have restricted habitat use flexibility and are easily disturbed by ship and helicopter traffic. Hence, the species is particularly at risk of colliding with **offshore wind turbines and other obstacles** and has a high score in the wind farm sensitivity index (Garthe & Hüppop 2006). Barrier effects and habitat loss for common eiders have been documented at wind farms in the North and Baltic Sea. Moreover, mortality losses due to collisions were recorded from certain wind farms (compiled in Dierschke & Garthe 2006).

Assessment justification

Breeding

The Baltic eider population has been declining since the 1990s. In the most important breeding areas, the declines have been estimated at 25% in 20 years in Sweden, and 39% in 15 years in Finland, respectively. The overall decline within three generations (21 years) is assumed to exceed 30%. The reasons for the decline have not ceased. Hence, the species is classified as *Vulnerable* (VU) according to criterion A2abe.

Wintering

The species has a very large range and a large population size and hence it does not approach the thresholds for a Red List Category under criteria B, C and D. However, the two comprehensive Baltic Sea surveys indicated that the winter population of common eider has undergone a dramatic decline from c. 1 048 000 birds in 1988–1993 to 515 000 birds in 2007–2009, equivalent to 61% over three generations (1993–2014; 21 years, according to the HELCOM Red List of Breeding Birds, HELCOM 2012). Hence, the species qualifies for *Endangered* (EN) according to criterion A2, as the causes of the reduction are not yet understood and the reduction may not have ceased. Currently, Ekroos et al. (2012) published a new assessment of the development of the Baltic/Wadden Sea population of common eider. According to this study, the winter numbers declined between 1991 and 2000. Afterwards, numbers increased in the Baltic Sea during 2000–2009, but decreased in the Wadden Sea. However, the authors could not exclude the possibility that this increase in the Baltic was due to improvements in survey methods, i.e. more accurate census methods in Denmark and better coverage in the German Baltic Sea between 2000 and 2009. If so, the recent apparent increase in midwinter numbers reported may not reflect a real change in abundance (Ekroos et al. 2012). Hence, the assessment was based on the figures presented by Skov et al. (2011) and the species is classified as Endangered according to criterion A2b. As the population size is large and the species has a large wintering range in the Baltic Sea, criteria B, C and D do not apply.

Recommendations for actions to conserve the species

Management options to be implemented on the breeding grounds to increase adult survival and/or breeding success are hindered by the fact that breeding success is affected by many factors which may vary locally in relative importance (Ekroos et al. 2012). Conservation actions in the wintering areas seem more straightforward, but as probably only the cumulative effects of the various threat factors

SPECIES INFORMATION SHEET

Somateria mollissima

eventually drive the dramatic decline, various management measures need to be considered. As chick production is dependent on body condition of female eiders, the conservation of the most important feeding areas is of considerable importance for the entire population. As the ratio of adult females in the population continues to fall, hunting during winter should mainly target male eiders (Ekroos et al. 2012). As a first step, this requires hunting studies on factors determining the current harvest rate. In Denmark, a reduction of the open season for female eiders probably resulted in a shifting sex ratio in the bag, with the harvest of females being considerably reduced (Bregnballe et al. 2006). Besides, a reduction of bycatch in fishing gear and the prevention of accidental and chronic oil pollution are necessary options to decrease additional mortality and to support the recovery of this species. As Schwemmer et al. (2011) assumed that common eiders may show habituation effects in areas with regular and predicted ship traffic, they recommended that spatial planning in marine areas should aim to channel ship traffic wherever possible to allow for habituation effects and to avoid further habitat fragmentation and loss of feeding and resting sites. Eventually, better coverage and better coordination of counts in winter and summer are also needed to get reliable monitoring data and models for forecasting the population development.

Common names

Denmark: edderfugl, Estonia: hahk, Finland: haahka, Germany: Eiderente, Latvia: parastā pūkpīle, Lithuania: gaga, paprastoji gaga, Poland: edredon, Russia: Обыкновенная гага, Sweden: ejder

References

- Balk, L., P.-Å. Hägerroth, G. Åkerman, M. Hanson, U. Tjärnlund, T. Hansson, G.T. Hallgrímsson, Y. Zebühr, D. Broman, T. Mörner & H. Sundberg (2009): Wild birds of declining European species are dying from thiamine deficiency syndrome. *Proceedings of the National Academy of Sciences of the United States of America* 106: 12001-12006.
- Bellebaum, J., K. Larsson & J. Kube (2012): Research on Sea Ducks in the Baltic Sea. Gotland University.
- Bregnballe, T., H. Noer, T.K. Christensen, P. Clausen, T. Asferg, A.D. Fox & S. Delany (2006): Sustainable hunting of migratory waterbirds: the Danish approach. In: Boere, G., C. Galbraith & D. Stroud (eds.): *Waterbirds around the world*, pp. 854–860. The Stationary Office, Edinburgh, UK.
- BWPi (2004): *Birds of the Western Palearctic interactive 1.00*. Interactive DVD Birdguides. Oxford University Press, Shrewsbury. www.birdguides.com.
- Christensen, T.K. & T. Bregnballe (2011): Status of the Danish breeding populations of Eiders *Somateria mollissima* 2010. *Dansk Orn. Foren. Tidsskr.* 105:195–205
- Christensen, T.K., T. Bregnballe, T.H. Andersen & H.H. Dietz (1997): Outbreak of pasteurellosis among wintering and breeding common eiders *Somateria mollissima* in Denmark. *Wildlife Biology* 3: 125–128.
- Dierschke, V. & S. Garthe (2006): Literature review of offshore wind farms with regards to seabirds. In: Zucco, C., W. Wende, T. Merck, I. Köchling & J. Köppel (eds.): *Ecological research on offshore wind farms: international exchange of experiences. Part B: literature review of ecological impacts*. BfN-Skripten 186: 131–198.
- Desholm, M., T.K. Christensen, G. Scheiffarth, M. Hario, Å. Andersson, B. Ens, C.J. Camphuysen, L. Nilsson, C.M. Waltho, S.H. Lorentsen, A. Kuresoo, R.K.H. Kats, D.M. Fleet & A.D. Fox (2002): Status of the Baltic/Wadden Sea population of the Common Eider *Somateria m. mollissima*. *Wildfowl* 53: 167–203.
- Durinck, J., H. Skov, F.P. Jensen & S. Pihl (1994): Important marine areas for wintering birds in the Baltic Sea. EU DG XI research contract no. 2242/90-09-01, Ornithology Consult Report, Copenhagen, 109 pp.
- Ekroos, J., A.D. Fox, T.K. Christensen, I.K. Petersen, M. Kilpi, J.E. Jónsson, M. Green, K. Laursen, A. Cervencil, P. de Boer, L. Nilsson, W. Meissner, S. Garthe & M. Öst (2012): Declines amongst breeding Eider *Somateria mollissima* numbers in the Baltic/Wadden Sea flyway. *Ornis Fennica* 89: 81–90.
- Eltis, J., A. Kuresoo, E. Leibak, A. Leito, V. Lilleleht, L. Luigujõe, A. Lõhmus, E. Mägi & M. Ots (2003): Status

SPECIES INFORMATION SHEET

Somateria mollissima

- and Numbers of Estonian Birds, 1998–2002. *Hirundo* 16, 58–83.
- Elts, J., A. Kuresoo, E. Leibak, A. Leito V. Lilleleht, L. Luigujõe, E. Mägi, R. Nellis, R. Nellis & M. Ots (2009): Status and Numbers of Estonian Birds, 2003–2008. *Hirundo* 22, 3–31.
- Estonian eBiodiversity. Red List 2008 results and species information available at <http://elurikkus.ut.ee/prmt.php?lang=eng>
- Franson, J.C., T. Hollmén, M. Hario, M. Kilpi & D.L. Finley (2002): Lead and delta-aminolevulinic acid dehydratase in blood of Common Eiders *Somateria mollissima* from the Finnish archipelago. *Ornis Fennica* 79: 87–91.
- Garthe, S. & O. Hüppop (2006): Scaling possible adverse effects of marine wind farms on seabirds: developing and applying a vulnerability index. *Journal of Applied Ecology* 41: 724–734.
- Garthe, S., N. Ullrich, T. Weichler, V. Dierschke, U. Kubetzki, J. Kotzerka, T. Krüger, N. Sonntag & A.J. Helbig, (2003): See- und Wasservogel der deutschen Ostsee – Verbreitung, Gefährdung und Schutz. Bundesamt für Naturschutz, Bonn - Bad Godesberg, 170 pp.
- Hario, M. & J. Rintala (2006): Fledgling production and population trends in Finnish Common Eiders (*Somateria mollissima mollissima*) – evidence for density dependence. *Canadian Journal of Zoology* 84: 1038–1046.
- Hario, M. & J. Rintala (2009): Age of first breeding in the Common Eider *Somateria m. mollissima* population in the northern Baltic Sea. *Ornis Fennica* 86: 81–88.
- Hario, M., M. J. Mazerolle & P. Saurola (2009): Survival of female common eiders *Somateria m. mollissima* in a declining population of the northern Baltic Sea. *Oecologia* 159: 747–756 DOI: 10.1007/s00442-008-1265-x.
- HELCOM (2012): Red List of Baltic Breeding Birds. HELCOM Red Lists of Baltic Sea Species and Habitats/Biotopes.
- Hildén, O. (1964): Ecology of Duck populations in the island group of Valassaaret, Gulf of Bothnia. *Annales Zoologici Fennici* 1: 153–279.
- Ketzenberg, C. (1993): Auswirkungen von Störungen auf nahrungssuchende Eiderenten (*Somateria mollissima*) im Königshafen/Sylt. *Corax* 15: 241–244.
- Kilpi, M. & M. Öst (2002): The effect of White-tailed Sea Eagle predation on breeding Eider females off Tvärminne, Western Gulf of Finland. *Suomen Riista* 48: 27–33.
- Kilpi, M., M. Öst, A. Lehikoinen & A. Vattulainen (2003): Male sex bias in Eiders *Somateria mollissima* during spring migration into the Gulf of Finland. *Ornis Fennica* 80: 137–142.
- Kirchhoff, K. (1982): Wasservogelverluste durch die Fischerei an der schleswig-holsteinischen Ostseeküste. *Vogelwelt* 103: 81–89.
- Lehikoinen, A., T. K. Christensen, M. Öst, M. Kilpi, P. Saurola & A. Vattulainen (2008a): Large-scale change in the sex ratio of a declining Eider population. *Wildlife Biology* 14: 288–301.
- Lehikoinen, A., M. Öst, T. Hollmén & M. Kilpi (2008b): Does sex-specific duckling mortality contribute to male bias in adult Common Eiders? *Condor* 110 (3): 574–578.
- Lyngs, P. (2000): Status of the Danish breeding population of Eiders *Somateria mollissima* 1988–93. *Dansk. Orn. Foren. Tidsskr.* 94: 12–18.
- Mendel, B., N. Sonntag, J. Wahl, P. Schwemmer, H. Dries, N. Guse, S. Müller, & S. Garthe (2008): Profiles of seabirds and waterbirds of the German North and Baltic Seas. Distribution, ecology and sensitivities to human activities within the marine environment. *Naturschutz und Biologische Vielfalt* 61, Bundesamt für Naturschutz, Bonn - Bad Godesberg, 427 pp.
- Mikkola-Roos, M., J. Tiainen, A. Below, M. Hario, A. Lehikoinen, E. Lehikoinen, T. Lehtiniemi, A. Rajasärkkä, J. Valkama & R. A. Väisänen (2010): Linnut, Birds. Aves. In Rassi, P., E. Hyvärinen, A. Juslén & I. Mannerkoski (eds.). *Suomen lajien uhanalaisuus – Punainen kirja 2010*. Ministry of the Environment & Finnish Environment Institute, Helsinki. P. 183–203.
- Nehls, G. (1991): Bestand, Jahresrhythmus und Nahrungsökologie der Eiderente, *Somateria mollissima*, L. 1758, im Schleswig-Holsteinischen Wattenmeer. –*Corax* 14: 146–209.
- Noer, H., I. Clausager & T. Asferg (1995): The bag of Eider *Somateria mollissima* in Denmark 1958–1990. *Danish Rev. Game Biol.* 14(5): 1–24.
- Numers, M. v. (1995): Distribution, numbers and ecological gradients of birds breeding on small islands in the Archipelago Sea, SW Finland. *Acta Zoologica Fennica* 197: 127 pp.

SPECIES INFORMATION SHEET

Somateria mollissima

- Scheiffarth, G. & D. Frank (2005): Shellfish-eating birds in the Wadden Sea – what can we learn from monitoring programs? *Wadden Sea Ecosystem* 20: 185–200.
- Schwemmer, P., B. Mendel, N. Sonntag, V. Dierschke & S. Garthe (2011): Effects of ship traffic on seabirds in offshore waters: implications for marine conservation and spatial planning. *Ecological Applications* 21: 1851–1860.
- Skov, H., S. Heinänen, R. Žydelis, J. Bellebaum, S. Bzoma, M. Dagys, J. Durinck, S. Garthe, G. Grishanov, M. Hario, J.J. Kieckbusch, J. Kube, A. Kuresoo, K. Larsson, L. Luigujõe, W. Meissner, H.W. Nehls, L. Nilsson, I.K. Petersen, M. Mikkola Roos, S. Pihl, N. Sonntag, A. Stock & A. Stipniece (2011): Waterbird populations and pressures in the Baltic Sea. *TemaNord* 550, 201 pp.
- Sonntag, N., B. Mendel & S. Garthe 2006: Die Verbreitung von See- und Wasservögeln in der deutschen Ostsee im Jahresverlauf. *Vogelwarte* 44: 81–112
- Südbeck, P., H.G. Bauer, M. Boschert, P. Boye & W. Knief (2009): Rote Liste und Gesamtartenliste der Brutvögel (Aves) Deutschlands. *Naturschutz u. Biolog. Vielfalt* 70 (1): 159–227.
- Tjernberg, M., I. Ahlén, Å. Andersson, M.O.G. Eriksson, S.G. Nilsson & S. Svensson (2010): Fågler – Birds. Aves. In Gärdenfors, U. (ed.) *Rödlistade arter i Sverige 2010 – The 2010 Red List of Swedish Species*. ArtDatabanken, SLU, Uppsala. P. 201–221. Red List categories available also at <http://www.artfakta.se/GetSpecies.aspx?SearchType=Advanced>
- Tomiałojć, L. & T. Stawarczyk (2003): *Awifauna Polski. Rozmieszczenie, liczebność i zmiany*. The Avifauna of Poland. Distribution, Numbers and Trends. Vol. I & II, Wrocław.
- Wetlands International (2012): *Waterbird Population Estimates*. Retrieved from wpe.wetlands.org on Friday 7 Dec 2012.
- Wind, P. & Pihl, S. (eds.) (2004–2010): *The Danish Red List*. - The National Environmental Research Institute, Aarhus University [2004]-. <http://redlist.dmu.dk> (updated April 2010). Species information available at <http://bios.au.dk/videnudveksling/til-myndigheder-og-saerligt-interesserede/redlistframe/soegart/>
- Žydelis, R., J. Bellebaum, H. Österblom, M. Vetemaa, B. Schirmeister, A. Stipniece, M. Dagys, M. van Eerden & S. Garthe (2009): Bycatch in gillnet fisheries – an overlooked threat to waterbird populations. *Biological Conservation* 142, 1269–1281.
- Žydelis, R. & M. Dagys (1997): Winter period ornithological impact assessment of oil related activities and sea transportation in Lithuanian inshore waters of the Baltic Sea and in the Kursiu Lagoon. *Acta Zoologica Lituanica* 6: 45–65.