

TUFTED DUCK

Aythya fuligula

Subspecies:

Monotypic.

Distribution:

Palaearctic, with a wide breeding distribution across northern Eurasia from Iceland to the Bering Sea, generally between 45° and 70°N. Western Eurasian populations commonly winter south to North Africa and the Gulf, and in much smaller numbers to West and East Africa.

Movements:

Partially migratory; present throughout the year on breeding grounds in temperate regions of western Europe, but northern populations are highly migratory. Birds breeding in Iceland, Fennoscandia, the Baltic region and Russia east to 65°E join resident breeding birds to winter in the Baltic and around North Sea and Atlantic coasts. In mild winters, over 40% of the northwest European population winter in the Baltic, the most important areas being in the shallow bays and lagoons along the northeast coast of Germany and in western Poland. The shallow waters of southeastern Denmark and the archipelagos of eastern Sweden are also very important for this species (Durinck *et al.*, 1994; Pihl *et al.*, 1995). Birds wintering in central Europe include local breeding birds and birds breeding to the northeast in European Russia. Birds wintering in the Black Sea area and east Mediterranean are thought to originate from northeast European Russia and northwestern Siberia (Cramp & Simmons, 1977; Monval & Pirot, 1989), while birds wintering in the Caspian region probably originate from western Siberia and central Asia. A bird ringed in western Siberia (Lake Mukhartukha) has been recovered in Egypt (Goodman & Meininger, 1989).

In hard winters, many ducks leave the Baltic, some moving to the Netherlands, Britain and Ireland, but the movements are poorly understood (Durinck *et al.*, 1994). The wetlands of lower Iraq may constitute a hard-weather refuge for birds which normally winter in the Caspian region: over 40,000 were recorded in Iraq in January 1979 (Scott & Carp, 1982), as compared with only a few tens or hundreds in normal years.

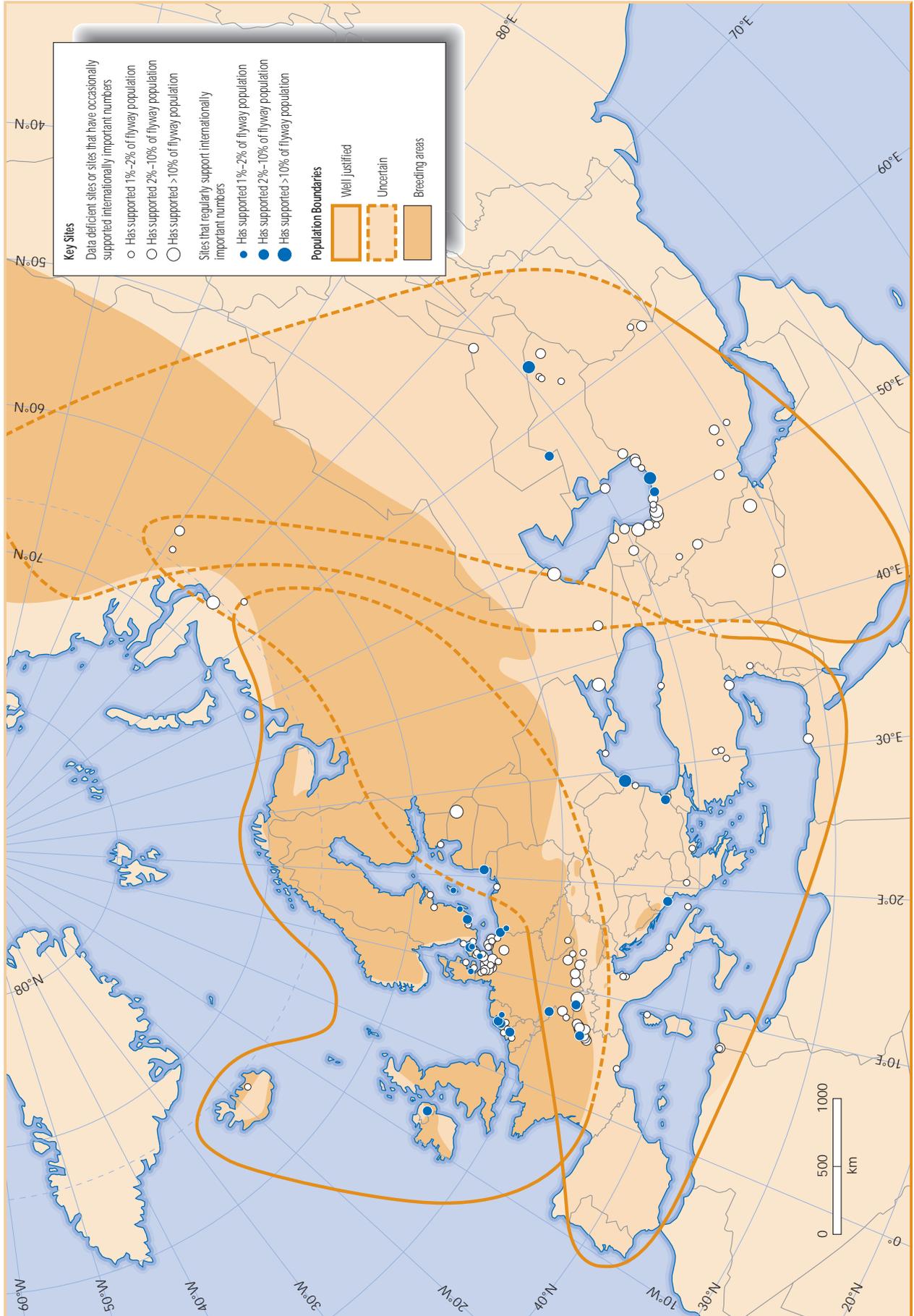
Population limits:

No discrete populations are identifiable. There seem to be no precise boundaries between the various breeding populations, but the wintering areas show more separation, with major concentrations of birds in northwest Europe (centred on the Baltic), the central European lakes, the Black Sea, the Sea of Azov and the Caspian Sea. Monval & Pirot (1989) considered that there was good separation between the birds wintering in northwest Europe and those wintering in central Europe, and included the central European birds with the Black Sea/Mediterranean population. Recent mid-winter counts show a continuous distribution of *A. fuligula* from central Europe through the Danube in Hungary to the Black Sea region, and support this treatment, which is adopted here. Thus, three 'populations' are recognized, based on the major wintering areas: northwest Europe, central Europe/Black Sea/Mediterranean, and Southwest Asia. It is apparent, however, that there is extensive overlap between these three groups on their breeding grounds.

Population size:

- **Northwest Europe: 1,000,000 (see Annex 1). 1% level 10,000.**
- **Central Europe/Black Sea/Mediterranean: 600,000 (Monval & Pirot, 1989). 1% level 6,000.** There has been no evidence of any significant change in this population in recent years, and the estimate of Monval & Pirot (1989) is therefore retained (see Annex 1). Small numbers of birds, presumably from this population, reach West Africa, e.g. up to 50 in Senegal, 150 in Nigeria and 26 in Chad.
- **Southwest Asia/northeast Africa: 200,000. 1% level 2,000.** Perennou *et al.* (1994) estimated the Southwest Asian wintering population at 200,000, based on counts of up to 170,000 in the 1970s and counts of up to 113,000 in the late 1980s/early 1990s. Urban (1993)

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estimated the total number wintering in northeast Africa (excluding Egypt) to be between 1,500 and 6,000, with the great majority in Sudan (500–2,000) and Ethiopia (500–3,000), and probably less than 100 in East Africa. As these numbers are insignificant in relation to the numbers wintering in Southwest Asia, the estimate of 200,000 given by Perennou *et al.* (1994) is retained for the entire 'flyway'.

Habitat/ecology:

Aythya fuligula prefers large, deep, freshwater lakes, ponds and reservoirs with open water and islands for breeding. Although primarily a freshwater species, substantial numbers of *A. fuligula* winter in estuaries, along sheltered sea coasts and on brackish inland seas (e.g. Caspian Sea). The species is highly gregarious in winter, with flocks often comprising thousands of birds. Moulting migrations occur in some areas, reaching a peak in late July. Large gatherings of males are found in parts of Matsalu Bay (Estonia), in northeast Germany, and at the IJsselmeer in the Netherlands. Males moult their flight feathers between late June and early September, and are flightless for three to four weeks. Females moult their flight feathers one or two months later. The autumn migration begins in September, and northern breeding areas are deserted by late October or early November. Birds begin to arrive on their winter quarters from early October, and reach peak numbers in January and February. There is some segregation of the sexes in autumn and winter, probably caused by the differences in the timing of the moult. In mild winters, the spring migration begins in late February, and in western and central Europe most birds are on their breeding grounds by mid-April. Some birds reach Fennoscandia by late March, but the northernmost breeding birds do not reach their breeding areas until mid-May.

Conservation status:

The numbers of *A. fuligula* wintering in northwest Europe and central Europe have shown a significant increase over the past twenty years, while the numbers wintering in the west Mediterranean have been increasing since 1983 (Monval & Pirot, 1989; Rose, 1995). In northwest Europe, the increase has been faster in recent years, while in central Europe there is evidence of a slight decline within the last few years. It has been suggested that an exchange of wintering birds between northwest Europe, central Europe and the west Mediterranean is at least partially responsible for the population trends exhibited in these regions (Rose, 1995). *A. fuligula* is one of the few *Aythya* species in Western Eurasia with large populations that have been stable or increasing in recent decades. The recent increase in numbers in parts of northwest Europe has been attributed to the bird's adaptability to take over new habitats artificially created by man, such as park lakes and reservoirs, and colonization of northwest Europe by exotic molluscs (especially the mussel *Dreissena polymorpha*) on which the bird may rely almost entirely for food at certain times of the year (del Hoyo *et al.*, 1992). Data from the Black Sea/east Mediterranean and Southwest Asia are inadequate to determine population trends.

Network of key sites:

It is possible that the entire Caspian wintering population autumn stages in the Volga Delta and very large passage concentrations for the Central Europe/Black Sea/Mediterranean wintering population can be found in the Danube Delta in Romania and at the mouth of the Ob river in Russia. Further west the known key passage sites tend to be smaller in Central Europe and the southern Baltic. Many more key staging sites might remain to be identified at the latitude of the northern Baltic. One site, Pskovsko Chudskoye Lakes in Russia near the Latvian border is known to harbour large numbers of *A. fuligula* on passage. In northwestern Europe, *A. fuligula* is relatively widely dispersed in winter but 50–60 key sites are still listed in Annex 2 for having supported between 1% and 10% of the population. These probably provide wintering habitat for the majority of the population in most winters. The Central Europe/Black Sea/Mediterranean and Caspian wintering populations are sometimes found in enormous concentrations under certain winter conditions but usually they are more dispersed. The 85 key wintering sites listed for these two populations form a very good basis for a key sites network but the very large counts present from some sites in Iraq on the few occasions they were visited maybe indicative of larger numbers if Iraq were to be properly surveyed.

Protection status of key sites:

Most of the important sites are protected, especially the passage sites, but some of the very important sites are not protected. These include the IJsselmeer in the Netherlands, Szczecin Lagoon in Poland and Skadarsko Jezero on the Albania/Macedonia (former Yugoslav Republic of)/Montenegro border.

GREATER SCAUP

Aythya marila

Subspecies:

Polytypic. Two subspecies are generally recognized: the nominate form of northern Europe and northwest Asia, and *mariloides* of northeast Asia and North America. Some authors recognize a third form, *nearctica*, for North American birds.

Distribution:

Holarctic; the most northerly of the *Aythya* species in summer and winter, breeding at high latitudes across northern Eurasia and North America and wintering south to the Mediterranean, Black and Caspian Seas, China, Japan and the southern USA. Only the nominate subspecies occurs in Western Eurasia. This breeds in Iceland, Scandinavia and northern Russia east to about the Lena River, and also along the Baltic Sea coast in Sweden, Finland and Estonia; it winters in the western Baltic, along the coasts of the Netherlands, Denmark, France and the United Kingdom, around the Black Sea and in the north Caspian. Small numbers also occur on large lakes in central Europe and in the Adriatic, and a few birds occasionally reach the coast of North Africa.

Movements:

Strongly migratory, wintering south along coasts and on inland seas at temperate latitudes. The Icelandic breeding population, estimated at 3,000–5,000 pairs (Koskimies, 1993) winters mainly in Ireland and Scotland, although there have been many recoveries in other parts of Britain and the Netherlands, and some recoveries from the southwest Baltic (Germany) and northwest France (Gardarsson, 1991a). Birds breeding in Fennoscandia and northern Russia east to at least to Tyumen winter mainly in the Baltic Sea and along the Atlantic coast south to France. The Baltic holds an average of 50% of the northwest European population in winter, the main areas being the shallow lagoons and bays along the German and Polish coasts from Wismar Bay to Szczecin Lagoon (Durinck *et al.*, 1994; Pihl *et al.*, 1995). However, the IJsselmeer in the Netherlands is the single most important wintering site for the species in northwest Europe, regularly holding over 100,000 birds. The population wintering in Britain and Ireland, recently estimated at about 14,000 birds (Kirby *et al.*, 1993), is composed mainly of Icelandic birds, but also contains some birds of continental origin. Kirby *et al.* (1993) suggest that Britain and Ireland may be important for continental birds displaced by cold weather. In eastern Europe and western Asia, the principal wintering areas are in the Sea of Azov and northern Caspian Sea. The origins of these birds are unknown, but it is assumed that they lie towards the east end of the breeding range of *A. marila* in northern Siberia.

Population limits:

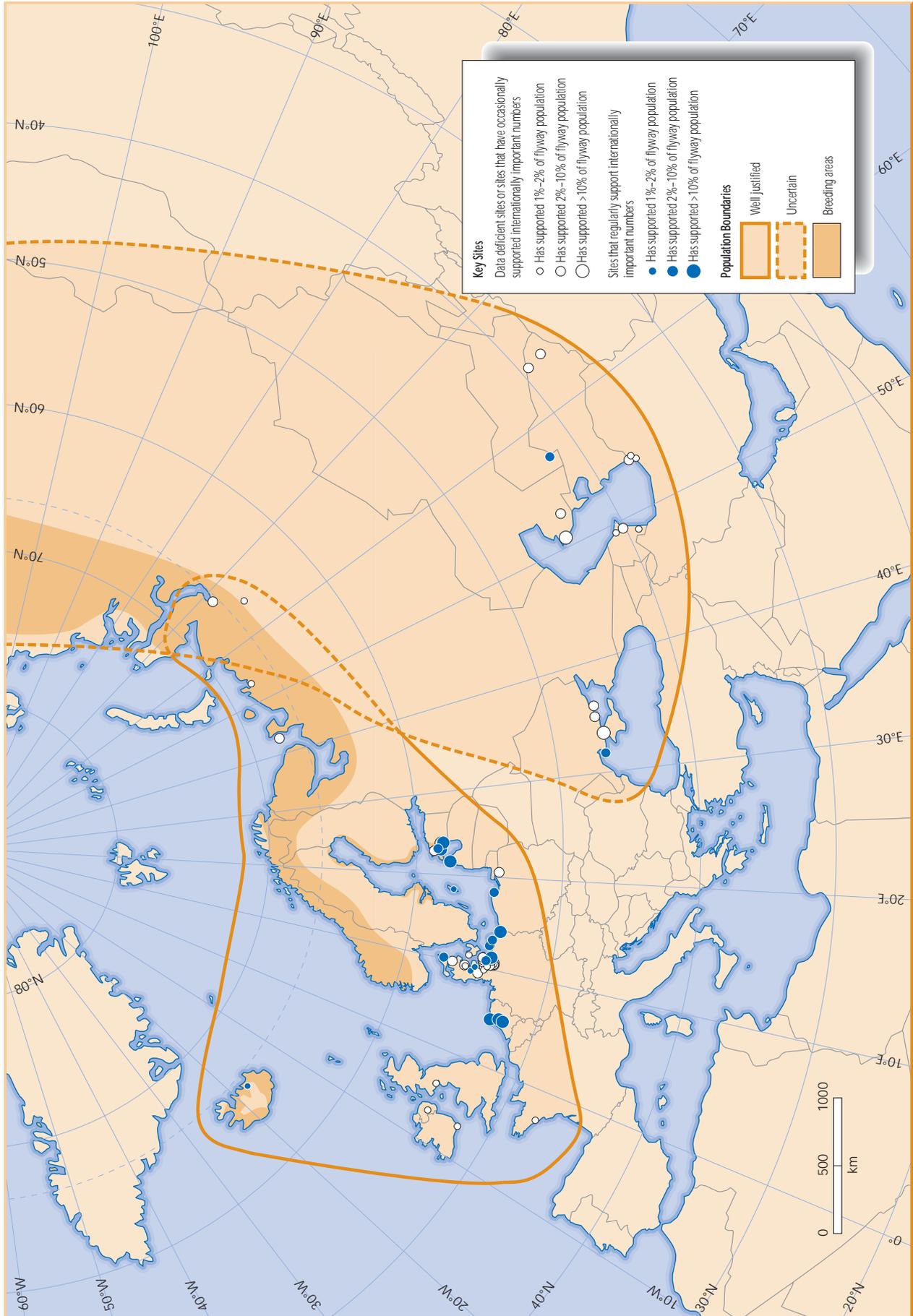
Two populations can be recognized in Western Eurasia on the basis of the main wintering areas: a population wintering in northwest Europe and a population wintering in the Black Sea and Caspian Sea. The extent to which these populations overlap on the breeding grounds is unknown. Birds ringed in the North Sea have been recovered as far east as 73°E in Tyumen (Cramp & Simmons, 1977), and estimates of the breeding population in Europe suggest that as many as 25–50% of the birds wintering in Europe come from western Siberia, east of the Urals. Any migratory divide between these birds and the birds wintering in the Black and Caspian Seas is likely to be in the region of western Taymyr.

The birds breeding in Iceland and wintering mainly in Ireland and Scotland have traditionally been included within the northwest European wintering population (Scott, 1980; Pirot *et al.*, 1989; Rose & Scott, 1994), and this treatment is retained here because of the considerable amount of overlap between these birds and birds of continental origin in the southern North Sea.

Population size:

- **Northwest Europe: 310,000 (Laursen *et al.*, 1992). 1% level 3,100.**
- **Western Siberia/Black Sea/Caspian: 100,000–200,000. Provisional numerical criterion 1,500.** The size of the Black Sea/Caspian Sea population is very poorly known. Szijj (1972) estimated the Black Sea/Mediterranean population of *Aythya marila* at 50,000 birds, and this figure has been repeated

GREATER SCAUP *Aythya marila*



by many authors since then (e.g. Scott, 1980; Pirot *et al.*, 1989; Laursen *et al.*, 1992; Rose & Scott, 1994), even though the birds wintering in the Caspian Sea have been included in this population by the most recent authors. Isakov (1970b) estimated the wintering population in the western USSR at 93,200 birds, mainly in the Black Sea with some in the Caspian. This higher estimate is more consistent with recent counts in the region. Mid-winter counts in the Black Sea have located only about 8,000–10,000 birds in recent years, although there were 10,000 in Ukraine alone in 1989. However, there has recently been a report of up to 150,000 in the lagoons of the Sea of Azov in autumn (A. Koshelev, pers. comm. to Wetlands International Seaduck Specialist Group). The winter quarters of these birds are unknown, but are likely to be somewhere in the Black Sea region.

The wintering population in the Caspian Sea has recently been estimated at 35,000, largely on the basis of a count of 31,200 in 1991 (Perennou *et al.*, 1994). Some 30,000 of these birds were counted at just two sites in Kazakhstan, and thus the estimate of 35,000 for the entire Caspian region seems very low. Only small numbers (less than 100) reach the south Caspian region in Iran (Scott, 1976), but 5,000–7,000 are said to winter on the southwest coast of the Caspian in Azerbaijan (Patrikeev, in prep.), and there have been several high counts in Turkmenistan (e.g. 12,550 at Lake Sarakamysh in 1993, 9,000 at the Kelifskiye Lakes in 1974, and 4,950 at Lake Dengizkul in 1993). It is suggested that the total population of *Aythya marila* wintering in the Black Sea and Caspian Sea is likely to be at least 100,000, and may be as high as 200,000. These figures are much more consistent with estimates of the breeding population in northern Siberia. Krivenko (1993) gives an estimate of 312,000 for the post-breeding population of *A. marila* in the tundra zone from the Yamal Peninsula to Taymyr, while Rogacheva (1992) gives an estimate of 530,000 for the autumn population in central Siberia alone. Although many of these birds may migrate west to winter in northwest Europe, the majority must winter somewhere between the Black Sea and the central Asian republics, as only very small numbers of *A. marila* of the nominate form occur further east in Asia.

Habitat/ecology:

Aythya marila breeds on shallow lakes and pools in the tundra and wooded tundra zones at high latitudes, in upland areas in Scandinavia, and along the Baltic coast; it winters mainly along the coast, on brackish lagoons, in estuaries, and in sheltered bays and shallow marine waters, and also on inland seas and, less commonly, large lakes. *A. marila* generally winters in shallow waters, less than 10 m deep, and in the Baltic, may feed mainly at night (Durinck *et al.*, 1994). In winter, the birds feed principally on molluscs, chiefly *Mytilus edulis* and *Macoma baltica* (Atkinson-Willes, 1976). In cold winters, some *A. marila* probably leave the Baltic Sea for the Netherlands and France, while others concentrate on small ice-free waters (Durinck *et al.*, 1994). The species is highly gregarious in winter, forming dense flocks of several thousand birds. Large flocks of moulting males occur in some areas in northern Russia, notably in the Pechora Delta, and small flocks of moulting males can be present on the IJsselmeer in the Netherlands in late July. Up to 4,000 males moult at Lake Myvatn in Iceland (A. Gardarsson, *in litt.*). Many females moult on the breeding grounds, but concentrations of 500–1,000 moulting adult females have been reported in Denmark during the second half of September and first half of October (Joensen, 1973). The birds are flightless for three to four weeks during the wing moult. The autumn migration begins in mid-August, and reaches a peak in September in the Arctic, in October in the southern Baltic and in November or December in Denmark. The spring migration begins in late February, and reaches a peak in western Europe in mid-March. Most birds leave Danish waters in April, although a few flocks remain until the middle of May. The main passage through the Baltic occurs in April, with birds reaching the lower Pechora during the second half of May and the Yamal Peninsula in early June.

Conservation status:

Overall trends are unknown in both populations because of the poor coverage of the counts until at least the late 1980s. Important breeding populations are fluctuating in Russia and Iceland, while numbers are decreasing in Estonia and Finland and stable in Sweden (Tucker & Heath, 1994). Increases in numbers of wintering birds have been noted in the Netherlands, along the German Baltic coast and along the Polish coast, while decreases have been reported in Britain, Ireland and Denmark (Kirby *et al.*, 1993; Tucker & Heath, 1994). According to Krivenko (1993), post-breeding numbers in the tundra zones of western and central Siberia remained relatively stable between 1972 and 1989.

Network of key sites:

In severe winters, it is estimated that over 90% of the European population is concentrated at fewer than ten sites (Tucker & Heath, 1994). Together, these sites regularly hold over 50% of the Icelandic

breeding population in winter. Although poorly known it is likely that the Black Sea wintering birds are also very highly concentrated, in the Sea of Azov and the Sivash (80,000 in the East Sivash in 1991) but the Caspian wintering birds appear to be more dispersed in winter. The apparent dispersed distribution of the Caspian wintering population might however be more indicative of a lack of knowledge rather than a real phenomenon (25,000 on Kazakhstan Caspian Coast in 1991). In total 17 key wintering sites in the Black Sea and Caspian Basin are known but very few staging and moulting sites can be identified outside of the Baltic. In the Baltic over 20 key passage and moulting sites are known and four sites in Estonia are estimated to provide spring staging grounds for over 50% of the population. Some large concentrations are also identified in the Russian breeding grounds but more must exist and it is not known if those identified are for non-breeding, staging or moulting birds. The 30+ key wintering sites identified for the northwest European wintering population probably provide wintering areas for over 90% of the population in most winters.

Protection status of key sites:

Important breeding and moulting areas in Russia are mostly unprotected. Many of the important wintering areas in the Netherlands and most of those in Denmark and Germany are unprotected because of the enormous difficulty faced when trying to protect offshore marine areas. The three most important wintering sites for Icelandic birds (the Solway Firth, Loughs Neagh and Beg, and Wexford Harbour) are all Ramsar Sites, and one of these, the Solway Firth, is also a Special Protection Area. Important sites in the Black Sea and Caspian regions are poorly known, but most are likely to be unprotected.

COMMON EIDER

Somateria mollissima

Subspecies:

Polytypic. Six subspecies have been described: the nominate form from northwest Europe east to Novaya Zemlya; *S. m. faroensis* from the Faroe Islands; *S. m. borealis* from northeastern Canada through Greenland, Iceland and Svalbard to Franz Josef Land; *S. m. v-nigra* in northeast Asia and northwest North America; *S. m. dresseri* on the Atlantic coast of North America from Maine to Labrador; and *S. m. sedentaria* in the Hudson Bay area, Canada. Birds from Greenland, Iceland, Svalbard and north Norway are sometimes separated as a distinct form *islandica*. Birds breeding in the Shetland Islands and Orkney Islands (Scotland) are somewhat intermediate between *faroensis* and *mollissima*, but are perhaps best included in *faroensis* (Cramp & Simmons, 1977).

Distribution:

Holarctic, breeding at high latitudes across northern Eurasia and North America and wintering mainly within the breeding range. Three subspecies occur in Western Eurasia. The nominate subspecies breeds in northern Britain (except Orkney and Shetland) and Northern Ireland and on the coasts of northern Europe, including the Baltic Sea, east to Novaya Zemlya, and winters mainly in the southern Baltic and North Sea area, with small numbers of birds reaching the Bay of Biscay, central Europe and the west Mediterranean (France and Italy). In recent years, a small non-migratory population of *S. m. mollissima* has become established in the northern Black Sea in Ukraine (Flint *et al.*, 1984). This population is presumably the origin of the birds which occasionally occur in winter on the Black Sea coast of Romania. *S. m. faroensis* breeds in the Faroe, Shetland and Orkney Islands. *S. m. borealis* breeds from Baffin Island east through the Arctic islands of northeast Canada to Greenland, Iceland, Svalbard and Franz Josef Land.

Movements:

Partially migratory, wintering at sea in north and northwest Europe, Iceland and west Greenland. Many populations are mainly sedentary, but large numbers of birds from Russia, Finland, Sweden and Norway are migratory, wintering mostly on the Murman coast, along the north and west coasts of Norway, in the Baltic Sea and in the Wadden Sea. A few birds winter inland in central Europe and in the west Mediterranean. Males tend to remain further north than females and immatures.

Birds breeding in Novaya Zemlya, Vaigach Island and islands in the Yugorsky Shar Strait (nominate *mollissima*) winter on the Murman coast, in northern Norway and irregularly along the southeast coast of the Kola Peninsula in the White Sea, where they mix with local breeding birds. Birds breeding in the White Sea (Onega Bay, Kandalaksha Bay and Solovetsky Islands) winter predominantly in Onega Bay (Bianki *et al.*, 1994; A.S. Koryakin & T.D. Paneva, *in litt.*). Birds ringed in western Norway have been recovered in Scotland and the Netherlands. Birds breeding in Finland and Sweden winter mainly in the southern part of Danish waters and on the north coast of Germany. Birds breeding on the west coast of Sweden and the southeast coast of Norway winter in the northern parts of the Kattegat, and presumably account for 200,000–300,000 of the 300,000–400,000 individuals counted here in mid-winter, the remainder being of Baltic origin. Birds breeding in the Baltic undergo extensive moult migrations in late summer. Large moulting flocks assemble off southwest Jutland, in the German Wadden Sea and on the Danish side of the Kattegat. After moulting, some disperse southwards to winter in the Wadden Sea, mixing with Dutch birds. Other Baltic breeding birds moult off Gotland (Sweden), Estonia and Latvia, and tend to winter among the Danish islands and (in small numbers) off north Germany. The majority of eiders from Danish breeding colonies (80,000 individuals in autumn) show only restricted movements, and only two colonies are totally migratory (Noer, 1993). Most Danish birds winter in the southern parts of the Kattegat, the Storebaelt and the archipelago south of Fyn. Birds breeding in the Netherlands are partially migratory, reaching the south and east coasts of Britain, Normandy in small numbers, and infrequently the Bay of Biscay.

The populations breeding in Britain and Ireland are mainly sedentary or dispersive, although they show some small movement, rarely over 200 km. A few birds ringed in Scotland have been recovered in Scandinavia, but there is no regular emigration by any British or Irish birds. The relatively small number of birds occurring in winter on the south and east coasts of England are believed to come from the Netherlands (Dutch birds have been recovered north to Fife in southern Scotland).

COMMON EIDER *Somateria mollissima*



S. m. faroensis in the Faroe Islands is mainly, if not wholly, resident. Birds resembling *faroensis* in the Shetlands and Orkneys are also presumably sedentary.

S. m. borealis breeding in northeast Canada (from Somerset and Ellesmere islands south to Southampton Island, Hudson Strait and northern Labrador) winters from Labrador south to Nova Scotia and rarely New England. The population of *S. m. borealis* breeding in west Greenland presumably winter mainly in southwest Greenland. Of 515 recoveries of breeding birds and chicks ringed in west Greenland, none has been found outside Greenland (S. Pihl, *in litt.*). Some birds from east Greenland probably winter in Iceland, where there has been one recovery of a ringed bird. Birds breeding in Iceland (200,000–300,000 pairs; Koskimies, 1993) are resident within Iceland, and there is no indication of any movement of Icelandic birds to Britain. Movements of the birds breeding in Svalbard are poorly understood. Birds ringed in Svalbard have been recovered in Iceland, and also at Tromsø in Norway, but it seems that very few *borealis* reach northern Norway (S. Pihl, *in litt.*), and it may be that this population is only partly migratory. The birds breeding in Franz Josef Land are migratory, disappearing from the islands in September and returning again in late May or early June (Dement'ev & Gladkov, 1952), but their winter quarters are unknown.

Population limits:

Three main populations are recognized for the purposes of this Atlas, corresponding to the subspecies occurring in Western Eurasia. However, each of these three populations consists of two or more relatively, if not entirely, discrete sub-populations which should, perhaps, be treated as separate units.

1. Populations of *borealis* (*islandica*)

1.1 Greenland: The population is currently assigned to *borealis*, but is sufficiently distinct from northeast Canadian birds to have been considered as belonging to a separate form *islandica*. The movements of Greenland birds do not appear to be known, but it seems likely that most, if not all, are resident within Greenland, wintering mainly along the southwest coast.

1.2 Iceland: Apparently a discrete, sedentary population.

1.3 Svalbard and Franz Joseph Land: Two migratory groups probably best lumped as a single population, although the winter quarters of both groups are unknown.

2. Populations of *faroensis*

2.1 Faroe Islands: A discrete sedentary population.

2.2 Shetland and Orkney Islands: The birds in the Shetland and Orkney Islands are sufficiently distinct from nominate *mollissima* of mainland Scotland to merit treatment as a separate population. They also differ slightly from Faroes birds, and as there is no evidence of mixing between these populations, the Faroes and Shetland/Orkney birds cannot easily be lumped.

3. Populations of nominate *mollissima*

3.1 Britain (except Shetland and Orkney) and Ireland: Probably best treated as a single population. There is doubtless considerable mixing between the large British and much smaller Irish populations, but apparently little mixing with continental birds.

3.2 Baltic, Denmark and Netherlands: There would appear to be little mixing between birds of the Atlantic coast of northern Europe (from west Norway north and east to Novaya Zemlya) and birds breeding around the Baltic, and in Denmark, Germany and the Netherlands. However, within the latter area there is considerable mixing of birds, with migratory and sedentary elements overlapping in the main moulting and wintering areas.

3.3 Norway and Russia (Kola Peninsula to Novaya Zemlya): Birds from Novaya Zemlya winter on the Murman coast, where they mix with local breeding birds. Some of the latter move to the Norwegian coast, where they mix with north Norwegian breeding birds which appear to be mainly sedentary. Birds in this group differ morphologically from those in the Baltic (A.S. Koryakin & T.D. Paneva, *in litt.*), suggesting that little if any mixing occurs.

3.4 White Sea: A relatively isolated population in the western part of the White Sea, breeding in Onega Bay, in Kandalaksha Bay and on the Solovetsky Islands, and wintering predominantly in Onega Bay. About 50% of this population breed in Kandalaksha State Nature Reserves. The White Sea birds differ morphologically from those in the Barents Sea and from those in the Baltic (A.S. Koryakin & T.D. Paneva, *in litt.*). Recoveries from over 20,000 *S. mollissima* ringed in the White Sea and Barents Sea show no evidence of any movement between these two areas, but there have been a few recoveries of birds from the White Sea in the Baltic (A.S. Koryakin & T.D. Paneva, *in litt.*).

Little information is available on the small population of *S. mollissima* (10–118 pairs; European Bird Database, 1994) breeding on the Black Sea coast of Ukraine.

Population size:

- ***borealis*: 700,000–1,300,000. 1% level 10,000.**
Greenland: 30,000–300,000
Iceland: 600,000–900,000
Svalbard and Franz Joseph: 40,000–80,000

The breeding population in Greenland is said to be in the range 10,000–100,000 pairs (European Bird Database, 1994). The breeding population in Iceland has been estimated at 200,000–300,000 pairs (Koskimies, 1993), and that in Svalbard at 10,000–20,000 pairs (European Bird Database, 1994). The breeding population in Franz Joseph Land is unknown, but is likely to be small; breeding is confined to the southern islands where the species is said to be common but not abundant (Dement'ev & Gladkov, 1952). These estimates of breeding populations suggest a total population of *borealis* in the region of 700,000–1,300,000 individuals.

- ***faroeensis*: 18,000–26,000. 1% level 220.**
Faroe Islands: 6,000–12,000
Shetland and Orkney: 12,000–13,500

The breeding population in the Faroes has been estimated at 2,000–4,000 pairs (European Bird Database, 1994). The total population of eiders in Shetland and Orkney has recently been estimated at 12,000–13,500 birds of which 7,000–7,500 are in the Shetland Islands and 5,000–6,000 in the Orkney Islands (Kirby *et al.*, 1993).

- ***mollissima*: 1,735,000–2,355,000. 1% level 20,000.**
Britain and Ireland: 65,000–75,000
Baltic, Denmark and the Netherlands: 1,350,000–1,700,000
Norway and Russia: 300,000–550,000
White Sea: 20,000–30,000

In the mid-1980s, the total population of *S. mollissima* wintering in Britain and Ireland (excluding Shetland and Orkney) was estimated at 58,600 birds, with only about 2,200 of these wintering in Ireland (Lack, 1986). More recently, Carter (1995) has given the breeding population in Britain (including Shetland and Orkney) as 31,000–32,000 breeding females, and that in Ireland as 600–1,000 breeding females (1988–91), implying a total population of over 90,000 birds. However, Kirby *et al.* (1993) have recently estimated the total British wintering population at only 77,500 birds, to which can be added another 2,000 birds in Ireland. After an allowance is made for the 12,000–13,500 birds in Shetland and Orkney, these figures suggest that the population of nominate *mollissima* in Britain and Ireland is in the region of 65,000–75,000 birds.

The population of *mollissima* wintering in the Baltic has recently been estimated at 1,000,000–1,300,000 birds (Pihl *et al.*, 1995) and that in the Wadden Sea at 350,000–400,000 (Wetlands International Seaduck Specialist Group, *in litt.*), giving a total wintering population of 1,350,000–1,700,000. Estimates of breeding populations agree reasonably well with these figures. The population of *mollissima* breeding in the Baltic, Denmark and the Netherlands is estimated at about 365,000–510,000 pairs (European Bird Database, 1994), or about 1,100,000–1,500,000 birds. Perhaps as many as 100,000 birds breeding in southwestern Norway apparently also belong to this population, suggesting a total population of about 1,200,000–1,600,000 birds.

Estimates of breeding populations suggest that the total population of the Norwegian/Russian group is likely to be in the region of 300,000–450,000 birds, i.e. most of the Norwegian population of 100,000–150,000 pairs (European Bird Database, 1994), and as many as half of the European Russian population of 20,000–30,000 pairs (European Bird Database, 1994). Counts of wintering birds suggest a somewhat higher figure. Nygård *et al.* (1988) estimated the wintering population in Norway at 400,000–500,000 birds, while Laursen (1989) gives an estimate of 50,000–100,000 for the number wintering in northwest Russia. Even allowing for the 20,000–30,000 birds in the White Sea (see below) and some immigrant *borealis* from the north, these estimates suggest a total population of 400,000–550,000.

The White Sea population has recently been estimated at 20,000–30,000 birds (A.S. Koryakin & T.D. Paneva, *in litt.*).

Taken together, these figures suggest a total population of nominate *mollissima* of between 1,700,000 and 2,300,000 birds.

Most earlier authors have recognized only a single population of *Somateria mollissima* in Western Eurasia, recently estimated at about 3,000,000 birds (Pirot *et al.*, 1989; Rose & Scott, 1994). This estimate does not include the birds breeding in Greenland. The present figures agree reasonably well with the earlier estimate, suggesting a total population of between 2,400,000 and 3,400,000 birds in Western Eurasia (i.e. excluding the Greenland birds).

Habitat/ecology:

Marine, breeding on islands along low-lying rocky coasts and estuaries; also inland on tundra pools or rivers. Disperses along shallow sea shores in winter, commonly in bays and at river mouths. Generally feeds in shallow waters less than 20 m deep. Highly gregarious, sometimes forming flocks of 50,000 individuals or more in winter and spring (Durinck *et al.*, 1994). In the Kattegat and Kiel Bay, regularly recorded in large flocks up to 40 km offshore (Durinck *et al.*, 1994). Most adult males leave the breeding grounds in May and June to form flocks with non-breeding and immature birds. In August, the males become flightless for some weeks when they moult their flight feathers. The birds breeding in Svalbard and northern Russia moult near their breeding grounds, although there are important moulting areas in the White Sea, used at least by breeding birds of Kandalaksha Gulf. Large concentrations of moulting *S. mollissima* occur in Iceland, especially along the west coast, where tens of thousands have been recorded at several localities and up to 100,000 have been observed in Borgarfjordur on Faxa Bay (A. Gardarsson, *in litt.*). Large numbers of birds, including some adult males, moult in the Swedish and Finnish archipelagos, although many males and immatures of the Baltic population undertake a moult migration in late June and July through the western Baltic to the Danish and German Wadden Sea and, to a lesser extent, also the Dutch Wadden Sea. In Denmark, the main autumn migration occurs in October and November, although some adult females and juveniles arrive in the Wadden Sea as early as September. The return passage begins in late February and reaches a peak in Estonia in March. Birds arrive on their breeding grounds in Finland in the second half of April.

Conservation status:

Overall trends in *borealis* are unknown. Numbers are reported to be decreasing in Greenland, increasing in Iceland and stable in Svalbard (European Bird Database, 1994). The population of *faroeensis* in the Faroe Islands is said to be stable (European Bird Database, 1994). A marked decline occurred in the Shetland population of *faroeensis* during the late 1970s and early 1980s, but numbers have increased since then to former levels (Kirby *et al.*, 1993). The numbers of nominate *mollissima* in Russia are said to be stable (Flint & Krivenko, 1990). Elsewhere in northwest Europe, numbers of *mollissima* have increased considerably in recent decades, with increases reported in Finland, Norway, Sweden, Denmark, Estonia, France, Germany, Britain and Ireland (European Bird Database, 1994). There has been a marked expansion in the breeding range and increase in numbers in Britain since the 19th century and in Ireland since initial colonization in 1912 (Kirby *et al.*, 1993). During the period 1968–72 to 1988–91, the British and Irish breeding population (very largely nominate *mollissima*) increased from an estimated 20,000 pairs to about 32,000 pairs (S.R. Baillie *in* Gibbons *et al.*, 1993). However, there are indications that over much of northwest Europe the numbers of *mollissima* may now have stabilized (Wetlands International Seaduck Specialist Group, *in litt.*); there have been no reports of increases within the last few years, and a decrease has been reported in the Netherlands (European Bird Database, 1994).

Network of key sites:

The Danish inshores, German Baltic coast and the Wadden Sea provide important habitat for *S. mollissima* throughout the year but especially in winter when over 30 key sites are identified. Kiel Bucht in Germany and Laeso South in Denmark harbour the largest flocks. The 16 key autumn staging and 19 key spring staging sites are all in Germany and Denmark and tend to be relatively small but two of the five moulting sites identified (Foglo-Dragsfjord in Finland and the Schleswig-Holstein Wadden Sea) each support up to 7.5% of all moulting individuals in the population. Although *S. mollissima* tends to breed, moult and stage in tight groups, very rarely if at all do these groups exceed the threshold values necessary for areas to qualify as key sites for the dispersive rather than migratory sub-populations. This is why only three relatively minor key sites and four major key sites are listed outside of the range of the Baltic/Denmark/Netherlands sub-population. The other exception is the Icelandic population of *S. m. borealis* which has four major key sites on Iceland where it breeds and moults in enormous concentrations. On Iceland, the eider down is commercially farmed at these key sites. To some extent this population is also very concentrated in winter.

Protection status of key sites:

Most of the important sites in Britain, Denmark, Sweden, Svalbard and Russia are protected, as are some of those in Norway and Greenland. In Iceland, *S. mollissima* enjoys special protection, and this extends to practically all breeding colonies. Some of the more important moulting and wintering sites are protected, including the entire coastline of Breidafjordur (A. Gardarsson, *in litt.*). However, some of the most important sites are unprotected. The problem of protecting marine areas is common to all seaduck species.

KING EIDER

Somateria spectabilis

Subspecies:

Monotypic.

Distribution:

Holarctic, breeding at high latitudes across northern Eurasia and North America and wintering south to Iceland (where very scarce), Norway, Kamchatka, the Aleutian Islands and Newfoundland. In Western Eurasia, *S. spectabilis* breeds only in Svalbard and Arctic Russia, west sporadically to Kandalaksha Bay in the White Sea and the east Murman coast (Bianki *et al.*, 1994); it winters south to central Norway.

Movements:

Migratory, wintering at sea quite far north in northern Europe and west Greenland. Stragglers sometimes occur well south of the normal winter range. Birds breeding in Svalbard and Arctic Russia east to west Taymyr winter from the White Sea south to central Norway. The small number of birds reaching Iceland are thought to originate from Canada, Greenland and Svalbard. The wintering areas of birds breeding in northeast Greenland are unknown, although it has been suggested that these birds winter in polynias in the sea ice between east Greenland and western Iceland (S. Pihl, *in litt.*). Birds wintering in west Greenland are believed to be of Canadian origin, and there is no evidence that birds from east Greenland move to west Greenland.

Population limits:

Somateria spectabilis occurring in the North Atlantic are perhaps best treated as a single population, extending from east Greenland to northeast Europe and western Siberia.

Population size:

- **East Greenland/western Siberia/northeast Europe: 300,000 (Wetlands International Seaduck Specialist Group, *in litt.*). 1% level 3,000.**

The breeding population in Svalbard has been estimated at 2,500–5,000 pairs, and the population in European Russia at 100,000–150,000 individuals or 40,000–60,000 pairs (European Bird Database, 1994; A. S. Koryakin and T.D. Paneva, *in litt.*). Krivenko (1993) estimated the autumn population in western and central Siberia (from the Yamal Peninsula to Taymyr) at about 220,000 birds, while Rogacheva (1992) estimated that about 100,000 birds migrated west from the Taymyr region to winter in the North Atlantic. The breeding population in east Greenland is unknown, but the total breeding population in Greenland is thought not to exceed 30,000 pairs (European Bird Database, 1994). These figures suggest a total North Atlantic population of at least 300,000 birds, and possibly as many as 400,000. About 45,000 birds are thought to winter along the Norwegian coast.

Habitat/ecology:

Somateria spectabilis generally breeds on freshwater lakes, pools, bogs and small rivers in the Arctic tundra, and spends the rest of the year at sea, often in deep waters away from land. Birds are present along the Murman and Norwegian coasts mainly from October to mid-April.

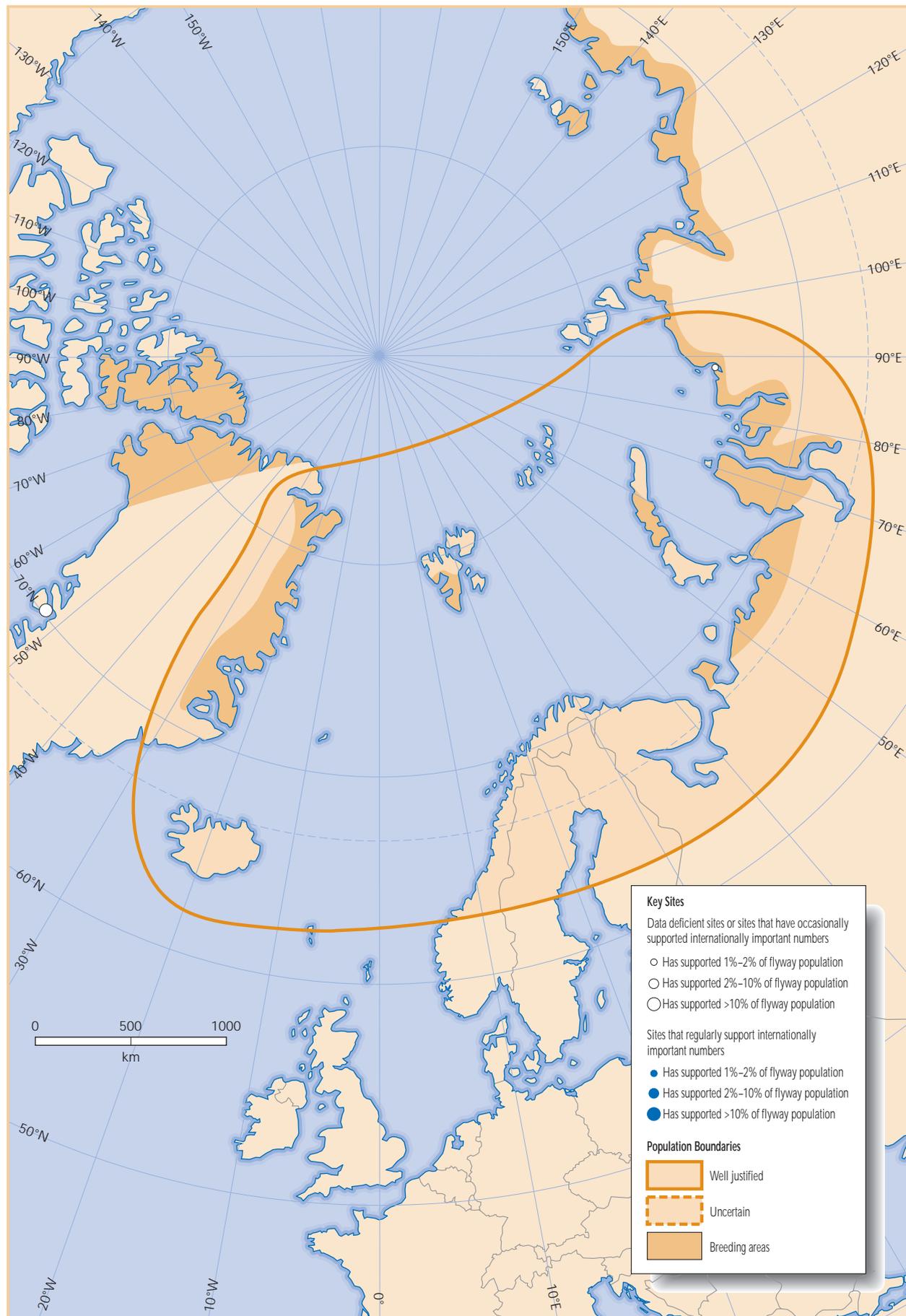
Conservation status:

Overall trends are unknown. The breeding populations in European Russia and Svalbard are said to be stable (European Bird Database 1994).

Network of key sites:

Only two key sites are listed and the most important (30,000 moulting birds in west Greenland) is judged to be part of the west Greenland/Canada breeding population that is beyond the scope of this work. The lack of sites is partly because the species is truly quite well dispersed at most times of year but perhaps mainly due to an extreme lack of information.

KING EIDER *Somateria spectabilis*



STELLER'S EIDER

Polysticta stelleri

Subspecies:

Monotypic.

Distribution:

Holarctic, breeding on Arctic coasts from the Yamal Peninsula east to northern Alaska. Birds breeding in northern Siberia east of the Khatanga Gulf (100°E) winter in the southern Bering Sea, while birds breeding west of the Khatanga Gulf on the tundras of Taymyr, Yamal and Gydan peninsulas migrate west to winter in Norwegian and Russian waters and the Baltic. The species bred sporadically in Varangerfjord, Norway, at the beginning of the present century, and has bred for the last few years on the east Murman coast and in Kandalaksha Bay in the White Sea (Bianki *et al.*, 1994).

Movements:

Migratory; birds breeding west of the Khatanga Gulf are believed to migrate west to winter on the coasts of Murman and Finnmark and in the northeastern and eastern Baltic, while birds breeding east of the Khatanga Gulf migrate east to winter in the southern Bering Sea. A bird ringed on the wintering grounds in Alaska was recovered near Khatanga. Substantial numbers of non-breeding birds summer in western Novaya Zemlya and in northern Norway and adjacent Russian waters (Murman coast to the White Sea). The most important wintering area in northern Europe extends from Varangerfjord in northeast Norway along the Murman and Kola coasts in northwest Russia to the edge of the ice and beyond in polynias. Other important wintering areas have recently been found in the eastern Baltic on the Lithuanian coast and around Saaremaa Island in Estonia. Much smaller numbers of birds occur in winter in Sweden (5–300), Finland (100–300), Latvia (1–10), Poland (1–70), Germany (0–10) and Denmark (5–15) (Nygård *et al.*, 1995).

The numbers, distribution and migration routes of *Polysticta stelleri* in Europe have recently been described in some detail by Nygård *et al.* (1995). The breeding grounds east to the Taymyr Peninsula have been described by Yésou and Lappo (1992).

Population limits:

Recent work in northern Russia has confirmed the existence of a discrete population that breeds to the west of the Khatanga Gulf and migrates west to winter in the North Atlantic and Baltic Sea (Nygård *et al.*, 1995).

Population size:

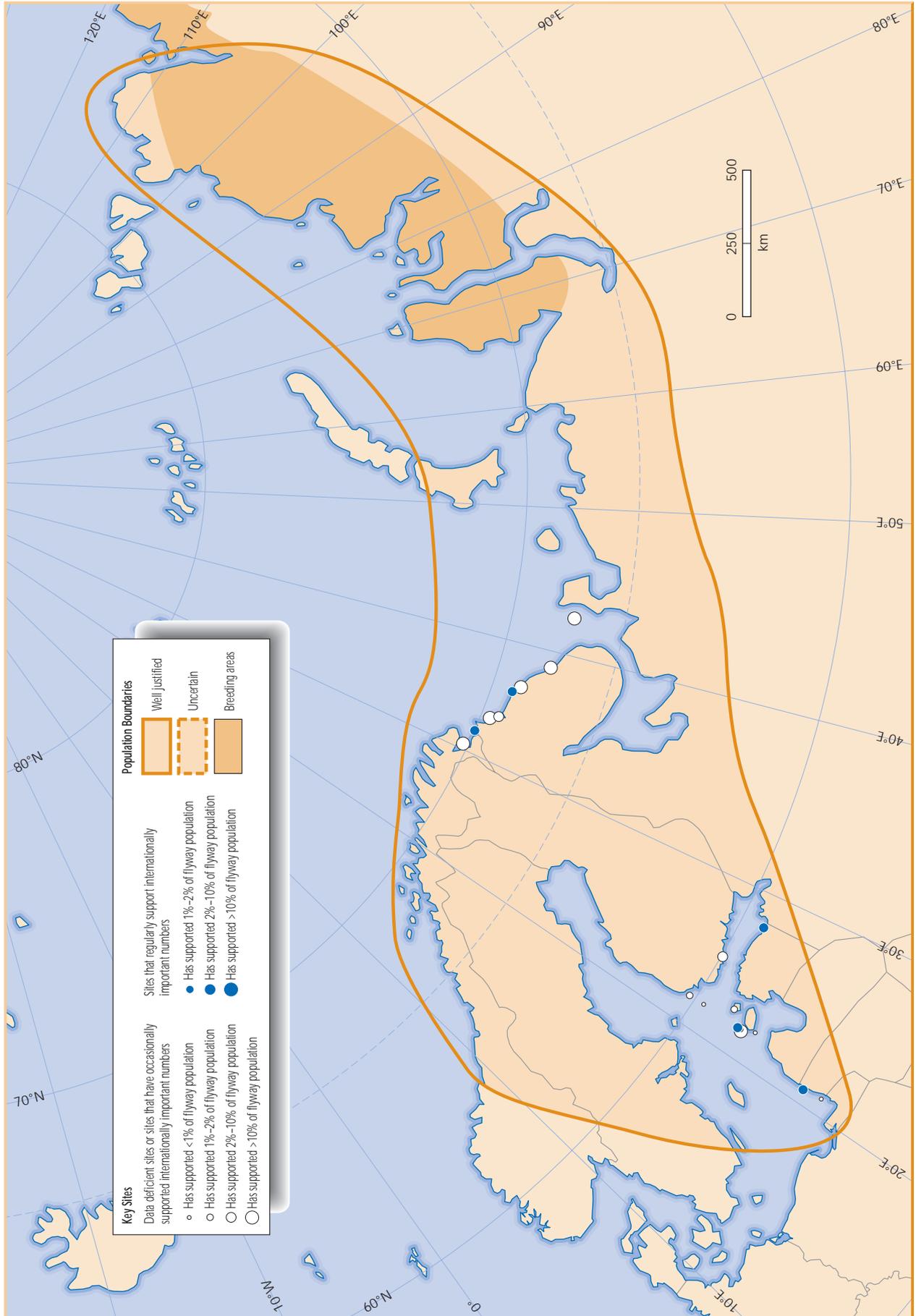
- **Western Siberia/northeast Europe: 30,000. 1% level 300.**

A.S. Koryakin and T.D. Paneva (*in litt.*) have estimated the western breeding population at 10,000 pairs or about 25,000 individuals, while Nygård *et al.* (1995) have estimated the wintering population in Europe at between 30,000 and 45,000 birds. C. Mitchell (*in litt.*) has estimated the population at 25,000–40,000, with 15,000–20,000 in Russia and 10,000–20,000 in Norway and the Baltic. Recent counts in winter have revealed that up to 12,500 birds may be present in Varangerfjord in eastern Finnmark. In northern Russia, a comprehensive count of the Kola coast west of Gremikha Bay to Rybachi Peninsula located over 15,000 *P. stelleri*, more or less evenly distributed along the coast. Allowing for areas not covered by this survey, it was estimated that the total wintering population in northern Russia was about 20,000 (Nygård *et al.*, in press). Also within the last few years, mid-winter counts have located 3,500–6,500 birds wintering in the Baltic, with up to 5,760 *P. stelleri* in Estonian waters (almost all on the west side of Saaremaa Island) and up to 1,500 in Lithuanian waters (mainly at Palanga, just north of Klaipeda) (Pihl *et al.*, 1995; Nygård *et al.*, 1995). As there is a possibility of some duplication in these counts, a conservative estimate of 30,000 is preferred, although it is likely that the population is considerably higher than this.

Habitat/ecology:

Polysticta stelleri breeds on pools, lakes, rivers and tundra bogs along the Arctic coast, and winters along rocky coasts, in bays and in estuaries. The extent of the sea-ice in winter seems to govern the winter

STELLER'S EIDER *Polysticta stelleri*



distribution of the eiders. Wintering birds often form dense flocks of several hundred individuals; they usually stay close to the coast in areas of shallow water less than five metres deep (Durinck *et al.*, 1994). Large flocks of *P. stelleri*, believed to be mainly sub-adults, spend the summer and presumably moult in Varangerfjord (up to 2,000) and Onega Bay in the White Sea (up to 1,000) (Nygård *et al.*, 1995). It is not known where the adults in the western population moult. Birds leave the breeding grounds between mid-July and mid-October, and arrive in the Baltic in October and November; most are thought to leave the Baltic in early or mid-April, and arrive back on the breeding grounds in late May or early June. Adults are said to leave Varangerfjord in late May.

Conservation status:

There has been no evident trend in the numbers wintering in Norway since at least 1981, and trends in the large numbers wintering off the Kola coast are unknown. In the Baltic, however, numbers have increased markedly during the last two decades. The species was first recorded in Estonia in the mid-1970s and in Lithuania in 1969. Since then, numbers have risen rapidly and are probably still increasing. This recent increase in numbers wintering in the Baltic has been attributed to a change in the migration pattern of birds breeding in the Taymyr Peninsula, with birds which formerly migrated east to winter in the Pacific now migrating west (A.S. Koryakin and T.D. Paneva, *in litt.*).

Polysticta stelleri has been identified as a threatened species on the basis of the new IUCN criteria for globally threatened status, and is listed as 'vulnerable' by Collar *et al.* (1994) and Green (1996). The world population was estimated at about 500,000 in the early 1970s, but has recently been estimated at only 150,000–200,000 (C. Mitchell, *in litt.*). According to Nygård *et al.* (1995), the breeding population in eastern Siberia has declined from an estimated 500,000 birds in the early 1970s to between 30,000 and 100,000 in recent years, while 138,000 have recently been counted in wintering areas in Alaska. Excessive hunting has been suggested as the primary cause for this decline. However, drowning in fishing nets may also cause significant mortality in this species, especially nets set for lumpsucker *Cyclopterus lumpus* in spring (Nygård *et al.*, 1995). Two oil spills in recent years have highlighted the vulnerability of this very gregarious species to oil pollution. A small oil spill in Vados harbour in January 1993 killed many *P. stelleri*, while a spill in Varangerfjord in March 1979 is known to have killed some birds. The proposed oil terminal near Palanga in Lithuania is thus a serious potential threat (Nygård *et al.*, 1995).

Network of key sites:

As for all globally threatened species, all sites regularly used by an appreciable number of individuals are of international importance. The recent rapid increase in the number of individuals wintering in the Baltic is well documented and there are probably very few localities, that regularly support the species, missing from the list of key Baltic wintering sites. This cannot be said for the breeding, wintering and staging areas in Siberia and east European Russia which appear to be poorly known. Recent surveys of the Kola Peninsula north coast did however identify 6 spring staging areas that sheltered the entire population between them. The presence of these staging areas was expected but very surprisingly some additional breeding areas in the Ainovy Islands and Gavrilovsky Archipelago were found (1,640 individuals)

Protection status of key sites:

Very few of the important sites are protected.

HARLEQUIN DUCK

Histrionicus histrionicus

Subspecies:

Polytypic. Two subspecies have been described: the nominate form centred on the North Atlantic, and *H. h. pacificus* centred on the North Pacific. The validity of *pacificus* has been questioned, e.g. by Madge and Burn (1988)

Distribution:

Holarctic, breeding in two widely separated areas: around the North Atlantic in northeast Canada, Greenland and Iceland, and in eastern Asia and northwestern North America from Lake Baikal eastwards to the Aleutian Islands and Alaska, and south to Colorado, USA. The species winters mainly along sea coasts adjacent to its breeding range. In Iceland, *H. histrionicus* is widely distributed, breeding wherever there are suitable rivers and streams.

Movements:

Not truly migratory; in winter, leaves rivers and moves to rocky sea coasts. The populations in Greenland and Iceland are resident within these islands, although there is movement of birds to the coast in winter. In Iceland, there have been recoveries of ringed birds at well over 200 km from their place of ringing (A. Gardarsson, *in litt.*). There is no evidence that Icelandic birds move to Greenland, or that west Greenland birds mix with Canadian Birds (S. Pihl, *in litt.*), but very few birds have been ringed.

Population limits:

Two discrete populations are recognized, *viz.* the population breeding in Greenland and the population breeding Iceland.

Population size:

- **Greenland: 1,000–2,000 (Rose & Scott, 1994). 1% level 15.**

The breeding population is currently estimated at 200–500 pairs (European Bird Database, 1994).

- **Iceland: 6,000–9,000 (Rose & Scott, 1994). 1% level 75.**

The breeding population is currently estimated at 2,000–3,000 pairs (Koskimies, 1993).

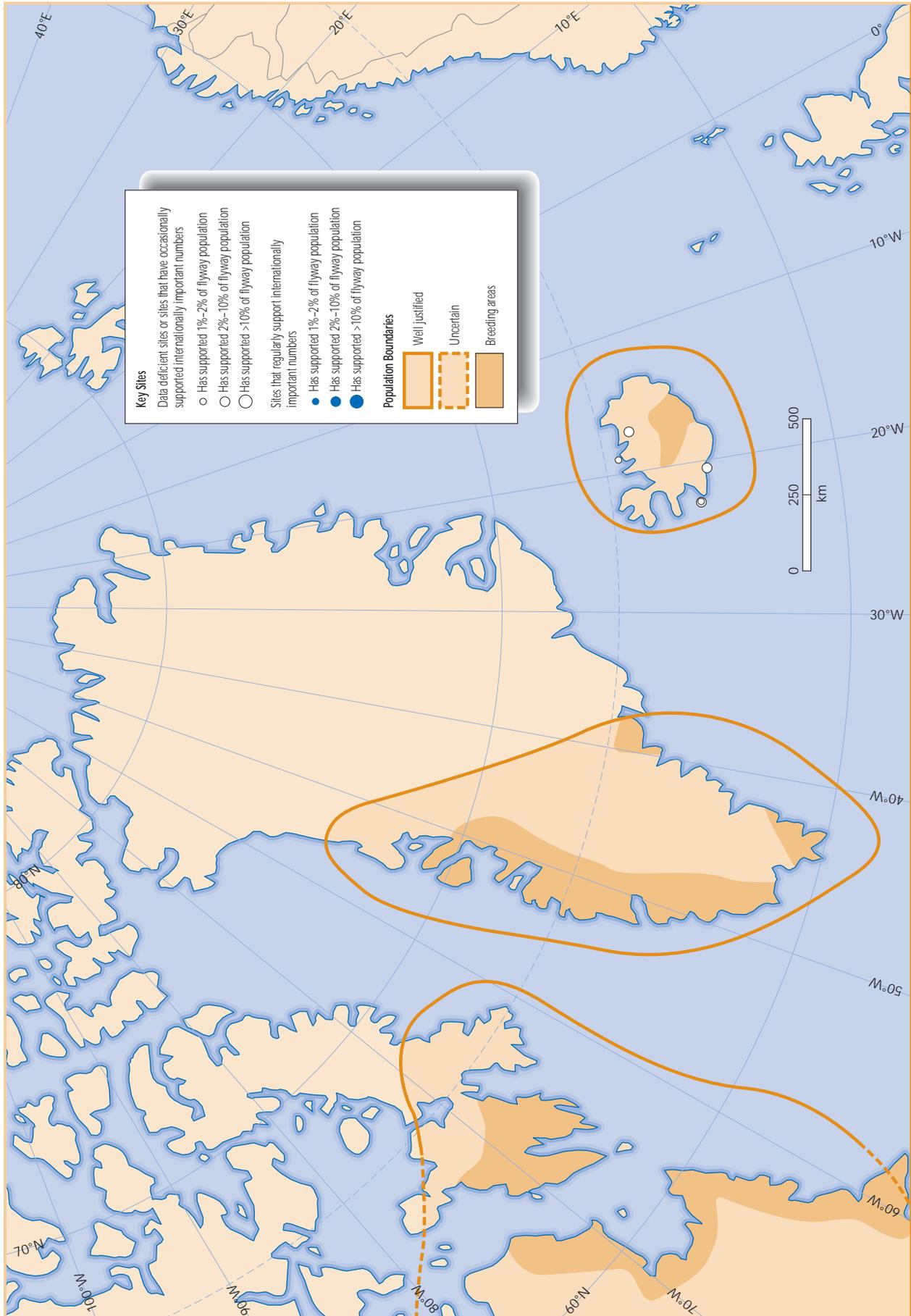
Habitat/ecology:

Histrionicus histrionicus is a river specialist, breeding on swift torrents and rapid streams of rugged uplands; the highest densities occur at lake outlets (Tucker & Heath, 1994). In winter, the species occurs in small flocks along exposed rocky coastlines. Males and immatures move away from inland breeding areas to the coast to moult in the first half of July. Breeding females and young leave the breeding areas in September and October. Gatherings are formed near estuaries in April, and the birds then move up the rivers to their breeding areas between April and June.

Conservation status:

The population in Greenland is believed to be stable, although it is very poorly known (Tucker & Heath, 1994). In Iceland, numbers have increased along the River Laxa due to improved feeding conditions locally, but population trends elsewhere in the country are unknown (A. Gardarsson, *in litt.*). The Icelandic population is vulnerable to habitat loss through the manipulation of rivers for hydro-electric schemes, food competition through the release of salmonid fish into rivers, and possibly predation by mink *Mustela vison* (Tucker & Heath, 1994). The Myvatn/Laxa system was designated as a Ramsar site in 1977, but it is now listed in the Montreux Record due to the numerous potential threats to the system. Diatomite dredging started in 1967 and now effects 6–7% of the lake's bed. There have also been plans to build dams on the River Laxa and to change fish distribution within the river system. All of these proposals would throw the blackfly (Chironomid) ecology into imbalance which would in turn effect *H. histrionicus* which relies on blackfly larvae for food.

HARLEQUIN DUCK *Histrionicus histrionicus*



An environmental impact assessment and development of a management plan for the area is underway and diatomite dredging should cease by the year 2010.

Network of key sites:

Defining key sites in winter is difficult because the birds are widely distributed along rocky coastlines. Four key wintering sites do however exist and 5 % of the population breed at Myvatn-Laxa.

Protection status of key sites:

The Myvatn-Laxa system is protected by law and has been designated as a Ramsar Site, but few of the wintering areas are protected.

LONG-TAILED DUCK

Clangula hyemalis

Subspecies:

Monotypic.

Distribution:

Holarctic, with an extensive breeding range at high latitudes across northern Eurasia and North America. The wintering range extends south to Britain, South Carolina and Washington in the USA, Korea and Japan. In Western Eurasia, the species breeds south to Iceland, northern Finland and the mountainous regions of Norway and Sweden, and winters south to the southern North Sea. Small numbers (probably only stragglers) extend south to central Europe, the Black Sea and the Caspian Sea.

Movements:

Migratory, wintering at sea in northern regions; occurs irregularly further south, often as a result of adverse weather conditions. The movements of *C. hyemalis* are poorly understood. This is a circumpolar species which moves about a great deal. The majority of birds breeding in Fennoscandia, north European Russia and western Siberia winter in the Baltic Sea. The main wintering areas in the Baltic Sea are the Gulf of Riga and adjacent Irbe Strait, the Hoburgs Bank to the south of Gotland, and Pomeranian Bay. In cold winters, when the Gulf of Riga and parts of Pomeranian Bay freeze over, large numbers of *C. hyemalis* move westwards to the southern part of Danish waters in the southwest Baltic (Durinck *et al.*, 1994). Other important wintering areas include the seas off Iceland, Britain and Norway. The precise origins of the 20,000–24,000 birds wintering in British and Irish waters are unknown, but birds ringed in Fennoscandia and Russia have been recorded in Britain (Kirby *et al.*, 1993). Large numbers of *C. hyemalis* concentrate in the northern part of the Gulf of Riga in early May, prior to passing overland to the White Sea via Lake Ladoga and Lake Onega.

The large breeding population in Iceland is partly resident and partly migratory, some birds moving southwest to winter in Greenland, and others moving southeast to winter in Scotland. There have been about ten recoveries of Icelandic birds in southwest Greenland and several recoveries in Scotland. The species is a common migrant and winter visitor in the Faroe Islands, with peak numbers occurring in October, and it seems likely that many of these are Icelandic birds moving to Britain and Ireland. Birds from east Greenland winter locally, but probably also in Iceland and possibly also in southwest Greenland. Two birds ringed in the same region on the middle of the west coast of Greenland were recovered on opposite sides of the globe: one in Denmark and the other near the mouth of the Mackenzie River in Canada (S. Pihl, *in litt.*).

Population limits:

Two populations are recognized for practical purposes: a population breeding in Greenland and Iceland, and a population breeding in northeast Europe and western Siberia. However, it is clear that there is considerable overlap between these two populations in their winter quarters, and there would be some justification for lumping these two populations in a single, large North Atlantic population.

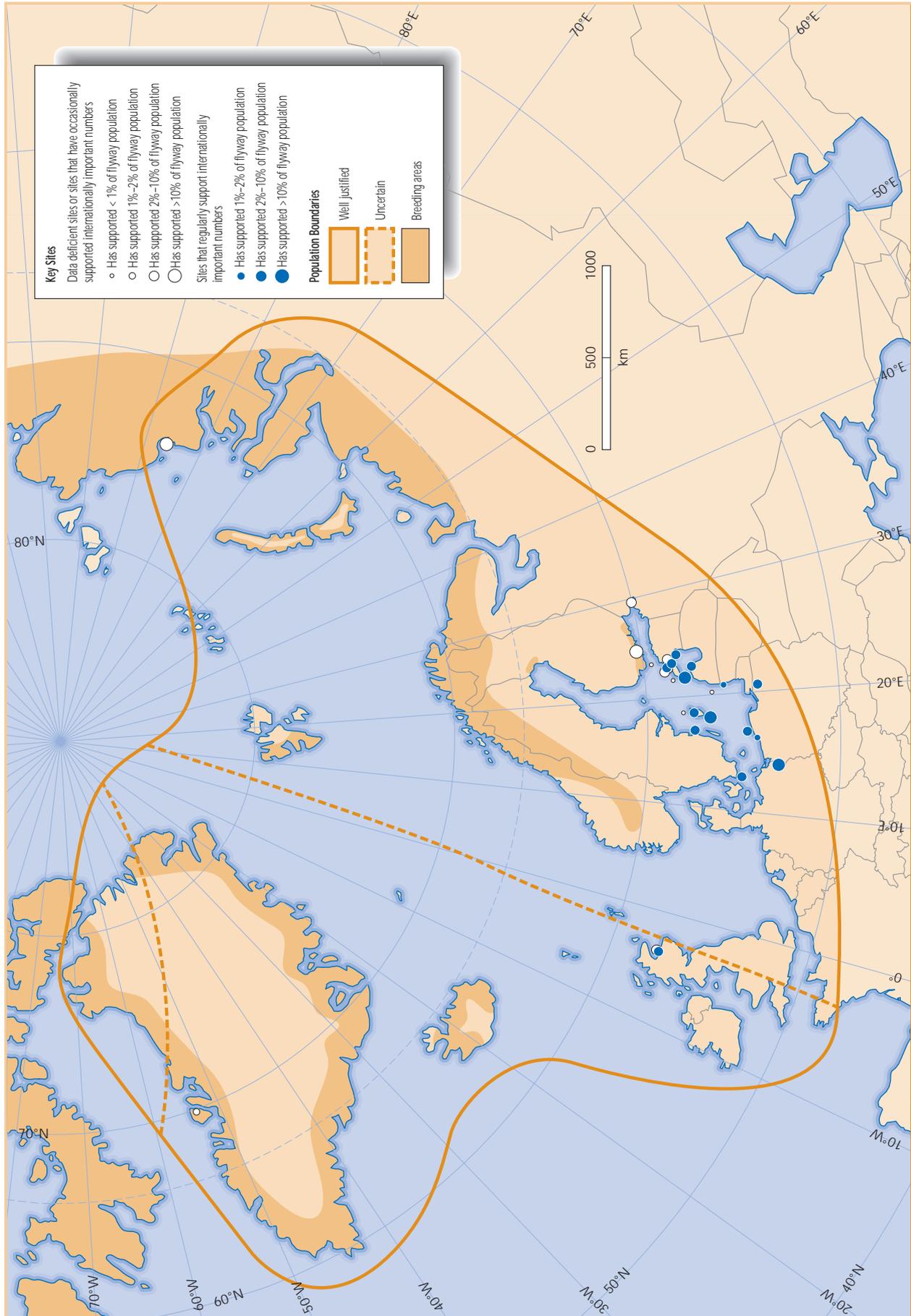
The Southwest Asian (Caspian Sea) 'population' listed by Perennou *et al.* (1994) and Rose & Scott (1994) probably represents nothing more than stragglers from the main northwest European population. There is only one recent record of the species in Iran (a single bird in January 1971), and only about 30 were recorded in the Caspian region during the Asian Waterfowl Census 1987–91, all in Turkmenistan.

Population size:

- **Iceland and Greenland: 150,000 (Pihl & Laursen, in press). 1% level 1,500.**

Laursen (1989) estimated the Iceland/Greenland population at about 450,000 birds based on a rough estimate of 200,000 pairs for the breeding population, and this estimate was followed by Rose & Scott (1994). However, the breeding population in Iceland has recently been estimated at

LONG-TAILED DUCK *Clangula hyemalis*



only 2,000–5,000 pairs (Koskimies, 1993), while that in Greenland has been given as only 10,000–30,000 pairs (European Bird Database, 1994). Pihl & Laursen (in press) suggest that the population is in the region of 150,000 birds, and this figure is adopted here, although it is somewhat higher than the breeding estimates suggest.

• **Western Siberia/northwest Europe: 4,600,000. 1% level 20,000.**

Rose & Scott (1994), following Pirot *et al.* (1989), gave a figure of 2,000,000 for the population of *C. hyemalis* wintering in northwest Europe. Extensive surveys in the Baltic Sea in recent years have revealed that the population is considerably larger than this. Pihl *et al.* (1995) estimated that there were 4,250,000 *C. hyemalis* in the Baltic in January 1993, while Durinck *et al.* (1994) gave an average figure of 4,272,400. These figures should be taken as minima, as the censuses did not include important areas in northern Estonia and central Riga Bay. Elsewhere in northwest Europe, there are thought to be about 50,000 *C. hyemalis* wintering in northwest Russia, 95,000 in Norway, 25,000 in Britain, Ireland and the Faroes, and 5,000 in the area off the Wadden Sea (Wetlands International Seaduck Specialist Group, *in litt.*). Allowing for about 200,000 missed birds in the Baltic, these figures suggest a total northwest European population (excluding Iceland and Greenland) of about 4,600,000. Comparable estimates have been obtained from the breeding grounds. Uspensky (1970) estimated that there were about 5,000,000 adult *C. hyemalis* breeding in the western territories of the former USSR. More recently, the breeding population in European Russia and Fennoscandia has been estimated at 354,000–515,000 pairs (European Bird Database, 1994), while Krivenko (1993) has given an estimate of 2,780,000 for the post-breeding population on the tundras of western and central Siberia, from the Yamal Peninsula to Taymyr. These recent figures suggest a total population in northern Europe and Siberia east to the Taymyr of about 3,800,000 to 4,300,000. Pihl & Laursen (in press) suggest that the total population of *C. hyemalis* in the Western Palearctic, including Iceland and Greenland) is about 5,000,000 birds.

Habitat/ecology:

Clangula hyemalis breeds on small tundra lakes, pools, bogs, rivers and coastal sites in the high Arctic; it winters mostly at sea, generally far offshore, but also locally inland on large, deep, freshwater lakes and inland seas. In the Baltic Sea, *C. hyemalis* is the only species of Anatidae that occurs in large numbers in water deeper than 20 m. Outside the breeding season, it usually occurs in small flocks, which may occur at high density in favoured feeding areas, especially in the Baltic where concentrations numbering several hundreds of thousands of birds have been recorded (Durinck *et al.*, 1994). The majority of birds winter offshore in waters 10–35 m deep. Males moult their flight feathers between late June and early September, females between early August and early October. Many males moult on the coast or on lakes close to the breeding areas, singly or in small flocks, although there has been a recent report of an important moulting site in the White Sea (S. Svazas, pers. comm. in Durinck *et al.*, 1994). There is some movement of birds away from the breeding areas in late June and early July, and large flocks build up during August and September. The overland passage from the White Sea to the Gulf of Finland occurs in the second half of October, with the main influx in the west Baltic in November and December. Departure from the breeding areas in Greenland and Iceland is with the first frosts in September or October. In the west Baltic, the return movement begins in mid-March. Peak passage to the White Sea occurs in May. Birds arrive on the breeding grounds in Iceland and west Greenland between late April and early June, and in east Greenland, Svalbard and northern Russia between mid-May and mid-June.

Conservation status:

The numbers breeding in Greenland are said to be stable (European Bird Database, 1994), and the Icelandic breeding population is apparently now stable after a marked decline earlier this century (Cramp & Simmons, 1977; Koskimies, 1993). Trends in the population wintering in northwest Europe are unknown. However, post-breeding numbers on the tundras of western and central Siberia were stable between 1972 and 1989 (Krivenko, 1993), and the breeding populations in Svalbard, European Russia, Norway and Sweden are thought to be stable (European Bird Database, 1994).

Network of key sites:

Outside of the breeding season, most important sites are offshore marine areas with a depth greater than six metres, and thus fall outside the scope of the Ramsar Convention. These sites are also very difficult to locate and are certainly not in the same place each year. Being a very numerous species,

the key site selection threshold is also very high. In conclusion, *C. hyemalis* is probably one of the least appropriate Anatidae species for the development of a key wintering sites network. The 19 wintering sites identified are almost impossible to protect at present and certainly do not support important numbers in every year. It is possible that *C. hyemalis* could benefit from a key sites network of passage and moulting sites but unfortunately these are mostly not known at present (six listed in Annex 2). One spring passage site in the Gulf of Finland is however very important (up to 100,000 individuals).

Protection status of key sites:

Some breeding areas in Sweden and east Greenland are protected, but otherwise most of the important sites are unprotected. Perhaps even more than other seaduck species *C. hyemalis* relies on offshore areas, often in international waters, that at present are not possible to protect.

COMMON SCOTER

Melanitta nigra

Subspecies:

Polytypic. Two subspecies have been described: the nominate form in Western Eurasia and *M. n. americana* in North America and eastern Asia. These are sometimes treated as separate species.

Distribution:

Holarctic, breeding at high latitudes across northern Eurasia and in northeastern and northwestern North America. The wintering range extends south to northwest Africa, China, Japan and the southern USA. Only the nominate subspecies occurs in Western Eurasia, breeding in Iceland, Ireland, Scotland, northern Scandinavia and northern Russia east to the Lena (125°E), and wintering from the Baltic Sea and southern North Sea, south along the Atlantic seaboard to Morocco and occasionally Mauritania (e.g. 40 at Banc d'Arguin in 1979) and the Adriatic (152 in Italy during 1995). Small numbers of birds winter along the northeast and southeast coasts of Iceland. Stragglers occur on the Mediterranean coast of North Africa east to Algeria, and the species has occurred as a vagrant in the Caspian basin.

Movements:

Migratory, wintering at sea off the Atlantic coast south to northwest Africa. Most birds breeding in Fennoscandia and Russia east to the River Lena, winter in the western part of the Baltic and off the coast of the Wadden Sea, with only a relatively small number of birds moving further south and west (up to 45,000 in France and 26,000 in Portugal). Birds breeding in Iceland have been recovered south to Spain, Portugal and even the Azores (A. Gardarsson, *in litt.*).

Population limits:

Only one population is recognized.

The small Icelandic breeding population, estimated at 400–600 pairs (Koskimies, 1993), apparently winters from western Britain and Ireland south to Portugal, and is included within the northwest European population, as are the tiny British and Irish breeding populations, recently estimated at 89 pairs and 100 pairs, respectively (Underhill *et al.*, *in prep.*).

Population size:

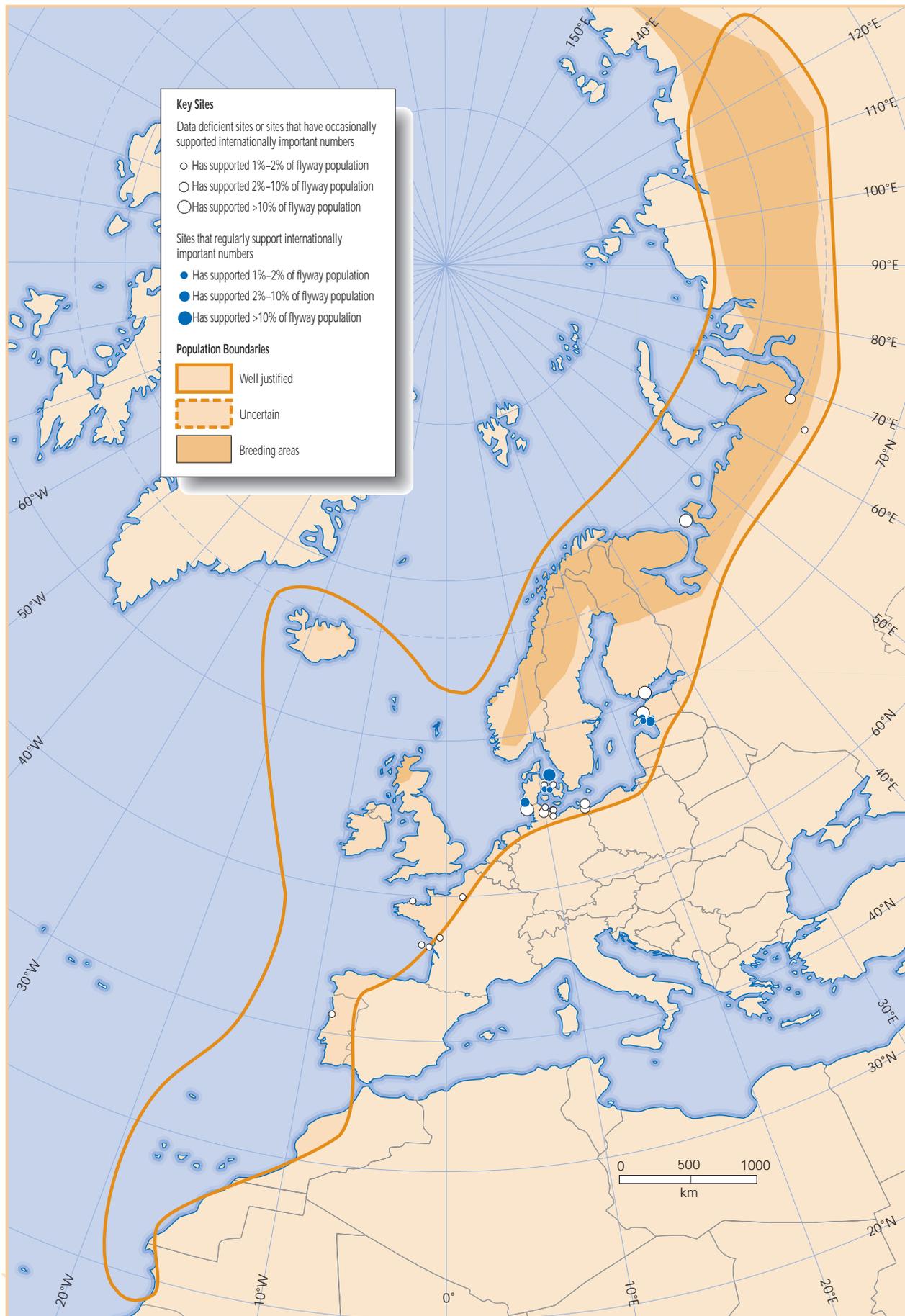
- **Western Siberia/western Europe/northwest Africa: 1,600,000 (Pihl & Laursen, in press). 1% level 16,000.**

The former estimate of 800,000 wintering in northwest Europe (Pirot *et al.*, 1989) has recently been revised upwards with the discovery of far larger numbers in the Baltic than had previously been supposed. About 950,000 birds were located in Danish waters alone in January 1992, and an estimated 1,200,000 were present in the Baltic in January 1993 (Pihl *et al.*, 1995). Pihl & Laursen (*in press*) have recently estimated the northwest European population at 1,600,000, with about three-quarters of these in the Baltic.

Habitat/ecology:

Melanitta nigra breeds on freshwater pools, small lakes or streams in tundra or boggy country, sometimes with scattered trees. It winters mostly at sea, preferably in shallow waters, 5–15 m deep, along low-lying coasts, although the largest flocks usually occur far out to sea (Durinck *et al.*, 1994). *M. nigra* is highly gregarious outside the breeding season, occasionally forming very large flocks of over 100,000 birds in winter. A large migration of males and immatures takes place from the Baltic to German and Danish waters from late June to August. Males become flightless for some weeks in early August and September, when they moult their flight feathers. After the moult, the males and immatures disperse west and southwest, mainly in September. Females and juveniles arrive in the Baltic in September and October. Icelandic birds leave their breeding grounds between early September and early October. The main autumn migration occurs in the Baltic in early November, and in the North Sea in November and early December. Return movements occur from late February to April in the Atlantic and North Sea, and in April and May in the Baltic. Large numbers of birds congregate in the

COMMON SCOTER *Melanitta nigra*



Gulf of Riga in early May, before flying overland to breeding grounds in Russia, where they arrive from mid-May to early June.

Conservation status:

The population appears to be relatively stable. Flint and Krivenko (1990) thought that numbers in the former USSR were stable, while Krivenko (1993) reports stability in post-breeding numbers in western and central Siberia between 1972 and 1989. The large breeding populations in European Russia, Norway and Sweden are also thought to be stable (European Bird Database, 1994), as is the small population in Iceland (Koskimies, 1993). There has been some contraction in range and reduction in numbers at the southern edge of the breeding range in recent years, especially in Britain, Ireland and Finland, but these local decreases have affected only a tiny proportion of the population.

Network of key sites:

Outside of the breeding season, most important sites are offshore marine areas with a depth greater than six metres, and thus fall outside the scope of the Ramsar Convention. *M. nigra* is another of the very numerous seaduck species that winters in all of the most suitable offshore areas along the sheltered coasts from Mauritania to Poland. Nineteen areas of marine water have been recorded as having supported over 20,000 individuals, but they are so large and so irregularly used that they do not really fit the usual description of a key site. More effort could usefully be applied to identifying more important breeding, moulting and staging sites which can then be used to help conserve the species. If these staging sites are as large as Matsalu Bay in Estonia (up to 1,000,000 *M. nigra* on passage) it is very important that they are found. At present only three key sites are known outside of the Baltic and away from wintering grounds further south.

Protection status of key sites:

A few breeding sites in Sweden, Ireland, and the UK, and a few wintering sites in Britain, Denmark and Estonia are protected, but otherwise most important sites for *M. nigra* are unprotected. The main difficulty lies in protecting large offshore marine areas.

VELVET SCOTER

Melanitta fusca

Subspecies:

Polytypic. Three subspecies are generally recognized: the nominate form in Western Eurasia, *M. f. stejnegeri* in eastern Asia; and *M. f. deglandi* in North America. Some authors give full specific status to *stejnegeri* and *deglandi* under the name *deglandi*.

Distribution:

Holarctic, breeding across northern Eurasia and North America, with an isolated population in Southwest Asia. The wintering range extends south to western Europe, China, Japan and the southern USA. Only the nominate subspecies occurs in Western Eurasia, breeding from northern Scandinavia east to the Yenisey River (85°E), where there is some overlap with *deglandi*, and in the Caucasus and eastern Turkey. Small breeding populations are also found along the coast of the Baltic Sea in Sweden, Finland, Russia and Estonia. Northern birds winter mainly in the Baltic Sea, with much smaller numbers in the North Sea and along the Atlantic coast south to France and Spain. A few hundred birds winter on lakes in central Europe (mainly Switzerland) and a few birds reach the northwest Mediterranean and Adriatic (133 in Italy in 1995). The tiny isolated population in Southwest Asia appears to be mainly sedentary. The species has occurred as a rare winter straggler to the coast of Morocco and Algeria.

Movements:

Mainly migratory; birds breeding from Scandinavia east to the Taymyr Peninsula and Yenisey River winter mainly in the Baltic Sea, with much smaller numbers continuing further west to the west coast of Norway, the Netherlands, Britain and France. In hard winters, when most of the Gulf of Riga freezes over, large numbers of birds from this area are believed to concentrate in the Irbe Strait south to Lithuania. Following cold weather in northern Europe in November 1985, a major influx occurred in central Europe, with about 1,000 birds appearing on waters north of the Alps in southern Germany, Austria and Switzerland. An even larger influx occurred in the winter of 1988/89, when 677 birds were present in the Lake Geneva and Lake Constance area alone (Aubrecht *et al.*, 1990).

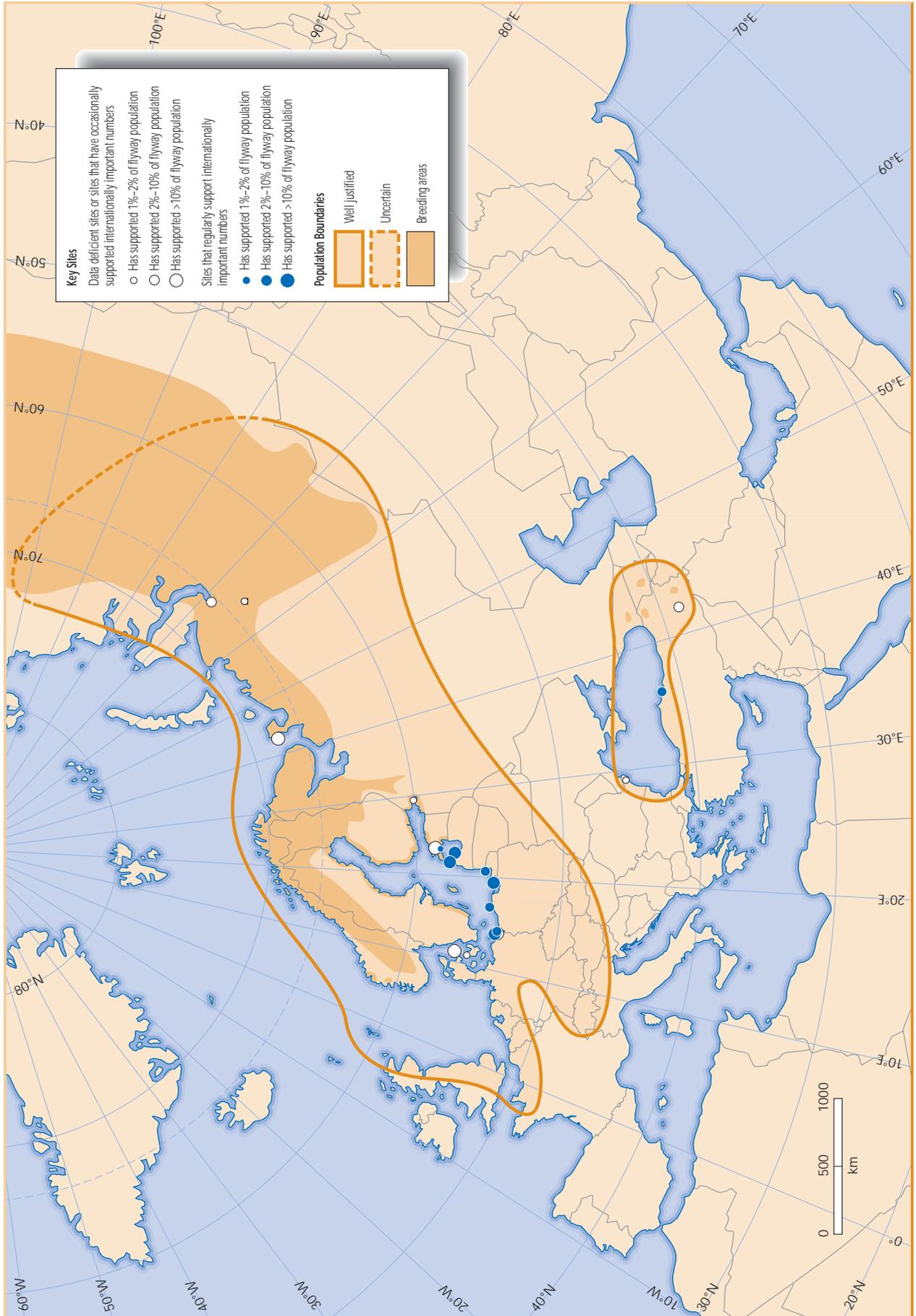
The small population breeding in eastern Turkey, Georgia and Armenia, appears to winter mainly along nearby Black Sea coasts, from where there are a number of records. However, two records in Egypt since 1950 (two birds in November 1952 and a single bird in March 1982) suggest that a few birds from this population may reach the east Mediterranean. Small numbers of *M. fusca*, possibly from this population, regularly wintered on the southwest coast of the Caspian Sea earlier this century, but there have been very few records from Azerbaijan in recent years (Patrikeev, in prep.) and no confirmed records in Iran since a single bird in the 1960s. The small number of birds which regularly winter in Krasnovodsk Bay on the east coast of the Caspian are likely to originate from one of the southernmost central Asian populations, as are the birds wintering on the Syr Darya, southeast of the Aral Sea (Dement'ev & Gladkov, 1952).

Population limits:

Two populations are recognized: a single large population in northwest Europe, and a tiny, isolated population in the Caucasus and Turkey.

Population size:

- **Western Siberia/northwest Europe: 1,000,000 (Pihl & Laursen, in press). 1% level 10,000.** The former estimate of 250,000 wintering in northwest Europe (Pirot *et al.*, 1989) has recently been revised upwards to 1,000,000 with the discovery of important wintering areas in the Baltic Sea (Pihl & Laursen, in press). Pihl *et al.* (1995) estimated that there were about 950,000 *M. fusca* in the Baltic Sea in January 1993. Most of these birds were concentrated in three well-defined areas: Irbe Strait/Riga Bay, Pomeranian Bay and the Kattegat. Elsewhere, there are an estimated 30,000 birds wintering off the west coast of Norway (Nygård *et al.*, 1988), 2,500–5,000 around Britain (Kirby *et al.*, 1993), and about 4,000–7,000 along the Atlantic coast from the Wadden Sea to Spain (Wetlands International Seaduck Specialist Group).



- **Black Sea/Caspian (Caucasus/Turkey): 1,500. Provisional numerical criterion 15.**

The size of the breeding population in eastern Turkey and the Caucasus is very poorly known. The only confirmed breeding in Turkey in recent years would appear to be a record of six pairs at Nemrut Dag crater lake in 1975 (Beaman, 1978). The species is described as a rather local winter visitor in moderate numbers along the Black Sea coast and occasionally in the Sea of Marmara (Beaman, 1978). Some birds were recorded between Ordu and Samsun in February 1974 (Beaman, 1978). There has been a recent report of a flock of 750 moulting birds on the Black Sea in eastern Turkey, near the Georgian border (G. Magnin, *in litt.*). These birds are likely to have been males, as female *M. fusca* usually moult on the breeding grounds. Assuming that this flock represents the bulk of the male population, and allowing for the very uneven sex ratio in the species (about 2:1 in favour of males), it seems likely that the total population is in the region of 1,500 birds (S. Pihl, *in litt.*).

Habitat/ecology:

Over most of its range, *M. fusca* breeds around small freshwater bodies in the boreal forests and Arctic tundra, sometimes well inland, although in Scandinavia it also breeds in alpine areas and coastal zones, on wooded islands and on skerries. It winters mostly at sea in shallow waters of the littoral zone. It is gregarious outside the breeding season, usually moulting and wintering in large flocks, sometimes of several thousand birds and often in company with *M. nigra*. In the Baltic, most *M. fusca* winter offshore in areas where the water depth is between 10 and 30 metres. In June, most males leave the breeding grounds to moult in large gatherings, mainly along the north coast of Russia. Small numbers of birds, mostly males, arrive in Danish waters in late June to moult there. Birds are flightless for three to four weeks during the wing moult. Adult females begin to arrive in Danish waters in August and September, but the main autumn migration in the Baltic takes place in October and November and the majority arrive in Danish waters during November and December. Peak numbers occur on the wintering grounds in January. The return migration starts late, with large numbers of birds remaining in Danish waters until April. Huge numbers concentrate in the Gulf of Riga in early May, before moving overland to breeding areas in northern Russia, where they arrive in late May or the first half of June.

Conservation status:

The west Siberian and northwest European population appears to be relatively stable. Flint and Krivenko (1990) thought that numbers in the former USSR were stable, while Krivenko (1993) reports stability in post-breeding numbers in western and central Siberia between 1972 and 1989. The breeding populations in European Russia, Norway and Sweden are also thought to be stable, and decreases have only been reported in the relatively small Finnish and tiny Estonian breeding populations (European Bird Database, 1994). Overall trends in the population in the Caucasus and Turkey are unknown, although the tiny breeding population in Turkey is thought to be stable (European Bird Database, 1994).

Network of key sites:

More than some other seaduck species that winter predominantly in the Baltic, *M. fusca* does tend to use some offshore areas very regularly in quite enormous numbers. Kursiu Spit in Lithuania (up to 700,000), the Pomeranian Bay (up to 372,000), the Gulf of Riga in Latvia (up to 200,000) and Irbe Strait in Estonia (up to 191,000) being notable examples. Only three passage/ moulting sites are known north of the Baltic and more could usefully be identified. The Black Sea wintering population is currently assumed to consist entirely of the small Caucasus breeding population but it is likely that thorough investigation of suitable habitat in winter could identify currently unknown key sites and substantiate the area as a wintering ground for Siberian breeding birds as well. At present only three key sites are listed.

Protection status of key sites:

Most of the important wintering areas in the west Baltic are protected, but other important wintering areas and the main breeding areas in northern Russia are unprotected. None of the known sites for the small population in Turkey and the Caucasus are protected.

COMMON GOLDENEYE

Bucephala clangula

Subspecies:

Polytypic. Two subspecies have been described: the nominate form from Eurasia and *B. c. americana* from North America, although the differences are slight and the validity of *americana* has been questioned.

Distribution:

Holarctic, with a wide breeding range across northern Eurasia and North America. The wintering range extends south to the Mediterranean, Black and Caspian Seas, China, Japan and the southern USA. Only the nominate subspecies occurs in Western Eurasia, breeding commonly in the coniferous forest zone from western Norway eastwards (north to 55°N), and wintering in northwest, central and southeast Europe and Southwest Asia. Scattered breeding populations are also found in the Baltic States, Poland, Germany, the Czech Republic and Britain (Scotland), and the species has recently colonized Denmark. Small numbers of birds (totalling about 100) winter on waters in southern Iceland (A. Gardarsson, *in litt.*). The species occurs as a rare winter visitor to North Africa (Morocco, Algeria and Libya) during severe winters. The few birds recorded in the Indian subcontinent probably originate from the Southwest Asian wintering population.

Movements:

Highly migratory, wintering mainly at sea in the northern parts of its winter range but also on large rivers, lakes, reservoirs and coastal lagoons further south, and often far inland (e.g. in central Europe). Birds breeding in northern Europe winter mainly in the Baltic Sea, Denmark, the Netherlands, Britain and Ireland. During the mild winters of 1992 and 1993, over 50% (154,400 birds) of the northwest European population were concentrated in the Baltic Sea (Pihl *et al.*, 1995). In hard winters, some of the *B. clangula* in the Baltic move further offshore, where they concentrate in small areas of ice-free water, while others move to western and central Europe. Birds wintering in the Caspian region probably originate from western Siberia.

Population limits:

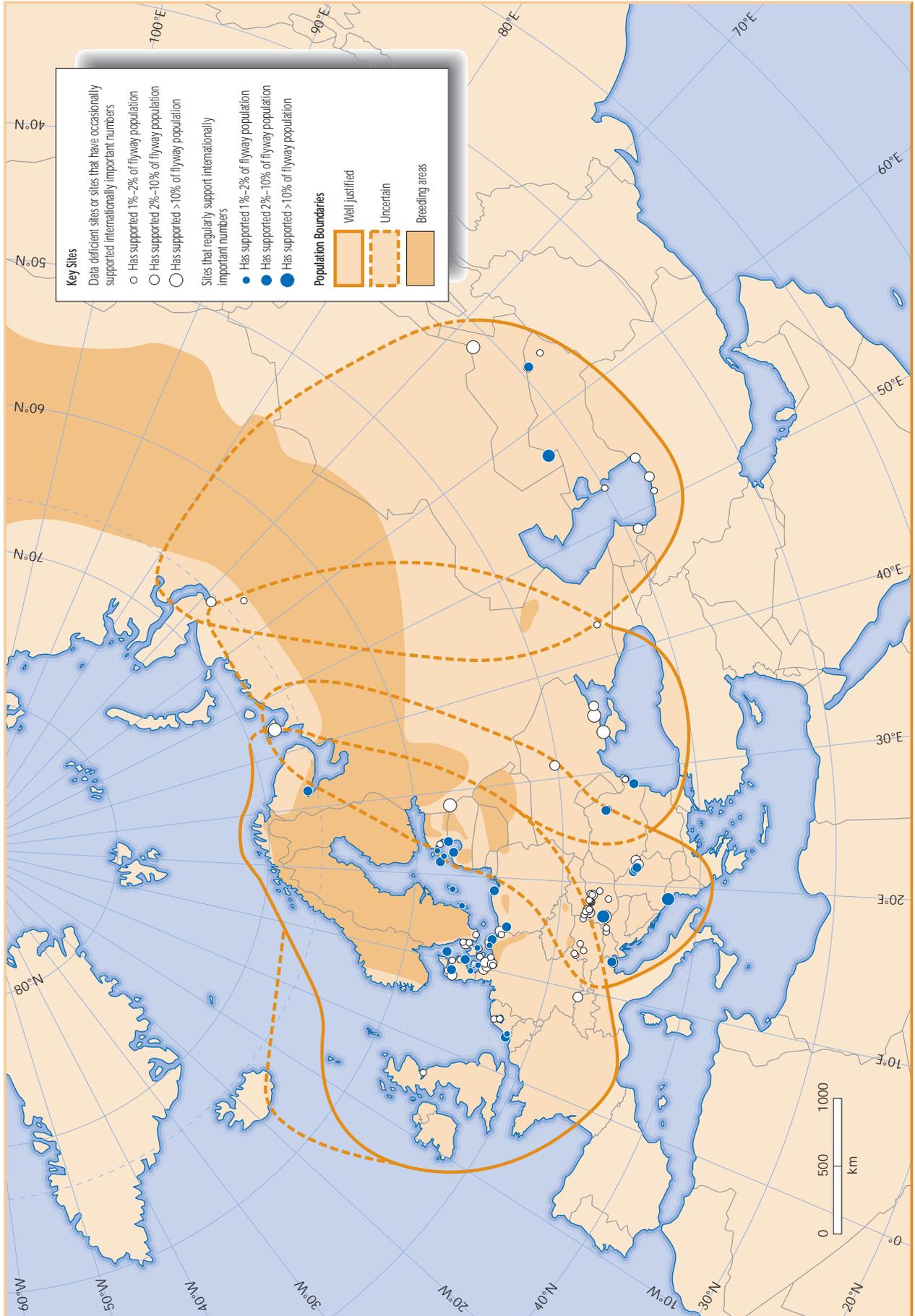
No discrete populations are identifiable. Previous authors have assumed that the birds wintering in northwest Europe, central Europe and the Adriatic belong to a single population, and counts from these three regions have always been combined (Monval & Pirot, 1989). The very small numbers of *B. clangula* wintering in the west Mediterranean (1989–1993 average only 12 birds) have been included in this population (Monval & Pirot, 1989). Monval & Pirot (1989), following earlier authors, also recognized an east Mediterranean/Black Sea wintering group of about 20,000 birds, concentrated in the Black Sea and Sea of Azov. Recent census data indicate that far more *B. clangula* winter in the Middle Danube and Adriatic than was formerly supposed, and as it is known that *B. clangula* move along rivers from Austria into Hungary and from Hungary into Yugoslavia and the Adriatic, there would seem to be good justification for treating the birds of the Danube catchment and Adriatic as a separate wintering group. *B. clangula* wintering in Switzerland and southern Germany are, however, retained as part of the northwest and central European population. Some mixing between these two groups seems likely, as does mixing between the east Mediterranean/Black Sea birds and the Adriatic birds, especially during hard winters.

Perennou *et al.* (1994) recognized a Southwest Asian wintering group of up to 25,000 birds concentrated in the central Asian republics and Iran. These birds appear to be well separated from the east Mediterranean/Black Sea birds, at least on their wintering grounds. Four wintering groups are therefore recognized: a northwest and central European group, a Middle Danube and Adriatic group, an east Mediterranean/Black Sea group, and a Southwest Asian (Caspian) group.

Population size:

- **Northwest and central Europe wintering: 300,000 (Monval & Pirot, 1989). 1% level 3,000.** Recent censuses suggest that the estimate of Monval & Pirot (1989) remains valid (Pihl *et al.*, 1995).
- **Middle Danube/Adriatic wintering: 75,000 (see Annex 1). 1% level 750.**

COMMON GOLDENEYE *Bucephala clangula*



- **Black Sea wintering: 20,000 (see Annex 1). 1% level 200.**
- **Caspian region wintering: 25,000. Provisional numerical criterion 250.**

The size of this population is unknown, but it is thought not to exceed 25,000 individuals (Perennou *et al.*, 1994; Rose & Scott, 1994).

Habitat/ecology:

Bucephala clangula breeds on freshwater lakes, pools and rivers surrounded by coniferous forest; in winter, it also occurs on coastal lagoons, estuaries, inshore marine waters and inland seas. It is usually restricted to areas with a water depth of less than 10 m, close to the shore, and rarely occurs in large flocks, usually occurring scattered along coasts in small groups. The species is very sensitive to habitat alterations on the breeding grounds, as its presence or absence in apparently suitable habitat mostly depends on tree holes being available for it to nest in; thus significant expansions in range and increases in numbers can be attained through programmes of nest-box erection (del Hoyo *et al.*, 1992). Moulting gatherings are common, e.g. in the White Sea, Matsalu Bay, southern Sweden, Finland and Latvia. Males arrive at these gatherings from early June, and reach peak numbers in late August, when many adult females arrive. The birds are flightless for three to four weeks during the wing moult. The autumn migration begins in late August, and reaches a peak in the Baltic and North Sea region in November. Most birds are on their winter quarters by early December. On average, females migrate further than males, and juveniles further than adults. The return passage begins early, in mid-February in the southern Baltic, and by the end of March most birds have left their wintering areas. The main arrival on the breeding grounds in Fennoscandia and western Siberia occurs in late April and the first half of May.

Conservation status:

The number of *B. clangula* wintering in northwest Europe has increased significantly over the past ten years; the rate of increase seems to be rising steadily, and the population is likely to have increased by 50% over the last ten years (Rose, 1995). However, the number of birds wintering in central Europe has remained more or less stable for the last 20 years (Rose, 1995). Recent increases in breeding populations have been reported in Finland, Sweden, Denmark, Estonia, Poland and Britain, while decreases have been reported only in the small populations in Lithuania and the Czech Republic (European Bird Database, 1994). Trends in the populations wintering in southeast Europe/Adriatic, the Black Sea and the Caspian Sea are unknown. However, Krivenko (1993) reports a slight decline in post-breeding numbers in the middle region of the former USSR between 1972 and 1989, and Patrikeev (in prep.) reports a major decline in numbers wintering in Azerbaijan between the 1940s and the early 1960s.

Network of key sites:

The Caspian and Black Sea wintering populations are extremely poorly known with only nine and 10 key sites identified respectively. In January 1994, 8,612 at Lake Sarakamysh in Turkmenistan is noteworthy. More counts are necessary before the true importance of this site can be determined. The Adriatic/middle Danube wintering population is justified on the basis of improved winter census coverage of this region, so it follows that the key wintering sites network is very good. Further improvements in the monitoring of this region will however be necessary before the real status of this population and its network of 27 key sites can be assessed. In northwest Europe *B. clangula* is a difficult species to monitor. Its winter distribution is widely dispersed along sheltered coasts and rivers, the relative extent to which these two habitats are used varying annually according to winter conditions. Consequently, the 40–50 key northwest European wintering sites form a useful key sites network but probably do not support a very large proportion of the population at any one time. The 18 passage and moulting sites listed is very incomplete despite the great importance of the Pskovsko-Chudskoye Lakes to moulting birds and the Kanin Peninsula to passage birds.

Protection status of key sites:

Several of the breeding areas in Britain and Sweden are protected, but most of the important breeding areas further east are unprotected. About half of the important sites in the Baltic are protected, but some very important sites are unprotected. The IJsselmeer in the Netherlands is also not protected. Important wintering areas in central Europe are protected. Most of the important wintering areas in the Adriatic, Black Sea and Caspian regions are unprotected.