

HOTTENTOT TEAL

Anas hottentota

Subspecies:

Monotypic. The Madagascar population has been separated as *delacouri*, but this form is no longer recognized.

Distribution:

Confined to the Afrotropical Region. The species occurs widely in eastern and southern Africa from Ethiopia and southern Somalia to South Africa, and also in West Africa (northern Nigeria, Cameroon and Chad) and Madagascar. In Nigeria, it occurs from Sokoto to Lake Chad and south to Zaria and the Borgu Game Reserve (Elgood, 1982); in Cameroon it is confined to the region of Lake Chad (Louette, 1981).

Movements:

The West African and Madagascar populations appear to be sedentary. Elsewhere, the species is partly sedentary and partly migratory, undertaking regular short-distance migrations in southern and eastern Africa in response to changing water levels. In Kenya, an annual influx is thought to originate from the north and northeast; a bird ringed at Lake Nakuru was recovered 490 km south-southeast in Tanzania, and a bird ringed at Lake Naivasha was recovered at Mwea, 105 km to the east. Six birds ringed at Kafue Flats, Zambia, were recovered within 260 km; two others were recovered in northern Botswana, 500 km and 700 km to the southwest.

Population limits:

The population in West Africa (northern Nigeria, Cameroon and Chad) appears to be very isolated from other populations, although there is an old record from the Bahr Salamat in eastern Chad (there are no records from Sudan). The Madagascar population is sufficiently distinct to have been considered for subspecific status. Although there are no major gaps in the species' range in eastern and southern Africa, there is probably little mixing between the eastern and southern African populations. Like *A. erythrorhyncha*, *A. hottentota* is most abundant in semi-arid areas, and there is little suitable habitat for it in northern Zambia, northern Malawi, northern Mozambique and southern Tanzania. Recoveries of birds ringed in southern Africa show no evidence of movement between eastern and southern Africa, and possible movement is not supported by regional count data (R.J. Douthwaite, *in litt.*). There seems a good case, therefore, for treating the southern and eastern African populations separately. Four populations are therefore recognized: a small, isolated population in northern Nigeria and Chad; a population in eastern Africa; a population in southern Africa (north to central Zambia, southern Malawi and southern Mozambique); and a population in Madagascar.

Population size:

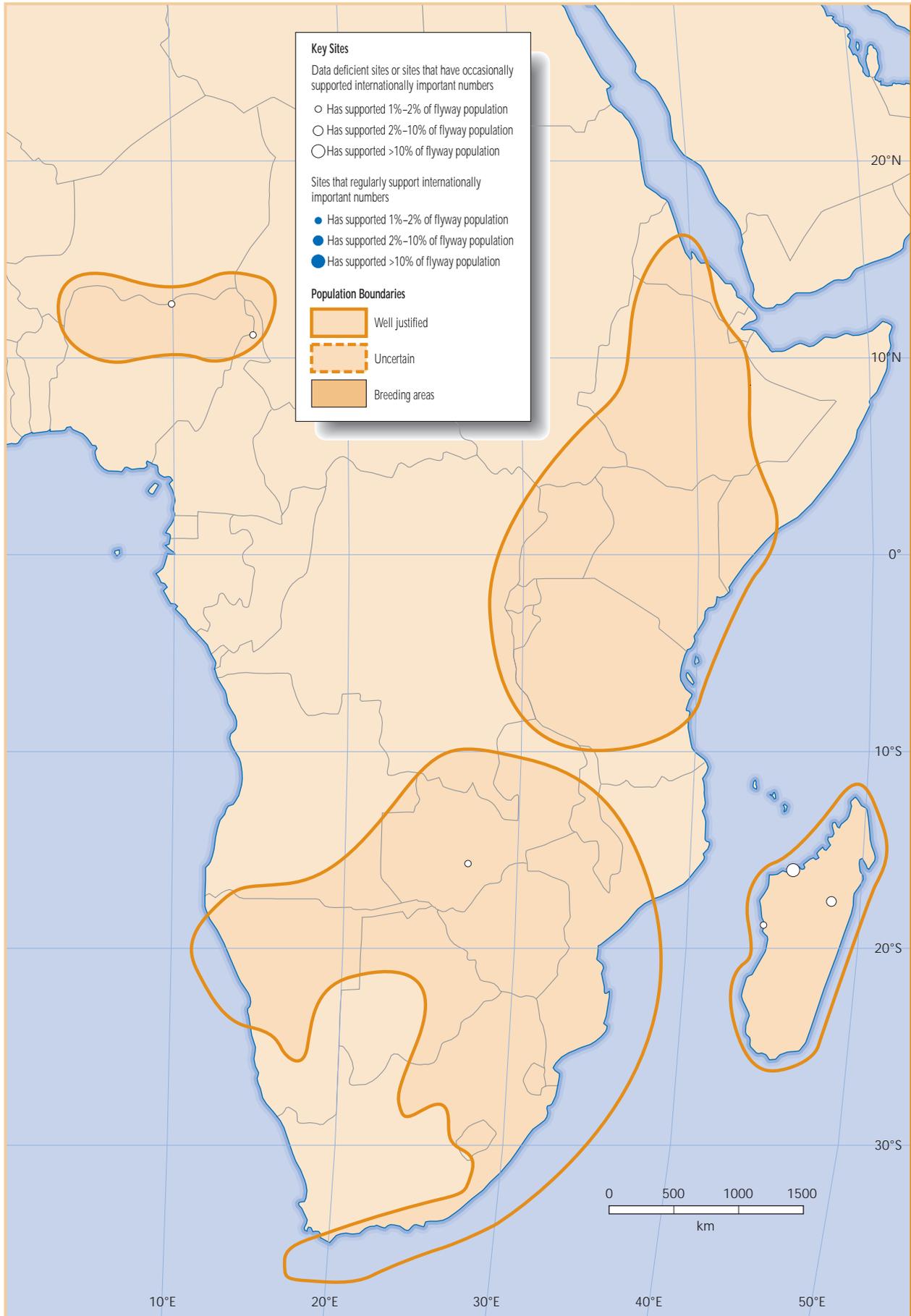
- **West Africa (northern Nigeria and Chad): 5,000–10,000. Provisional numerical criterion 75.**

An uncommon resident in Nigeria, although there is one record of about 100 on oases near the Niger border (Elgood *et al.*, 1994). The highest count during mid-winter waterfowl censuses in West Africa has been 300 in 1972.

- **Eastern Africa: 100,000–300,000. Provisional numerical criterion 2,000.**

Abundant in parts of eastern Africa; described as common in Ethiopia (Urban & Brown, 1971), and widespread in small numbers in Kenya, Tanzania and Uganda (Britton, 1980). Very abundant in Kenya during the northern winter and especially during local dry years; concentrations of thousands have been recorded in Kenya and Tanzania, e.g. at Lake Kitangiri, Tanzania, in June and August–October 1955 (Brown *et al.*, 1982). A total of 1,920 was recorded in Tanzania during very extensive waterfowl counts in January 1995. Common in the Ruzizi Marshes on the border between Zaire and Burundi in May and October–February (Brown *et al.*, 1982). The highest count in eastern Africa during the African Waterfowl Census (1991–94) was 1,414 in January in 1994.

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- **Southern Africa: 100,000–200,000. Provisional numerical criterion 1,500.**

Locally common throughout much of southern Africa, although absent from arid areas in the southwest (Sinclair *et al.*, 1993). Fairly common in northern and eastern Botswana, especially the Okavango Delta (Penry, 1994), and widespread in Zimbabwe, where commonest in the west (D.V. Rockingham-Gill, *in litt.*). Widespread in southern Malawi, occurring in hundreds, with especially large numbers at Lake Nderendere (Benson & Benson, 1977), and fairly common in southern and southwestern Zambia (Benson *et al.*, 1971). Some 2,833 were recorded at Kafue Flats in Zambia in January 1994. The highest count in southern Africa during the African Waterfowl Census (1991–94) was 3,630 in January 1994.

- **Madagascar: 5,000–10,000. Provisional numerical criterion 75.**

Common in the west; uncommon in the east and north; rather rare in the south and on the High Plateau (Langrand, 1990). Few large gatherings have been reported, although 1,878 were present at Lake Amboromalandy in October 1993 (F. Hawkins, *in litt.*), and 880 at Lake Alaotra in November 1983 (Pidgeon 1996). Only 371 were recorded during the waterfowl census in January 1994.

Habitat/ecology:

A. hottentota frequents fresh waters in open country, favouring shallow freshwater marshes and ponds fringed with reeds or papyrus and with floating plants. It also occurs on sewage lagoons, and occasionally on large open waters devoid of emergent vegetation. During the dry season, *A. hottentota* regularly occurs in small numbers at small scattered pans in semi-arid regions (T. Dodman, *in litt.*). Wing moult has been recorded in August–September in Zambia.

Conservation status:

In the 1970s, it was probably increasing and becoming more widespread in Nigeria (Elgood, 1982), but numbers were decreasing in Kano State by 1987 (Elgood *et al.*, 1994), and the West African population as a whole may now be in decline (del Hoyo *et al.*, 1992). In Madagascar, numbers are now probably decreasing as a result of habitat alteration (O. Langrand, *in litt.*).

Network of key sites:

Although two key sites are listed for the West Africa population this is on the basis of old data. Recent counts of *A. hottentota* in West Africa are extremely few and certainly not high enough for any key sites to be identified. No key sites can be identified for the eastern Africa population, one for the southern Africa population and three for the Madagascar population. In October up to 25% of the Madagascar population of *A. hottentota* have been counted at Amboromalandy Lake.

Protection status of key sites:

Only Kafue Flats in Zambia is adequately protected out of all six key sites.

GARGANEY

Anas querquedula

Subspecies:

Monotypic.

Distribution:

Palaearctic, breeding widely at temperate latitudes across Europe and Asia, mostly between 42°N and 65°N. Birds breeding in Western Eurasia winter almost exclusively in Africa south of the Sahara, mainly in West Africa from southern Mauritania, Senegal and Gambia to Chad, but also extending south in substantial numbers as far as Ghana, Kenya, Tanzania and Uganda. Small numbers reach Malawi and Zambia, and the species has occurred as a vagrant in Zimbabwe, Botswana and South Africa (Transvaal).

Movements:

Highly migratory, wintering almost entirely within the northern tropics, although regularly extending south of the Equator in eastern Africa. The species breeds widely across Western Eurasia, birds from breeding areas west of the Urals wintering almost exclusively in Africa south of the Sahara. Many birds from the forest and forest-steppe zones of western Siberia (as far as 70–90°E) migrate southwest through the eastern Mediterranean and Southwest Asia to winter in West and East Africa, while some birds from the same breeding area migrate southeast through eastern Iran to winter in Pakistan, India and Sri Lanka.

West African populations originating from breeding areas in Europe reach their wintering areas via Spain and Italy, and apparently do not linger in North Africa. There is also no evidence that the North African wetlands are a major staging area for birds in spring. Breeding season recoveries of birds ringed in the Senegal Delta are spread over a wide area from western Europe (France) through European Russia and western Siberia (Tobol and Irtysh) to the Yenisey River at 92°E (Roux, 1981). The ringing recoveries from birds ringed in Mali show little difference from those ringed in Senegal, with recoveries stretching as far east as 70°–90°E. Birds recovered in Nigeria had been ringed in Greece, Latvia, Russia and India.

There is a massive autumn passage of *A. querquedula* westward along the north coast of Sinai at Zaranikh (Egypt); 203,000 were recorded during the period 15 August to 5 October 1978 and 221,600 during the period 16 August to 24 September 1981. No comparable numbers are recorded elsewhere in Egypt in autumn, and it seems likely that the majority of birds cross Egypt on a broad front, not stopping until they reach tropical Africa (Goodman & Meininger, 1989). Some 100,000–200,000 birds pass through Israel in autumn, and are presumably part of this same movement. Further east, the species has also been seen moving south-southwest across the Red Sea and off the tip of Sinai, while a regular autumn passage has been recorded in Eritrea (Smith, 1957) and Ethiopia (Brown *et al.*, 1982). As the wintering population in eastern Africa (from Sudan southwards) is thought to number only some 95,000–181,000 birds (Urban, 1993), it seems likely that the bulk of the birds passing westwards along the north Sinai coast are bound for West Africa, while most of the birds wintering in eastern Africa enter the continent on a broad front across the Red Sea.

Population limits:

Monval & Pirot (1989) were unable to define any precise biogeographical populations in Western Eurasia, and considered the population wintering in Africa as a discrete population for practical reasons. Perennou *et al.* (1994), however, treated the birds passing through Southwest Asia and presumably wintering mainly in eastern Africa as a separate group, and this treatment is adopted here. Thus two main passage and wintering populations are recognized: one passing through Europe and the eastern Mediterranean and wintering mainly in West Africa east to Chad, and one passing through Southwest Asia and wintering mainly in eastern Africa. The small number of birds recorded in winter in Southwest Asia represent only the extreme northern edge of the large wintering population in eastern Africa.

Population size:

- **Europe/West Africa: 2,000,000 (Perennou, 1991a). 1% level 20,000.**

Major concentrations in West Africa have included up to 900,000 in the Central Niger Delta, 535,000 at Lake Chad and 246,000 in the Senegal Delta. The highest mid-winter count during



the 1980s was 1,537,000 in 1987, but since then the total count has not exceeded 450,000. The European breeding population has recently been estimated at 642,000–1,063,000 pairs (European Bird Database, 1994), a figure which agrees reasonably well with an estimated wintering population of 2,000,000.

• **Southwest Asia/eastern Africa: 100,000–200,000. Provisional numerical criterion 1,500.**

Monval & Pirot (1989) suggested that the average number of *A. querquedula* wintering in the Nile Basin in eastern Africa is probably close to 500,000. More recently, Urban (1993) has estimated the total wintering population in eastern Africa at 95,000–181,000, although he noted that the number may be as high as 500,000 in some years. However, the highest mid-winter count in eastern Africa during the 1980s and 1990s was only 33,260 (in 1983). The most important wetlands for *A. querquedula* in eastern Africa are situated in the Sudd region on the middle reaches of the Nile in Sudan. These wetlands have never been surveyed specifically for ducks, although Nikolaus (1987) indicated that large numbers of *A. querquedula* winter in the Sudd south of 12°N. Kingdon (1984) noted that *A. querquedula* winter in substantial numbers in the Sudd, and estimated from aerial surveys carried out in February 1980 and 1981 that tens of thousands of *A. querquedula* were likely to be present near Nyany in the north of Bor. Urban (1993) concluded that the wintering population in Sudan was in the range 70,000–120,000 birds. The total wintering population in Kenya has been estimated at 20,000 (Brown *et al.*, 1982), while thousands are said to winter in southwestern Uganda. However, only 421 were recorded in Tanzania during very extensive waterfowl counts in January 1995. Clearly, no reliable estimation of the size of the eastern African wintering population will be possible until adequate censuses have been undertaken in the Sudd region of Sudan. However, as it seems likely that the population is in the range 100,000–200,000, a provisional numerical criterion of 1,500 is proposed for the identification of key sites.

Habitat/ecology:

Anas querquedula breeds mostly inland, on swampy meadows, flooded fields and shallow freshwater marshes, pools and small lakes with abundant emergent vegetation; it winters mainly in floodplains, rice-fields, coastal lagoons and shallow freshwater marshes. *A. querquedula* is highly gregarious outside the breeding season, and often occurs in huge concentrations on its winter quarters. Moulting gatherings of males are formed from late May. During the wing moult, birds are flightless for three to four weeks. The Volga Delta, in particular, is a major moulting area for this species. The autumn migration begins in late July and reaches a peak in Europe and Egypt in August and early September. Birds begin to arrive on their winter quarters in West and East Africa in early September, with the main immigration occurring in October. The spring migration begins in February, and birds start to arrive on their breeding grounds in western Europe as early as mid-March. Further north and east, birds may not arrive on their breeding grounds until mid-May.

Conservation status:

Overall trends in both populations are unknown, but numbers appear to be decreasing in many parts of Europe, and there are reports of a sharp decline in numbers in the middle region of the former USSR between 1972 and 1989 (Krivenko, 1993). In western Europe, the number of breeding pairs appears to have fallen from about 12,000–22,500 in 1970 to less than 8,000 in recent years (Tucker & Heath, 1994). The decrease has been attributed to widespread deterioration of breeding habitat, especially in central Europe, where increasing aridity in the climate and subsequent lowering of the water-table, drainage of wetlands and transformation of wetlands to dammed reservoirs have resulted in the loss and degradation of much former breeding habitat (Tucker & Heath, 1994). Loss of habitat may also now be a problem in West Africa, where large-scale river diversion and irrigation schemes pose a major threat to several of the most important wintering areas.

Network of key sites:

Despite being a dispersed broad front migrant, there must be important staging areas for *A. querquedula* in North Africa, northern Europe or Kazakhstan for example. At present, the only key passage sites known are the autumn gathering point at the mouth of the River Ob, the moulting and passage site at the Volga Delta/Western Ilmen and the smaller passage sites in the Sea of Azov, Middle Ob and Iran (12 key passage sites in total).

The West African wintering population is usually highly concentrated and opportunistic in its exploitation of the variable water regime within the West African Sahel. However, most of the population is usually supported by a combination of the 23 key wintering sites listed in Annex 2. Fifteen key

wintering sites are listed for the Caspian/East African wintering population but little is known about the relative winter distribution of this population between the southern Caspian (3 key wintering sites) and East Africa. This population must be poorly represented by the current key sites network at all times of year.

Protection status of key sites:

The few known key passage and moulting sites are mostly protected. The 3 key wintering sites in the Caspian basin are protected but protected status information was provided for very few of the African sites.

CAPE SHOVELER

Anas smithii

Subspecies:

Monotypic.

Distribution:

Afrotropical, occurring in southern Africa from Cape Province, South Africa, north to Namibia and Botswana (rarely to Natal, Zimbabwe, Angola and Zambia).

Movements:

Largely sedentary, but somewhat nomadic and dispersive within its range, the movements seemingly being associated with local wetland conditions but poorly understood. There may also be some true north-south migration through central parts of South Africa. The species is most numerous in southwest Cape Province (a region of austral winter rainfall) in May–September, while the reverse applies in Orange Free State and Transvaal (regions with austral summer rainfall). Birds ringed in South Africa have been recovered in Namibia, up to 1,680 km away (Brown *et al.*, 1982).

Population limits:

Only one population is recognized, *viz.* the entire population of the species.

Population size:

Entire population: 20,000–50,000. Provisional numerical criterion 350.

Locally common over its rather limited range. In South Africa, it is most abundant in southwest Cape Province, Orange Free State and Transvaal, and is uncommon in east Cape, Natal and the arid northwest (Brown *et al.*, 1982). It is described as a fairly common resident in southeastern Botswana, and sparse and uncommon on the Magadigadi Pan system in the north (Newman, 1989; Penry, 1994). The total population in Zimbabwe is estimated to number in the hundreds of birds (Ewbank, 1993), mostly in Matabeleland. It is uncommon in Namibia, rare in Angola, and only a vagrant to Zambia, Zaire and Tanzania. The highest count obtained during the African Waterfowl Census (1991–94) in southern Africa was 3,656 in 1994.

Habitat/ecology:

A. smithii is essentially a bird of fresh water, but tolerates tidal estuaries, saline lagoons and pans. It prefers temporary sheets of open, shallow water and marsh remaining after flooding, but also commonly occurs on highly alkaline waters and sewage disposal ponds where the water fertility is high. It is gregarious, usually occurring in small groups when not breeding. During the post-nuptial moult, birds retire to large, open waters. The moult (when birds are flightless) occurs in southwest Cape Province in July–December and in west Transvaal mainly in October–December and Apr–July.

Conservation status:

The species appears to be maintaining quite stable numbers, although it is said to have increased greatly in southwestern Cape Province in recent years (del Hoyo *et al.*, 1992), and is also reported to be increasing in Zimbabwe, on large dams in Mashonaland (D.V. Rockingham-Gill, *in litt.*).

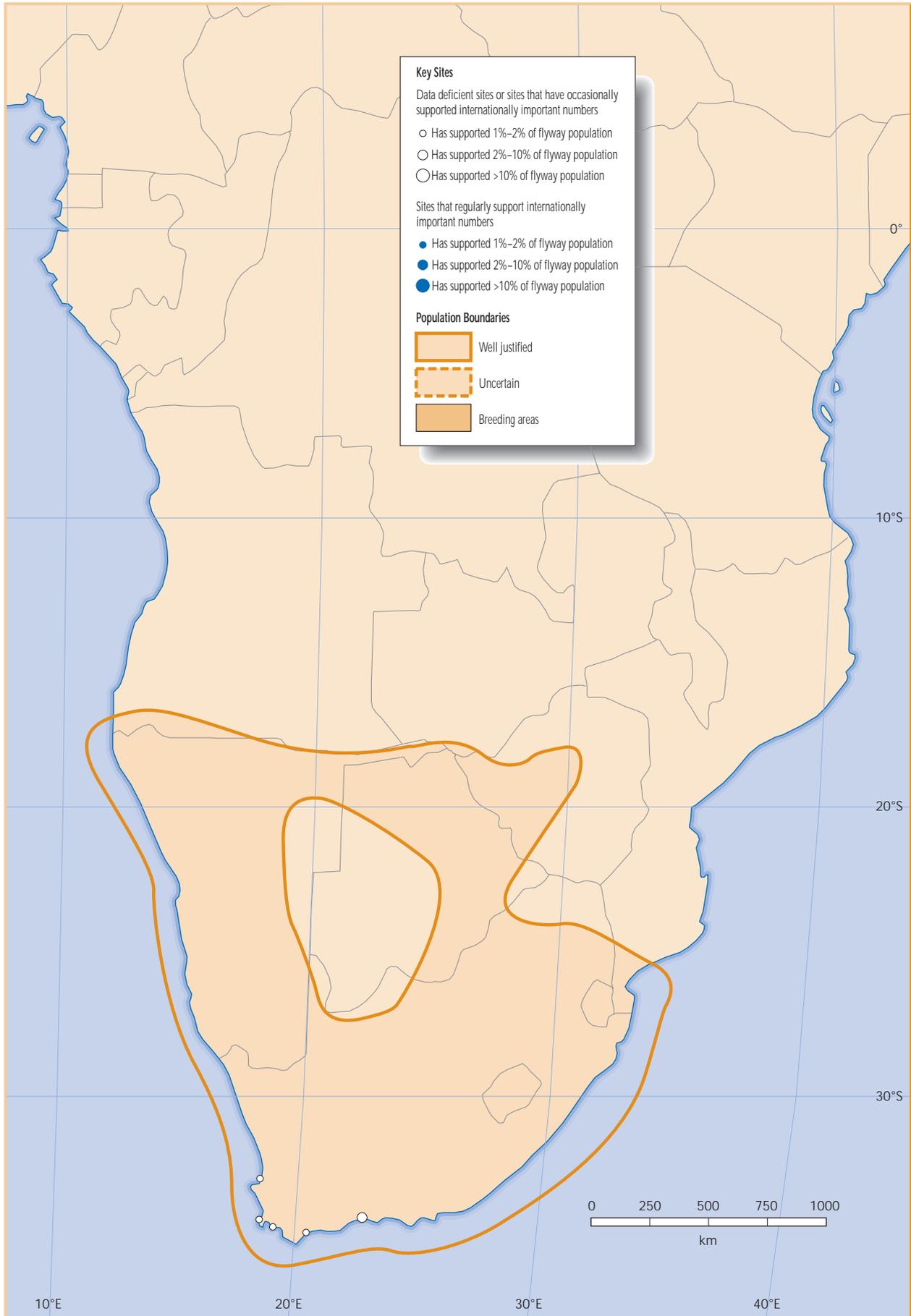
Network of key sites:

Five key sites in the vicinity of Cape Town support important numbers of *A. smithii* in July. It is not known if other key sites exist at this time or at any other time.

Protection status of key sites:

Protected status information was not supplied for any of the five key sites listed in Annex 2.

CAPE SHOVELER *Anas smithii*



NORTHERN SHOVELER

Anas clypeata

Subspecies:

Monotypic.

Distribution:

Holarctic, with a wide breeding distribution across North America and northern Eurasia. Western Eurasian populations winter south to West Africa, East Africa (commonly to Kenya, Tanzania and Uganda) and the Arabian Peninsula. Small numbers reach Gambia, Ghana and Guinea-Bissau, and stragglers extend south to Zambia, Malawi, Mozambique, Zimbabwe, Namibia and South Africa (Transvaal). The species has bred in Iceland since 1931.

Movements:

Anas clypeata breeds and winters further south than most Palearctic ducks, with the majority of birds occurring in winter in the Mediterranean Basin, Southwest Asia and Africa. Northern populations are highly migratory, wintering in temperate and subtropical latitudes south, in eastern Africa, to the Equator, while some southern breeding birds (e.g. in western Europe) are sedentary or dispersive. Birds wintering in northwest Europe are thought to originate mainly from Fennoscandia and Russia east to about 60°E. However, large numbers of birds passing through northwest Europe on migration continue on to winter in the Mediterranean Basin, where they mix with birds of a more eastern origin. The tiny Icelandic breeding population, estimated at only 10–30 pairs (Koskimies, 1993) apparently winters in northern Britain and Ireland. Cold weather movements have been recorded in northwest Europe. Birds tend to move out of the Wadden Sea coasts to western France, Britain and Ireland during cold spells in many winters. During more severe weather, these birds may move to Spain and Portugal, although the Iberian peninsula may be the ultimate destination of many birds even in less severe winters (Ridgill & Fox, 1990).

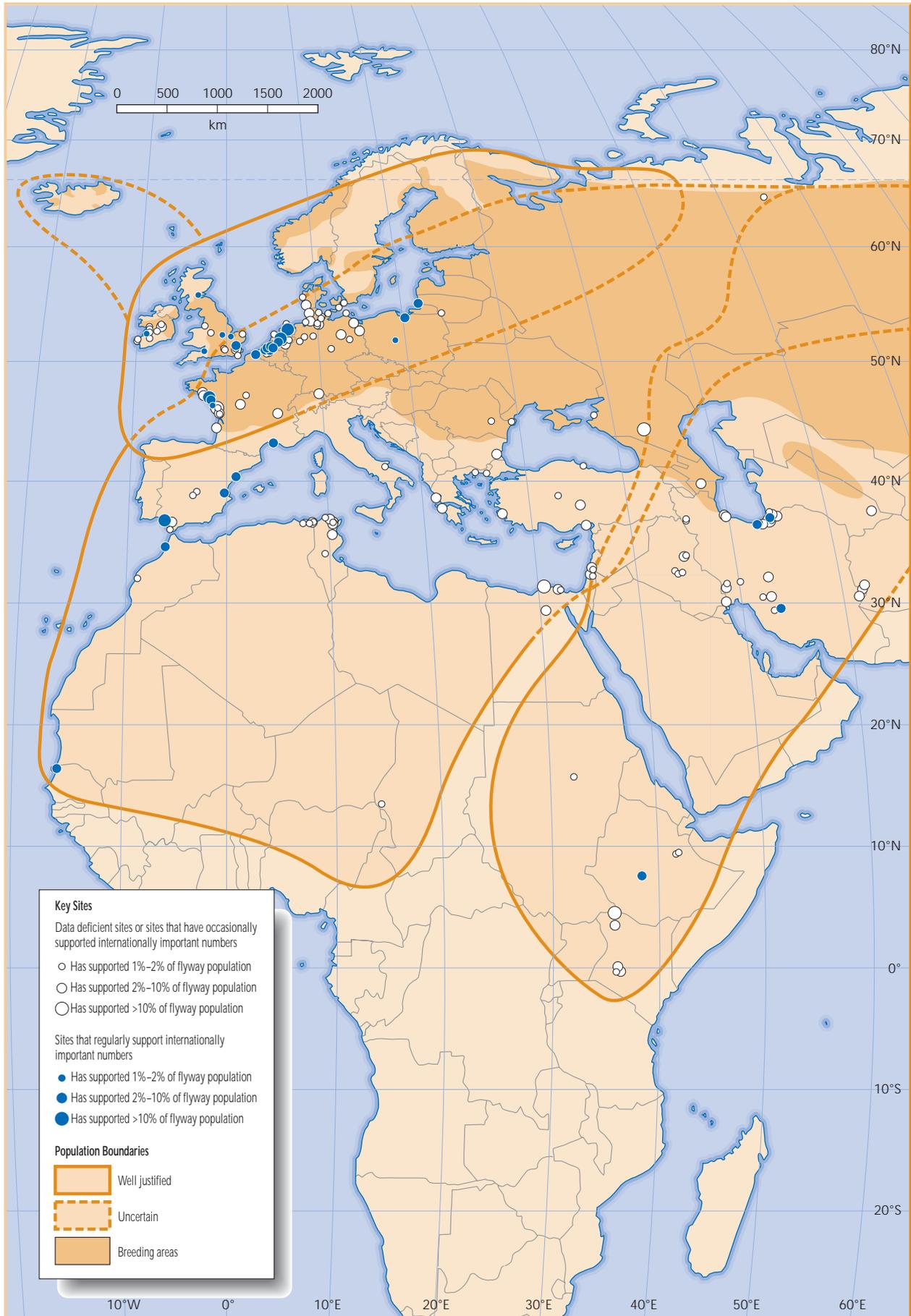
Birds breeding in central and southeast Europe winter in the Mediterranean Basin where they mix with birds from further east. Ringing recoveries indicate that the birds wintering in northwest and West Africa originate mainly from Europe (Brown *et al.*, 1982). Birds wintering in Southwest Asia and northeast and eastern Africa presumably originate mainly in western Siberia, but there are few ringing recoveries to support this. In a total of 14 ringing recoveries involving birds ringed or recovered in Egypt, 10 came from moulting areas in the north Caspian (Astrakhan) and the other five came from the basins of the Ob and Irtysh rivers (60°–80°E) (Goodman & Meininger, 1989). Of five Russian-ringed birds recovered in Iran, two came from the Volga Delta and three from the west Siberian plain between 78° and 82°E. However, three birds ringed at Bharatpur, Rajasthan, India, were recovered in subsequent winters in Iran (Argyle, 1975 & 1976), suggesting that there is considerable mixing between the Southwest Asian and south Asian wintering populations of this species.

Population limits:

Ruger *et al.* (1986) concluded that it was impractical to define discrete wintering populations in Europe because of the complex autumn and spring movements of birds through northwest Europe and the extensive mixing of birds of western and eastern origin in the Mediterranean Basin. These authors therefore made no attempt to split the Western Palearctic wintering populations of *A. clypeata* into distinct wintering groups, but made divisions for convenience, based on the quality of data available. Monval & Pirot (1989) reached the same conclusions, and rather than attempt to define precise biogeographical populations for *A. clypeata*, followed the traditional breakdown into 'flyways' based on wintering regions. These authors recognized three 'populations' in the Western Palearctic: northwest Europe, Black Sea-Mediterranean and West Africa. For the purposes of trend analyses, Monval & Pirot (1989) split the Black Sea/Mediterranean region into two sub-regions, the west Mediterranean and the east Mediterranean, because of the paucity of data from the east Mediterranean, but stressed that there was no evidence that different populations were involved.

There is no evidence to suggest that the birds wintering in West Africa differ in any way in origin from birds wintering in the Mediterranean. Furthermore, the very wide fluctuations in numbers of *A. clypeata* wintering in West Africa, especially in Senegal, seem more likely to be a result of 'overspill'

NORTHERN SHOVELER *Anas clypeata*



from a much larger population to the north, than genuine fluctuations in numbers in a relatively discrete population. It would therefore seem more appropriate to treat the relatively small number of birds wintering in West Africa as part of the much larger Black Sea/Mediterranean population. This was the approach adopted by Rose & Scott (1994), although these authors recognized separate west Mediterranean and Black Sea/east Mediterranean populations, and included the West African birds (20,000) with the latter.

Perennou *et al.* (1994) recognized a large Southwest Asian wintering population of *A. clypeata*, and linked this with the substantial numbers of birds wintering in northeast and eastern Africa. The abundance of this species on passage and in winter in the Arabian Peninsula (where it is one of the commonest ducks) suggests a broad-front migration of *A. clypeata* over Arabia into northeast Africa. Large numbers of *A. clypeata* formerly wintered in Iraq, and it is possible that the high counts in eastern Africa in recent years could involve birds displaced from Iraq following the recent large-scale drainage of wetlands in Mesopotamia.

Only three 'populations' of *A. clypeata* are therefore recognized in the present report: a relatively small population wintering in northwest Europe; a large population wintering in the Black Sea, Mediterranean Basin and West Africa; and a large population wintering in Southwest Asia and northeast and eastern Africa.

Population size:

- **Northwest Europe: 40,000 (Monval & Pirot, 1989). 1% level 400.**

Recent census data (1989–1993) are very similar to those from the period 1982–86, and suggest that the estimate of Monval & Pirot (1989) remains valid.

- **Black Sea/Mediterranean/West Africa: 450,000 (see Annex 1). 1% level 4,500.**

- **Southwest Asia/northeast and eastern Africa: 400,000. 1% level 4,000.**

Perennou *et al.* (1994) estimated the wintering population in Southwest Asia and eastern Africa at 300,000 birds, but a reappraisal of the Southwest Asian data and recent high counts in eastern Africa suggest that a figure of 400,000 is more appropriate. Counts in Southwest Asia exceeded 100,000 in the 1970s and have amounted to 50,000 in recent years, despite the lack of coverage in Iraq, a key wintering area for this species. It seems likely, therefore, that at least 150,000 and probably nearer 250,000 *A. clypeata* winter in Southwest Asia. Urban (1993) estimated the total population wintering in eastern Africa (excluding Egypt) to be 100,000–240,000 birds; high counts in recent years have included over 25,000 in Ethiopia (in 1994), a dry season minimum of 22,000 in Kenya, mainly at Lake Naivasha, and over 15,000 in Tanzania (in 1995). Combining the Southwest Asian and African figures suggests a total population of about 400,000 (from a range of 250,000–500,000).

Habitat/ecology:

Anas clypeata occurs in a wide variety of shallow, freshwater wetlands, preferably well vegetated lakes and marshes with muddy shores in open country. In winter, it also occurs on brackish lagoons and tidal mudflats. Males may stay with the females during the moult, or may undertake moult migrations to favoured moulting areas, e.g. the Volga Delta. Males moult from early May to early June, and females one month later. During the wing moult, the birds are flightless for three to four weeks. In western Europe, the main autumn migration occurs in September and October, with birds arriving in wintering areas in October. The spring migration begins in February, and the main migration through Europe occurs from mid-March to mid-April. Almost all birds are back on their breeding grounds by early May.

Conservation status:

The wintering population in northwest Europe appears to have been relatively stable over the past 20 years, although many birds disappear from the region in harsh winters, and this tends to complicate the pattern (Rose, 1995). The major concentrations of *A. clypeata* in the east Mediterranean are inadequately covered by the International Waterfowl Census, and no determination of trends is possible. There has been a significant increase in the number of birds wintering in the west Mediterranean, although the rate of increase has decreased in recent years, while there appears to have been a slight decline in the small number of birds wintering in central Europe (Rose, 1995). Trends in the numbers wintering in Southwest Asia and northeast Africa are unknown. However, Krivenko (1993) has reported a sharp decline in the numbers of birds in western and central Siberia between 1972 and 1989. This population

(estimated at over 530,000 birds at the end of the breeding season) could account for most if not all of the Southwest Asian/northeast African wintering population.

Network of key sites:

The three key wintering site networks are quite complete. Over 60 key sites in northwest Europe provide winter habitat for at least 14,500 *A. clypeata* (30–40% of the population). Count coverage of the key site networks for the other two populations is too irregular to estimate their exact value to the populations but they are extensive (43 key wintering sites in the Mediterranean/West Africa and 42 in the Caspian/East Africa).

Only seven key passage sites are known for the Mediterranean/West African and Caspian/East African wintering populations but Manych-Godilo lakes in the Caucasus is recorded as being used simultaneously by 555,000 *A. clypeata* in spring. If this is true, most of the individuals from the two combined wintering populations are present at this site. It follows that the majority of *A. clypeata* in northwest Europe in spring must be from northwest European wintering grounds which is why key staging sites in northwest Europe have been selected on this basis. Around 30 key autumn passage sites and over 5 key spring passage sites in northwest Europe (mainly in Germany and the Netherlands and to a lesser extent Denmark) are listed in Annex 2. Despite the enormous number of *A. clypeata* at Manych-Godilo Lakes in the Caucasus, ringing recoveries show that some birds staging in northwest Europe are certainly from, or destined for Mediterranean wintering grounds, so the migratory strategy of the three populations needs to be better understood before the true value of any key passage sites network can be assessed for *A. clypeata*.

Protection status of key sites:

Most of the major key sites for which protected status information was provided are protected. The most notable unprotected key sites are in the Mediterranean (particularly in the east) and two very important sites in Iran (Seyed Mohali Zarinkola and Larim Sara plus Kaftar Lake).

MARBLED TEAL

Marmaronetta angustirostris

Subspecies:

Monotypic.

Distribution:

Palaearctic, with a fragmented distribution from Spain and North Africa east through the Mediterranean Region and Middle East to Pakistan, the central Asian republics and extreme western China. Some birds reach sub-Saharan Africa in winter; it is regular in very small numbers in Senegal, and has also been recorded in Nigeria (two records, in 1977 and 1988), Mali (maximum 61), Chad (maximum 50) and Cameroon (one record of a flock in 1976). There has also been a recent breeding record from Senegal (one pair).

Movements:

Dispersive, partially migratory and nomadic; in many parts of its range, *M. angustirostris* is largely nomadic, making unpredictable, non-cyclical and opportunistic movements in relation to rainfall and flooding patterns that themselves are highly unpredictable. There is a general migration southwards in winter, but the timing and extent of these winter movements vary considerably between years (Green, 1995). In eastern Turkey, northwestern Iran and the central Asian republics, the species appears to be mainly if not entirely migratory. It is a summer visitor to the Amu-Darya Basin in southwest Uzbekistan, arriving in April and leaving by mid-October (Mukhina, 1995). It is also a summer visitor to the breeding areas in Azerbaijan (Patrikeev, in prep.) and the Uromiyeh Basin in northwestern Iran (D.A. Scott, pers. obs.). A. Green (*in litt.*) suggests that birds breeding in Uzbekistan probably winter in Pakistan, while birds from Azerbaijan, Armenia and Turkmenistan probably winter in Iran, although he admits that there is no real evidence for this. In the 1970s, there was some evidence of a small spring and autumn passage of *M. angustirostris* through the southeast Caspian region of Iran, presumably of birds moving between breeding grounds in Transcaspia and the main wintering areas in southwestern Iran (D.A. Scott, pers. obs.). The few birds breeding in the Lake Van region of eastern Turkey and Uromiyeh basin of adjacent northwestern Iran probably migrate southeast to winter in southwestern Iran, but again there is no real evidence to support this.

M. angustirostris wintering in the east Mediterranean are most likely to come from the small resident and partially migratory populations in the countries bordering the eastern Mediterranean. The few birds occurring on spring passage (March to May) in Cyprus, where the species formerly bred, are presumably Turkish breeding birds, perhaps on their return migration from Egypt. *M. angustirostris* breeding in Spain probably join the birds breeding and wintering in Morocco, and some of these in turn disperse southward across the Sahara to the major West African wetland basins in Senegal, Mali and Chad. Birds ringed in Coto Donana, Spain, have been recovered in northwest Morocco and northwest Algeria.

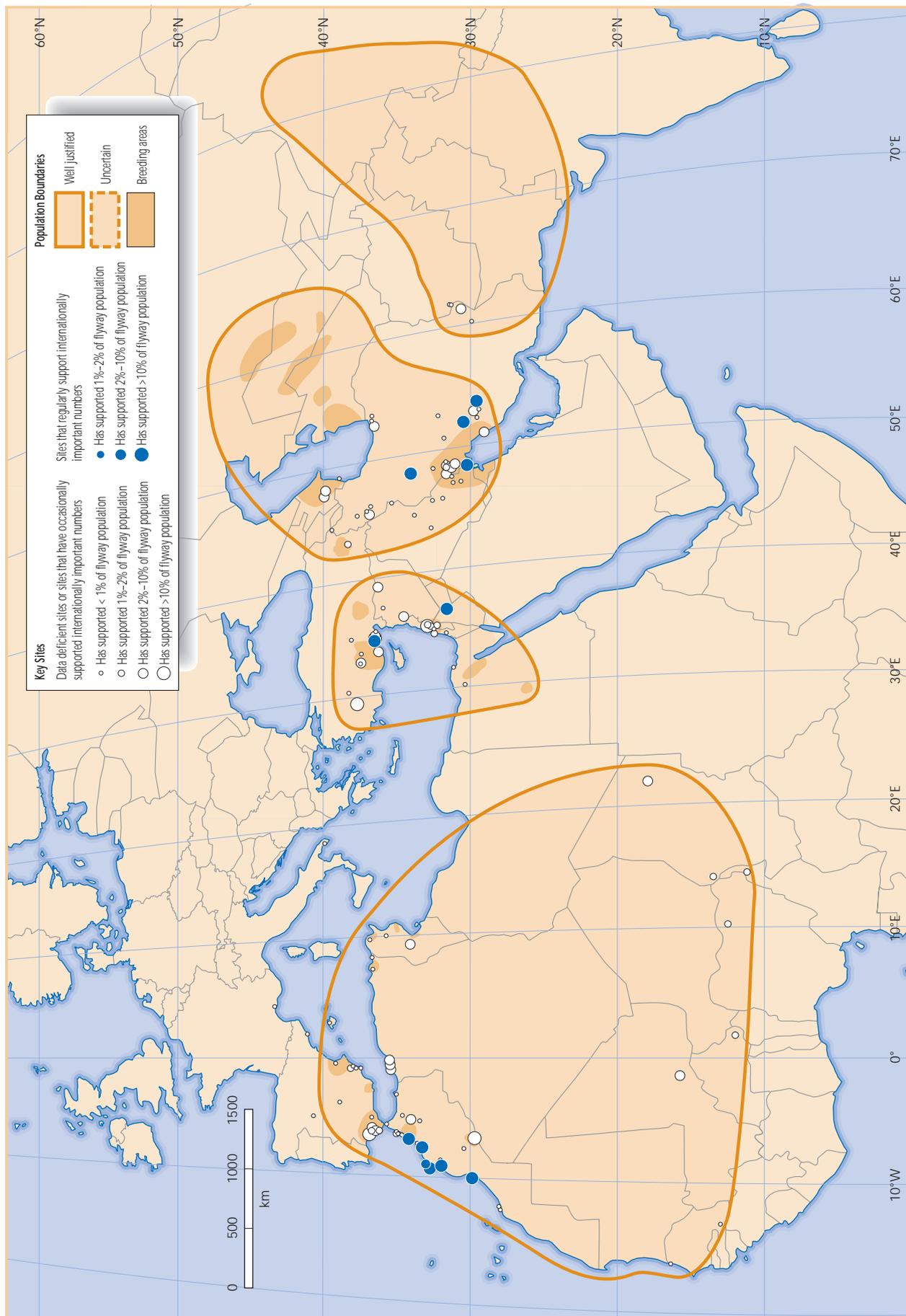
Population limits:

Monval & Pirot (1989) recognized two small and apparently discrete populations in the Mediterranean, one in the west and one in the east, and considered the main population in Southwest Asia to belong to a third population. These three populations are retained in the present report: a small population centred on the west Mediterranean, some of which winter (and may breed) in sub-Saharan West Africa; a small population in Turkey and the Levant, wintering south to Egypt; and a large population which breeds from eastern Turkey, Iraq, northwestern Iran and the Caspian region east to Kazakhstan, and winters mainly in southwestern Iran. The bulk of this population breeds in Iran and Iraq and winters in Shadegan Marshes in Iran. A fourth population winters in Pakistan and northwest India, and presumably originates from breeding areas in Afghanistan, Pakistan, and central Asia east to western China. This population, estimated at about 5,000 birds (Perennou *et al.*, 1994) is outside the area covered by the present report.

Population size:

- **West Mediterranean/West Africa: 3,000 (Green, 1993). 1% level 30.**

Some 2,410 were counted in Morocco alone in 1993 (A. Green, *in litt.*). The breeding population in Spain was listed as 50–230 pairs (Tucker & Heath, 1994), but has only ranged from 30 to 100 pairs between 1993 and 1996 (A.J. Green, *in litt.*).



- **East Mediterranean (Turkey/Levant): 1,000 (Rose & Scott, 1994). 1% level 10.**

This population is estimated at about 1,000 birds. Green (1993) gives a figure of 600 birds, based on breeding season estimates of 200 pairs in Turkey and Israel. However, Tucker and Heath (1994) give the breeding population in Turkey alone as 150–250 pairs, suggesting a somewhat higher total population size. *M. angustirostris* formerly bred in Egypt, but there have been only a few records since 1980, involving tiny numbers of wintering birds.

- **Southwest Asia: 5,000–15,000 (A.J. Green, *in litt.*). 1% level 100.**

Green (1993) estimated the population in southwest and southern Asia at about 30,000, based on a mid-winter count of 26,275 in Iran and Pakistan in 1992. This estimate included about 5,000 in southern Asia (mainly Pakistan), giving a Southwest Asian population of about 25,000 (Perennou *et al.*, 1994; Rose & Scott, 1994). Mid-winter counts at the main wintering area in southwestern Iran have fluctuated widely from a few hundreds to 20,000 (Scott, 1995), but this is almost certainly because of variations in coverage and the lack of aerial surveys in recent years. The breeding population in Russia has been estimated at 400 pairs (Vinogradov in Ellis-Joseph *et al.*, 1992), and that in Iran in the 1970s at 1,000–2,000 pairs (1995). Scott and Evans (1993) estimated the breeding population in Iraq, prior to the recent large-scale destruction of the Mesopotamian Marshes, at about 4,000–6,000 pairs. It seems likely that a major decline in numbers has occurred in this population during the last few years, following the drainage of a large proportion of the Mesopotamian Marshes in Iraq. A. Green (*in litt.*) has suggested that the Southwest Asian population may now have fallen to as few as 5,000–15,000 individuals. Most birds breeding in Iraq were thought to winter in Iran, and the extremely low mid-winter counts from Iran in 1993 (5,021) and 1994 (1,919) seem to provide evidence for such a population crash (Green, 1995). In light of the almost certain decline, an estimate of 5,000–15,000 is preferred.

Habitat/ecology:

M. angustirostris breeds on shallow, eutrophic wetlands, typically with dense emergent and submerged vegetation. Fresh to saline wetlands are used, but there is some evidence of a preference for slightly brackish wetlands. In winter, *M. angustirostris* seems to prefer recently flooded seasonal wetlands, and temporary wetlands that flood only in years of high rainfall seem to be highly attractive to the species. This is particularly true in North Africa, where some of the most important breeding sites are dry in most years. Pairing occurs in early spring, and egg-laying from late April to the first half of July. Brood amalgamation has often been observed, with up to 32 ducklings recorded with one female (Green, 1993). The species undergoes a full, flightless moult in late summer, probably followed by a partial moult into breeding plumage in late autumn/early winter. Moulting flocks have been reported in Tunisia in the first half of July, and moulting birds have been observed in Uzbekistan in June (Green, 1995). In Azerbaijan, birds leave the breeding grounds in August and early September, and return in the second half of March and April (Patrikeev, *in prep.*).

Conservation status:

A declining and threatened species, listed as 'vulnerable' by Collar *et al.* (1994) and Green (1996). The status and conservation of *M. angustirostris* have been described in some detail by Green (1993). The situation in Europe has been summarized by Green (*in* Tucker & Heath, 1994) and van Vesseem (1994), and an Action Plan for *M. angustirostris* in Europe has been compiled by Green (1995).

There has been extreme fragmentation of the range and massive decline in numbers of *M. angustirostris* in Europe and west-central Asia this century. The world population has declined by at least 50% this century, with larger declines indicated where quantitative historical data are available. Breeding populations in Spain and the former USSR have declined by over 90% since 1900, while the Turkish population appears to have declined by over 60% since 1970 (Callaghan & Green, 1993). The Spanish population is thought to have exceeded 1,000 birds in autumn in the late 1980s, but since 1990 there has been a marked decline to as few as 100–200 in 1994/1995 inclusive (A.J. Green, *in litt.*). In the 1950s and 1960s, there were thought to be between 300 and 500 pairs breeding in the Marismas del Guadalquivir alone, but by the late 1980s, there were only 15–25 pairs on the eastern side of the Guadalquivir and only a few more on the western side (Hidalgo, 1991). *M. angustirostris* was a common breeding bird in Azerbaijan in the 19th century, but numbers have dwindled during the 20th century, and by the late 1980s and early 1990s, the total population probably did not exceed 100 pairs (Patrikeev, *in prep.*). In Turkmenistan, it was formerly a common breeding bird and passage migrant, also wintering on the southeast coast of the Caspian Sea (e.g. 17,000 in 1932). However, it is now on the verge of extinction in Turkmenistan, having disappeared from much of its former range and currently breeding

only in small numbers in the Middle Amu Darya Valley (Poslavski, 1992). In Uzbekistan, it now occurs only in the Amu Darya Delta near the Turkmenistan border, and is rare there (Poslavski, 1992). The status of the species in its main breeding areas in Iran and Iraq is less clear, as reliable historical information is lacking. The population wintering in Iran (comprising over 70% of the world population) is thought to have remained relatively stable throughout the 1970s and 1980s (Perennou *et al.*, 1994), but must now be declining rapidly with the loss of important breeding habitat in Iraq (Scott & Evans, 1993).

The dramatic decline in numbers of *M. angustirostris* in Europe and west-central Asia has been attributed to hunting, pollution and above all drainage and degradation of wetlands, especially in the breeding areas. In Turkmenistan, the main cause of the decline has been a catastrophic reduction in breeding habitat, with many wetlands being replaced by cotton fields (Poslavski, 1992). Green (1993) thought that the world population of *M. angustirostris* at the beginning of the 1990s was most likely to lie in the range 34,000–40,000, with a total breeding population of 8,000–13,000 pairs. However, these figures may now already be out of date because of the massive destruction of breeding habitat that has occurred in the Iraqi marshes since 1991.

Network of key sites:

As for all globally threatened species, all sites regularly used by an appreciable number of individuals are of international importance. Green (1993) and Green (1995) list all sites known to be of importance for the species. All sites known to have supported *Marmaronetta angustirostris* are also listed in Annex 2 and if taken with the sites listed in Green (1993) and Green (1995), are probably an extremely complete and valuable key sites network. Iran holds by far the largest concentrations of *M. angustirostris* in the world, with one site, Shadegan Marshes in Khuzestan Province, regularly supporting between 10,000 and 20,000 birds (40%–80%) in mid-winter during the 1970s (Scott, 1995). Twenty-one other sites in Iran are wintering sites for *M. angustirostris* and this population is rarely recorded from other countries in winter. In addition, 17 breeding areas are known, 4 spring staging sites and 1 autumn staging site. The 5 sites listed from the far east of Iran and Afghanistan are more likely to represent the western edge of the population centred around Pakistan and hence fall outside the scope of this publication.

For the east Mediterranean population 9 breeding sites, 4 passage sites and 16 wintering sites are listed but some of these are selected on the basis of outdated census data. It is particularly ironic that the largest single concentration of individuals in this population (1,200) was recorded at Aynas Swamp in Turkey in 1968 just before the site was totally drained. The largest recent counts of wintering flocks in this population have been from the Hula Valley (138) in Israel. The west Mediterranean/West Africa population is well represented by 64 sites some of which contain very large numbers. The single most important breeding site by a wide margin is the Marismas del Guadalquivir, but numbers here are declining rapidly. The most important gaps that need filling in these key sites networks concern breeding areas (especially around the Caspian), Iraq, the status and origin of individuals in West Africa and more information on spring and autumn gatherings.

Protection status of key sites:

Most of the important sites in northwest Africa are unprotected. The breeding areas in the Marismas del Guadalquivir in southern Spain are only partially protected, but other Spanish breeding sites are mostly protected. Many of the sites in the east Mediterranean are unprotected. Most of the important sites in Iran are protected to some degree but even Shadegan Marshes, the single most important wintering site for the species, is only partly protected. Many other important sites in Southwest Asia are unprotected. Compared to most key sites networks in this report the protected status seems to be quite unfavourable for *M. angustirostris*.

RED-CRESTED POCHARD

Netta rufina

Subspecies:

Monotypic.

Distribution:

Palaearctic, with a very patchy breeding distribution from Iberia across southern and central Europe to west and central Asia. The main breeding range extends in the steppe and desert zones from the northern Black Sea to approximately 90°E in south-central Russia and northwestern China. West of the Black Sea, the species breeds mainly in southeast Spain and in small isolated groups scattered over central and parts of northwest Europe. The small population in northwest Europe is thought to be mainly, if not entirely, derived from feral birds. Western populations (from breeding areas east to the Aral Sea) winter south to the Mediterranean basin and south Caspian. In Africa, *N. rufina* is primarily a scarce winter visitor from Morocco to Egypt (south on the Nile to 25°N), although small numbers occasionally breed in Morocco, Algeria, Tunisia and Libya.

Movements:

Western and central European breeding populations are partially migratory, with some birds being sedentary and others undertaking only short-distance migrations within the Mediterranean Basin. Most east European and central Asian breeding birds are migratory, moving southwest from their breeding grounds to the Caspian and Black Sea regions. Birds wintering in the Black Sea/east Mediterranean region are thought to originate from breeding areas in southeast Europe, Turkey and European Russia east to the Volga Delta in the north Caspian. Birds wintering in Southwest Asia (mainly on the east side of the Caspian Sea) presumably originate from important breeding areas in Transcaucasia and central Asia. *N. rufina* is subject to hard-weather movements in Southwest Asia, with large numbers of birds moving into the south Caspian region during severe winters, presumably from their main wintering areas in Krasnovodsk-north Cheleken Bays and Lake Sarakamysh. An estimated 15,000–20,000 birds appeared in northern Iran during the particularly severe winter of 1972, as compared with only 500–4,500 birds in the milder winters of 1973, 1974 and 1975 (Scott, 1976). Moulting migrations take place in summer; birds breeding in the Camargue in southern France have been found moulting at the Bodensee.

Population limits:

Monval & Pirot (1989) recognized two wintering groups in the Western Palaearctic: a central European/west Mediterranean population centred on Spain and the Camargue in southern France, and a Black Sea/east Mediterranean population centred on the Danube Delta. Perennou *et al.* (1994) recognized a third, much larger population in central and Southwest Asia, with its wintering distribution centred on the east Caspian, especially Turkmenistan. These three wintering groups are recognized here. The western group appears to be almost entirely discrete, although there may now be some mixing in the north with the mainly feral northwest European population. There is no clear separation on the breeding grounds between the east Mediterranean/Black Sea and Southwest Asian wintering groups, and indeed considerable overlap in the north Caspian region seems likely, but as the principal wintering areas of these two groups are widely separated, treatment as separate populations seems amply justified.

The small northwest European population of about 350 birds is not considered here because of its likely feral origin (see Annex 1).

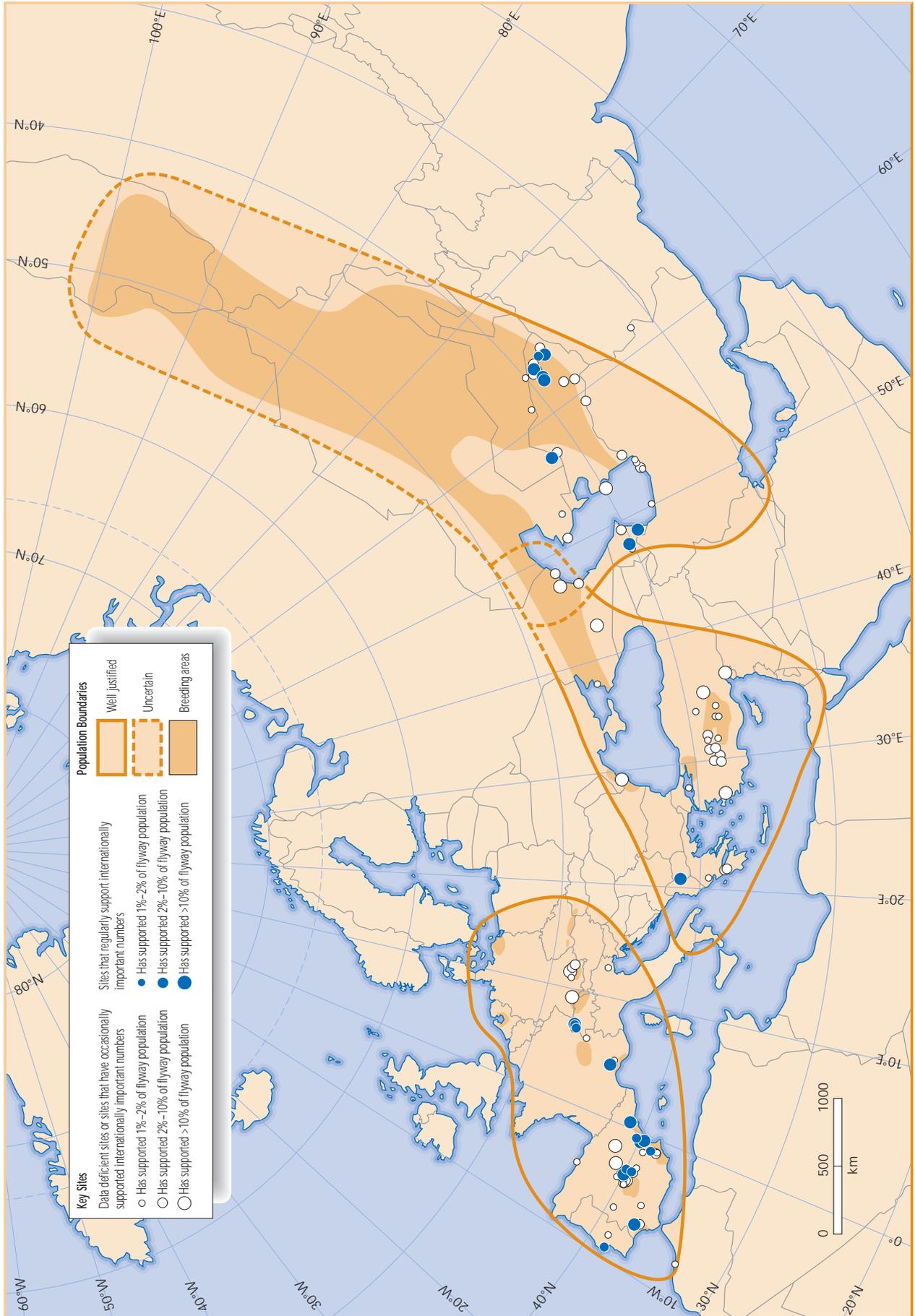
Population size:

- **Central Europe/west Mediterranean: 25,000 (see Annex 1). 1% level 250.**

- **Black Sea/east Mediterranean: 50,000 (Monval & Pirot, 1989). 1% level 500.**

Monval & Pirot (1989) estimated the Black Sea/east Mediterranean population at approximately 50,000 birds. The data remain very incomplete, and no better estimate of population size is as yet available (see Annex 1).

RED-CRESTED POCHARD *Netta rufina*



- **West-central Asia/Southwest Asia: 200,000 (Perennou *et al.*, 1994). 1% level 2,000.**

The estimate of Perennou *et al.* (1994) remains the best estimate available. High mid-winter counts in recent years have included 13,000 in Kazakhstan and 140,700 in Turkmenistan in 1991, and total counts of 145,651 in 1993 and 146,756 in 1994. Krivenko (1993) estimated that there were about 180,000 birds in south-central Russia and the central Asian republics in autumn. Isakov (1970b) estimated over twice this number in western parts of the former USSR, a figure which is consistent with the expected autumn numbers for wintering populations of 50,000 and 200,000 in the Black Sea and Southwest Asia respectively.

Habitat/ecology:

During the breeding season, *Netta rufina* favours rather deep, large lakes and lagoons of fresh or brackish water with abundant fringing vegetation, mainly inland in open country; in winter it also occurs in estuaries and other sheltered marine habitats. The moult migration of the adult males and immatures starts in early June, and flocks of several hundred moulting birds gather in some areas in late summer. Males moult their flight feathers between June and August, females one month later. During the wing moult, the birds are flightless for four weeks. The main autumn migration occurs in late October and early November, most birds reaching their winter quarters by December. The return movement occurs in February and March, and most breeding areas are re-occupied by April or early May.

Conservation status:

The total number of birds wintering in central Europe and the west Mediterranean has remained relatively stable over the past twenty years. However, there appears to have been a marked shift of birds within the region, with numbers increasing in central Europe and decreasing in the west Mediterranean (Rose, 1995). The reasons for this apparent shift in population are not understood. The wintering population in the Black Sea/east Mediterranean region appears to be decreasing, but the data are inadequate to confirm this (Monval & Pirot, 1989; Rose, 1995). However, the breeding populations in southeast Europe are known to have declined between 1970 and 1990, especially in the strongholds in Russia and Romania. A major decline has been reported at the important breeding grounds in the Volga Delta and Kuban River Valley (Sea of Azov) in Russia in recent years. These sites held a maximum of 9,000 pairs in 1973, 6,000 pairs in 1979 and only 4,000 pairs in the early 1990s (Tucker & Heath, 1994). This decline has been attributed to the recent sharp rise in level of the Caspian Sea and consequent reduction in the extent of reed-beds suitable as nesting habitat. There has not, however, been any evidence of a decline in the large breeding population in west-central Asia. According to Krivenko (1993), the post-breeding population in Kazakhstan and the Caspian region remained relatively stable between 1972 and 1989. There is no known reason for the decline in Romania.

Network of key sites:

The large annual fluctuations in the number of *N. rufina* counted, its irregular appearance at many key sites, and its shifting winter distribution all contribute to make it difficult to quantify the value of a key sites network for this species. All three populations occasionally appear in enormous concentrations, the largest substantially exceeding the size of the population estimates as do the highest annual totals for each population (see Annex 1 for discussion). The largest counts are of 220,000 at Sarysu Lake in Azerbaijan in January 1993, 285,000 at Manych-Godilo Lakes in the Caucasus region, staging counts of approximately 50% of the population at Sultansazligi in Turkey and the Danube Delta in Romania, and 35,680 at Gallocanta in Spain in January 1979. In other winters the population is highly dispersed.

Although only a few (11) key staging/passage/moulting sites are known, they are so major that it is conceivable that they harbour the majority of all three populations. This statement of course requires to be verified. The 103 key wintering sites listed (49 in central Europe/west Mediterranean, 23 in the east Mediterranean and 31 in the Caspian Basin) are probably quite complete and, in some years, they will provide wintering grounds for a very large proportion of each population.

Protection status of key sites:

Most of the very important staging sites are protected but many of the major wintering areas, particularly in Spain, and the east Mediterranean are unprotected. Many of the key wintering sites in Southwest Asia are also unprotected.

SOUTHERN POCHARD

Netta erythrophthalma

Subspecies:

Polytypic. Two subspecies have been described: the nominate form in South America and *N. e. brunnea* in Africa.

Distribution:

The nominate form has a very patchy distribution in northern and central South America. *N. e. brunnea* occurs widely in southern and eastern Africa from South Africa to Eritrea. It is not known to breed north of central Kenya and western Uganda, though it occurs commonly as a migrant in Ethiopia and Eritrea (Britton, 1980) and as an occasional straggler to Somalia (Ash & Miskell, 1983).

Movements:

Populations in southern Africa are known to undertake local and long-distance migrations. In South Africa, numbers are lowest from March to August (dry season) and at a peak in October and November (early wet season), suggesting the existence of two populations, one of which is migratory (Brown *et al.*, 1982). Ringing recoveries suggest dry season movement northwards from South Africa to Zimbabwe, Zambia, Malawi, Botswana, southern Mozambique and Kenya (Lake Naivasha). Most records in Botswana are between March and October, with peak numbers in March suggesting passage of birds through the country (D.R. Bishop, *in litt.*). In Zambia, there is an annual influx at Kafue Flats in mid-May; numbers build up at Lake Bangweulu after September, reaching a peak of many thousands in December. In Kenya, the largest numbers occur during the northern winter, with a large influx occurring in most years in October, and many birds departing in February (Brown *et al.*, 1982). These records suggest that birds may congregate in the central parts of their range (Zambia, Tanzania) in the middle of the year to breed.

Population limits:

The species has a wide range in eastern and southern Africa from Eritrea to the Cape, with no major gaps in its distribution. Some elements of the population undertake lengthy movements, virtually spanning the range of the species in Africa, and there would therefore seem to be no justification for separating the African population into smaller units. Only one population is therefore recognized, *viz.* the entire population of *N. e. brunnea*.

Population size:

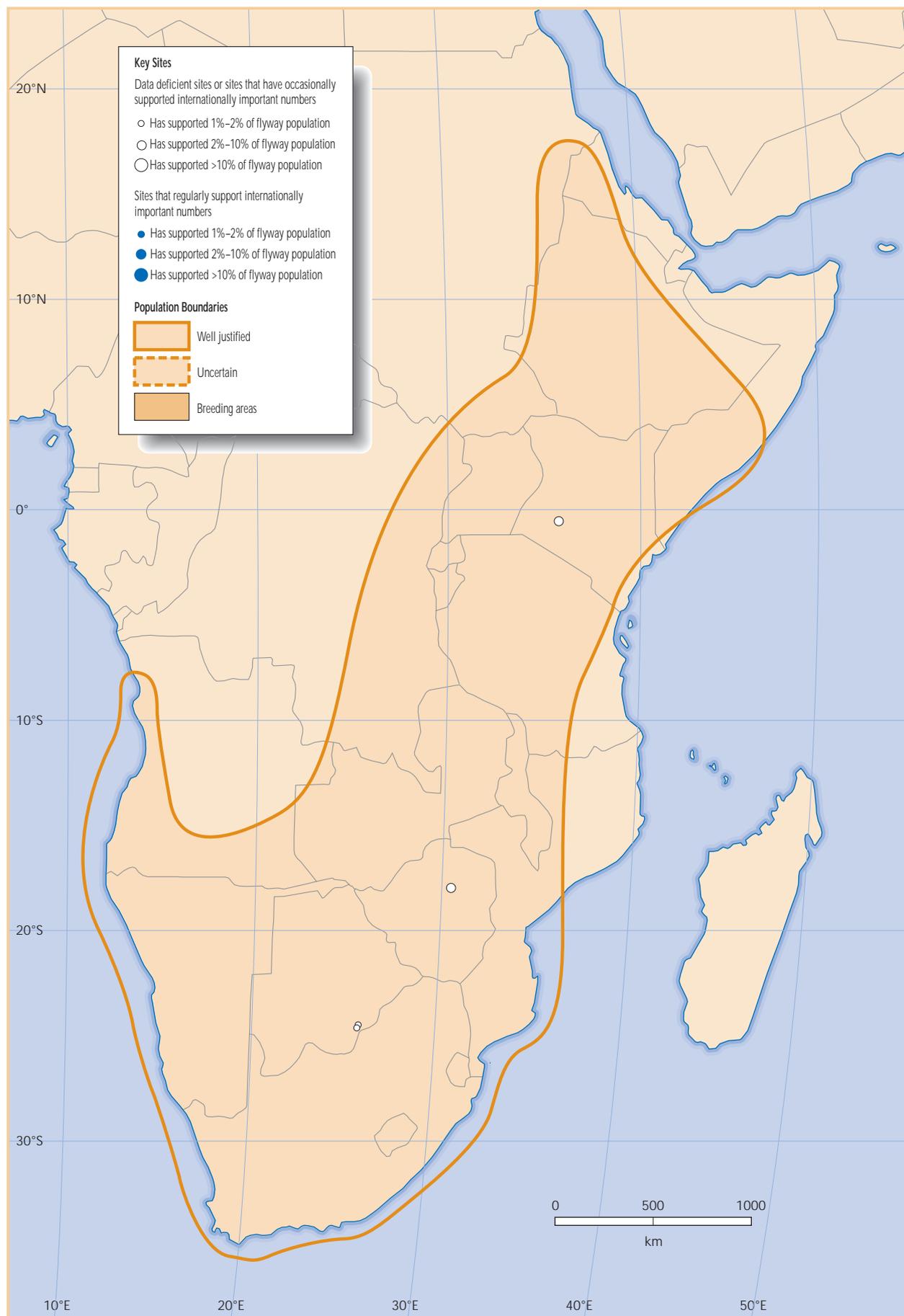
- **Entire population of *brunnea*: 30,000–70,000. Provisional numerical criterion 500.**

Common to abundant in much of its range; described as a regular visitor in small numbers to flooded cultivation in Eritrea (Smith, 1957), common to abundant in Ethiopia (Urban & Brown, 1971), widespread and common in Kenya, Tanzania and Uganda (Britton, 1980), common below 4,000 feet in Malawi (Benson & Benson, 1977), frequent in Zimbabwe, but not in the lowland (D.V. Rockingham-Gill, *in litt.*) and numerous at times in Zambia, especially at the Luapula River, Bangweulu Swamps and Lake Lusiwashi (Benson *et al.*, 1971). It is the commonest diving duck on many lakes in East Africa, especially south of the equator, often occurring in hundreds or thousands (Britton, 1980). It is a fairly common resident in Botswana (Newman, 1989), and a common resident elsewhere in southern Africa (Sinclair *et al.*, 1993). High counts have included: up to 2,300 at Lake Nakuru and 1,300 at Lake Naivasha in Kenya; flocks of 800–5,000 in western Cape Province, South Africa; 3,664 at Lake Chivero, Zimbabwe, and 7,500 at Kafue Flats in Zambia. The highest count during the African Waterfowl Census (1991–94) was 5,035 in 1993. A total of 926 was recorded in Tanzania during very extensive waterfowl counts in January 1995. Callaghan and Green (1993) suggest that the total population is under 100,000.

Habitat/ecology:

Netta erythrophthalma occurs mainly on deep, clear, permanent, fresh waters with or without emergent vegetation, and rarely on temporary waters or shallow ponds. In parts of southern Africa, it commonly

SOUTHERN POCHARD *Netta erythrophthalma*



occurs on man-made waters. It occurs at altitudes up to 2,400 m in the highlands of East Africa. In southwest Cape Province, South Africa, wing moult occurs after an influx of birds from the north in August and September.

Conservation status:

Numbers have increased in Zambia during the present century, probably because of the proliferation of man-made waters (Aspinwall, 1984), and an increase has also been reported in Zimbabwe (D.V. Rockingham-Gill, *in litt.*). However, according to del Hoyo *et al.* (1992), populations in other parts of Africa are prejudiced by transformation of their habitat to agricultural land.

Network of key sites:

Only three key sites could be identified on the basis of both January and July concentrations. Lake Chivero in Zimbabwe is recorded to have supported the largest concentration.

Protection status of key sites:

All three key sites are protected.

COMMON POCHARD

Aythya ferina

Subspecies:

Monotypic.

Distribution:

Palaearctic, with a wide breeding distribution at temperate latitudes across Eurasia to southeastern Russia and northeastern China. *A. ferina* is essentially a bird of the steppes, but has expanded its range westwards in recent years to colonize western Europe. Western Eurasian populations winter south to North Africa and the Gulf, with only small numbers continuing on south into West Africa, northeast Africa and the Arabian Peninsula. The species formerly bred in North Africa, and is only an irregular breeding bird in Iceland (up to five pairs). It occurs only as a vagrant in East Africa.

Movements:

Partially migratory; the species is present throughout the year on breeding grounds in temperate regions of western and southern Europe, but northern populations are highly migratory, wintering south to West Africa and occasionally the Equator in East Africa. *A. ferina* wintering in Western Eurasia originate from as far east as 120°E, where they breed in the forest-steppe zone of central Asia. Birds wintering in Britain and the Netherlands originate from Scandinavia, northern Germany, Poland, the Baltic states and Russia east to 70°E, between latitudes 45° and 70°N. Birds wintering in the Black Sea/Mediterranean region come from southern and central Europe, southern Russia, southern regions of western and central Siberia, Kazakhstan and other central Asian republics (Cramp & Simmons, 1977; Monval & Pirot, 1989), while birds wintering in Southwest Asia probably originate mainly from the central Asian republics and western and central Siberia.

Aythya ferina shows a dramatic movement out of the Baltic and Wadden Sea coasts during hard weather, moving south and west of the regular wintering areas. East European birds move down into unfrozen, large, high altitude lakes of Switzerland during harsh conditions, but movements within inland continental Europe remain unclear (Ridgill & Fox, 1990). Interestingly, the harsh weather troughs in the trends for the northwest European wintering population correspond exactly in timing and magnitude with the peaks in the trends for the central European wintering population (Rose, 1995).

Population limits:

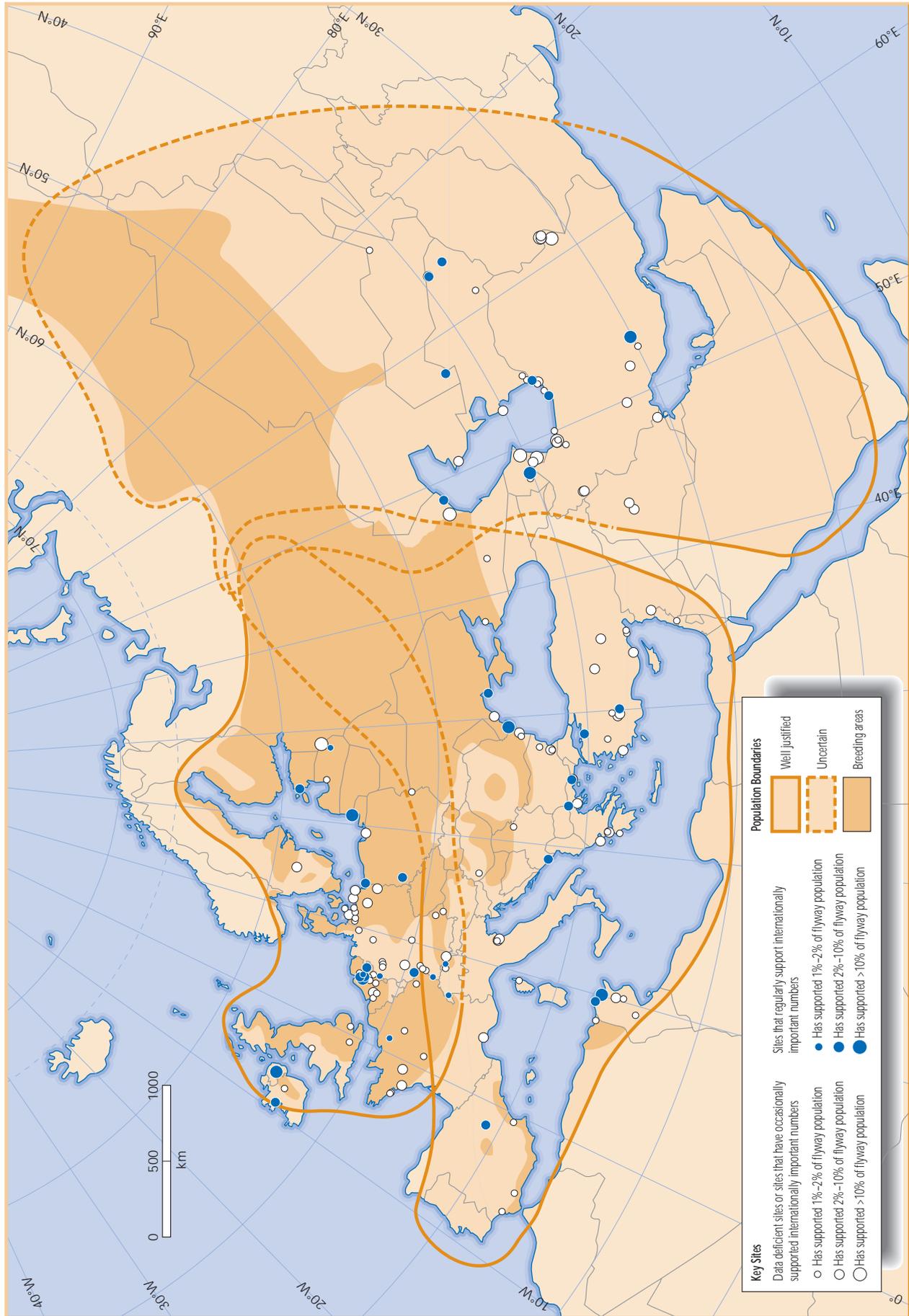
No discrete populations are identifiable, and it is very doubtful if any such populations exist. Monval & Pirot (1989) concluded that too few ringing recoveries were available to substantiate the hypothesis that the *A. ferina* occurring in Europe should be divided into two discrete populations, and thought it likely that important numbers of *A. ferina* wintering in the Mediterranean had the same origin as those wintering in northwest Europe. Similarly, there appears to be considerable overlap in the breeding areas of birds wintering in the Black Sea/east Mediterranean region and those wintering in Southwest Asia, with many birds from both wintering groups breeding in southern Siberia and the central Asian republics. Further east, there is also some overlap between the birds wintering in Southwest Asia and those wintering in the Indian subcontinent. Two birds ringed in Rajasthan, India, have been recovered in Iran, one only 12 days after ringing, and the other in a subsequent winter (Argyle, 1975). Earlier authors have recognized three sub-populations on the basis of the main wintering areas, *viz.* northwest Europe, Black Sea/Mediterranean and Southwest Asia (e.g. Monval & Pirot, 1989; Perennou *et al.*, 1994; Rose & Scott, 1994), and these are retained here. It is not obvious to which sub-population the birds wintering in central Europe are best assigned. There is clearly some exchange of birds with northwest Europe in harsh winters, but long-term trends in the central European birds differ markedly from those in both the northwest European and west Mediterranean birds. Monval & Pirot (1989) included the central European birds with the Black Sea/Mediterranean population. In the absence of good information and for the sake of consistency, this treatment is adopted here.

Population size:

- **Northwest Europe: 350,000 (Monval & Pirot, 1989). 1% level 3,500.**

Recent counts suggest that the estimate of Monval & Pirot (1989) remains valid (see Annex 1).

COMMON POCHARD *Aythya ferina*



- **Central Europe/Black Sea/Mediterranean: 1,000,000 (see Annex 1). 1% level 10,000.**

A few thousand birds from this population cross the Sahara into West Africa, e.g. up to 1,500 in Senegal, 505 in Mali, 350 in Nigeria and 615 in Chad.

- **Southwest Asia: 350,000 (Perennou *et al.*, 1994). 1% level 3,500.**

Perennou *et al.* (1994) estimated the Southwest Asian wintering population at 350,000, based on counts of up to 260,000 in the 1970s and counts of up to 191,000 in the late 1980s/early 1990s. Urban (1993) estimated the total number wintering in northeast Africa (excluding Egypt) to be between 1,000 and 3,000, with the great majority in Sudan (500–2,000) and Ethiopia (200–300). Recent counts in Southwest Asia support the 350,000 of Perennou *et al.* (1994), and as the number of *A. ferina* wintering in northeast Africa is relatively insignificant, this figure is retained for the entire 'flyway'. However, a recent count of 550,000 at Sarysu Lake in Azerbaijan (in 1993) suggests that this figure may be much too low.

Habitat/ecology:

Aythya ferina generally favours nutrient-rich waters less than six metres deep, including well-vegetated swamps, marshes, lakes and slow-flowing rivers with areas of open water. In winter, it often occurs on larger lakes, reservoirs, brackish coastal lagoons, tidal estuaries and inshore coastal waters. The species is highly gregarious, often wintering in flocks of many thousands of birds. In Russia, many birds moult in small groups on the breeding grounds. Larger gatherings of moulting birds, mostly males, are found in parts of western Europe between early June and late August or September, with peak numbers occurring in mid-July. The birds are flightless for three to four weeks during the wing moult. In eastern and southern Europe, the autumn migration reaches a peak in late September and October; in the maritime countries of western Europe, the peak is in October and November. There is some segregation of the sexes in winter, with males generally staying further north than females. In mild winters, the spring migration may begin as early as February, but the main migration occurs in March and early April. The breeding grounds are re-occupied from early March (in the south) to early May (in Siberia).

Conservation status:

Both the northwest European and Black Sea/Mediterranean wintering populations have been decreasing for the last two decades (Monval & Pirot, 1989; Rose, 1995). In northwest Europe, the rate of decline implies a 30% reduction in numbers over this period, but there are early signs that the trend might be stabilising at levels close to those in the late 1960s and early 1970s. In the Black Sea/Mediterranean region, the decline has been most marked in the west Mediterranean, where the rate of decline implies a 70% reduction in numbers over the 20 year period. There has also been a marked decline in the numbers of *A. ferina* reaching West Africa in recent decades (Brown *et al.*, 1982). Trends in the Southwest Asian population are unknown, although some decline seems likely. Krivenko (1993) reports a slight decline in post-breeding numbers in the middle region of the former USSR between 1972 and 1989, and the numbers wintering in Iran apparently decreased by 20–30% between the early 1970s and 1991 (Perennou *et al.*, 1994).

Network of key sites:

The three networks of key wintering sites for *A. ferina*, containing around 150 wetlands between them, are probably very complete. The largest problems arise in deciding to which population the central European wintering birds belong and of course the real answer is probably that the region contains a mixture of birds from both populations. For the purpose of selecting key sites a decision had to be taken and the higher selection criteria used for the Mediterranean region was applied (see discussion in preceding text and Annex 1). Some of the wintering sites for *A. ferina* are very important; for example, Sarysu Lake in Azerbaijan usually has over 400,000 wintering *A. ferina*, up to 120,000 winter at Lac Ichkeul in Tunisia and well over 10% of the northwest European wintering birds can be present at the IJsselmeer in the Netherlands and at Loughs Neagh/Beg in Ireland.

In contrast only 24 key passage and moulting sites are identified and most of these are autumn gathering sites near to final wintering grounds. Many more key passage sites must exist and based on the extremely large concentrations in Kursiu Lagoon and the Nemunas Delta (41,000) in Lithuania in autumn, the Danube Delta in Romania (369,150) in spring and the Volga Delta during moult some of these could be very important for *A. ferina*.

Protection status of key sites:

Most of the important sites for *A. ferina* are protected, although there are some important unprotected sites for example Skadarsko Jezero on the Albania/Macedonia (former Yugoslav Republic of)/Montenegro border, Burgas Lake in Bulgaria and Hamoun-I Puzak in Afghanistan.

FERRUGINOUS DUCK

Aythya nyroca

Subspecies:

Monotypic.

Distribution:

Palaearctic, with a fragmented breeding distribution at temperate latitudes (north to about 54°N) in the steppe, desert and southern forest zones from western Europe (where now rare) and northwest Africa across central Asia to western China (Sinkiang and northern Szechuan) and western Mongolia. In Western Eurasia, the main breeding range is located in eastern Europe (Romania, Hungary, Russia, Ukraine, Moldova and Turkey) and the southwestern republics of the CIS, but small numbers breed in isolated pockets throughout west and central Europe. The main wintering areas are in the Black Sea and Caspian regions, the coastal Mediterranean and West Africa, with relatively small numbers of birds reaching the Arabian Peninsula and eastern Africa (south to Kenya and rarely western Uganda). In West Africa, the main wintering areas are in Mali and Nigeria, but small numbers reach Cameroon, Chad, Niger, Senegal and Sierra Leone, and stragglers have been recorded in Gambia and Ghana.

Movements:

Chiefly migratory, although some southern breeding birds remain in their breeding areas year-round. Almost nothing is known about the migration routes of this species. It is known to be a summer visitor to the breeding areas in North Africa, and it is suspected that these breeding birds (and presumably also Iberian birds) winter in West Africa. A movement of birds from North Africa on a broad front across the Sahara seems likely. Birds wintering in Egypt (up to 7,500) probably originate from southeast Europe and Turkey. Small numbers of birds occur on passage in Cyprus (J. Gordon, *in litt.*), and these are likely to be birds moving between Turkey and Egypt. Some of the birds wintering in Southwest Asia breed locally (e.g. 150–300 pairs in Iran), but the majority probably breed mainly in areas to the east of the Caspian Sea east as far as the Aral Sea. The origin of the small number of birds wintering in northeast Africa (Sudan to Kenya) is unknown, but is likely to be in western Asia, in view of the relative frequency with which this species is recorded on passage in the Arabian Peninsula.

Population limits:

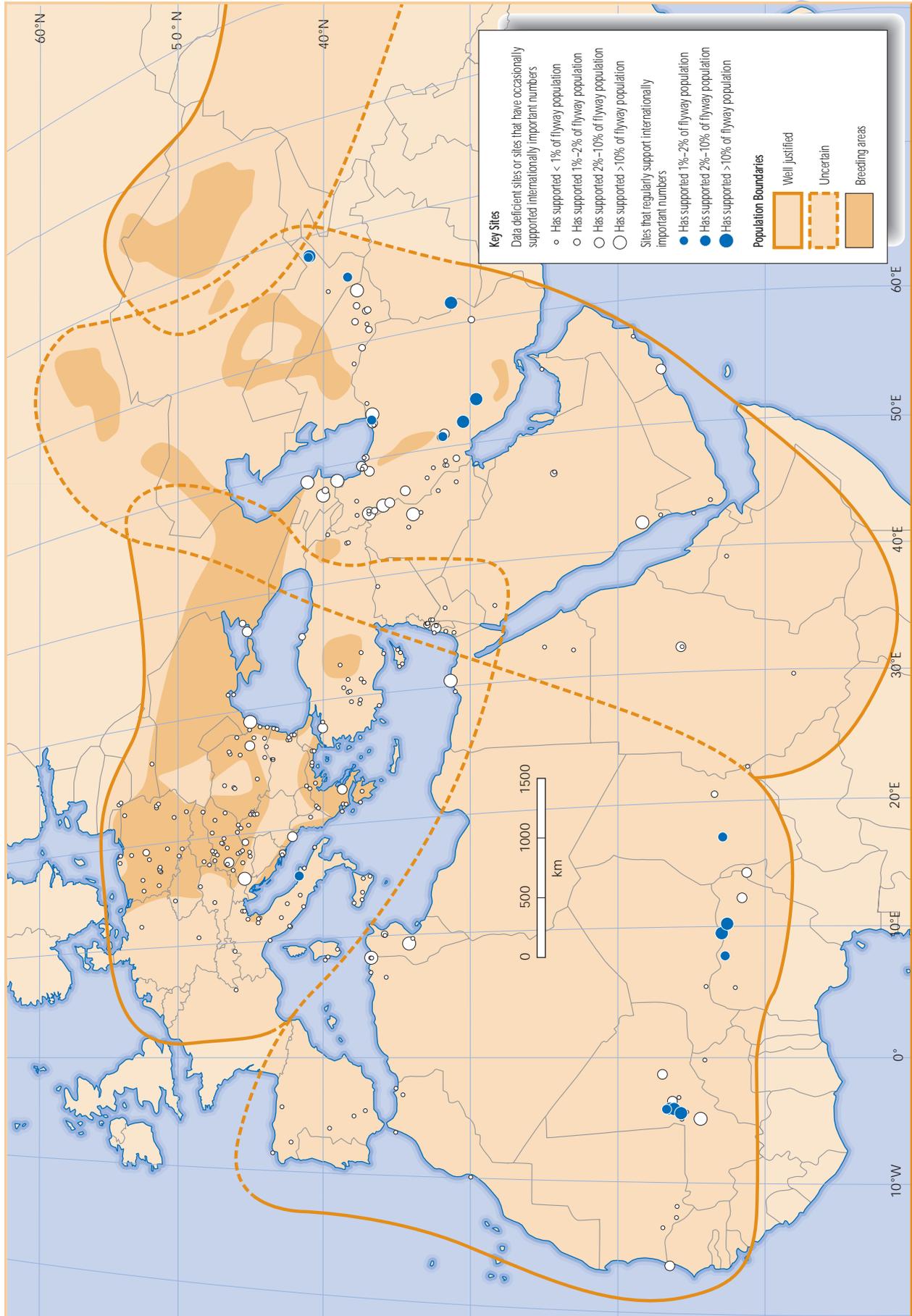
Three populations are recognized: a population breeding in the west Mediterranean and North Africa and wintering mainly in West Africa; a population breeding in eastern Europe and wintering in the Black Sea/east Mediterranean region south to Egypt; and a Southwest Asian population wintering through the Arabian Peninsula to northeastern Africa. (A fourth group winters in southern and eastern Asia). A. Green (*in litt.*) suggests that the birds breeding in western Europe and North Africa are now isolated from birds breeding further east, and probably therefore constitute a discrete population. However, it is unlikely that there is any clear division between the Black Sea/Mediterranean and Southwest Asian wintering groups, and these two 'populations' are retained primarily for practical reasons.

Population size:

- **West Mediterranean/West Africa: 10,000. 1% level 100.**

Monval & Pirot (1989) estimated the population wintering in West Africa to be 10,000, about half of which were in Mali. Perennou (1991b) suggested that a decline in numbers had occurred, and revised the population estimate to 7,000–10,000. The highest mid-winter count in the 1980s was 6,450 (in 1985); numbers in the Niger Basin were consistently high, with a mean of over 4,500 during the period 1984–87, while counts in the Chad Basin varied widely from nil to 2,200, with a recent peak of 1,606 in 1988. Elgood (1982) reported flocks of up to 1,000 between Sokoto and Lake Chad in Nigeria, while Louette (1981) observed several hundred at Waza, Cameroon, in January 1981. Up to 230 were recorded in the Senegal Delta in the 1970s, but the highest count during the period 1990–95 was only 30 (P. Yésou, *in litt.*). Only low numbers have been recorded in West Africa since the late 1980s, with the maximum in the 1990s being only 128 in 1994, but this may be largely due to reduced coverage of some of the key wintering areas.

FERRUGINOUS DUCK *Aythya nyroca*



The numbers of *A. nyroca* breeding in North Africa seem to have been grossly under-estimated in the past; Boumezbear (1992) counted 1,360 birds in El Kala National Park in Algeria in April 1992, and estimated that there were over 600 breeding pairs in the park, mainly at Lac Tonga. The species has also recently been found breeding in the lower Loukos in Morocco.

- **Eastern Europe/Black Sea/east Mediterranean: 10,000–50,000 (Callaghan, in press). 1% level 300.**

The European breeding population has recently been estimated at between 11,000 and 25,000 pairs, with about 6,000–15,000 of these in Romania (European Birds Database, 1994). This suggests a total population of 33,000–75,000 birds, most of which presumably winter in the Black Sea/east Mediterranean region. Monval & Pirot (1989) estimated the Black Sea-Mediterranean wintering population at 50,000, but noted that this figure had not been confirmed by mid-winter counts, and considered that it might be an over-estimate. Certainly very few are counted during the International Waterfowl Census; total counts between 1982 and 1986 averaged only 700, while typical counts in recent years have included 832 in 1992 and 762 in 1994. (An exceptionally high count of over 3,000 in 1993 included a large number of birds in Algeria). There have been recent reports of increased use of new canals and reservoirs by this species, and this would offer some explanation for the low counts, as such sites are not currently well covered by the International Waterfowl Census. Poor coverage of Egyptian wetlands may also be a factor in the low counts of recent years, as these appear to be especially important for this population e.g. 6,580 were recorded at Lake Burullus, Egypt, in February 1979 (Goodman & Meininger, 1989). N. Hecker (*in van Vessem*, 1994) concluded that in the absence of any comprehensive surveys, it was not possible to produce a more realistic estimate for this population than that given by Monval & Pirot (1989). However, a recent workshop to review the status of the species concluded that in the absence of any recent high counts and very little data an estimate of 10,000–50,000 was more appropriate (Callaghan, in press).

- **Southwest Asia/northeast Africa: 5,000 (Perennou *et al.*, 1994). 1% level 50.**

The Southwest Asian/northeast African population has been roughly estimated at about 5,000 birds (Perennou *et al.*, 1994), but the numbers are poorly known. Mid-winter counts in the 1970s approached 6,000 (with as many as 5,000 at the Kelifskiye Lakes in Turkmenistan in 1974), but the highest count in recent years has been only 2,407 in 1994. Patrikeev (*in prep.*) states that the wintering population in Azerbaijan is unlikely to exceed 3,000–5,000 birds, but this estimate appears to have been based on counts made in the 1960s, and there are no recent counts of more than a few tens of birds. It is possible that many birds in this population winter well to the east of the Caspian Sea and are never counted by the International Waterfowl Census. Urban (1993) has recently estimated the total population wintering in eastern Africa (excluding Egypt) to be no more than about 500 birds; Perennou (1992) gives 100–600. The highest mid-winter count in this region in recent years has been 110 in 1983. Urban (1993) estimated the wintering population in Sudan at 10–500 birds, and there has been a count of 105 in the White Nile Bird Sanctuary (in 1983), but Nikolaus (1987) listed the species as a rare migrant in this country. Small numbers winter regularly in Eritrea and Ethiopia (less than 100) and Kenya (less than 50), but there are no records from Tanzania or further south in Africa.

Green (1992) suggests that the world population may now be as low as 49,000 birds. The central Asian population (which winters in southern and eastern Asia) has been estimated at about 10,000 birds (Perennou *et al.*, 1994). With the present estimates of 10,000 in the west Mediterranean/West Africa, 10,000–50,000 in the Black Sea/east Mediterranean, and 5,000 in Southwest Asia, this suggests a world population of possibly under 50,000 birds.

Habitat/ecology:

A. nyroca breeds in shallow pools and marshes with abundant vegetation of all types, especially in large river deltas; it winters on larger lakes and lagoons, usually with reed-beds, and also in coastal marshes. Open water is rarely used by the species in any season. No moult migrations have been reported, birds undertaking the wing moult on the breeding grounds in July and August. Birds begin to leave northern breeding grounds in early September. Along the north coast of the Black Sea, the main migration occurs between early September and mid-October. The first birds arrive in wintering areas south of the Sahara in late October. Southern breeding areas are not deserted until the onset of cold weather. Spring migration begins in early March, and birds arrive back on their breeding grounds from mid-March to early April (in central Europe) and from mid-April to early May (in Russia).

Conservation status:

A declining and globally threatened species, listed as 'vulnerable' by Collar *et al.* (1994) and Green (1996). *A. nyroca* has declined markedly throughout much of its main breeding range in eastern Europe and western Asia in recent decades, and in several parts of its range has become extremely local. Isakov (1970a) estimated the breeding population in the former USSR at 140,000 pairs in the 1960s. By the early 1980s, the population in the European part of the former USSR had fallen to just 12,000–14,000 pairs, and by the early 1990s, as few as 6,000 pairs (Tucker & Heath, 1994). The decline in numbers and contraction in range have been especially pronounced in western Europe, where the small breeding populations in Spain and France have decreased to the verge of extinction. The Spanish breeding population has decreased from about 500 pairs earlier this century to only 1–5 pairs in recent years, while the French population may now be extinct (1–5 pairs in the 1970s, none in recent years). Krivenko (1993) reports only a slight decline in post-breeding numbers in Kazakhstan and the Caspian region between 1972 and 1989. However, there has been a marked decline in the numbers wintering in Turkmenistan, especially at the Kelifskiye lakes which held 5,000 *A. nyroca* in 1974, 1,300 in 1976 and 180 in 1978, but have held only occasional birds since then. The wintering population in northeast Africa has also declined markedly in recent decades (Brown *et al.*, 1982). The massive declines in numbers of *A. nyroca* have been widely attributed to wetland drainage compounded by high hunting pressure. Increased aridity in the climate of central Europe may also have caused widespread loss and deterioration of wetlands (Tucker & Heath, 1994). An action plan for the conservation of *A. nyroca* in Europe has recently been compiled by N. Hecker (*in van Vesseem*, 1994).

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 list of sites at which *Aythya nyroca* occurs in eastern Europe/Black Sea/east Mediterranean is very extensive and extremely useful as a conservation tool, but it still only includes a rather small proportion of the entire population because of the widely dispersed distribution of this species in most seasons. Nevertheless, Annex 2 lists 55 breeding localities 18 passage sites and 119 wintering areas which is an extremely good basis for establishing a protected areas network for this globally threatened species.

For the other two populations very few breeding areas are listed especially for the west Mediterranean/West Africa population (1 only) and even fewer passage/moulting sites (4 in total). The single breeding locality for the west Mediterranean/West Africa population is however of 1800 individuals at Lac Tonga in Algeria which is a very significant number. It is extremely important to find out more about breeding areas east of the Caspian which is a gap in the key sites network at present. Seventy wintering sites are listed for the Southwest Asia/northeast Africa population of which 42 have held over 50 individuals. In 1981 25,000 *A. nyroca* were recorded from Bakhtegan and Tashk Lakes in Iran which regularly held high numbers however numbers of this magnitude would be very unlikely now. Forty-five wintering sites are listed for the Mediterranean/West Africa population but this list is of minimal value until it can be properly determined where the West African wintering birds breed and until the erratic appearance of *A. nyroca* in North Africa can be explained.

Protection status of key sites:

About half of the main breeding areas in Europe are unprotected, and most of the important wintering areas in Africa are unprotected. Some of the most important sites around the Black Sea and Caspian Sea are protected, but most are unprotected.

MADAGASCAR POCHARD

Aythya innotata

Subspecies:

Monotypic.

Distribution:

Endemic to Madagascar. Apparently confined to lakes and pools (most importantly Lake Alaotra) in the northern central plateau of Madagascar. Possibly now extinct.

Movements:

Presumably sedentary within its very restricted range, as there are no records from other areas.

Population limits:

Only one population is recognized, *viz.* the entire population of the species.

Population size:

Entire population: 0–10. 1% level 1 (but possibly extinct).

Most recent records come from the Lake Alaotra region, although there have been a few isolated records outside this region, particularly at Ambohibao and Itasy lakes near Antananarivo. Collar and Stuart (1985) have summarized the known records of the species. There have been few records of the bird from anywhere within its known range since the 1930s. Two flocks (of five and three birds) were seen in the southeast part of Lake Alaotra in May 1960, a flock of 20 was seen in this area in June 1960, and a flock of five was seen on the northeast side of the lake in July 1960 (Collar & Stuart, 1985). In the 1930s, Lake Itasy was identified as another locality for the species, but there are no subsequent records from this lake. A pair was recorded on Lake Ambohibao near Antananarivo in March 1970. Around 1930, the species was seen on a small pond near Antsirabe, and three were collected in 1915 at Ambatomainty, near Maevatanana. Two were seen at a barrage near Ambadivato, in the Andilamena region 70 km north of Lake Alaotra, in June 1960. The type specimen is from Betsileo country, *i.e.* the southernmost named area for the species. Three surveys in the 1980s, along with interviews with local villagers, failed to find evidence of the bird (Wilmé, 1994). However, a single male was captured alive in fishing gear at Lake Alaotra in August 1991 (Wilmé, 1993). This bird died in captivity in January 1993.

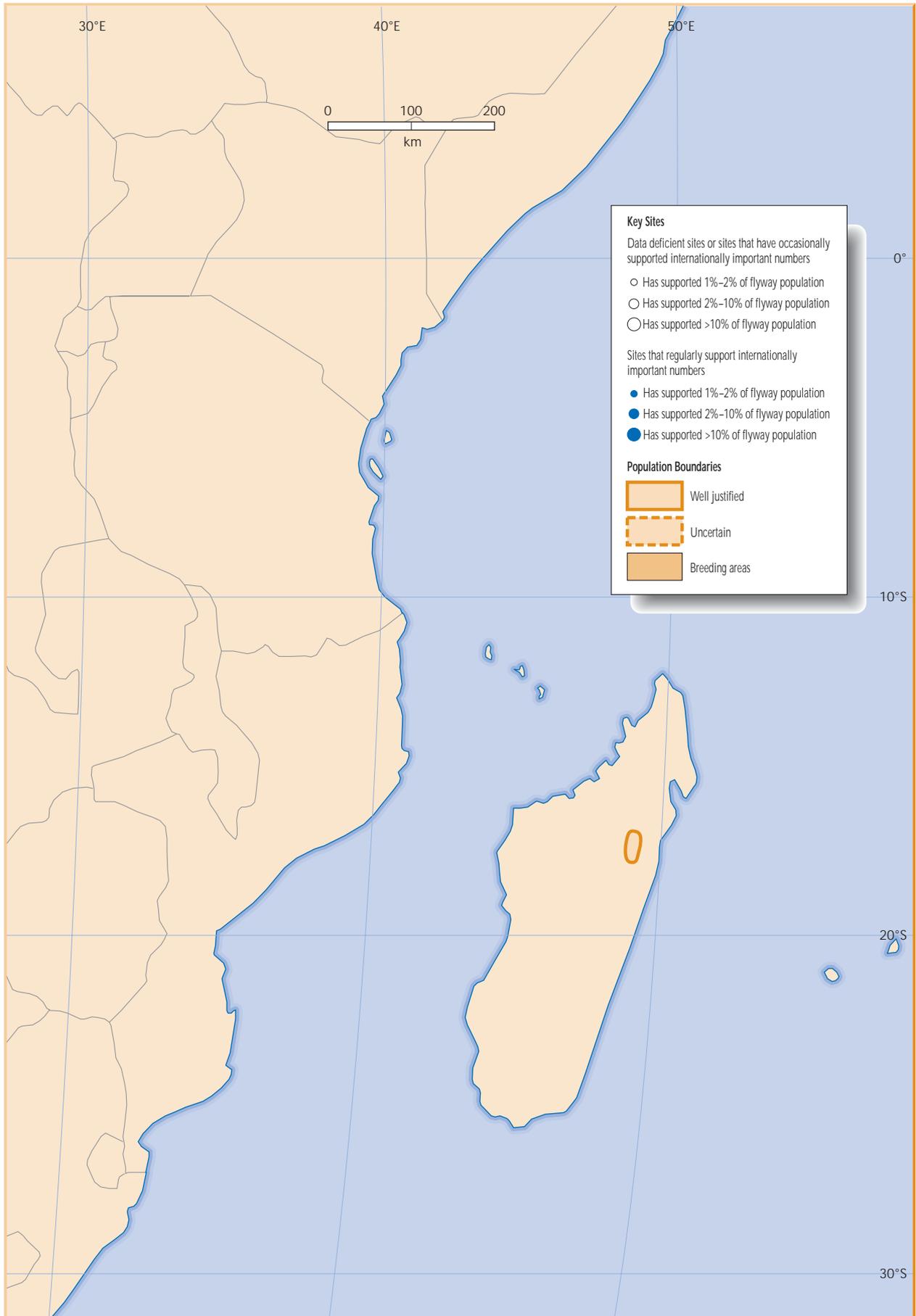
Habitat/ecology:

A. innotata is very poorly known. It is a diving duck of shallow freshwater lakes, pools and swamps with areas of open water and many islets of vegetation; all observations have been at elevations of 750–1,500 m. The pochard was usually found alone or in pairs, and was always very secretive. It apparently flew little, and habitually stayed near islets of vegetation, seldom venturing into open water (Langrand, 1990). Nesting has been observed in March and April.

Conservation status:

A declining and globally threatened species, listed as 'critically endangered' by Collar *et al.* (1994) and Green (1996), and possibly already extinct. There has been a progressive decline in numbers at Lake Alaotra since 1930s, when the species is said to have been common (Langrand, 1990). The lack of records in the 1970s and 1980s, despite a number of surveys, suggested that the bird was on the brink of extinction. Since one reported sighting near Antananarivo in 1970, the only record of the species has been of a male caught at Lake Alaotra in 1991. Intensive searches at Lake Alaotra in 1989–90 and 1993 failed to discover more birds, and the species may now be extinct. The decline in numbers has been attributed to trapping and hunting, introduction of exotic fish species (*Tilapia* spp., *Ophiocephalus* sp., *Cyprinus* sp., *Micropterus salmoides* etc.), introduction of exotic plants (*Eichhornia crassipes* and *Salvinia* sp.) and steady transformation of the Alaotra Lake area into rice-fields (Langrand, 1990; Wilmé, 1993 & 1994). Exotic fish compete for food and have eliminated beds of water lilies *Nymphus* spp. which may have been essential for the bird (Collar & Stuart, 1985; Young & Smith, 1989). Gill-net fishing of exotic fish may also have taken a heavy toll of

MADAGASCAR POCHARD *Aythya innotata*



adult birds (Collar & Stuart, 1985). Erosion in the catchment area, caused by slash-and-burn cultivation, has given rise to an extreme problem of siltation. These silt deposits have killed off much of the benthic fauna, particularly bivalves which are likely to have been an important source of food for *A. innotata* (O. Langrand, *in litt.*). Pidgeon (1996) reviews the degradation of Lake Alaotra and the probable extinction of *A. innotata*.

Network of key sites:

Lac Alaotra is the only known regular haunt of the species, and the only site at which it has been recorded since 1970. The recent appearance of a single adult at this site was however far enough temporally removed from the previous sighting to confirm that the individual must have originated from another site. It is thought to be certain that all individuals disappeared from Lac Alaotra between the last two sightings (Young, *in litt.*).

Protection status of key sites:

Lac Alaotra is unprotected.