

How many Cormorants do we have in total?

To answer this question in a meaningful way we need to refine it to a specific geographic area. The regional division shown in this publication is a first attempt. An analysis of the migratory movements of ringed birds could be used to elaborate, and to distinguish in a more sophisticated way, between different sub-populations. From the overall number of breeding pairs in groups A, B and C (*carbo* and *sinensis* combined), we estimate a total number of 372,300 breeding pairs. Applying the same conversion factor as we derived for the *sinensis* population in groups A and B (3.25), and 'converting' from breeding pairs to January numbers, we would tentatively estimate 1.2 million birds in 2007 throughout the whole western Palearctic region. However, this figure must be treated with caution as not all these birds can be classified as "European".



Map of Europe and beyond showing the major areas of occurrence of Cormorants

What is "Europe" and which populations are we talking about?

Cormorants, like many waterbirds, show large differences between their summer and wintering areas. Compared to the breeding distribution, the wintering distribution of Cormorants covers a much larger geographical range and birds are far more widely dispersed. In summer the majority of colonies is found in coastal areas, whereas in winter inland lakes and rivers also form an important habitat. With regard to the major pattern in distribution, the difference in proportional occurrence between the populations in the three regional groups is striking if winter and summer are compared (see Table 1). In winter, the Atlantic-North Sea group (A) has about half of all birds, whereas in summer this region accounts for only one-third of the total numbers of birds, the largest proportion of which (44%) breed in the Baltic-Central

European area (B). Talking about Cormorant numbers is only useful if the exact geographic area under consideration is stated precisely. Moreover, the majority of Cormorants do not roam about freely in this "super space" as distinct populations occur, with discrete migration patterns. For example the birds of group C will never show up in Western Europe and *carbo* birds hardly migrate into the interior parts of Europe.

What future work is needed?

Based on the available data from two integrated counts, a fairly clear picture of Cormorant status and distribution could be drawn. However, the populations might change due to climate change, shifting food supplies, management measures and other factors. Therefore a repeated census is necessary, both in winter and in summer. Indications from this and earlier work point towards declining Cormorant numbers in the southernmost wintering areas. Therefore, special effort is required to get these areas counted well in northern Africa, the Middle East and Turkey. On the other hand, the still expanding population in the Baltic needs further study in relation to numbers and migratory patterns. The detailed distribution and migratory patterns of birds breeding in the eastern Baltics, Belarus, northern Ukraine, parts of the Russian Federation and Georgia are very poorly understood and deserve attention. Finally, the reproduction and dispersion of *carbo* needs further clarification for large parts of its range.

#### Acknowledgements

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# Cormorants in the western Palearctic

## Distribution and numbers on a wider European scale

This overview presents information about numbers and distribution of Cormorants *Phalacrocorax carbo*. It is based on two Pan European censuses, carried out in January 2003 and census of breeding birds in 2006. Birds show distinct patterns of occurrence and different populations use this vast area, partly extending into the Russian Federation, Northern Africa, Turkey and the Middle East.

#### Counting Cormorants

Cormorants breed in colonies in summer, where they construct nests either in trees, bushes, or on the ground in reed beds and on bare rock or sand. In winter they disperse over large areas in both freshwater and marine shallow waters. Birds concentrate at night in roosts, situated on islands, river banks or artificial constructions like high tension poles, lighthouses, and ship wrecks. Although winter and summer areas overlap, most birds breed at northern latitudes and winter more to the south. During daytime, foraging flights occur between colonies or roosts and these range from 5-25 km (maximum 40-60 km) in each direction. In Europe breeding counts are best performed at colonies whilst outside the breeding season the most accurate counts are made at night roosts.

Counts require coordinated action by very many skilled persons, using binoculars, telescopes and other techniques such as aerial photography and ship-based counts in large, inaccessible areas.

#### Ecology, flyways and countries involved

In the western Palearctic, Europe, the Middle East and North Africa constitute the main area of distribution for two Cormorant subspecies: *sinensis* occurring mostly inland and along coasts of non-tidal waters,

and *carbo* breeding on rocky coasts in more exposed, marine habitats. The population number and geographic distribution range have recovered over the last forty years due both to protection (starting in The Netherlands in 1965) and to favourable feeding conditions (for example, due to eutrophication, degradation and modification of water bodies, decreased use of pesticides and over-fishing causing a shift towards simple communities of smaller fish).

According to the breeding distribution and migratory movements of Cormorants, the area can roughly be divided into three regional groups, mainly:





Photo: Torbjørn Moilås

**A Atlantic-North Sea/western Mediterranean** population ranging from Norway, Denmark, UK, Ireland, The Low countries, France, and into the western Mediterranean. This group includes the subspecies *carbo* whose breeding is generally confined to coastal marine waters.

**B Baltic/central European** population ranging from Sweden, Finland, the Baltic countries, Poland, Germany all the way south through central and eastern Europe (Danube countries) and to the south, including Italy and Libya.

**C Black Sea/eastern Mediterranean** population ranging from Belarus, Ukraine, European Russia south to Turkey, Israel and Egypt.

These three groups can not be considered as separately operating 'units', but as so-called "meta populations" – a group of populations existing at the same time in different places across a very large land surface area. Both groups (A) and (B) have strong links to countries outside the EU in winter, whereas Cormorants in group (C) are largely confined to non-EU countries during both breeding time and in winter.

**Breeding count 2006**

The most recent Pan-European breeding census on Cormorants was organised in 2006. In the area holding populations (A) and (B), a total of 232,311 breeding pairs of *sinensis* was assessed and 52,143 breeding pairs of *carbo*, giving a total of almost 284,500 breeding pairs breeding in the EU-27 region and Norway and Switzerland. We are far less well informed about the Group (C) population, where some 87,880 breeding pairs were estimated. This territory includes Belarus, Ukraine, European Russia and Turkey.

In order to arrive at an estimate of the total number of birds that might occur outside the breeding period, we used estimates for the average production of fledged young. These were, the old, long established colonies (1.0 fledgling/nest), the expanding group (2.5/nest) and the remaining group (1.8/nest). Applying different mortality rates for different age classes of birds through the winter until January allows us to estimate the mid-winter population. We used annual mortality rates of 40% for first calendar year birds, 30% for immature non-breeders

and 20% for breeding adults based on best estimates. The number of "floaters", that is immature birds of one, two and three years old that have not yet bred, was estimated at between 100,000 and 200,000 individuals for population group (A) and (B).

Thus from the breeding counts of groups (A) and (B), a January 2007 total of 755,300 Cormorants (*sinensis*) was estimated. This number includes the young of the year, the non-breeders and the breeding birds.

**Winter count 2003**

This Pan-European approach was organised in order to obtain the first standardised assessment of the status and distribution of the mid-winter distribution of Cormorants in Europe and beyond. Using data from about 2500 roosts, complemented by counts of Cormorants at water bodies during the annual International Waterbird Census (IWC), a total of almost

676,000 Cormorants was assessed over all three regional groups. Half of this total was in the Atlantic-North Sea-Western Mediterranean area (A) and one third in the Baltic-Central European area (B). These two areas, including the greater part of west and central Europe, are estimated to share a total of 561,000 Cormorants.

**The *carbo* subspecies**

Two subspecies occur in this part of the range, *carbo* mostly breeding at rocky cliffs and bare islands in Iceland, Norway, United Kingdom, Ireland and coastal parts of NW France (group A). Cormorants in Greenland also belong to this subspecies but these have been excluded here. The January 2003 count resulted in a total number of 134,100 *carbo* birds. In winter *carbo* birds stay mostly along the sea-coasts but also migrate inland (UK) and to the south (to Denmark, France, Spain and Portugal) where



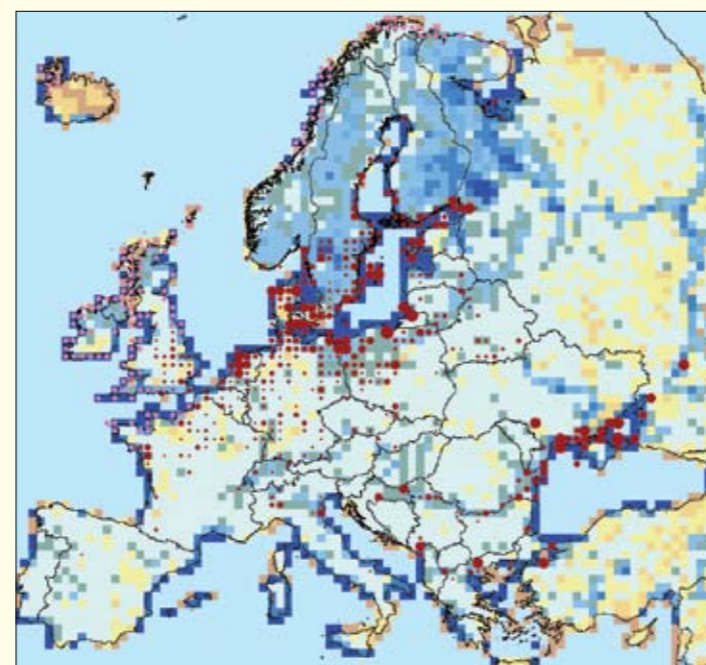
Photo: Mervyn Roos

they mix with *sinensis*, the other subspecies. The breeding census in 2006 revealed 52,100 breeding pairs of *carbo*. Because of its habit to use exposed, often inaccessible areas, this portion of the population cannot easily be monitored. Thus, we have less detailed geographic information on this subspecies compared to *sinensis*.

**Discussion**

*How comparable are the summer and winter data?*  
The number of birds assessed both in winter and summer correspond reasonably well, especially for groups (A) and (B) taken together. Given the most recent count from the breeding survey, the 755,000 *sinensis* estimated for January 2007 (based on the breeding count in 2006) would correspond to an estimated 558,000 - 615,000 birds in January 2003, depending on the number of non-breeders assumed. This estimated total can then be compared with the actual number counted which was almost 427,000 Cormorants (subspecies *sinensis*) in this region in January 2003. Given the different counting methods (breeding versus winter) and the completely different geographic areas involved in summer and winter (see maps), both estimates compare reasonably well. The estimate based on the summer count is higher because the geographic area covered in the winter census includes some uncounted areas in Eastern Europe and/or because some birds may have migrated out of the region completely (to other Middle East countries, Sudan etc.). Another possibility for the apparent discrepancy is that the actual survival and/or the overall number of non-breeders are less than we have assumed from current knowledge.

*Breeding Distribution of Cormorants in the western Palearctic*



Number of Cormorant nests

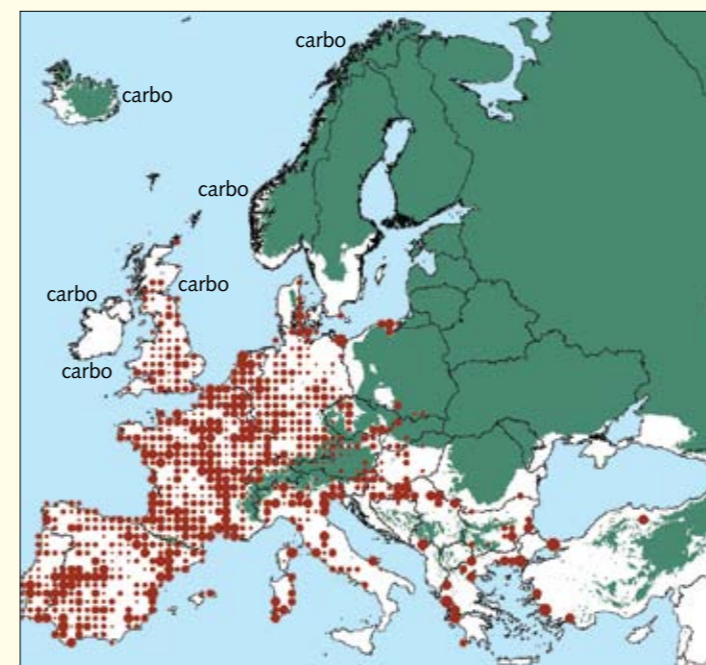
- 1-25
- 25-100
- 100-250
- 250-500
- 500-1000
- 1000-2500
- 2500-5000
- 5000-10000
- 10000-15000

Shallow surface waters (ha),

- 1-250
- 250-500
- 500-1000
- 1000-5000
- 5000-10000
- 10000-25000
- 25000-50000
- 50000-100000
- 100000-150000
- 150000-200000
- 200000-250000

*Distribution of colonies of Cormorants in 2006, presented as number of breeding pairs per grid cell (50\*50 km). Different colours indicate the availability of Cormorant foraging habitat - shallow surface waters. Most breeding Cormorants in Europe are present in the area of Baltic and North Sea as well as in the northern part of the Black Sea. The distribution area of the subspecies *carbo* is indicated in pink. Those *carbo* and *sinensis* birds that had incomplete geo-reference data are however included in Table 1.*

*Wintering Distribution of Cormorants in the western Palearctic*



Number of Cormorants

- 1-25
- 25-100
- 100-250
- 250-500
- 500-1000
- 1000-2500
- 2500-5000
- 5000-10000
- 10000-15000
- >15000

*Distribution of Cormorants in winter, based on the Pan European January 2003 census. Numbers have been presented per grid cell of 50\*50 km. The area of average January temperature of - 5.5 °C and lower is shown in green, this area is largely frozen over in winter. The presence of the subspecies *carbo* along the coasts of Iceland, Ireland, UK and Norway could not be presented clearly in this map on the basis of grid cells. The same holds for wintering Cormorants in the Russian part of the Azov Sea, and parts of Turkey. These, as well as those birds wintering in northern Africa, have however been taken into account in the Table showing the overall numbers.*

| Regional Group "Population"      | January 2003   |            | Summer 2006    |            |
|----------------------------------|----------------|------------|----------------|------------|
|                                  | birds          | %          | nests          | %          |
| (A) Atlantic-North Sea           | 346,524        | 51         | 121,763        | 32         |
| (B) Baltic-Central Europe        | 214,413        | 32         | 162,691        | 44         |
| (C) Black Sea-East Mediterranean | 114,898        | 17         | 87,882         | 24         |
| <b>Total</b>                     | <b>675,835</b> | <b>100</b> | <b>372,336</b> | <b>100</b> |

*Table 1. Comparison of inventories of Cormorants in 47 countries in the western Palearctic, including North Africa and the Middle East, in winter 2003 and summer 2006, separated by three geographic regional groups.*