

Status of the Golden Eagle *Aquila chrysaetos* in Europe

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Summary

Population estimates (number of breeding pairs) of Golden Eagles *Aquila chrysaetos* are given for most countries in Europe based on recent published accounts. Where published data are not available information is from local raptor specialists. The "best estimate" of the contemporary European population is 5,600 pairs \pm 5%. The largest numbers are in Spain (c. 1,200 pairs) with Norway, European Russia, Scotland and Sweden each holding over 300 pairs. Information on trends reveals that most substantial populations (> 200 pairs) are stable; decreases are reported from some Baltic countries and in parts of south-east Europe. The total population is also shown for five biogeographic regions across Europe. In some cases, such "regions" may be more appropriate for the formulation of conservation priorities and policies than are the biologically artificial units defined by national boundaries.

Des estimations des populations (nombre de couples nicheurs) d'Aigles royaux basées sur des publications récentes sont présentées pour la plupart des pays d'Europe. Là où les publications font défaut, des informations ont été requises auprès de spécialistes locaux. La population européenne actuelle est estimée à 5,600 couples \pm 5%. Les populations les plus fortes, soit plus de 300 couples, se trouvent en Espagne (env. 1,200 couples), Norvège, Russie européenne, Ecosse et Suède. Les informations sur les tendances des fluctuations indiquent que la plupart des grandes populations (plus de 200 couples) sont stables; un déclin a été constaté chez certaines populations de l'est de la Baltique et du sud-est de l'Europe. La population totale est aussi indiquée pour cinq régions biogéographiques qui peuvent s'avérer plus adéquates que les pays avec leurs frontières artificielles pour la formulation de priorités et d'une politique pour la conservation de l'espèce.

Introduction

Population estimates of uncommon species such as diurnal raptors are increasingly being used to support national and international conservation and protection policies (Bezzel 1980, Stroud *et al.* 1990). For example, the European Communities Birds Directive (79/409/EEC) requires member states to enact "special conservation measures" for a list of species (Annex 1 in the Directive). The Directive goes on to say that "Trends and variations in population levels shall be taken into account as a background for evaluations" and further "that Member States shall classify . . . special protection areas for the conservation of these species". If this policy is to retain political and biological credibility it is important that the information which underpins it is widely available and is periodically reviewed in the light of new research and survey. This paper presents a

comprehensive review of the status of one such Annex 1 species, the Golden Eagle *Aquila chrysaetos*, throughout Europe west of the Urals. It builds on a series of earlier reviews, most of which were geographically incomplete (Bijleveld 1974, Chancellor 1977, Cramp and Simmons 1980, Dennis *et al.* 1984, Génsbøl 1987, Meyburg and Meyburg 1987, Michel 1987) and incorporates the most contemporary published and unpublished population estimates for the species available at the end of 1991.

Sources of information

Where possible, information was obtained by extensive review of the European literature although, for the majority of countries, a population estimate for Golden Eagles was published during the period 1984–1991. If gaps were evident I wrote to known authorities on diurnal raptors and replies were received in most cases. Full details of sources are given under each country in the geographical review. In all cases the population estimate is for the number of breeding pairs of Golden Eagles.

Scope of the review

Europe is defined as those countries north of the Mediterranean (including the islands) and west of the Ural mountains. The south-eastern boundary is taken arbitrarily as a line from Orsk (51°12'N 58°34'E) south-westwards to Odessa (46°28'N 30°44'E) on the Black Sea. Turkey, the Middle East and North Africa are therefore excluded from the assessment although they fall within the western Palearctic biogeographic region. Knowledge of the status of Golden Eagles in these countries is generally poor.

In most cases information is presented by country and separately for the recently independent states of the former USSR. The main exceptions are the larger Mediterranean islands (Corsica, Sardinia, Sicily and Crete), which are geographically distinct from their respective geopolitical affiliations and are therefore dealt with as separate units.

Geographical review

The following country/island accounts are listed in alphabetical order and summary information on status is presented in Table 1. The trend in the population is given in one of four categories (increasing, decreasing, stable, unknown) and the source is the same as the population estimate unless otherwise stated. Whilst some figures clearly exhibit spurious accuracy I have not attempted to change these from figures given by the original authors.

1. *Albania*. Ornithologically this is one of the least known countries in Europe and the estimate of 40–50 pairs by Mevlan and Jaupi in Michel (1987) is the best available. Trend Unknown.
2. *Austria*. Niederwolfsgruber (1987) gives a minimum estimate of 60–70 pairs, with a possible additional 20–30 breeding pairs. However, Gamauf (1991) gives

Table 1. Population estimates of Golden Eagles and current trends in 26 European countries and five of the larger Mediterranean islands.

Location	Estimated population size (breeding pairs)	Trend ^a
1. Albania	40–50	U
2. Austria	60–250	S
3. Belorussia	30–40	D
4. Bulgaria	130–140	U
5. Corsica	29–35	S
6. Crete	10	U
7. Cyprus	2	U
8. Czechoslovakia	60–70	S
9. England	1–2	S
10. Estonia	25–30	S
11. Finland	220	I
12. France ^b	250	S
13. Germany	25–30	S
14. Greece ^c	210	D
15. Hungary	1	U
16. Italy ^d	250–339	U
17. Latvia	10	U
18. Lithuania	? few	U
19. Norway	700–1,000	S
20. Poland	15	D
21. Portugal	15–20	D
22. Romania	28–30	S
23. Russia (part)	300–700	U
24. Sardinia	30–38	U
25. Scotland	420–425	S
26. Sicily	13	D
27. Spain	1,192–1,265	S
28. Sweden	600	S
29. Switzerland	200–250	S
30. Ukraine	5–6	U
31. Yugoslavia	100	D
Total	4,971–6,151	

^aS, stable; I, increasing; D, decreasing; U, unknown.

^bExcluding Corsica; ^cExcluding Crete; ^dExcluding Sardinia and Sicily.

200–250 pairs. The figure in Table 1 gives the minimum–maximum range based on the above. Trend Stable.

3. *Belorussia*. V. V. Ivanovsky (*in litt.*) reports a population of 30–40 pairs in 1990. Trend probably Decreasing.

4. *Bulgaria*. A recent and extensive survey revealed an estimated 130–140 pairs (Michev *et al.* 1989). Trend Unknown.

5. *Corsica*. A report of 16 pairs in 1977 (Thibault in Génsbol 1987) has been revised upwards to 29–35 pairs, following fuller investigation (J.-C. Thibault verbally 1992). Trend Stable.

6. *Crete*. Vagliano (1981) estimates 10 pairs on Crete. Trend Unknown.

7. *Cyprus*. Meyburg and Meyburg (1987) report just two pairs. Trend Unknown.

8. *Czechoslovakia*. S. Danko (*in litt.*) states that the present population (1991) numbers some 60–70 pairs, all in Slovakia. Trend Stable.

9. *England*. Over the ten years 1981–1990 the population in England has been 1 or 2 pairs (RSPB unpublished data). Trend probably Stable.
10. *Estonia*. T. E. Randla (*in litt.*) estimates the population in 1990 as 25–30 pairs. Trend probably Stable.
11. *Finland*. S. Sulkava (*in litt.*) and Virolainen and Rassi (1990) report a Finnish population of 220 pairs. Trend Increasing slowly.
12. *France*. The published estimate of 250 pairs (Meyburg and Meyburg 1987) was quickly superseded by a revised estimate by Michel (1987) of 280 pairs. The figure in Table 1 has been calculated by removing an estimated 30 pairs for Corsica, leaving 250 pairs for mainland France. Trend probably Stable.
13. *Germany*. The most recent published estimate is Bezzel and Schöpf (1987) with 25–30 pairs, all in southern Bavaria. Trend Stable.
14. *Greece*. Excluding Crete there are an estimated 210 pairs (Meyburg and Meyburg 1987), although Andrinos (1987) gives a lower figure of 150–200 for the whole of Greece. Trend probably Decreasing (Hallman 1985).
15. *Hungary*. The first contemporary record of breeding in Hungary was in 1987 (Anon. 1988). Trend Unknown.
16. *Italy*. The best estimate is given by Fasce and Fasce (1987) with 250–339 pairs and some 50–60 of these in the Appennines, the remainder in the Italian Alps. Estimates for Sicily and Sardinia have been excluded. Trend Unknown.
17. *Latvia*. An estimate of 10 pairs is given by T. E. Randla (*in litt.*). Trend Unknown.
18. *Lithuania*. According to T. E. Randla (*in litt.*) “some pairs may occur”, although there are no confirmed breeding records for recent years. Trend Unknown.
19. *Norway*. Bergo (1987) summarizes recent estimates and concludes with a figure of 500 pairs. However, Gjershaug (1991) revises this upwards to 700–1,000 pairs. Trend Stable.
20. *Poland*. Krol (1987) estimates some 15 pairs, mainly in the extreme south-east and extreme north-east of the country. Trend Decreasing.
21. *Portugal*. Rufino *et al.* (1985) estimate 15–20 pairs for 1982. Trend probably Decreasing (Palma 1985).
22. *Romania*. L. Kalaber (*in litt.*) gives an estimate of 28–30 pairs for 1990. Trend Stable.
23. *Russia*. For European Russia, west of the Urals, T. E. Randla (*in litt.*) estimates some 600–700 pairs, although Galushin (*in press*) gives 300 pairs only. The figure in Table 1 gives the minimum–maximum range based on the above. Trend Unknown.
24. *Sardinia*. There are some 30–38 pairs (Fasce and Fasce 1987). Trend Unknown.
25. *Scotland*. The national survey in 1982–1983 revealed some 420–425 pairs (Dennis *et al.* 1984). Trend probably Stable.
26. *Sicily*. An estimated 13 pairs breed (Seminara *et al.* 1987). Trend probably Decreasing.
27. *Spain*. Arroyo *et al.* (1990) published the results of a national survey done mainly in 1987–1988. They estimate the Spanish population to be between 1,192 and 1,265 pairs. Trend Stable.
28. *Sweden*. Tjernberg (1990) estimates the population to be around 600 pairs. Trend Stable.

29. *Switzerland*. Extrapolating from detailed census work in parts of Switzerland the whole population is estimated at 200–250 pairs (Haller 1987). Trend Stable.
30. *Ukraine*. Gorban (1985) estimates 5 or 6 pairs for the Ukraine. Trend Unknown.
31. *Yugoslavia*. Vasić *et al.* (1985) estimate 100 pairs for Yugoslavia with the largest proportion in Macedonia. Trend slowly Decreasing.

Size of the European population

Based on the figures in Table 1, an estimate of the contemporary population of Golden Eagles in Europe would lie in the range 4,971–6,151 pairs. Removing the spurious accuracy of these figures it is probable that the best estimate is somewhere in the range $5,600 \pm 5\%$. Since figures for virtually all countries with estimated populations larger than 200 pairs have now been derived from complete or partial census data it is unlikely that the true figure will differ substantially from this estimate. Probably the greatest uncertainty lies in countries with populations in the range 50–100 pairs (e.g. Albania, Austria, Yugoslavia) where census data are few. Judging by the estimated population in surrounding countries, the figure for Romania may well be low. In countries where partial or complete censuses have recently been taken for the first time (for Spain, Arroyo *et al.* 1990; for Scotland, Dennis *et al.* 1984; for Sweden, Tjernberg 1990) the result has invariably been to raise substantially the previous "best estimate". It is therefore extremely unlikely that, when better data are available for less well known countries, the final figure for Europe will be lower than the current "best estimate".

Trends in populations

Information on trends is generally encouraging. Whilst in only 14 (45%) of the 31 units populations are considered stable or increasing, these in fact account for nearly 70% of the total estimated population. The main areas where a decrease is reported are in the regions termed below as the Balkan Mountains (particularly Greece and Yugoslavia) and the East Baltic Lowlands (particularly Poland and Belorussia). In Greece and Yugoslavia as well as Sicily and Portugal, the principal reasons for declines have been human persecution and disturbance, whilst habitat destruction, mainly loss of wooded peatlands, is the main cause in Poland and Belorussia. Of these populations where the trend is unknown it is likely that the large Russian population may be subject to habitat loss comparable to that in Poland and Belorussia. It is also possible, given the trends in surrounding countries, that threats from persecution may be impinging on populations in Italy, Albania and Bulgaria.

Biogeographic regions

Estimates of population size have inevitably been derived from survey work done, and knowledge accumulated, within geopolitical units (mainly countries). However, these essentially artificial divisions may not be the most appropriate units within which to judge the general health and conservation needs of wide-

ranging, low-density species such as Golden Eagles. Instead such birds lend themselves to a more radical approach based on biogeographic regions, and this is particularly appropriate when information on distribution and abundance is relatively complete over an area as large as Europe. For the Golden Eagle the various country populations fall into five clear biogeographic regions (Watson 1991): the North-West Mountains, East Baltic Lowlands, West Mediterranean Mountains, Alpine Mountains and Balkan Mountains (Figure 1 and Table 2). A comparison of Table 2 with the trends column in Table 1 shows clearly the priority areas for conservation action if Golden Eagles are to be retained over their full range across Europe. Populations in the North-West Mountains and the West Mediterranean Mountains are large and generally stable and that in the Alpine Mountains, though smaller, is clearly healthy. However, the smaller populations in the East Baltic Lowlands and the Balkan Mountains are under threat with population declines identified in several countries. Retention of a substantial population of the remarkable lowland-bog-nesting eagles (Zastrov 1946) will depend on effective conservation of their habitat in European Russia and Finland. By contrast, control of persecution through effective legislation and conservation education should be sufficient to reverse apparent declines in the Balkan Mountains.

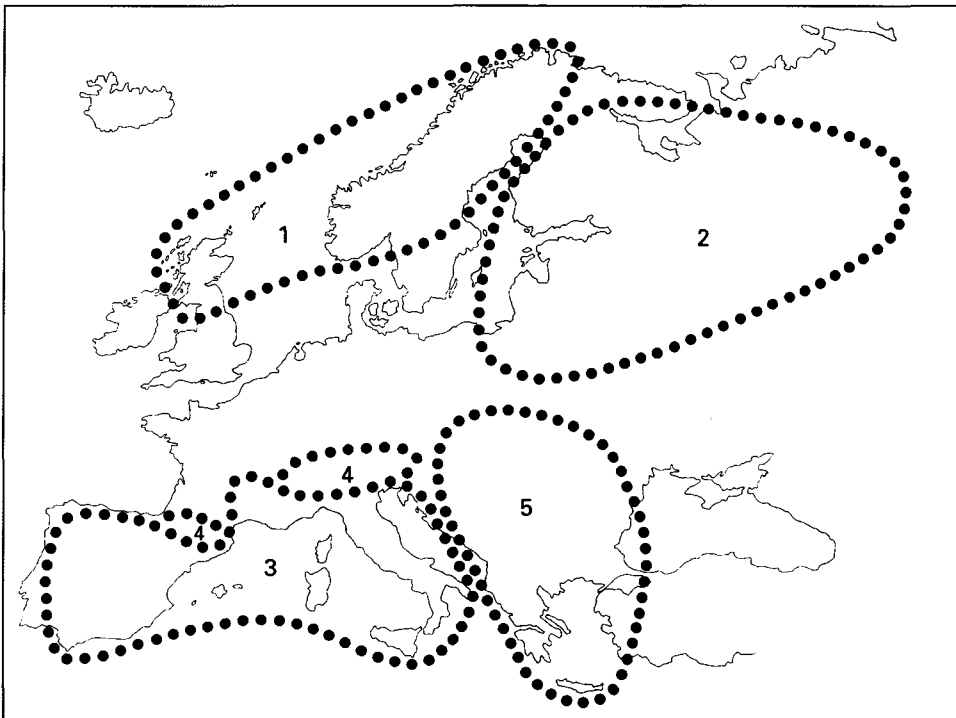


Figure 1. Map of Europe showing the approximate locations of the five biogeographic regions referred to in the text. The regions are 1, North-West Mountains; 2, East Baltic Lowlands; 3, West Mediterranean Mountains; 4, Alpine Mountains; 5, Balkan Mountains.

Table 2. Population estimates of Golden Eagles in five biogeographic regions across Europe. Locations falling within regions are listed (see text for details) along with a brief description of ecological features.

Biogeographic regions	Locations ^a falling within each biogeographic region	Ecological features ^b of region as reflected by Golden Eagle populations	Total estimated population of each region ^c
North-West Mountains	9, 19, 25, 28	Nesting at or above treeline, on cliffs or trees; main food grouse (Tetraonidae) and hares/rabbits (Leporidae)	1,880
East Baltic Lowlands	3, 10, 11, 17, 18, 20, 23	Only strictly lowland (<200 m asl) population in Europe; exclusively tree-nesting. Food mainly avian and very varied	810
West Mediterranean Mountains	5, 12 (part), 16 (part), 21, 24, 26, 27 (part)	Nesting below treeline in arid landscape mainly on cliffs. Main food is partridge (<i>Alectoris</i>) and hare (<i>Lepus</i>)	1,470
Alpine ^d Mountains	2, 12 (part), 13, 16 (part), 27 (part), 29	Nesting in cliffs at high altitude; generally hunting above natural treeline. Food usually includes high % of marmots (<i>Marmota</i>)	840
Balkan Mountains	1, 4, 6, 7, 8, 14, 15, 22, 30, 31	Mainly cliff-nesting; hunting below natural treeline. Tortoises (Testudinidae) usually form high % of diet	600
		Total	5,600

^a Numbers refer to locations given in the Geographical Review and Table 1.

^b These are aspects of nest site selection, hunting terrain and diet and have been chosen to represent some of the ecological differences between regions. Information is mainly from Cramp and Simmons (1980) but also several of the regional accounts referred to in this paper; see also Watson (1991).

^c These figures have been rounded to the nearest 10.

^d Includes the high mountains of the Alps and the Pyrenees.

Whilst the implementation of conservation policies will probably always be determined by national governments, it is helpful for the formulation of conservation priorities to view biological information in its true biogeographical context. For example, the Scottish population of Golden Eagles comprises some 7.5% of the European population but over 22% of the population in the North-West Mountains biogeographical region. This clearly places an international obligation on the British government in relation to the conservation of Golden Eagles. By contrast, the population in Portugal is just 0.3% of the European and 1.2% of the West Mediterranean population. The international obligation is clearly less, though the fact that the population is apparently decreasing should be a factor in determining national priorities for bird conservation in Portugal.

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