

## Policy and Practice

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## Conservation Values from Falconry

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### Introduction

Falconry is a type of recreational hunting. This chapter considers the conservation issues surrounding this practice. It provides a historical background and then discusses how falconry's role in conservation has developed and how it could grow in the future.

Falconry, as defined by the International Association for Falconry and Conservation of Birds of Prey (IAF), is the hunting art of taking quarry in its natural state and habitat with birds of prey. Species commonly used for hunting include eagles of the genera *Aquila* and *Hieraëtus*, other 'broad-winged' members of the *Accipitrinae* including the more aggressive buzzards and their relatives, 'short-winged' hawks of the genus *Accipiter* and 'long-winged' falcons (genus *Falco*).

Falconers occur in more than 60 countries worldwide, mostly in North America, the Middle East, Europe, Central Asia, Japan and southern Africa. Of these countries, 48 are members of the IAF. In the European Union falconry

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is regulated under the Wild Birds Directive (79/409/EEC) and in the United States by the Migratory Birds Act. Some countries with few falconers have no legal provisions. Falconry is recognised in international conventions: CITES has a system that allows individual raptors owned by falconers to be moved across international borders.<sup>1</sup>

## A concise history of falconry

Falconry is probably 2–3000 years old. Raptor bones are frequent in the burial kurgans of Scythian tribes and the earliest indisputable evidence comes from a Chinese description that could be as early as 700 BC (Xaodie, 2005). A claim in the Shahnameh epic of Ferdowsi, that falconry in Iran predated Zoroaster (c. 4000 years BC), was written after the conquest by Muslims. If falconry was that old, there should have been signs in the relics of Persepolis (Yazdani, 2005) and in writings from Egypt and Greece. A bas-relief possibly depicting a falconer was found in the ruins of Khosabad (c.1700 BC), but Lindner (1973) concluded from many mosaics and writings that raptors were used by Greek and early Roman citizens for fowling (e.g. to attract mobbing birds down to nets or twigs covered with bird-lime, and in Thrace by flying raptors to frighten birds down into nets at ground level) but not for falconry.

Falconry reached Japan in the 3rd century AD and Europe with the Vandals in the fourth (Lindner, 1973). It thrived in early Muslim culture; the first Arabic treatise is from the eighth or 9th century AD (Allen, 1980). Trained raptors have been widely used across Asia, from Turkey, Iran, Mongolia and China in the north, to Arabia and the Indian subcontinent in the south, with extension into North Africa as far as Morocco. Sparrowhawks *Accipiter nisus* are still trapped widely on migration in the eastern parts of their range, for flying at migratory prey such as Eurasian quail *Coturnix coturnix*, before release in spring.

Owing to the levy value of hawks in Britain (tax could be paid as a hawk or £8–10 in lieu), the Domesday Book (11th century) records 24 nesting areas, presumed to be of goshawks *Accipiter gentilis*, for the county of Cheshire. This gives an early raptor density estimate of 0.9 pairs per 100 km<sup>2</sup> (Yalden, 1987). Within 200 years, Emperor Frederick II of Hohenstaufen was writing *De Arte Venandi cum Avibus* (von Hohenstaufen, 1248), for which he has been called the father of ornithology. His principle of testing hypotheses, for instance by sending a trusted servant to the north to see whether barnacles

really metamorphosed into geese, was an important step in the development of modern science.

The Boke of St Albans (Berners, 1486) indicates that falcons were probably flown mainly by nobles, offering spectacular flights on excursions to large open spaces with a stable of reliable horses, whereas a goshawk was 'for ayeoman', being better for keeping a larder stocked with small-game. *An Approved Treatise on Hawks and Hawking* (Bert, 1619) reveals how sophisticated the veterinary treatment of trained raptors had become by the 17th century (Cooper, 1979). In Britain, falconry lost popularity after the English Civil War with the development of effective sporting guns and Land Enclosure Acts (which restricted access to good hawking land). By the late 18th century, the practice of falconry was restricted to a few landowners who formed a series of clubs until the present British Falconers' Club (BFC) was founded in 1927 (Upton, 1980).

Falconry was responsible for early laws to protect raptors. In England, goshawks were protected by Henry VII (1457–1509) 'in pain of a year and a day's imprisonment, and to incur a fine' (Cooper, 1981). When loss of interest in falconry was followed by the persecution of raptors to conserve game, Morant (1875) wrote in scorn of an 1873 committee on bird preservation 'No doubt, beside certain naturalists, it is our falconers who are anxious to make birds of prey more numerous'. Early in the 20th century, the BFC and the Royal Society for the Protection of Birds pioneered a bounty scheme for landowners who preserved raptor nests.

A small number of people kept falconry alive in most European countries and helped to establish it in North America between the two World Wars. The subsequent renaissance in Western falconry, illustrated by the increasing membership of the BFC (Figure 11.1), was stimulated by books, films, game fairs and journalists rediscovering a 'lost art'. It coincided with increasing general interest in wildlife, with falconers responsible for early quantitative studies of raptor predation (e.g. Craighead & Craighead, 1956; Brüll, 1964).

The early stage of the falconry renaissance also coincided in the 1950s and 1960s with some steep raptor population declines. Research eventually attributed these to the agricultural use of organochlorine pesticides (Ratcliffe, 1980; Newton, 1986), but not before falconry had been blamed. The removal of young from the last wild peregrines *Falco peregrinus* in Denmark and Schleswig-Holstein created fears that falconry was a threat to bird-of-prey populations. Laws banned hunting with raptors in countries with little history of falconry, including Sweden and (for recreation)

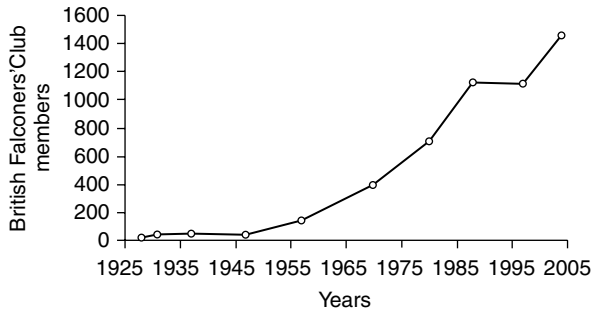


Figure 11.1 Growth in membership of the British Falconers' Club from 1925 to 2005.

Australia. However, most countries were content to tighten controls on the ownership of raptors.

Once aware of the pesticide problem, BFC members voluntarily restricted their licence applications for wild British peregrines. In the UK and North America, falconers created raptor conservation bodies (Hawk Trust, Raptor Research Foundation and Peregrine Fund) and began trying to breed peregrines, which had vanished in parts of Europe and the Americas. Peregrines had first been bred in Germany in 1943 (Waller, 1982) and isolated successes were achieved again in Germany and the US during 1970–1972. From a production of about 20 large falcons in 1972 (10 in Germany), the number bred annually rose to more than 200 in 1975 (Kenward, 1976). Falconers ran six of the seven major release projects for peregrines (in Germany, Poland and the US), and were heavily involved in the release programmes for Mauritius kestrels *Falco punctatus* and California Condors *Gymnogyps californianus* (Cade, 1986; Saar, 1988; Jones *et al.*, 1994; Trommer *et al.*, 2000; Wallace, 2001; Cade & Burnham, 2003).

## Sources of raptors for falconry

Traditionally, raptors for falconry were obtained as 'eyasses' from wild nests or trapped after fledging. However, most are now domestic bred. Falconers seldom train wild adults ('haggards'), which have had longer in the wild to accumulate latent diseases or learn behaviour that hinders training.

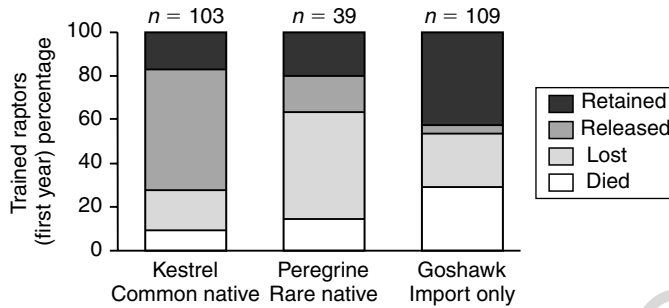


Figure 11.2 **Kestrels and peregrines, obtained from the wild under licence by members of the British Falconers' Club before 1970, were more often lost or released in their first year of life than Goshawks, which were relatively expensive imports. Data from Kenward (1974).**

Prior to 1970, raptors used in the UK were all native or potentially native species, and most were lost or released back to the wild in their first year (Figure 11.2, Kenward, 1974). Goshawks, which were relatively expensive imports, had fewest lost or released in their first year, but 52 per cent eventually, which successfully re-established a native Goshawk population (Kenward, 2006).

In the UK, the supply of licences to obtain native or imported raptors was gradually restricted during the 1970s, with the result that the value of raptors rose to a level supportive of commercial breeding. However, different species are not equally easy to breed. The species bred earliest in Britain were Eurasian kestrels *Falco tinnunculus* and sparrowhawks, for which production peaked in 1987–1988, at more than 1000 and around 600 respectively (Fox, 1995). Domestic breeding was slower to develop for Goshawks than for falcons. Breeding of Harris hawks *Parabuteo unicinctus* from North America, which are a social raptor that is relatively easy to train, developed fastest of all the large raptors in Britain (Figure 11.3). Overall, the breeding of peregrines, goshawks and Harris hawks, representing the main species flown by falconers, rose from 100 in 1980 to 800 in 1991 and supported the growth in the numbers of falconers, many of whom were not registered in Figure 11.1 as members of the BFC. Production of pure species flown by falconers in Britain tended to plateau during the 1990s, as supply met demand. Prices for large raptors reduced from maxima of around £1000 to an average of perhaps £500 (€750)

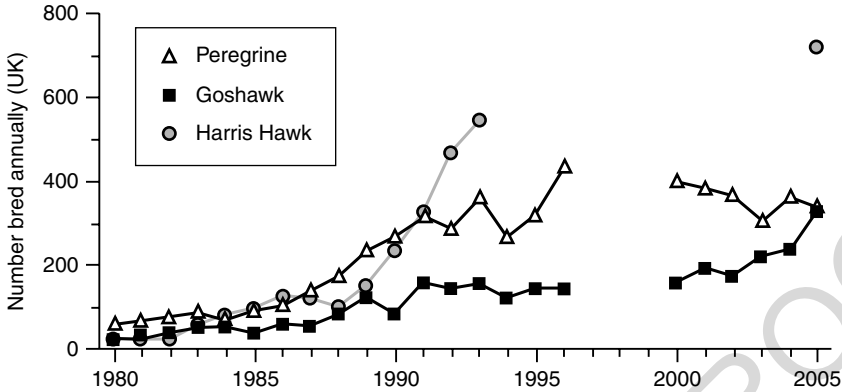


Figure 11.3 During the period of government registration of all domestic breeding of raptors in the UK, production of goshawks developed more slowly than for other species favoured by falconers. Data, from Hawk Board (1988), Fox (1995) and British Falconers' Club, originated in the Government Environment Department and the Independent Bird Register (after 1993, Government data were kept only for rare native species).

in 2006. Breeding of pure peregrines has tended to decline since the late 1990s (Figure 11.3).

Development in Britain of 'DNA fingerprinting' (Jeffreys *et al.*, 1985) as a parentage test for raptors (Parkin, 1987) had proved a very strong deterrent against 'laundering' of wild birds. Initial tests showed a minority of breeding claims to be false and random survey of 20 domestic raptor broods in 1995–1996 found no illegality (Williams & Evans, 2000).

A survey for the European Commission recorded only 88 wild raptors (including 61 goshawks and eight peregrines) licensed for falconry in 2005. This is tiny in proportion to an estimated domestic production of about 10,000. Although nine states in the European Union (EU) still permit use of wild raptors for falconry, the proportion allowed probably exceeds five per cent of domestic production in only three.

The use of captive-bred birds in the UK and the rest of Europe contrasts with the situation in South Africa and the US. The US Fish and Wildlife Service permits a harvest of up to five per cent of wild raptor production and records the use of 800–900 wild raptors annually (Millsap & Allen, 2006).



In the Middle East there has also been greater reliance on birds captured from the wild and over-harvesting has had negative effects on both the raptors and the prey animals they are then used against. The tradition had been to use saker falcons *Falco cherrug*, trapped on migration between their Central Asian breeding grounds and wintering areas in Africa, to hunt migratory prey, especially the houbara bustard *Chlamydotis undulata* of which many make a similar migration to winter in the Middle East (Allen, 1980). Houbara are challenging prey for sakers, which normally take smaller species and breed best where there is abundance of mammals (Pfeffer, 1987) that do not require great speed. In the early 1990s, some 2750 wild sakers were being trapped annually (Riddle & Remple, 1994), and oil wealth had driven prices in the Middle East to an average US\$5000 (€7500) per bird. Whereas the difficulty of providing such birds with fresh meat had formerly provided a strong incentive to release them after nomadic hunting, a wealthier and settled population with refrigerators could keep more falcons. This put unsustainable pressure on houbara stocks and resulted in an unsustainable harvest of wild sakers in some areas, as political changes made Central Asian breeding areas more accessible (Fox, 2001; Kenward *et al.*, 2007).

Along with the use of captive bred birds has come the development of hybrid birds. In 1971 a female saker falcon and 'tiercel' (male) peregrine, which each courted other falcons but lacked conspecific partners, were put in a breeding enclosure in Ireland and reared two young from five eggs (Morris & Stevens, 1971). From this beginning grew a fashion for breeding falcon hybrids, initially partly as novelties (and proof of domestic parentage rather than laundering in days before DNA forensics) and subsequently because of advantageous traits in hunting particular quarry. This latter consideration applied especially in the Middle East where sakers have been bred with gyr falcons *Falco rusticolus* to be larger than pure sakers, and with peregrines to be faster.

Combined data from the surveys showed a very strong tendency for few hybrids to be produced, or used, in countries that permitted enough wild raptors for more than 3 per cent of their falconers annually (Figure 11.4). The reason for this relationship is uncertain. Only where countries are permitting falconers to acquire a new wild raptor every three to four years would supply approach demand and reduce domestic production. A plausible explanation is that where falconers were obliged to depend on domestic progeny by early restriction of access to wild stocks, early development of commercial breeding gave producers experience and competitive incentives to develop a fashion for hybrids.

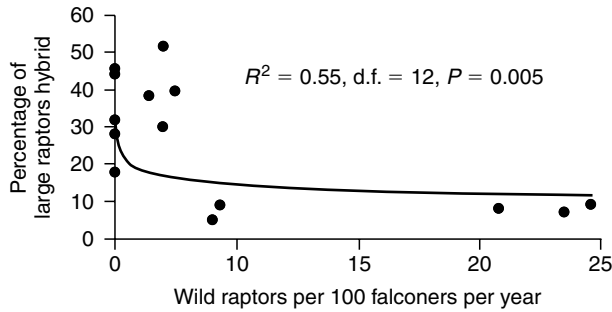


Figure 11.4 The proportion of hybrids among large raptors produced or flown (whichever was greater in the IAF survey of 2000 and the EC survey of 2006) did not exceed 10% in countries where more than three wild raptors were permitted per 100 falconers each year. Data from Kenward (2004) and the European Commission survey.

## Contributions to conservation

There are a number of ways in which falconry is valuable for conservation. To enable eyasses to gain flight skills as they would in the wild, falconers 'hack' them by providing food at an artificial nest site to mimic the natural post-fledging period before recovery for training. Hacking has since become a highly efficient conservation technique for soft-release to restock raptor populations (Cade, 2000), modify nesting behaviour and rehabilitate wild birds after veterinary treatment. Young peregrine falcons 'hacked' from platforms on buildings readily adopted such sites for breeding (Tordoff *et al.*, 1998). In Australia, incapacitated wild hawks maintained weight best after release if flown with falconry techniques (Holz *et al.*, 2006).

At hack or when flown free after training, raptors wear location aids, traditionally as 1–2-cm-long closed bells on the legs or tail. Early use of wild-life radio tags on eagles (Southern, 1964) was followed by a commercial RB-4 receiver for falconry, named after Robert Berry who first bred goshawks by artificial insemination (Berry, 1972), which became the first reliable receiver widely used in wildlife research (the LA-12). The large falconry market for radio-tags will drive further developments.

Falconers are a small but elite proportion of the hunting community. A survey in the US showed that 83 per cent of falconers had tertiary education,

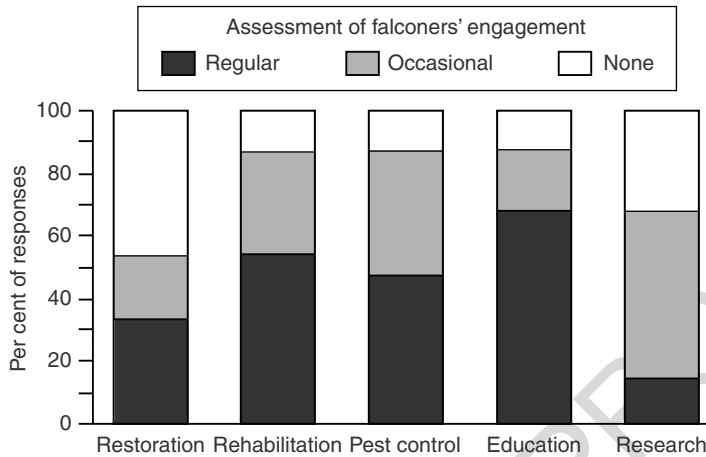


Figure 11.5 The engagement of falconers in conservation activities as assessed by delegates of national authorities in 15 countries of the European Union. Data from the European Commission survey.

compared with 47 per cent for other hunters and 57 per cent for wildlife-watchers. They spent twice as much time on their passion as hunters and six times that of watchers (Peyton *et al.*, 1995). US falconers also had a remarkably high engagement as volunteers in rehabilitation of wild raptors (57 per cent), conservation education projects (47 per cent) and raptor reintroduction work (35 per cent).

Similar engagement in Europe was recognised by delegates to the European Commission of national authorities responsible for the Wild Birds Directive. From 15 states with falconry, all but one recorded engagement in some aspect of raptor conservation. There was regular engagement in at least one activity in 12 cases, most often in education and awareness-raising, less in rehabilitation or use of raptors for biological control of nuisance species (typically on airfields) and least in research (Figure 11.5). Falconers in eight countries were engaged in conservation breeding or release work.

Falconers can also be important for monitoring wild raptors. Their peregrine nest maps in the mid-20th century were crucial for survey and restoration work (Cade & Burnham, 2003). Marking at nests by falconers and others was combined with subsequent trapping, for mark-recapture surveys of goshawks (Kenward, 2006) and sakers. The IUCN World Conservation

Table 11.1 Harvest rates and values of hunted red grouse, estimated for shooting by staff of the Game Conservancy Trust and measured for falconers at one estate in northern Scotland.

Harvest parameters	Shooting (driven grouse)	Shooting (walking-up)	Falconry
Grouse/hunter/day	c. 25	c. 10	0.3
Payment/grouse killed	€ 100–200	€ 27–40	€ 65
Total value/grouse killed	€ 100–200	€ 27–40	€ 325

Congress (WCC2 was in Amman in 2000) called on saker range states and falconers to work with others to, *inter alia*, monitor populations and estimate sustainable yields (IUCN Resolution WCC 2.74).

Finally, there is potential for conservation in hunting with trained raptors, because it can bring high value to local communities through prolonged presence yet does not require a high density of quarry species. A shooter party may take 30–75 times as many grouse as a falconer daily, while the falconer is worth from two to ten times as much to the estate per grouse bagged (Table 11.1, from Kenward & Gage, in press). Falconry can also control pests where guns are undesirable (Saar *et al.*, 1999).

## Conservation problems and responses in modern falconry

The recent survey for the European Commission addressed three concerns about falconry, namely the risk of introduction of exotic species; illegal procurement from wild populations; and the risk from introgression of genes through hybridisation. Of these, the introduction of exotic species was considered of least importance in Europe.

As has been seen there is little procurement of raptors from the wild in Europe. Indeed, wild peregrine populations tend to be highest in countries with most falconers (Figure 11.6), a relationship that remains even when the differing area of countries is taken into account ( $P < 0.01$ ). There is therefore no evidence that falconers in Europe are reducing the numbers of wild peregrines. Overall, the number of raptors used in falconry in Europe remains

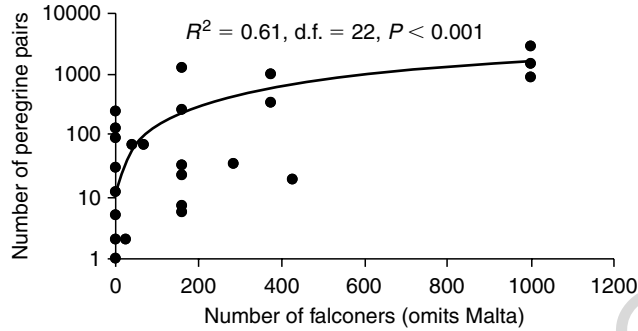


Figure 11.6 High numbers of falconers in EU states were where BirdLife International recorded large peregrine populations. Data from Burfield & van Bommel (2004) and the European Commission survey.

relatively low compared to the numbers breeding in the wild. Summary statistics gathered by Birdlife International in 2004 indicate a total of about 8400 pairs of peregrine falcons and more than 55,000 pairs of goshawks (Burfield & van Bommel, 2004) in the European Union.

The situation of the saker falcon in parts of Central Asia where trappers can easily access breeding areas is less healthy, with numbers reduced to a tenth of their former abundance. High productivity of this species gives it the potential for an unusually high yield of juveniles but is coupled with low survival in the first year to make it unusually sensitive to the harvest of adults (Kenward *et al.*, 2007). Nevertheless, saker populations are growing in Europe, remain large in west Kazakhstan and Mongolia (Dixon, 2005) and restocking has already started from domestic breeding with local genetic stock in depleted parts of southern Kazakhstan. It is essential for falconers to accept marking to certify the legal origin of sakers, so that value is low for birds outside official quota schemes. If necessary, marking can be associated by the banking of a feather or other genetic material as a 'mark-and-bank' security against marker tampering (Kenward, 2004). This could be linked to the development of a pay-to-use system, although this is challenging for a migratory species such as saker, because funds from harvesting in migration and wintering areas need to be transferred to ensure the conservation of breeding habitats. This might require an international agreement, perhaps under the Convention on Migratory Species.

The greatest concern in the European Commission survey was about hybrid falcons, with cases of hybrid breeding in the wild from four countries. However,

it is important to recognise that natural hybridisation has been recorded between peregrine and prairie falcon *Falco mexicanus* in North America (Oliphant, 1991). It is also now clear from observation and genetic analyses that hybridization is not uncommon in zones where sakers encounter lanner falcons *Falco biarmicus* or gyr falcons (Wink & Sauer-Gürth, 2004; Nittinger *et al.*, 2006). For the species involved to have maintained their phenotypic identity for millennia in the face of natural hybridization, which represents a lack of behavioural isolation mechanisms, suggests that there are strong selection pressures against survival of intermediate phenotypes. This suggests that the *occasional* loss of artificial hybrids may not do great harm to healthy wild falcon populations.

## Future directions

What is the future direction of falconry? Although severe action against falconry may be a tempting option for European governments because it will reduce lobbying pressure and the costs of regulation, it risks loss of special raptor management skills which take years to acquire.

Falconers certainly need to be cautious in their use of hybrids and thoughtful about exotic species, but governments need to recall that these are the product of restricted access to wild populations. When raptor populations are threatened, encouraging domestic breeding makes good sense. However, it may be that falconry in Europe would contribute more to conservation if more raptors were harvested from the wild. Perhaps the greatest cost to conservation associated with falconry in Europe now arises from obliging falconers to depend on domestic production, instead of using their funding and volunteer effort to help conserve wild stocks of popular species, like peregrines and goshawks, which are not at risk in the wild but need monitoring to ensure that populations remain healthy.

At an average €750 per bird, the domestic production of raptors in Europe is worth €7.5m. A one per cent harvest, of 1000 wild goshawks, would cover current demand in Europe and provide payments to landowners to compensate the predatory impact of this species as well as to fund monitoring. Although falconers in the US have recently regained access to peregrine populations that they helped to restore, harvesting peregrines more widely in Europe would require complex agreements to overcome entrenched positions and even five per cent (700 birds) would not meet the demand for large falcons. Domestic

breeding would therefore remain important for species that have proved more vulnerable than the goshawk to unexpected human impacts. Maintenance of expertise and capacity in domestic breeding is important too, for providing insurance against problems that are detected so late in wild raptor populations that few are left, as in the case of Mauritius kestrels, Californian condors and the *Gyps* vultures in southern Asia.

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## Note

1 For more information on practical and ecological aspects of falconry, see [www.i-a-f.org](http://www.i-a-f.org)

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