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THREATS TO AND CONSERVATIONIST ASPECTS OF BIRDS OF PREY IN THE CANARY ISLANDS

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INTRODUCTION

The situation of birds of prey at the top of the food chain and their susceptibility to changes in the environment make these predators worthy of in-depth study, especially in island ecosystems. Given the number of island species no longer found or seriously threatened, the need for knowledge of their biology and status in such confined surroundings is self-evident. Thus the five extinct species given in Fuller (1987) were endemic to islands, and of the seven taxa of diurnal birds of prey thought to be in immediate danger (Meyburg 1986), five also occur only on islands.

In Spain the destruction of predatory vertebrates (carnivorous mammals, birds of prey) considered harmful to human interests had considerable effect from 1953 onwards following the creation of the Juntas de Extinción de Alimañas. It seems that such persecution has been fairly general on the European continent during the last 150 years (Newton 1979).

The Canary Islands, lying off the north-west coast of Africa, have an avifauna of chiefly Palaearctic origin. Nine species of raptor occur on this archipelago (*Neophron percnopterus, Accipiter nisus, Buteo buteo, Pandion haliaetus, Falco peregrinus/pelegrinoides, F. tinnunculus, F. eleonorae, Asio otus* and *Tyto alba*); one further species - *Milvus milvus* - became extinct at the end of the 1960s (Martin 1987). Taking into account the checks done by King (1979) and Meyburg (1986), of those species currently threatened worldwide, only *Pandion haliaetus* is present in the Canary Archipelago, and whereas this is now considered by these authors to be "out of danger", in the Canary Islands it is fighting for survival.

CONSERVATION PROBLEMS

Antecedents

The birds of the Canary Islands seem to have withstood human encroachment relatively well, at least until the arrival of 20th century man and, in particular, man in the second half of this century.

Birds of prey were also persecuted here as vermin, an attitude even fostered by some researchers such as Mompo (1876), who proposed that the destruction of "harmful" birds be rewarded.

Similarly, the study methods of the naturalists and museum collectors in the second half of the 19th century and early decades of the 20th caused innumerable casualties among birds of prey. Bolle (1854), Tristram (1889), Meade-Waldo (1889), Koenig (1890), Polatzek (1908) and Bannerman (1912), among others, hunted down countless birds including raptors, shooting them and taking their eggs.

Parallel with these practices were the no less harmful customs of local people motivated by ignorance or perhaps by actual need. For instance, until recent times the nests of Eleonora's Falcon were regularly robbed of their chicks for food (Hernandez *et al.* 1985) and the same thing happened with the Osprey, especially during the post-war years (Diaz *et al.* 1986), when even their nests were destroyed for use as fuel.

Nocturnal birds of prey were also harrassed, being regarded as birds of ill omen and as "stone throwers" - popular beliefs held until quite recent times.

The wholesale use of insecticides to combat locust (*Schistocerca gregaria*) plagues during the 1950s (del Cañizo 1953-54) marked the irremediable beginning of rarefaction in certain raptor species. Martin and Emmerson (1982) have adduced that this could be one of the causes of extinction of the Red Kite and of the notable reduction in numbers of the Egyptian Vulture.

Army manoeuvres had also to be added to the list of traditional threats: the Roque del Este (a small islet to the north of Lanzarote) was used as a bombing range on at least two occasions, 30 June 1965 by the Spanish navy and 4 February 1967 by the French navy, although this probably occurred also on previous dates (Hernandez pers. comm.). These activities may well explain the scarcity of Eleonora's Falcon (only 18 pairs) during the 1976 census taken in the eastern islets (Hernandez *et al.* 1985). Fortunately the recent designation of this group as a nature reserve safeguards them from such harmful practices in the future.

MODIFICATION OF THE HABITAT

The increase in the human population and consequent demand for living space; the establishment of numerous coastal resorts to meet the boom in tourism; and the opening up of footpaths (most of them useless) etc., have transformed many areas of vital importance to birds. One of the species most affected by the rapid and substantial deterioration of the habitat has been the Osprey, which has suffered a drastic decline in numbers in recent years (Hernandez *et al.* 1987). This species may be regarded as a prime indicator of the impact of tourism on our islands, a close correlation having been established between abandoned breeding sites and development for tourism (Diaz *et al.* 1986). This is particularly significant on the islands of Fuerteventura, Gran Canaria and Tenerife where, in addition, the constant activity of sportscraft and bathers in the vicinity of the nests has disturbed the normal balance of the breeding cycle.

The drastic reduction in the amount of woodland (according to Santos *et al.* 1985, in Tenerife alone the present area of surviving laurel-forest is only one-tenth of its original size) has had an unquestionable influence on the rarefaction of birds inhabiting woodland areas. The Sparrowhawk, the only true forest raptor in the archipelago, seems to have come under the greatest pressure due to deforestation, especially on Gran Canaria. Between 1854, when Bolle considered it abundant on this island, and the present day, when it probably no longer breeds, a period of intensive human exploitation of the environment has taken place, leading one to conclude that this is the major limiting factor affecting its reproduction (Delgado 1986).

It is difficult for conservationists to understand how traditional practices of wood-cutting are allowed to continue in force, especially on the island of La Palma, where extensive tracts are still felled to provide poles for fencing and fuel for ovens.

POACHING AND NEST-ROBBING

The passage of time has modified the pressure exerted by hunting on birds of prey; the number of hunters to-day in the archipelago totals approximately 32,000 (about 4.3 per km^2). According to Rodriguez (pers. comm.), the records of the Bird Rehabilitation Centre in Tenerife for the years 1987-88 show that the species most often shot are *Buteo buteo,Falco tinnunculus* and *Accipiter nisus*. Diaz *et al.* (1986) consider it possible that individual Ospreys could have been killed, given the custom of shooting *Calonectris diomedea* and *Columba livia* from hides in boats.

The pillaging of nests in the Canary Islands seems to accord with the general pattern of this threat throughout Spain, to judge from the report prepared by the Coordinadora para la Defensa de las Aves (CODA 1988). Although a high percentage (45%) of the raptors brought in to the two bird

rehabilitation centres in the Canaries (Rodriguez, pers. comm.) are young taken from the nest, this follows an age-old tradition, as stated by Bannerman (1914), on the island of La Graciosa, where both village children and adults like to keep them in their homes, without any special significance for the practice of falconry.

The species most affected by this custom are *Falco tinnunculus, Buteo buteo* and *Asio otus*. However, on Gran Canaria at least, there are signs of an incipient interest in falconry, begun about 2 1/2 years ago. The birds used are *Falco* spp., Kestrel, Buzzard and Goshawk (Dominguez, pers. comm.). As has already occurred with other species, if some of the exotic birds imported for this practice escape, we could well witness the adaptation of non-native species to the Canary ecosystems, with the corresponding negative repercussions that this would imply.

The wide distribution of the Kestrel and easy access to its nest make this species in many cases the most vulnerable, especially in rural areas.

For reasons which we cannot explain, we have also encountered robbing and spoliation of nests of the Egyptian Vulture on Fuerteventura, despite its being a species well-known to farmers. This is also true for the Barn Owl, many of whose nests have a pile of boulders below them to provide easy access.

It is evident, therefore, that, next to habitat destruction, poaching and nest-robbing form the greatest threats to birds of prey in the Canary Islands (Table 1), despite the supposed legal protection given them at the present time. These negative factors coincide with those of other Spanish regions (Muntaner & C.R.P.R. 1985; Kostrzewa *et al.* 1986).

PESTICIDES

No studies have been made regarding the impact of these substances on birds of prey in the Canary Islands. Nevertheless various clutches found to be partially or wholly infertile strongly suggest that these poisons have entered the food chain and are affecting some species. Hernandez *et al.* (1985) are of this opinion as regards *Falco eleonorae* and Diaz *et al.* (1985) share this view with regard to *Pandion haliaetus*. Rodriguez (pers. comm.) has also pointed out that 6.25% of raptors admitted to the Tenerife Bird Rehabilitation Centre in 1987-88 may well have absorbed toxic substances.

There is a need for an in-depth study of the levels of absorption of these toxic compounds and their impact on the breeding cycles and mortality rates of these birds.

TABLE 1: Factors currently threatening birds of prey in the Canary Islands (from Carrillo, 1986, partially modified).

(*) indicates the importance of each factor; (@) probably affecting almost every species but its true importance is unknown; (#) extinct species.

B.b. - Buteo buteo; A.n. - Accipiter nisus; N.p. - Neophron percnopterus; P.h. - Pandion haliaetus; M.m. - Milvus milvus; F.t. - Falco tinnunculus; F.e. - Falco eleonorae; F.p./p. - Falco peregrinus/pelegrinoides; A.o. - Asio otus; T.a. - Tyto alba.

	B.b.	*A.n.*	*N.p.*	*P.h.*	*M.m.*	*F.t.*	*F.e.*	*F.p./p.*	*A.o.*	*T.a.*
Destruction of habitat				***				***		
Damage			*	***			**	*		
Nest Pillaging	**	*	*			***	*		**	***
Direct Hunting	***	**		*	#	***		**	**	**
Reduction of Nutritional Resources			**							
Impact of Cars						*			**	**
Pesticides	@	@	@	@		@	@	@	@	@

OTHER THREATS

Collision with vehicles seems mainly to affect three species:- Long-eared Owl, Barn Owl and Kestrel, representing 6.25% of birds of prey admitted to the Tenerife Bird Rehabilitation Centre during the past two years.

Diaz *et al.* (1986) speculate on another factor which may affect the Osprey - the systematic over-fishing to which more than a few enclaves along the coasts are subject.

INTRODUCTION OF EXOTIC SPECIES

The evolution of various aboriginal cultures in the Canary Islands (from the first millenium B.C. to the 15th Century) led to the introduction of such domestic animals as dogs, goats, pigs and sheep. This implied an alteration to the normal rhythm of the indigenous ecosystems causing, among other things, a marked deterioration of the vegetation due to ruminants, as recorded in ancient chronicles. However, the number of species introduced at this stage was minimal in comparison with those established during the last five centuries. The mammals (*Oryctolagus cuniculus*, *Felis catus*, *Mus* spp., *Rattus rattus*, *R. norvegicus*) have adapted most successfully, inflicting considerable losses on native species such as seabirds (Martin *et al.* 1987). We believe that some easily accessible nests of birds of prey may suffer from predation by rodents and cats. Despite such losses, however, it must not be forgotten that the introduction of these mammals has been on the whole "favourable" to birds of prey, widening and modifying their nutritional spectrum. Thus we find the Long-eared Owl and Barn Owl preying essentially on *Mus* and *Rattus* (Martin *et al.* 1985; Delgado *et al.* 1986; Carrillo *et al.* 1989); the Kestrel in specific areas and times of year preys on *Mus* and occasionally on *Atlantoxerus getulus*; the Buzzard on *Rattus* and *Oryctolagus* and occasionally in Fuerteventura on *A. getulus*. On the other hand, the principal food of the Egyptian Vulture seems to be goat carcasses (*Capra hircus*), hedgehogs (*Erinaceus algirus*) and rabbits.

In general, detrimental human activity is clearly reflected in the numbers of raptors admitted to the two Bird Rehabilitation Centres in the islands from their establishment until 1986: out of 184 birds admitted, 52.2% were raptors (40.2% diurnal, 12% nocturnal), of which around 80.5% had suffered from human aggression (Carrillo 1986). Similar percentages have been calculated for the two-year period 1987-88.

Thus the future does not appear too promising for birds of prey, several species of which have suffered a severe decline, with to-day only vestigial populations with a high risk of extinction. The prospects for *Pandion haliaetus* (12-15 pairs in 1987), faced with the slow deterioration of the coastline, and for *Falco peregrinus/pelegrinoides* (about 6 pairs) - the rarest bird of prey in the archipelago - are the greatest cause for concern. Other species such as *Neophron percnopterus*, with 30-36 pairs, and *Falco eleonorae*, with about 64 pairs, are in a rather more favourable position but by no means out of danger.

RECOMMENDATIONS

The unchecked progress of the above-mentioned threats suggests the immediate application of the following measures:

1. Strict conservation of remaining habitats, with effective protection of the islets to the north of Lanzarote (Alegranza, Montaña Clara and Roque del Este).

2. Strict application of the law, hitherto infringed with impunity, so as to bring about rigorous control of both hunting and taxidermy. Likewise, greater protection given to the nests of the more endangered species by the appointment of wardens.

3. Institution of public education campaigns to promote the biological importance of birds of prey to the ecosystems.

4. Annual monitoring of the populations of the most vulnerable species: Barbary Falcon, Osprey, Eleonora's Falcon and Egyptian Vulture.

5. Formulation of an adequate strategy to combat possible fresh plagues of locusts, taking into account the devastating effect that insecticides have had on birds, especially birds of prey. At the same time, a systematic study should be made of the impact of insecticides on the breeding and mortality rates of this group of birds.

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