

Habitat Loss and Vultures: a Case Study from Israel

Reuven Yosef and Ofer Bahat

Surprisingly, there is much difficulty in finding studies that relate directly to the effects of habitat loss on vulture populations. In most published papers this is hinted at, or mentioned in circumspect language. This makes it difficult to interpret past studies as to whether they do or do not relate to population fluctuations or to habitat loss. We would like to stress that we were unable to find in our literature search the exclusion of vultures from any given area by a competing or hostile species - whether mammalian, reptilian or avian. Most studies therefore hint at the fact that habitat loss is almost exclusively due to human activities.

Human-related encroachment on vulture habitats can be categorised in many different ways, but we have tried to be generalistic because, as we have all come to realize, each and every case is different and must be handled individually. Thus, we have narrowed things down to three major human-related elements. Further, we examine these points to see how they have affected the once healthy vulture populations of Israel. We feel that the situation in Israel is a good example of the complexities and conflicts (e.g., human population explosion, housing, jobs, food, recreation) that need to be taken into account in the conservation of vultures. Hence, we divided the human-related modifications of habitats as follows:

Settlement - building hydro-electric power stations (electrocution and drowning; e.g., Marinkovic & Orlandic 1994), bio-invasions that cause a decrease of indigenous biodiversity, building of roads in breeding gorges (Marinkovic & Orlandic 1994), subsequently causing mortality when vultures feed on road-kills, building towns and cities in non human-frequented areas.

Agriculture - transmission of diseases from carcasses, deforestation in tropical areas, poisoning (e.g., Soto 1986, Kiff 1989, Terasse *et al.* 1994), persecution.

Recreation - Hunting (non-sustainable) (e.g., Tewes 1994), disturbance, trade in wildlife or body-parts (Xiao-Ti 1991),

However, not all vultures are adversely affected by human encroachment. There are species that appear to have expanded their distribution and some can even be categorized as human commensals. This is especially true in areas where local religions believe in feeding vultures as a natural way of recycling their dead back into nature. Buddhists in Northern India and Tibet are known to put out cadavers for Himalyan Griffons *Gyps himalayensis*, Cinereous/Eurasian Black Vulture *Aegypius monachus* and Bearded vultures *Gypaetus barbatus* (Xiao-Ti 1991), and Parsee dead are disposed off by Red-headed *Sarcogyps calvus* and Indian White-backed *Gyps bengalensis* vultures (Satheesan 1998). Examples of species that appear to have benefited from human-related activities and habitat-modifications are Turkey *Cathartes aura* and Black *Coragyps atratus* Vultures in the New World,

Hooded *Necrosyrtes monachus* and African White-backed *Gyps africanus* in Africa, and the Long-billed *G. indicus* and Indian White-backed in the Indian subcontinent.

Evaluating the information presented for all vulture species from Mundy *et al.* 1992 and del Hoyo *et al.* 1994 we have found that in reality, of the 22 species, only half are known to be adversely affected by human encroachment (Table 1). The rest are either those that benefit or are indifferent and will adapt to scavenging human refuse. However, we emphasize that many populations that are classified as "Not globally threatened" could possibly be endangered, or suffer from local threats, and the situation for these species could deteriorate rapidly owing to unpredicted, stochastic events. Examples of such stochastic incidents are the recent (1998) mass poisoning in the Spanish Doñana reserve which resulted in high mortality amongst an established and flourishing population of vultures and other raptors; the same also holds true for a recent (July 1998) incident on the Golan Heights in Israel wherein the vulture population was badly affected. An example of vulture populations that have not successfully adapted to human-related activities is reflected in the present very severe situation in Israel.

Table 1. Status, level of knowledge based on existing literature and the ability of the species to adapt to human-induced changes to the environment. NGT denotes - Not globally threatened.

<i>Species</i>	<i>Status</i>	<i>Level of knowledge</i>	<i>Effect of human disturbance</i>
New World Vultures:			
Turkey Vulture <i>Cathartes aura</i>	NGT	Good	+
Lesser Yellow-headed Vulture <i>C. burrovianus</i>	NGT	Poor	?
Greater Yellow-headed Vulture <i>C. melambrotus</i>	NGT	Poor	-
American Black Vulture <i>Coragyps atratus</i>	NGT	Good	+
King Vulture <i>Sarcoramphus papa</i>	NGT	Poor	-?
California Condor	Endangered - I	Medium	+-
<i>Gymnogyps californianus</i>			
Andean Condor <i>Vultur gryphus</i>	NGT - II	Poor	?
Old World Vultures:			
Palm-nut Vulture <i>Gypohierax angolensis</i>	NGT - II	Good	+-
Bearded Vulture <i>Gypaetus barbatus</i>	NGT - II	Medium	-
Egyptian Vulture <i>Neophron percnopterus</i>	NGT - II	Good	-
Hooded Vulture <i>Necrosyrtes monachus</i>	NGT - II	Good	+
African White-backed Vulture <i>Gyps africanus</i>	NGT - II	Good	+
Indian White-backed Vulture <i>G. bengalensis</i>	NGT - II	Good	+
Long-billed Vulture <i>G. indicus</i>	NGT - II	Medium	+
Rüppell's Griffon <i>G. rueppellii</i>	NGT - II	Good	-
Himalyan Griffon <i>G. himalayensis</i>	NGT - II	Poor	?
Eurasian Griffon <i>G. fulvus</i>	NGT - II	Good	-
Cape Griffon <i>G. coprotheres</i>	Rare - II	Good	-
Eurasian Black Vulture <i>Aegypius monachus</i>	Vulnerable -II	Medium	-
Lappet-faced Vulture <i>Torgos tracheliotus</i>	NGT - II	Medium	-
White-headed Vulture <i>Trigonoceps accipitalis</i>	NGT - II	Medium	?
Red-headed Vulture <i>Sarcogyps calvus</i>	NGT - II	Medium	-?

Key:

Status: I - CITES I II - CITES II
Human disturbance effect: + Positive - negative +- indifferent ? unknown

In Israel, since the turn of the century (then called Palestine), and especially since Israel gained independence in 1948, Government policies have been best illustrated by the slogans they inspired - make the deserts bloom, development of the wilderness, etc. - and have led to wide scale changes being wrought on the environment. Wetlands were drained, human settlements were advocated and built in the middle of no-where in the so-called "wilderness", and large scale agriculture backed by technology and use of biocides was encouraged. Consequently, all xeric regions within Israel's boundaries have undergone extensive environmental changes that have adversely affected the region's indigenous avifauna. Some were subtle and were not discovered till recently - like the exaggerated exploitation of ground water for human purposes which has resulted in a die out of a wide range of indigenous flora and fauna and in parallel has allowed non-desert species (such as the Great Spotted Cuckoo, *Clamator glandarius*, Indian House Crow, *Corvus splendens*, or the Graceful Warbler, *Prinia gracilis*, Yosef 1996, 1997) to penetrate the desert regions. Similarly, habitat changes related to agricultural development have had, and continue to have to date, the most severe and widespread impact on vulture populations. On a global scale, these changes have reached a point where most vulture populations are dependent on domestic mammals as a major food source (e.g., 50-80% of the diet of Bearded Vulture in Macedonia, Grubac 1991).

In Israel, three out of our five vulture species have gone the way of the Dodo. The first to disappear was the Cinereous Vulture, which may have bred at the extreme periphery of its breeding range in northern Israel (see Nathan *et al.* 1996, Shirihi 1996), but certainly wintered in larger numbers, and is almost never seen today. This disappearance may not necessarily be solely linked to the changes in Israel's landscape but also probably to the widespread decline across its range in Europe and the Levant. However, the possibility of side-effects following the use of biocides in winter cannot be ruled out.

The first of the confirmed breeding vultures to go extinct was the Bearded Vulture, mainly owing to changes in habitat use due to human settlements and activity, chiefly in desert habitats, as well as foraging habits and sanitation levels of Bedouin goat and sheep herds, and the extensive use of biocides. This was a wide-spread, low population density species, that occurred in most of our mountainous regions - whether Alpine, temperate, Mediterranean, or desert (Fig. 1). However, owing to the burgeoning human population and their exploitation of the human-friendly habitats prior to venturing into the desert, and the education for environmental recreation (Leshem 1988), the last vestiges of the population were confined to the geocentric heart of the Judean Desert (Leshem 1980). The last confirmed breeding attempt was in 1981 (Bahat 1986) and since then we only have sporadic observations of loitering or migrant individuals.

In the past decade, the last surviving Negev Lappet-faced Vultures *Torgos tracheliotus negevensis* were taken into captivity for a breeding programme, and possible future reintroduction. The causes of the decline of this species in Israel are many - lack of food, increased disturbance by nature-loving hikers and recreationists, hunting, egg collecting, biocides, electrocution (Meretzky & Lavee 1991), as well as the illegal trade in Israeli birds to European zoos, of which we have knowledge of at least 12 cases. The range in mid-20th century was in most of the desert regions - Judean, Negev and the Syrian-African Rift Valley or the Arava, and several tens of pairs were estimated to have occurred (Fig. 2). In the 1980s this dropped to less than 5 breeding pairs restricted to the Arava valley and the last pair attempted to breed in 1990 (Yosef & Hatzofe 1997). From the conservation perspective - although comparatively large resources are today utilized for the captive breeding programme in Israel - the problem is that the responsibility to preserve the relevant habitats is not shouldered by any of Israel's conservation agencies and these areas are today slated for almost immediate development. Our concern is that if the propagation of the young in the breeding programme does succeed, and the young are to be released in Israel's wild in the future, the only place is the southern Arava region: this area that must be targeted immediately, a hands-off policy implemented, and held in trust for the future of the project.

The situation of the Egyptian Vulture *Neophron percnopterus* is one of ups and downs - until the mid-20th century it was a widespread breeder with an estimated 500-1000 pairs. However, owing to extensive use of biocides this population plummeted almost to extinction in the late '50s and '60s. A

Figure 1. Changes in the distribution of Bearded Vultures in Israel. The last confirmed breeding attempt was in 1981.

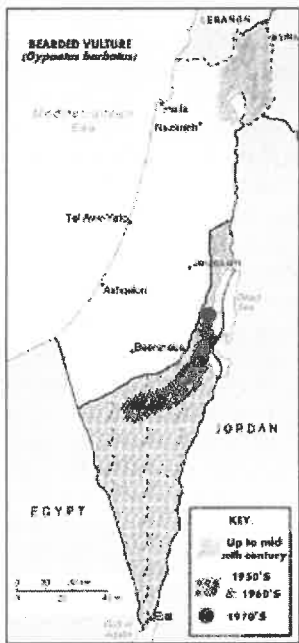


Figure 2. Changes in the distribution of Lappet-faced Vultures in Israel. The last confirmed breeding attempt was in 1990.

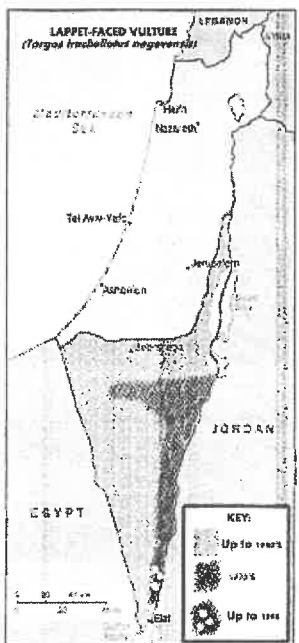


Figure 3. Changes in the distribution of Egyptian Vultures in Israel. Today an estimated 50-70 pairs breed in Israel.

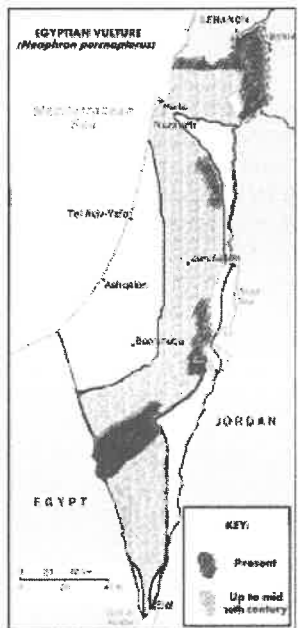
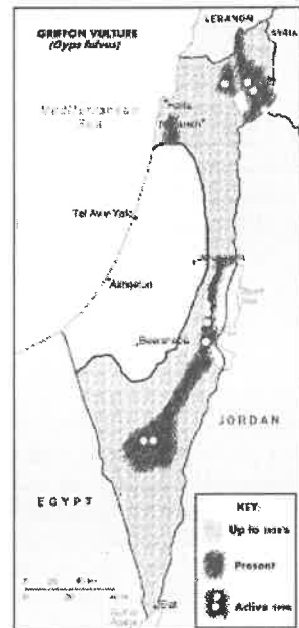


Figure 4. Changes in the distribution of Griffon Vultures in Israel. During the 1998 breeding season 45 pairs successfully reared young.



recovery occurred in the 1970s when up to 80 breeding pairs were counted. This rose further in the 1980s with 133 pairs noted, of which 129 (97%) were in the deserts or along the Rift Valley and the Golan Heights (Fig. 3). We regret to say that the 1990s have marked another decline and today only 50-70 pairs breed in Israel. From the conservation perspective this species appears to have a viable population in the wild that should be appropriately encouraged (e.g., habitat conservation, feeding stations, prevention of nest disturbance, etc.) and not necessarily by investing in the very expensive process of a captive breeding programme.

The Griffon Vulture, in our eyes, represents the critical state of Israel's environment at present. When Henry Baker Tristram, an English missionary, published accounts of his trips in the Holy Land in 1865 and 1884 he wrote: "The numbers of the Griffon Vulture in every part of Palestine are amazing." The species bred in most mountainous regions (Fig. 4) and it is estimated that in the mid-19th century about 1000 pairs bred in Israel (Shirihai 1996). However, in the 1950s it almost became extinct owing to a human-induced onslaught on its populations which included lack of food, electrocution, pesticides, hunting, etc. In the late 1970s and early 1980s only about 80 pairs, i.e., 5% of the former population, were observed to breed. There was an improvement in the late 1980s and we had about 130 pairs, but this has plummeted today to 45 pairs which successfully reared young in 1998. Many of the former known breeding sites of Griffon Vultures have been deserted due to human activity and disturbances (Court *et al.* 1997). The population is at present still at a viable level wherein with appropriate measures it can be rehabilitated. However, this is contingent on law enforcement (especially by education and/or harsh penalties) when poisonings occur. Recent incidents in Israel have shown that the culprits go unpunished and the problem continues. This also raises questions about the existing breeding programmes and release of Griffon Vultures into the wild when the existing problem has not been eliminated.

Although we have up to this point presented a negative side of Israel's environmental implementation policies and the subsequent results, we would like to stress, and to give examples of, the efforts underway to try and return the vultures to Israel's skies. These activities include a reintroduction project on the Carmel mountains, directed by Ohad Hatzofe. In the framework of this project, nearly 50 Griffon Vultures have been reintroduced into the wild since 1993. Another project, directed by OB, involves the Israel Electric Corporation, together with the Israeli Nature Reserves Authority and National Parks (INRANP) and the Society for the Protection of Nature in Israel (SPNI). As part of this project, electricity poles and lines have been protected against electrocution of birds, while satellite telemetry has been implemented to follow the movements of Griffon Vultures inside and outside of Israel's international boundaries. The above mentioned organizations, together with the International Birding & Research Center in Eilat (IBRCE), have undertaken a joint effort to preserve Gamla - the biggest breeding colony of Griffon Vultures in Israel. This project includes a thorough nest surveillance (e.g., Court *et al.* 1997), monitoring and radio-tracking of chicks in the fledging and post-fledging stages, as well as analysis of food contamination (Bahat 1997). Another important project, due to start soon in the desert regions, is a network of feeding stations in 9 different areas from the northern Judean hills down to the Elat mountains. We consider this project vital to the survival of the remaining Griffon and Egyptian vultures in the arid regions of Israel.

Vultures as a group are highly vulnerable to human persecution of any kind. Although many of the characteristics of vultures have led human communities to believe them to be, for example, God's messengers, or have aroused the scientist community's curiosity, they have suffered a major downfall over the past century. The fact that vultures are group feeders allows for an increased die-off in case of a pin point calamity. Vultures have an important role in our nature - they are a major scavenging force which our environment needs. However, this group of birds, which has survived for the last 20 million years will most probably not survive humankind unless we take action to save the vultures and their appropriate habitats today.

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Reuven Yosef
International Birding & Research Center in Eilat
P. O. Box 774
Eilat 88000, Israel

Ofar Bahat
Faculty of Aerospace Engineering
Technion - Israel Institute of Technology,
Haifa 32000, Israel