



WWF Greece

**DADIA – LEFKIMI – SOUFLI
Forest Reserve**

DIURNAL RAPTOR ASSEMBLAGES

**Status report
of raptor species populations**

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March 2003

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This report must be referred as: Poirazidis, K. (2003). *Dadia-Lefkimi-Soufli Forest Reserve, Diurnal raptor assemblages, Status report of raptor species populations.*

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Introduction

The decline of most species of raptorial birds (raptor species) has been relatively well investigated in Europe (Newton 1979, Cramp and Simmons 1980). Greece lost large parts of its raptor populations during the last 30-50 years, but some areas still hold a good population of these species (Hallmann 1979, Catsadorakis 1994). The Evros region harbours the most diversified population of nesting raptor species occurring in Europe, which comprises very endangered species such as the Black Vulture (*Aegypius monachus*), the Imperial Eagle (*Aquila heliaca*), and the White-tailed Eagle (*Haliaeetus albicilla*) and in fact 90% of European raptor species occur in this region (Hallmann 1979; Dennis 1989).

In the oldest scientific reports, compiled by foreign ornithologists during the '60s, it seems that the numbers of certain raptors, in Evros region and Dadia-Lefkimi-Soufli forest reserve (Dadia reserve), were higher compared to their present populations. The first systematic raptor survey was undertaken during the '70s (Hallmann 1979) and until the 1999 many surveys had been done from different ornithologists (e.g. Hallmann 1979; Adamantopoulou et al. 1989; Vlachos 1989; Papageorgiou et al. 1994; Adamakopoulos et al. 1995). Most of these surveys were restricted to counts of vultures and larger eagles, while for the remaining species the data collected were clearly insufficient. The **Systematic Monitoring** of the raptor species populations in the Dadia reserve became possible through the compilation in 1999 the first systematic monitoring plan for Dadia (but also for Greece) and its implementation the next years from the programme of WWF Greece. The main aim of the raptor-monitoring plan is to track and interpret population changes in raptor species, which use the area for reproduction with standardized methods, so comparable results to exist in the future (Poirazidis et al., 2001).

The main objectives of this report are:

1. The compilation of historical data and the description of the changes which occurred in the populations of raptor in the period 1978 – 2002
2. The description of the current situation of the populations of raptor of the Dadia reserve in the period 2000-2002.
3. The description of the spatial changes of the raptor territories in the period 1979 – 2002.

The methodology for the recording raptors in the period 2000 – 2002 was based on the Systematic Monitoring Plan that is applied by the WWF Greece. An analytical description of the methodology is described in the Poirazidis et al., 2001.

Dadia forest reserve

The Dadia forest reserve is situated in the Evros Prefecture, northeastern Greece (Fig. 1) and has been declared as reserve since 1980 by Presidential Decree. It covers a forest complex extending over c. 43,000 ha (hereafter study area) including two zones of strict protection (core areas). The study area is characterised by steep valleys covered by extensive oak and pine forests, and includes a variety of other habitats, such as cultivations, fields, pastures, torrents and stony hills.

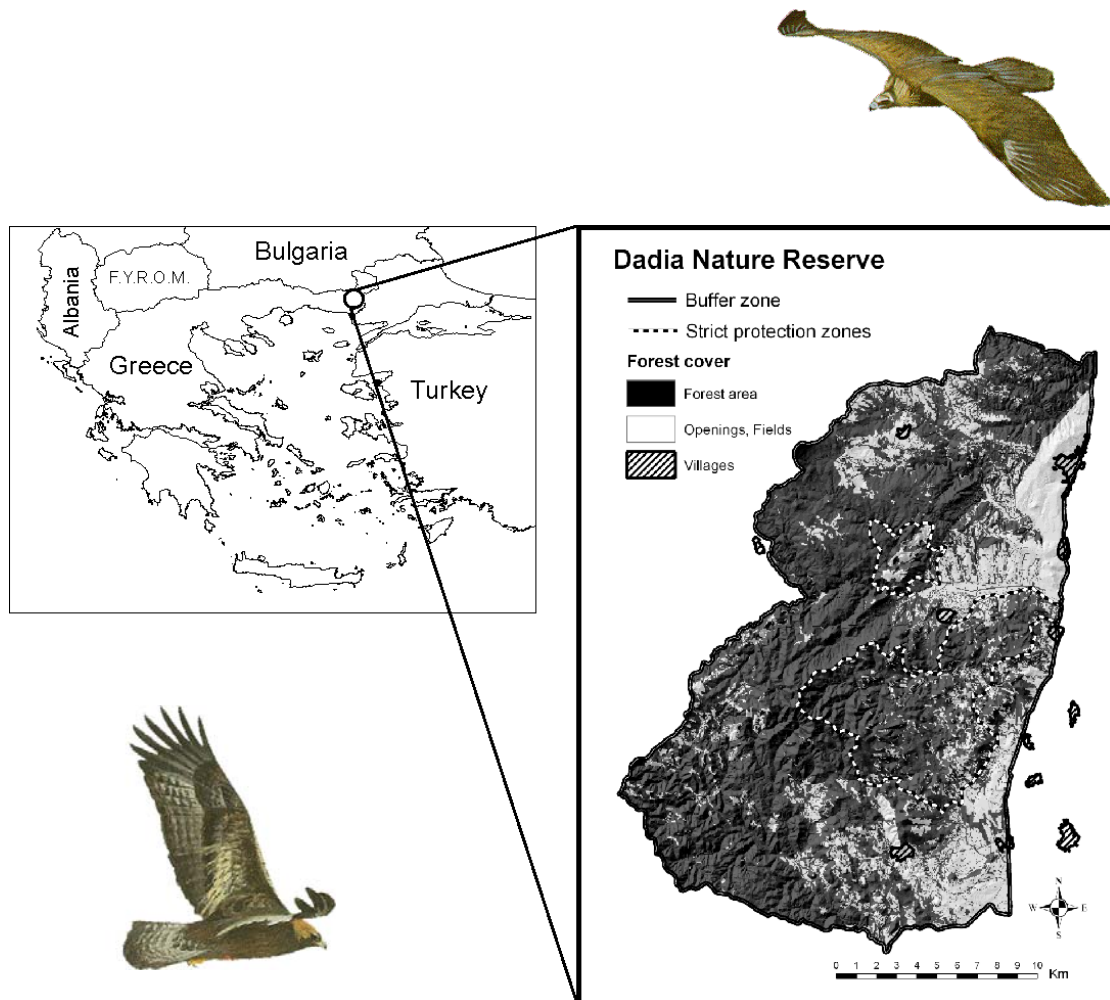


Figure 1. Map of Dadia-Lefkimi-Soufli Nature Reserve

Historical data for the Dadia raptor species - a briefly description

By European standards, Dadia reserve is characterized by the presence of an extremely large variety of birds of prey. In total, from the 38 raptor species occurring in Europe, 36 have been observed in Dadia Forest. Up to 1970, twenty-four of these used to breed in the area (Hallmann, 1979, Adamakopoulos et al. 1995, Poirazidis et al. 2001).

Over the last three decades, five species ceased to nest in Dadia reserve: the White-tailed Eagle (*Haliaeetus albicilla*), the Imperial Eagle (*Aquila heliaca*), the Bonelli's Eagle (*Hieraaetus fasciatus*), the Lammergeier (*Gypaetus barbatus*) and the Lesser Kestrel (*Falco naumanni*) (Adamakopoulos et al. 1995, Poirazidis et al. 2001).

Dadia reserve constitutes one of the few European regions where three out of four vulture species occurring in Europe can be observed together: Black Vulture (*Aegypius monachus*), Griffon Vulture (*Gyps fulvus*), and Egyptian Vulture (*Neophron percnopterus*). Up to 1969, the forth species (Lammergeier) also nested here. Since then, only one individual has survived.

In 1999, seventeen species of diurnal raptors nested within the borders of the Dadia Forest. Three more species nested in neighbouring areas, while using the specific forest however, for foraging.

According to the monitoring data of 2000, the number of breeding species has increased to eighteen (18), while the breeding of Imperial Eagles was confirmed, after an absence of 8 years. Seventeen (17) species are winter in the area, three of which are present only during winter, among which, considerable populations of the Spotted Eagle (*Aquila clanga*). In addition, several individuals of the White-tailed Eagle, the Imperial Eagle and the Long-legged Buzzard (*Buteo rufinus*) are winter in the area (arriving from countries further to the North). Twelve raptor species in the Annex I of the Birds Directive have been breeding in the Dadia forest at the last three years (2000-2002).

Table 1 presents a detailed list of the observed raptor species in Dadia until now and their presence status.

Table 1. List of the observed raptor species in the Dadia forest.

The symbols means: BM: Breeding-Migrating; M: Migrating; E: Extinct; FB: Former breeding; RM: Resident-Migrating; R: Resident; MW: Migrating-Wintering; RMW: Resident-Migrating-Wintering; BMW: Breeding-Migrating-Wintering; S: Summering

	Species		Presence status
	English name	Latin name	
1	Honey Buzzard	<i>Pernis apivorus</i>	BM
2	Black Kite	<i>Milvus migrans</i>	M
3	Red Kite	<i>Milvus milvus</i>	E
4	White-tailed Eagle	<i>Haliaeetus albicilla</i>	FB
5	Lammergeier	<i>Gypaetus barbatus aureus</i>	FB
6	Egyptian Vulture	<i>Neophron percnopterus</i>	BM
7	Griffon Vulture	<i>Gyps fulvus</i>	RM
8	Black Vulture	<i>Aegypius monachus</i>	R
9	Short-toed Eagle	<i>Circus gallicus</i>	BM
10	Marsh Harrier	<i>Circus aeruginosus</i>	MW
11	Hen Harrier	<i>Circus cyaneus</i>	MW
12	Pallid Harrier	<i>Circus macrourus</i>	M
13	Montagu's Harrier	<i>Circus pygargus</i>	M
14	Goshawk	<i>Accipiter gentilis</i>	RMW
15	Sparrowhawk	<i>Accipiter nisus</i>	RMW
16	Levant Sparrowhawk	<i>Accipiter brevipes</i>	BM
17	Common Buzzard	<i>Buteo buteo buteo</i>	BMW
18	Steppe Buzzard	<i>Buteo buteo vulpinus</i>	BM
19	Long-legged Buzzard	<i>Buteo rufinus</i>	BMW
20	Steppe Eagle	<i>Aquila rapax orientalis</i>	E
21	Lesser-Spotted Eagle	<i>Aquila pomarina</i>	BM
22	Greater Spotted Eagle	<i>Aquila clanga</i>	W
23	Imperial Eagle	<i>Aquila heliaca</i>	RW
24	Golden Eagle	<i>Aquila chrysaetos</i>	R
25	Booted Eagle	<i>Hieraaetus pennatus</i>	BM
26	Bonelli's Eagle	<i>Hieraaetus fasciatus</i>	E
27	Osprey	<i>Pandion haliaetus</i>	M
28	Lesser Kestrel	<i>Falco naumanni</i>	BM
29	Kestrel	<i>Falco tinnunculus</i>	BMW
30	Red-footed Falcon	<i>Falco vespertinus</i>	M
31	Merlin	<i>Falco columbarius</i>	W
32	Hobby	<i>Falco subbuteo</i>	BM
33	Eleonora's Falcon	<i>Falco eleonora</i>	S
34	Lanner	<i>Falco biarmicus feldeggii</i>	R
35	Saker	<i>Falco cherrug</i>	E
36	Peregrine	<i>Falco peregrinus</i>	BMW

Studies of populations of raptor in the period 1978-1997

The Dadia reserve is one of the fewest places in Greece, where status report for the raptor populations had been existed for many years in the past. Unfortunately most of these reports followed a non-systematic methodology to count the number of pairs. This has to be taken into consideration in the comparable analysis of the results. According to the historical data, in the period 1978-1997, the estimated population of many species differs from study to study even in studies with difference of only two years (e.g. Vlachos (1989) in relation with Adamatopoulou et al. (1989), Papageorgiou et al. (1994) in relation with Adamakopoulos et al. (1995). These differences make the comprehensive study of the population changes very difficult.

According to our opinion this is owed in the incomplete recording of the raptor territories in the area of the Dadia reserve. The main problem with these reports was the under-estimation of the commonest species. In general the estimated numbers of these species were very low if compared with the modern data, which came from the WWF monitoring program applied from 2000. On the contrary this problem seems does not appear with the big raptors (e.g. vultures, big eagles), as the survey of these species was easier and the nesting sites were better known, allowing us to accept these historical data as the real numbers in the estimated years.

The most comprehensive work for all the raptor assemblages from this period (1978-1997) was from the study of Ben Hallmann, carried out at 1979. In this study also the spatial distribution of the raptors was presented, allowing us to study not only the population change of these species, but also the specific regions where these changes took place.

Moreover, during the last 20 years, three specific Doctoral Thesis were carried out in the area, for the Lesser-Spotted Eagle (Vlachos, 1989), Long-legged Buzzard (Alivizatos, 1996), and Short-toed Eagle (Bakaloudis, 2001). Therefore for these species more reliable data are available. In the independent studies, Vlachos (1986) found sixteen (16) pairs of Lesser-Spotted Eagle, but he estimated a population of 16-20 pairs in Dadia reserve. Alivizatos (1996) found sixteen (16) active territories of Long-legged Buzzard, in the Evros region in 1990, where five (5) of them were located in Dadia reserve. Bakaloudis (2001) found in 1997 twenty-nine (29) active territories of Short-toed Eagle in Dadia reserve.

Tables 2 and 3 are presented the existing information of the raptor populations in Dadia reserve. In these tables only the breeding species in the Dadia reserve are included. For the presentation of the raptor species list we used general functional categories, namely: eagles, vultures, medium-sized raptors, hawks, falcons.

Table 2. Changes of Raptor populations from 1979 to 1997 in the Dadia forest. The population presenting as number of breeding pairs, respectively individuals when indicated (inds).

	Study reference	Hallmann (1979)	Vlachos (1989)	Adamantopoulou et al. (1989)	Papageorgiou et al. (1994)	Adamakopoulos et al. (1995)
	Estimation year	1978	1987	1989	1991-93	1993-94
Species						
Eagles						
White-tailed Eagle	<i>Haliaeetus albicilla</i>	1	1	1	1	0
Golden Eagle	<i>Aquila chrysaetos chrysaetos</i>	5	4-5	6-7	3-4	3-4
Imperial Eagle	<i>Aquila heliaca heliaca</i>	3	1	1	1	0
Lesser-spotted Eagle	<i>Aquila pomarina</i>	19	16-20	9	13-15	14-17
Short-toed Eagle	<i>Circus gallicus</i>	21	13-16	14	11	20-23
Booted Eagle	<i>Hieraaetus pennatus</i>	9	8-10	4	3-5	20
Vultures						
Lammergeier	<i>Gypaetus barbatus aureus</i>	no data	1ind	1ind	1ind	1ind
Black Vulture	<i>Aegypius monachus</i>	5 (26 inds)	12-15	12	17	20
Griffon Vulture	<i>Gyps fulvus</i>	(25 inds)	8-10	3	7-8	8-12
Egyptian Vulture	<i>Neophron percnopterus</i>	17	20-25	12	5-6	10-14
Medium-sized raptors						
Buzzard	<i>Buteo buteo buteo</i>	no data	15-20	16-20	10-12	16-20
Long-legged Buzzard	<i>Buteo rufinus</i>	7	5-10	7	2-3	7-9
Honey Buzzard	<i>Pernis apivorus</i>	no data	2-4	6-10	4-6	10-12
Hawks						
Goshawk	<i>Accipiter gentilis</i>	18	10-15	7-10	6-7	10-12
Sparrowhawk	<i>Accipiter nisus</i>	no data	5-10	4-6	4-5	8-10
Levant sparrowhawk	<i>Accipiter brevipes</i>	no data	no data	5-10		8-12
Falcons						
Hobby	<i>Falco subbuteo</i>	no data	?	3	no data	3-5
Kestrel	<i>Falco tinnunculus</i>	no data	no data	15	no data	5-10
Peregrine	<i>Falco peregrinus</i>	1	no data	1	no data	1
Lanner	<i>Falco biarmicus feldeggii</i>	2	1	1	1	1

Vlachos (1986): Lesser-spotted Eagle = 20 pairs for 1986

Alibizatos (1996): Long-legged Buzzard = 5 pairs for 1990

Bakaloudis (2001) Short-toed Eagle = 29 pairs for 1997

Recent raptor species populations status (2000-2002)

Twenty-seven (27) raptor species were totally recorded during the spring and summer period in Dadia reserve, where eighteen of them were breeding in the area. According to the results of the 2000-2002 monitoring (WWF Greece unpublished data), the status of the breeding species population in the Dadia reserve is presented in the table 3. While some territories were not active per year, or some of these had not certified 100% (possible territories), the number of territories per species is presented with the minimum and maximum estimated number.

Table 3. Status of the raptor populations in 2000-2002 in the Dadia forest.

Raptor species		Annex I	Total territories 2000-2002
<i>English name</i>	<i>Latin name</i>		
EAGLES			
White-tailed Eagle	<i>Haliaeetus albicilla</i>	+	0
Golden Eagle	<i>Aquila chrysaetos</i>	+	4
Imperial Eagle	<i>Aquila heliaca</i>	+	1
Lesser-spotted Eagle	<i>Aquila pomarina</i>	+	20
Short-toed Eagle	<i>Circus gallicus</i>	+	37-40
Booted Eagle	<i>Hieraaetus pennatus</i>	+	21-25
VULTURES			
Lammergeier	<i>Gypaetus barbatus</i>	+	1 ind
Black Vulture	<i>Aegypius monachus</i>	+	22 (89 inds)*
Griffon Vulture	<i>Gyps fulvus</i>	+	0 (112 inds)*
Egyptian Vulture	<i>Neophron percnopterus</i>	+	13-14
Medium sized raptors			
Buzzard	<i>Buteo buteo</i>		120 – 130**
Long-legged Buzzard	<i>Buteo rufinus</i>	+	4
Honey Buzzard	<i>Pernis apivorus</i>	+	25 – 30
Hawks			
Goshawk	<i>Accipiter gentilis</i>		21
Sparrowhawk	<i>Accipiter nisus</i>		35
Levant sparrowhawk	<i>Accipiter brevipes</i>	+	7
Falcons			
Hobby	<i>Falco subbuteo</i>		12
Kestrel	<i>Falco tinnunculus</i>		20
Peregrine	<i>Falco peregrinus</i>	+	2-3
Lanner	<i>Falco biarmicus</i>	+	1-2

* according to the Dadia annual Vulture monitoring (maximum number of birds observed together)

** estimated number of territories in the area controlled by the monitoring

Raptor populations trend (1978 - 2002)

Evaluating all the available information from 1978 to 2002, we can classify the raptor species according to their population trend.

Species that the population increased

- Black Vulture
- Griffon Vulture (as individuals)

Species that the population possible increased (*possible under-estimation from the historical studies*)

- Short-toed Eagle
- Booted Eagle
- Honey Buzzard

Species that the population decreased

- White-tailed Eagle
- Imperial Eagle
- Griffon Vulture (as breeding pairs)
- Egyptian Vulture
- Long-legged Buzzard

Species that the population was in general stable (*small changes in all the reference period*)

- Golden Eagle
- Lesser spotted Eagle
- Goshawk
- Peregrine
- Lanner

Species that the population trend is unknown (*not good or not existed information from the historical studies*)

- Buzzard
- Sparrowhawk
- Levant sparrowhawk
- Hobby
- Kestrel

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