A STUDY INTO THE IMPORTANCE OF JABAL MOUSSA FOR BIRDS IN LEBANON

A Rocha Lebanon

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JABAL MOUSSA BIRD RESEARCH

2007 & 2008

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A STUDY INTO THE IMPORTANCE OF JABAL MOUSSA

FOR BIRDS IN LEBANON

1.0 INTRODUCTION

1.1 Introduction to Mount Lebanon and Jabal Moussa

Jabal Moussa is situated on the western side of the Mount Lebanon range of mountains on the western side of Lebanon. In a relatively small land area, Lebanon holds a very high level of biodiversity. Without setting this study in its global context the significance of this richness in its fauna and flora can be lost. Indeed what can seem common at a local level can be highly unusual at a global level.

Mount Lebanon hosts high levels of biodiversity for the following three main reasons:

1.1.1 It is part of the Mediterranean 'Hotspot' for biodiversity.

Myers (1990)[1] recognized the Mediterranean basin (see Fig. 1) as one of the world's "hotspots" harboring exceptionally high percentages of the world's biodiversity in relatively small areas. Many reasons have been put forward to explain such natural richness but for our purposes here it is important to recognize the end result of the evolutionary, geographic and climatic changes in the nature of the extant biodiversity of the Mediterranean basin. This can be illustrated by the following two examples out of many that could have been chosen:

- The Flora of the Mediterranean includes more than 25000 species of flowering plant[2], this is approximately 10% of all known flowering plant species on earth, although the land area of the basin is only 1.5% of the earth's land surface.
- The Mediterranean is the richest area in Europe in terms of invertebrates, 75% of the total European fauna is found in the basin.[3]

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[1] Myers, N. (1990) The biodiversity challenge: expanded hotspot analysis. *The Environmentalist,* **10**, 243-256

[2] Quezel, P. (1985) Definition of the Mediterranean region and origin of its flora. In plant conservation in the Mediterranean area (ed. C. Gomez- campo), pp 9-24

[3] Baletto, E. and Casale, A. (1991). Mediterranean insect conservation. In the conservation of insects and their habitats (ed. N.M. Collins and J.A. Thompson) pp 121-142

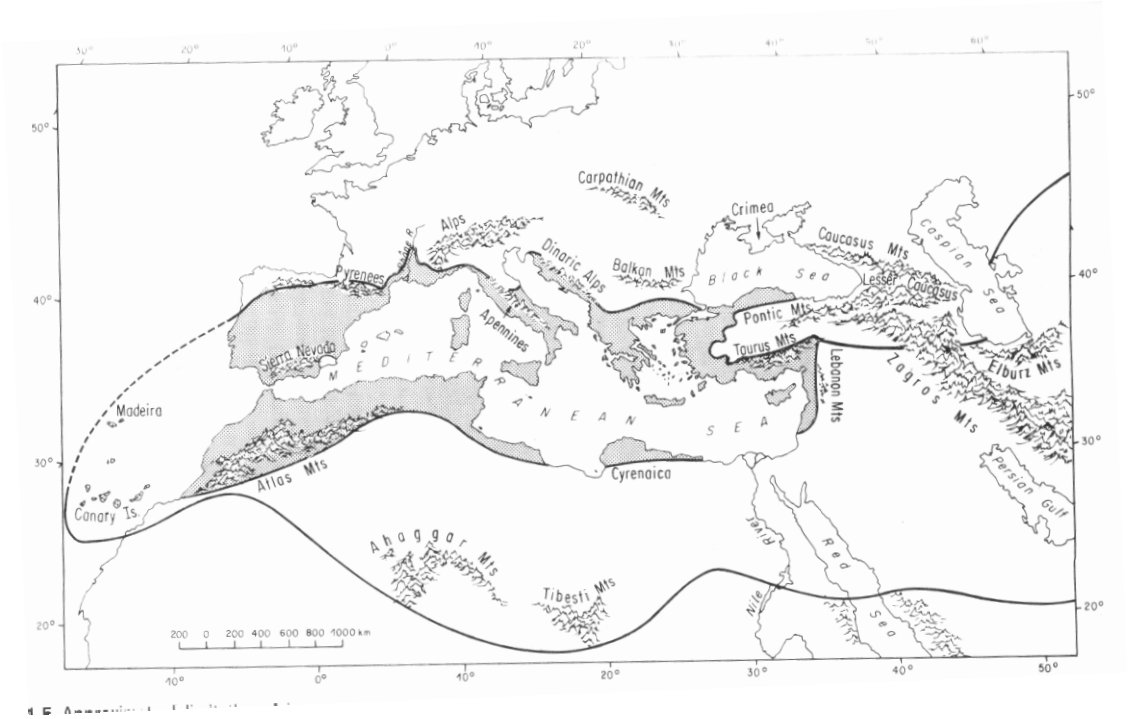


Figure 1 Approximate determination of the Mediterranean land area [4]

1.1.2 Regional Hotspots within the Mediterranean

Even within the context of the richness of the biodiversity of the Mediterranean basin the Mount Lebanon area is noted as a "regional hotspot". It is observed that endemism increases with altitude and so it is little surprise that very high levels of endemism amongst plant species have been observed in the Mount Lebanon chain. [5] See **Fig. 2**.

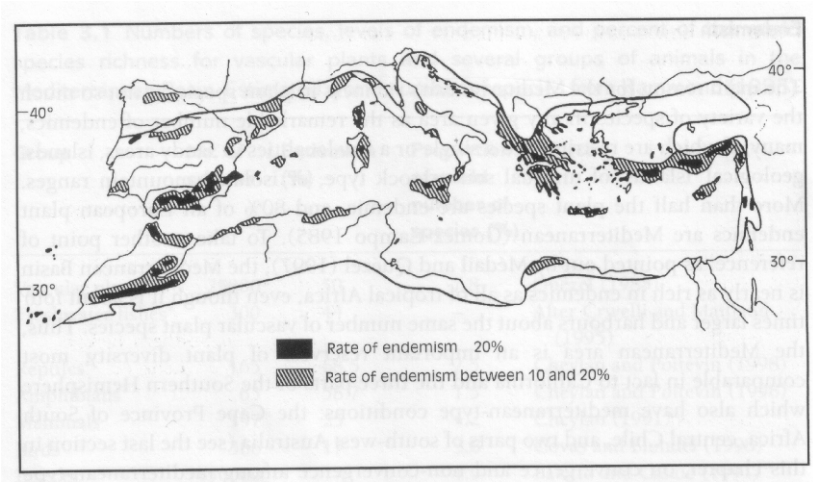


Figure 2 Hotspots for Plant endemism in the Mediterranean basin

[4] Biology and Wildlife of the Mediterranean Region. J. Blondel and J. Aronson.
[5] Biology and Wildlife of the Mediterranean Region. J. Blondel and J. Aronson.

1.1.3 Due to its proximity to neighbouring Biogeographical regions

A third reason for the high biodiversity of the Mount Lebanon area is that, located as it is, adjacent to four biogeographical regions it has been influenced by elements of the neighbouring floras and faunas. See **Fig. 3**.

Figure 3 Subdivisions of the Mediterranean area and delineation of the major biogeographical regions and provinces[6]

The land area of Lebanon and neighbouring countries can be seen as a land bridge linking Europe with Asia, including Arabia, and Africa. As well as a cross roads for human history the area has seen both plants and animals spread from their ancestral zones to colonise new ones many of which are still represented in the extant Lebanese flora and fauna.
One example illustrates the point:

- Of the four quadrants of the Mediterranean basin the Eastern quarter is richest in mammals with 106 species, 23 species of which are of Asian origin that do not occur elsewhere in the basin. An example of a Lebanese species of African origin is the Striped Hyaena *Hyaena hyaena*, whereas the Wild Boar *Sus scrofa* is an example of a European coloniser.

[6] Quezel, P. (1985) Definition of the Mediterranean region and origin of its flora. In plant conservation in the Mediterranean area (ed. C. Gomez- campo), pp 9-24

1.2 Migration Pathways of Soaring Birds

Due to their mode of flight, over long distances soaring birds such as raptors, storks, cranes and pelicans avoid sea crossings and so fly on well documented migratory flight paths between their wintering grounds and summer breeding grounds. Lebanon lies on one such migration route, between wintering grounds to the south, particularly sub Saharan Africa, and Western Palearctic breeding grounds to the north, for more than 30 species of raptor. Indeed due to the relative positions of the Black, Caspian and Mediterranean seas Lebanon is at one of the most concentrated points on this complex migration route. Well known as a "bottleneck site" it plays host to large concentrations of migrating soaring birds each spring and autumn. See **Figs 4** and **5**.

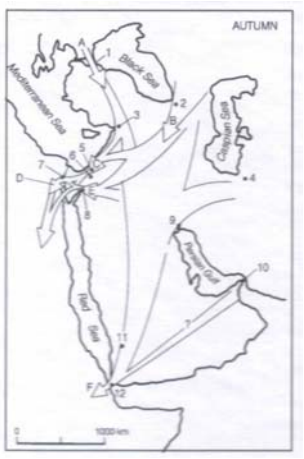


Figure 4 Migration routes of raptors in the Middle East : Autumn[7]

Seasonal Maxima:

C: (just to the South of Lebanon)

- Honey Buzzard = 437 000
- Lesser Spotted Eagle = 141 000
- Levant Sparrowhawk = 44 000

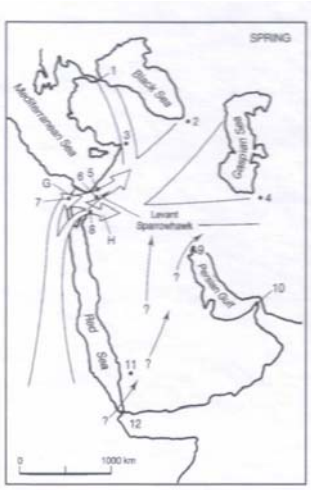


Figure 5 Migration routes of raptors in the Middle East : Spring

[7] Raptor Migration in the Middle East Shirihai, H. Yosef, R. Kirwan, G. Spaar, R.

1.3 Mediterranean Life Zones

At an altitude of between approximately 1000 to over 1500 m, and a latitude of 34, 10 N the flora can be categorized as Meso Mediterranean leading to Supra Mediterranean on the higher slopes. See **Fig. 6**

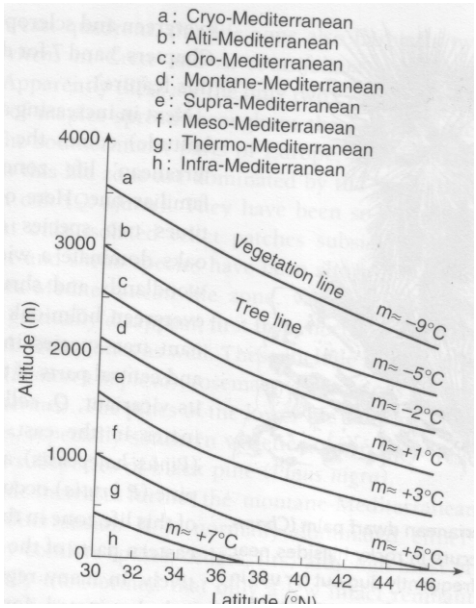


Figure 6 Altitudinal / latitudinal gradients showing zonation of life zones. [8]

The Meso Mediterranean life zone is dominated by one or two species of evergreen oaks, in Lebanon mainly *Quercus calliprinos*, the eastern form of the Evergreen Holm Oak. The supra Mediterranean zone is characterised by deciduous oak *Quercus infectoria* forest with other broad-leaved deciduous trees also present. With increasing altitude, various cold sensitive plant species gradually disappear first from north facing slopes. At the highest elevations, natural vegetation would be dominated by conifers (pines, cedars, firs) but only remnant vestiges are left, for example the cedar forest above the village of Tannourine (although outside the study area in question.)

Fig 7 shows a cross section through Lebanon from the Mediterranean Sea in the West to the Syrian Desert in the East. It puts into altitudinal context the Meso- and Supra- Mediterranean life zones of the study area. As can be seen the Meso-Mediterranean is characterized by mixed evergreen- deciduous forest.

[8] Blondel, J. and Aronson, J.(1995) Biodiversity and Ecosystem function in the Mediterranean basin; human and non human determinants. In Mediterranean type ecosystems. The function of biodiversity (ed G.W. Davis and D.M. Richardson

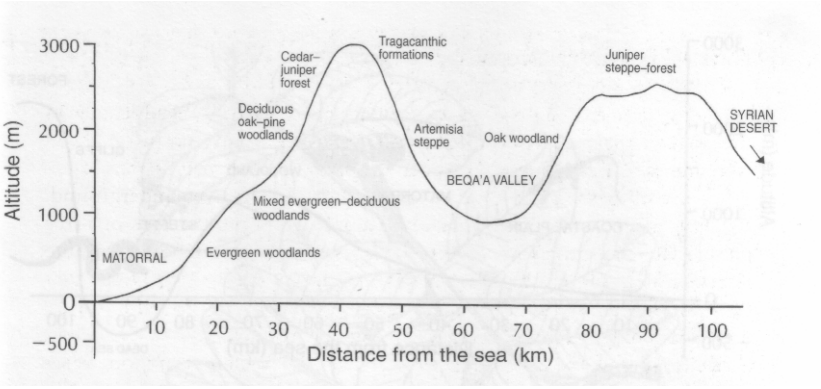


Figure 7 Transect from the Mediterranean coast to the Anti- Lebanon range and Syrian Desert. Indications of bio indicator plant species are given for each life zone.[9]

1.4 Routes of Soaring Birds in Lebanon

As section 1.2 made clear, Lebanon is a key country in the migration of soaring birds from Eurasia to North and Sub Saharan Africa. As such, large flocks of migrating raptors and other soaring birds can be encountered almost anywhere in country. However recent research has shown that even within the relatively small land area of Lebanon certain concentrations can be observed and routes established. Beale and Jaradi[10] postulate a western route and an eastern route either side of the Mount Lebanon chain which come together at the level of Deir el Harf in the Metn mountains for autumn soaring migrants. See **Fig. 8**. Indeed at the confluence of these two routes 40 % of all birds recorded in their study were seen. This is relevant to our study area as the Western route is thought to follow land between the 750 and 1500 m above sea level on the western side of the mountain. Clearly this includes the lower reaches of Jabal Moussa and means that the Jabal Moussa area forms part of the most important route in Lebanon of the most important route in the world of migrating soaring birds!

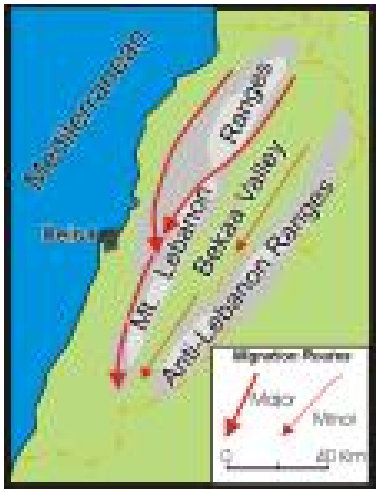


Figure 8: Map of Lebanon showing main routes used by migrating soaring birds during autumn 2000

[9] Biology and Wildlife of the Mediterranean Region. J. Blondel and J. Aronson.
[10] Beale, C. and Jaradi, G. (2001) Autumn routes of migrating raptors and other soaring birds in Lebanon. *Sandgrouse* 23 (2): 124-129

1.5 Introduction to the Jabal Moussa Project

Jabal Moussa was originally included as part of a 3-year project from 2004 - 2007 to survey different areas in Lebanon for their designation as Important Bird Areas (IBAs). Following preliminary migration studies at Jabal Moussa during 2007, plans for future work were drawn up to fill in the gaps in knowledge at this site in 2008. More information on the avifauna was needed to obtain an overall picture of the ornithological interest at Jabal Moussa.

The gaps in knowledge were considered to be on breeding birds, and information on resident birds (i.e. birds that are present at Jabal Moussa throughout the whole year). Also migration surveys during 2007 did not include a major part of the estimated peak period of Honey Buzzard migration, and therefore it was important to include this time period (estimated 28th August to 15th September) as part of the study.

Important Bird Areas (IBAs)

The Society for the Protection of Nature in Lebanon (SPNL) is the BirdLife International partner in Lebanon. As such, any relevant data generated by the Jabal Moussa project will be forwarded to SPNL to pass on to BirdLife International, for the consideration of Jabal Moussa to be designated as an IBA.

The designation IBA is one which is given by BirdLife International to sites which meet certain criteria. They are 'key sites for conservation – small enough to be conserved in their entirety and often already part of a protected-area network – that do one or more of three things:

1. Hold significant numbers of one or more globally threatened species
2. Are one of a set of sites that together hold a suite of restricted-range species or biome-restricted species
3. Have exceptionally large numbers of migratory or congregatory species'

A site is designated as an IBA only if it meets certain criteria based on the occurrence of key bird species that are vulnerable to global extinction or whose populations are otherwise irreplaceable. An IBA must also be amenable to conservation action and management.

IBA criteria are internationally agreed, standardized, quantitative and scientifically defensible. Ideally, each IBA should be large enough to support self-sustaining populations of as many as possible of the key bird species for which it was identified, or, in the case of migrants, fulfill their requirements for the duration of their presence. By definition, an IBA is an internationally agreed priority for conservation action' (BirdLife International Website www.birdlife.org/action/science/sites/index.html)

The criteria for IBAs which apply in the Middle East are given below. Criteria for Lebanon are set by the BirdLife Middle East office based in Jordan, which decides whether or not a site becomes designated as an IBA.

A1. Species of global conservation concern

The site regularly holds significant numbers of a globally threatened species, or other species of global conservation concern.

A2. Restricted-range species
The site is known or thought to hold a significant component of the restricted-range species whose breeding distributions define an Endemic Bird Area (EBA) or Secondary Area (SA).

A3. Biome-restricted species
The site is known or thought to hold a significant assemblage of the species whose breeding distributions are largely or wholly confined to one biome.

A4. Congregations

i. The site is known or thought to hold, on a regular basis, ≥ 1% of a biogeographic population of a congregatory waterbird species.

ii. The site is known or thought to hold, on a regular basis, ≥ 1% of the global population of a congregatory seabird or terrestrial species.

iii. The site is known or thought to hold, on a regular basis, ≥ 20,000 waterbirds or ≥ 10,000 pairs of seabird of one or more species.

iv. The site is known or thought to be a 'bottleneck' site where at least 20,000 storks (Ciconiidae) or raptors (Accipitriformes and Falconiformes) or cranes (Gruidae) regularly pass during spring or autumn migration.

The IBA work at Jabal Moussa largely concentrated on migrating soaring birds (Storks, Raptors and Cranes) as these are the species found here which could make it an IBA.

Conclusion from Previous IBA Fieldwork at Jabal Moussa
Fifteen visits were carried out during 2007 (7 in the spring and 8 in the autumn). Totals for the different groups of soaring birds that can be amalgamated for the purposes of the IBA work are as follows:

Species group	**Spring 2007**	**Autumn 2007**
Storks	1,176	29
Pelicans	0	3
Cranes	0	363
Raptors (birds of prey)	330	818

As many species migrate over a period of several weeks, and visits were only made on a relatively small number of days during 2007, extrapolation techniques could be used to obtain estimated totals for the numbers of birds migrating through. In the preliminary study, total numbers of birds were predicted by multiplying the daily average by the number of days birds are thought to migrate during their 'peak passage' time, and then adding on the number seen outside of this peak period.

Species group	**Totals when numbers extrapolated Spring 2007**	**Totals when numbers extrapolated Autumn 2007**
Storks	1,176	63
Pelicans	0	3
Cranes	0	11,616
Raptors (birds of prey)	1,829	2,107

With extrapolation totals, the data suggests that the Jabal Moussa area is important for migrating soaring birds, but more work was needed, particularly for Honey Buzzard as the peak migration for this species was outside of the survey dates during 2007.

2.0 METHODOLOGY

Several different methodologies were used, including fixed point counts, walkover surveys, breeding bird surveys, and bird-ringing. These are detailed below.

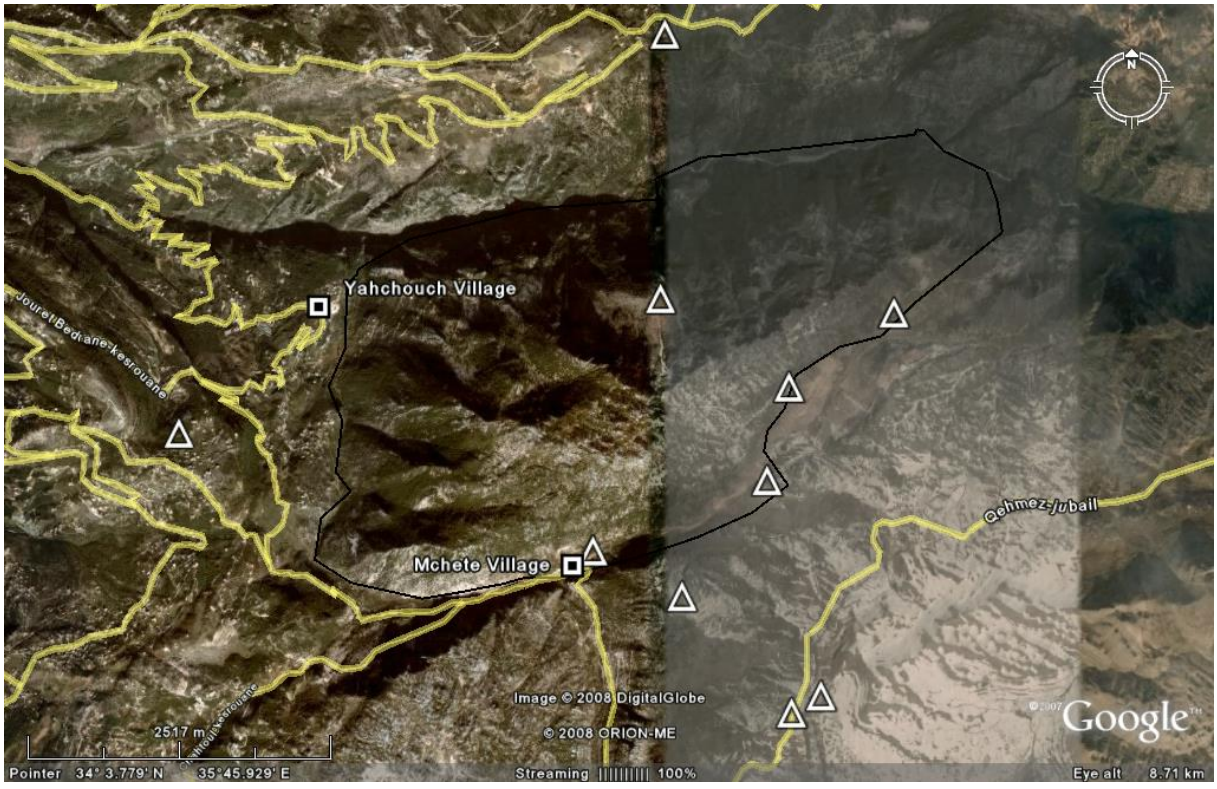
2.1 Fixed Point Counts

For: Soaring bird migration
Passerine migration

This is specifically for migration watching and was carried out only during spring and autumn. Jabal Moussa was visited over the peak migration periods between March and May, and then again between August and October. These estimated peak migration dates are illustrated in **Appendix 1**.

Several different watch points were used to observe Jabal Moussa, as better views were gained from a distance. These points are indicated on **Map 2.1** below**.**

Map 2.1 Soaring Bird Migration Watchpoints



The sky and surrounding area was scanned regularly during the visit day using binoculars and telescopes, and all birds seen were noted. The number of hours was recorded, and a minimum of about four hours was aimed for, however on some occasions this was not possible or not worth the time spent due to the weather (particularly cloud or fog obscuring the view). Typically there were two

observers on each visit, however this varied and sometimes there would be just one person and other times three. Visit details are given in the Appendix. Records were also obtained from people who worked on private land to the south of Jabal Moussa, after descriptions had been taken.

2.2 Walkover Surveys

For: All birds particularly wintering species

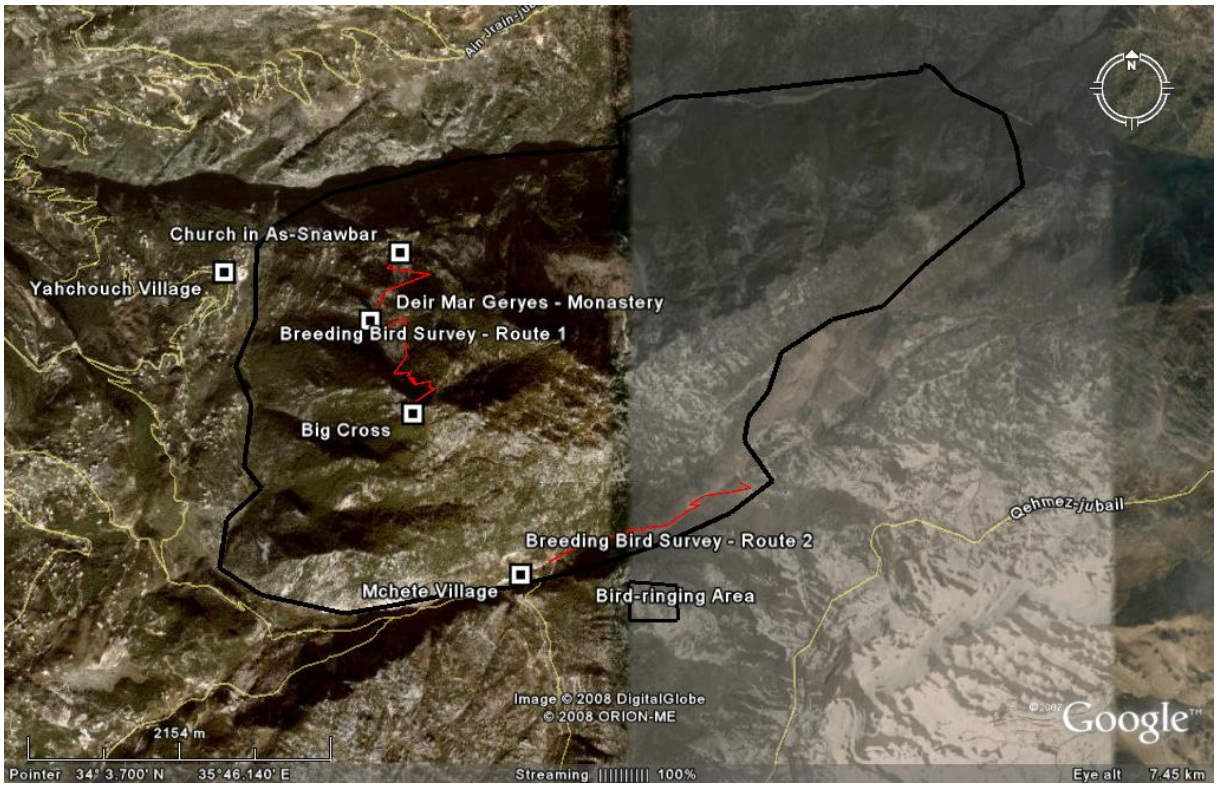
Walkover surveys were carried out so as to record birds present in seasons when other surveys could not be carried out due to time of year. These involve recording all birds seen or heard walking fairly slowly in the mountain. Often when there is dense scrub and tree cover, it is not possible to catch more than a glimpse of a particular bird. Therefore it is particularly important in this sort of habitat to be able to recognize bird calls and songs. This type of survey was particularly valuable for counting wintering species.

2.3 Breeding Bird Surveys

For: Breeding birds at Jabal Moussa

Two different areas at Jabal Moussa were chosen to concentrate specifically on breeding birds and these are shown on **Map 2.2** below**.** Two routes were walked that could be easily repeated to allow a number of visits to the same area. These routes also went through a number of habitat zones to be representative of the whole mountain. Route 1 is along the north-western slopes of the mountain from near Yahchouch, up from the monastery to the large cross. Route 2 is the 'Roman staircase' which is a valley going up the southern edge of Jabal Moussa from Mchete to a road at the top of the slope, near the village of Qahmez.

Map 2.2 Routes of Breeding Bird Surveys



The methodology used for breeding bird surveys was an adapted version of the standard used by the British Trust for Ornithology (BTO), and described in Bibby et al, 1992. The routes were walked slowly in the early morning when birds were active, searching for food and singing, indicating territories. All birds seen and /or heard were recorded together with their approximate locations on a map. The behaviour of each bird was also noted on the map, such as alarm calls, singing, carrying food etc. These are put together to gain a picture of what each species is doing but particularly relevant are those behaviours related to breeding such as carrying food. Four visits were carried out to each of the two sites. Once all the visits were completed, the details for each species were put together on a map, and the number of breeding territories for each species was estimated.

2.4 Bird Ringing

For: Passerine migration monitoring
Breeding bird information

The purpose of bird ringing at Jabal Moussa was to assess numbers of passage migrants passing through and to see which birds were breeding there. It also allowed some birds to be caught that were not seen during other surveys. There were several difficulties in finding a suitable site as there had to be enough vegetation to allow the nets to be camouflaged, and also fairly accessible by vehicle for the ringing equipment, but not accessible or visible to the general public so as to ensure that nets remained on site.

A site just south of the Jabal Moussa mountain was chosen, which was immediately to the south of Route 2 of the breeding bird survey. The location of the ringing area is indicated on **Map 2.2**, and the locations of each of the nets within this area are shown below on **Map 2.3** below.

Map 2.3 Locations of Nets Within Ringing Area Indicated on Map 2.2

Ringing was carried out in the mornings on six days in April 2008. The ringing nets were set in place the evening before and then furled (wound up) so that no birds were caught during the night. The nets were opened just before it got light in the morning, and left open for 5-6 hours, depending on the weather. Nets should not be left open during windy, rainy or hot weather, or too cold weather, as this would compromise bird survival.

A total of 7 nets were put up at any one time, although the positions varied a little over the ringing period as some nets were found to be more productive than others.

Birds caught in the nets were carefully extracted and biometric details were taken, a ring put on the right leg, and then the bird was released. Details taken included: species, age, sex, fat and muscle scores, ring number and weight. Each ring number is unique so that the individual bird can be recognized if it is caught again. If any are recaptured, particularly useful feedback would be the place, date and time of capture. Any details help to build up a picture of how birds may be using the site.

3.0 RESULTS AND DISCUSSION

3.1 Fixed Point Counts

A summary of the results for Spring and Autumn 2008 is given in the table below, showing numbers of each species observed during both seasons. A full results table is given **Appendix 2** which shows visits to the mountain and the number of each species seen on each visit. Some data was obtained while carrying out breeding surveys and ringing, as migrating soaring birds were observed.

A total of six dedicated migration surveys were carried out in the spring with an additional sixteen days when migrating birds were observed while carrying out breeding bird surveys and ringing. Twenty-four migration visits were carried out in the autumn. These visits included records from others apart from the A Rocha team, and a list of contributors is included in the Appendix.

Soaring Bird Migration Summary 2008

Species	TOTAL SPRING: 22 visits fr 20 Feb – 21 May 2008	TOTAL AUTUMN: 24 visits fr 12 Aug – 21 Oct 2008
White Pelican	525	0
White Stork	751	420
Black Stork	614	146
Stork spp.	0	145
Griffon Vulture	1	1
Osprey	0	1
Imperial Eagle	1	0
Lesser Spotted Eagle	69	2,193
Greater Spotted Eagle	5	210
Steppe Eagle	1	0
Short-toed Eagle	36	8
Booted Eagle	0	5
Eagle spp.	22	844
Black Kite	7	25
Eurasian Marsh Harrier	0	3
Hen Harrier	0	0
Montagu's Harrier	0	3
Harrier spp.	1	3
Long-legged Buzzard	13	13
Common Buzzard	90	65
Honey Buzzard	3	9,961
Buzzard spp.	151	73
Raptor spp. (non-Falco.)	3	311
Eurasian Sparrowhawk	9	16
Levant Sparrowhawk	0	5
Sparrowhawk spp.	21	48
Common Kestrel	1	7
Lesser Kestrel	0	3
Kestrel spp	11	25
Red-footed Falcon	2	3
Eurasian Hobby	0	7

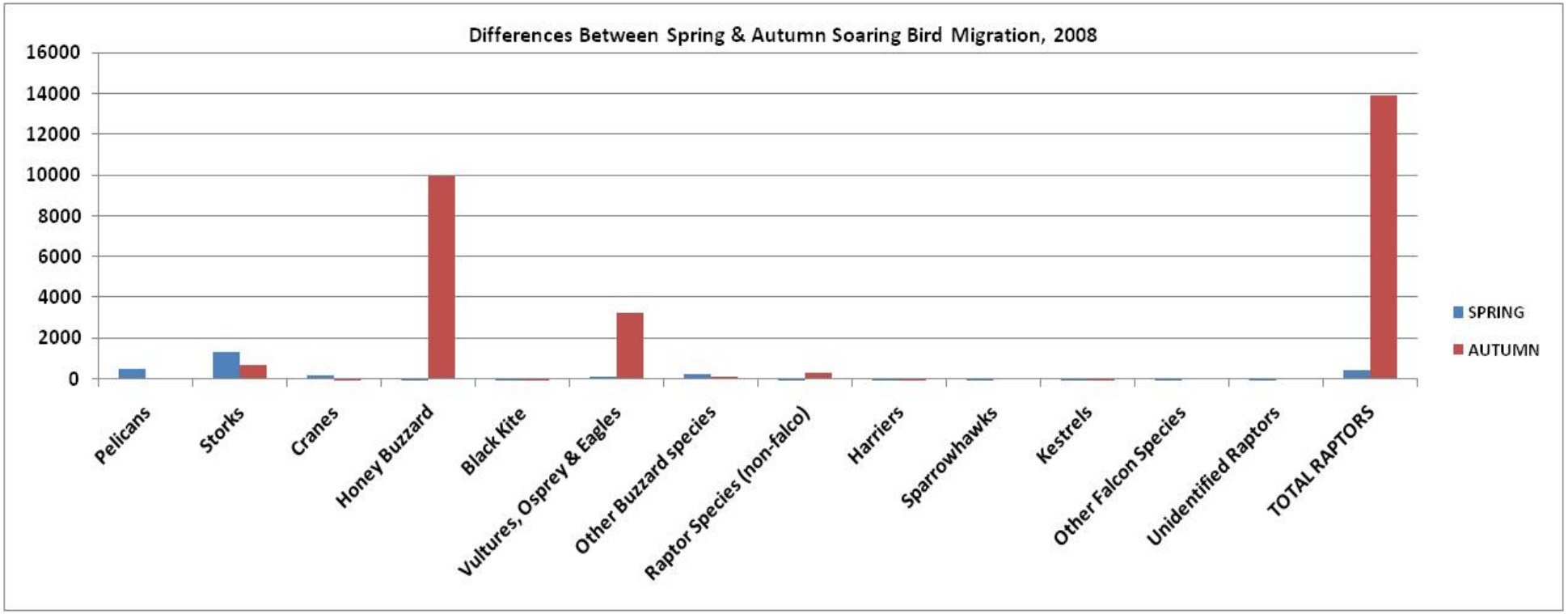
Species	TOTAL SPRING: 22 visits fr 20 Feb – 21 May 2008	TOTAL AUTUMN: 24 visits fr 12 Aug – 21 Oct 2008
Peregrine Falcon	0	1
Falcon spp.	3	64
Unidentified Raptor spp.	7	84
Common Crane	172	30
TOTAL BIRDS OF PREY	**457**	**13,982**
TOTAL STORKS	**1365**	**711**
TOTAL CRANES	**172**	**30**
TOTAL PELICANS	**525**	**0**

Total numbers of migrating soaring birds were much higher this year, in 2008, than they were in 2007. This is likely to be due in part to the total number of visits undertaken in 2008, but also that they took place over a greater range of the year, enabling more of each species to be seen. Particularly large numbers of certain species such as Honey Buzzard and Lesser Spotted Eagle were a proportion of the total numbers of soaring birds seen, particularly in the autumn.

The main differences between spring and autumn migration are illustrated by **Graph 3.1** on the following page.

Looking towards Jabal Moussa from Mashnaqa

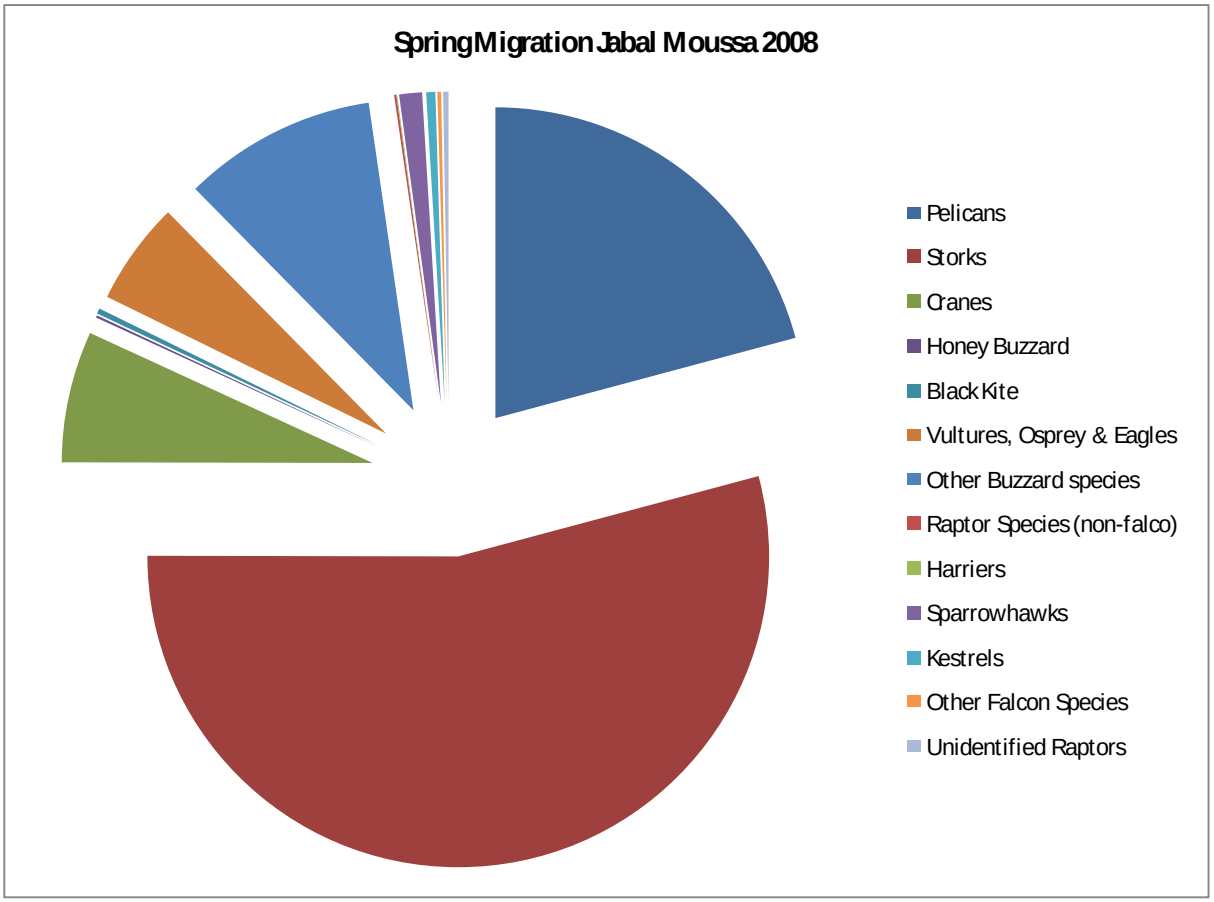
Graph 3.1 Spring and Autumn Migration 2008



Soaring Bird Migration: Spring

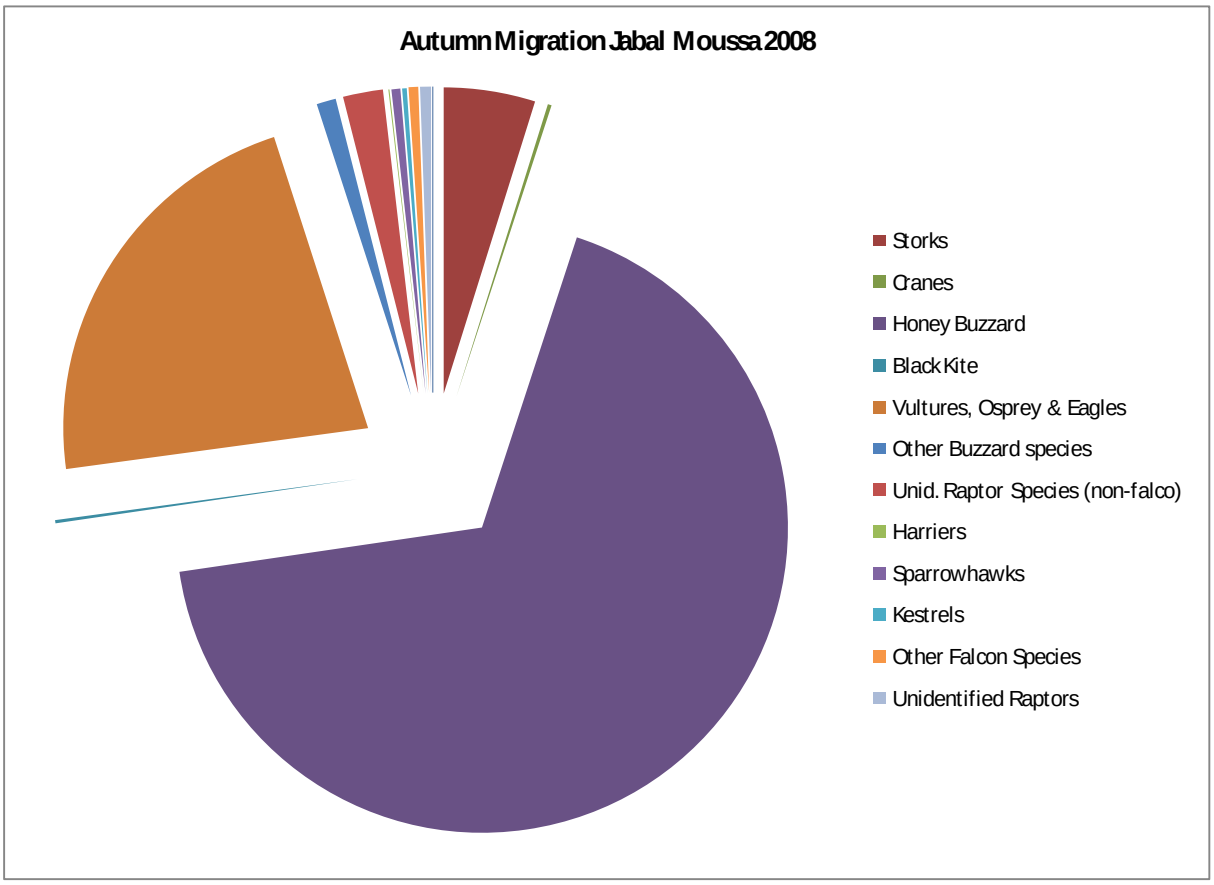
In terms of numbers of soaring birds, both Storks and Pelicans were more numerous than birds of prey in the spring. Taken together, Pelicans, Storks and Cranes made up over 75% of soaring bird numbers in the spring, with Cranes being the smallest group of the three. During the spring, the largest group of all the birds of prey was 'Other buzzard species' which included buzzard species apart from Honey Buzzard (Long-legged and Common).

The relative numbers in each group, with 'Birds of Prey' being subdivided into smaller families, is illustrated in the chart below.



Soaring Bird Migration: Autumn

In the autumn, the largest group by far was birds of prey, which was due mainly to the Honey Buzzard migration that begins in late August. Birds of prey accounted for nearly 95% of the total autumn migration numbers of soaring birds. Relative numbers of different families are shown in the chart below, with Honey Buzzard as a category on its own to indicate the high proportion of this species. Honey Buzzard accounted for 75% of the total birds of prey seen in the autumn (71% of the total migration including Storks and Cranes). Numbers of Lesser Spotted Eagles were also much larger in the autumn than the spring, increasing the proportion of eagles in the autumn. No Pelicans were observed in the autumn, and the numbers of Storks (Black and White and unknown combined) were about half the total recorded in the spring. Numbers of cranes were also small (30) in the autumn.



The two charts clearly illustrate the differences in the species biodiversity between spring and autumn migration at Jabal Moussa. The 2008 data is illustrated and discussed above, and shows consistency with data collected in 2007 regarding the differences between spring and autumn migration: For example, a far greater number of Storks observed in the spring than the autumn, and many more birds of prey seen in the autumn than in the spring. Numbers of cranes were comparatively small in both years, with autumn totals being 363 and 30 for 2007 and 2008 respectively.

3.2 Breeding Bird Surveys

Results

Visits to the two sample areas chosen within the Jabal Moussa site, shown on **Map 2.2**, commenced in early April after the snow had melted, and continued until the end of May. Visits to both sites were carried out early in the morning when birds are more active.

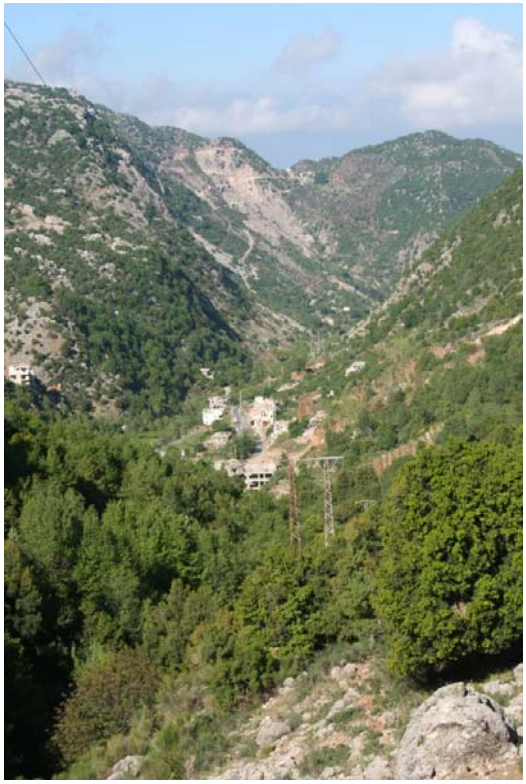
A total of eight visits were carried out, four visits to each of the two areas.

Breeding Bird Survey Visits

Date	Site	Route
8 April 08	Monastery	Route 1
9 April 08	Roman staircase	Route 2
29 April 08	Monastery	Route 1
30 April 08	Roman staircase	Route 2
6 May 08	Monastery	Route 1
7 May 08	Roman Staircase	Route 2
20 May 08	Roman Staircase	Route 2
21 May 08	Monastery	Route 1

A table showing the breeding birds at Jabal Moussa is given below. It should be noted that the breeding bird surveys gave a sample of the birds breeding at Jabal Moussa, and therefore they are not absolute totals of birds breeding along the survey routes. Rather, the number of *territories* of each species on each route is estimated by taking into account all the information gathered during all of the breeding bird survey visits. Different species also have very different territory sizes, for example a pair of breeding Short-toed Eagles could have as one territory a whole valley, whereas the same area could support over 30 pairs of Wrens.

Roman Staircase, Route 2



Breeding Birds at Jabal Moussa

FAMILY **Species**	**Estimated Number of territories Yahchouch – big cross ROUTE 1**	**Estimated Number of territories Mchete – Roman Staircase ROUTE 2**	**TOTAL Estimated territories from surveys**
Short-toed Eagle	-	Possible	Possible
Long-legged Buzzard	-	Possible	Possible
Common Kestrel	-	Possible	Possible
Chukar	3	4	7
Common Cuckoo	2-3	1-2	5
Great Spotted Cuckoo	-	Possible	Possible
*Tawny Owl			Possible
Wren	18	20	38
Yellow-vented Bulbul	1	1	2
Nightingale	-	1	1
Black-eared Wheatear	3	4-5	8
Black Redstart	3	1	4
Blackbird	3-4	6	10
Blue Rock Thrush	-	1	1
Blackcap	-	2	2
Lesser Whitethroat	4-5	8	13
Sardinian Warbler	2	2	4
Eastern Orphean Warbler	-	Possible	Possible
Whitethroat	-	1	1
Eastern Olivaceous Warbler	3	5-6	9
Eastern Bonelli's Warbler	Possible	-	Possible
Chiffchaff	9	6	15
Willow Warbler	-	1	1
Blue Tit	7	3	10
Great Tit	8	9	17
Coal Tit	1	-	1
Western Rock Nuthatch	1	1	2
Masked Shrike	Possible	-	Possible
Jay	-	2	2
Rock Sparrow	Possible	1	1 +
Chaffinch	18	7	25
Greenfinch	3	-	3
Rock Bunting	Possible	1	1+
Black-headed Bunting	-	1	1

*Tawny Owl heard within the ringing area during April.

Breeding Bird Surveys: Discussion

Twenty-six bird species are found breeding at Jabal Moussa, with an additional eight species as 'possible' – i.e. it was likely that they were breeding but there was not enough evidence.

The most numerous breeding birds observed, combining the number of territories recorded from both routes, include Chiff-chaff, Blue Tit, Great Tit, Blackbird, Chaffinch, Wren, Lesser Whitethroat and Eastern Olivaceous Warbler. These are all fairly common species in Lebanon and the habitats at Jabal Moussa are suitable for all of these, with low scrub and abundant insects especially near the base of the routes. Blue tit is an exception to this as records of breeding Blue tits are rare in Lebanon.

The three possibly breeding birds of prey species (Kestrel, Long-legged Buzzard and Short-toed Eagle) were recorded on many of the visits to Jabal Moussa, and breeding was considered likely as these birds were hunting and staying around the area rather than migrating on.

3.3 Results of Bird Ringing

Ringing at Jabal Moussa was carried out over 6 morning visits, and one short evening visit, during April 2008. The details of each ringing session are given below.

Ringing Visit Details

Date	No. of hrs nets open	Total Net Length (m)	Total Net Hours (hrs/m)	Birds /m/ hr!	Approx hrs ringing	Ringers Present	Weather	No. of birds	No. of Species	Bird species/no. ratio
01 Apr	1.00	90	90.00	0.04	2	HID, CRC, SI	Showers, cloud, cool	4	4	1
02 Apr	5.75	102	586.5	0.03	5.5	HID, CRC, MO, KW	Cold, frost, sunny	18	9	2
15 Apr	4.83	108	521.64	0.04	5	HID, CRC	Cloud 3/8, Wind NE 1	20	6	3.33
15 Apr	1.50	108	162.00	0.01	3	HID, CRC	Cloud 3/8, thin, sunny, warm, wind 1-2	1	1	1
16 Apr	6.00	108	648.00	0.02	6	HID, CRC	Sunny, hot, cloud 4/8, Wind W 2, gust 3	13	6	2.17
22 Apr	5.83	132	769.56	0.02	6	HID, CRC	Sunny, no cloud (0/8), hazy, v light SE wind	19	6	3.17

Date	No. of hrs nets open	Total Net Length (m)	Total Net Hours (hrs/m)	Birds /m/ hr!	Approx hrs ringing	Ringers Present	Weather	No. of birds	No. of Species	Bird species/no. ratio
23 Apr	6.33	132	853.56	0.02	6	HID, RC, MO		20	11	1.81
TOTALS	**31.24**		**3,613.26**	**0.03**	**33.5**			**95**	**20**	**4.75**

A total of 95 birds were ringed at Jabal Moussa of 20 species. Details of each bird ringed are given in the Appendix, and a summary is given below.

Summary of Bird Ringing

FAMILY (No. ringed) Species	**Status at Jabal Moussa**	**Number of individuals Ringed**	**No. of Males**	**No. of Females**	**No. of unknowns**
PIPITS (1)					
Tree Pipit	PM	1			1
WREN (3)					
Wren	R	3	2		1
THRUSHES (17)					
Thrush Nightingale	PM	2			2
Common Redstart	PM	1	1		
Black Redstart	R	12	5	6	1
Blackbird	R	3	1	2	
WARBLERS (59)					
Blackcap	PM, SB	19	11	8	
Garden Warbler	PM	1			1
Lesser Whitethroat	PM,SB	28	9	4	15
Sardinian Warbler	R	2	2		
Eastern Orphean Warbler	PM, SB	1		1	
Whitethroat	PM,SB	1	1		
Eastern Bonelli's Warbler	PM, poss. sb	1			1
Chiffchaff	PM, SB,WV	3			3
Willow Warbler	PM	2			2
Wood Warbler	pm	1			1
TITS (11)					
Blue Tit	PM,SB, WV	6	2	2	2
Great Tit	PM,SB	5	4	1	
NUTHATCHES (2)					
Rock Nuthatch	R	2		1	1
FINCHES (1)					
Chaffinch	R	1	1		

KEY: PM = Passage Migrant, R = Resident, SB = Summer Breeding, WV = Winter Visitor

Small letters = low numbers

Bird Ringing: Discussion

Looking at the table above of birds ringed at Jabal Moussa indicates the usefulness of this sort of study combined with other surveys. Some passage migrants such as Garden Warbler, Wood Warbler, Thrush Nightingale and Tree Pipit were caught and ringed but were not recorded at any other times during bird survey visits. Breeding birds were also caught during the survey visits, giving a sample of breeding birds within the local area, including Lesser Whitethroat (very numerous), Blackcap and Black Redstart. Two females of this species were caught where they were obviously 'with egg' and so released quickly.

The largest number of any one species ringed was Lesser Whitethroat (28 ringed), followed by Blackcap (19 ringed), and Black Redstart, of the *semirufus* subspecies (12 ringed).

The species diversity of birds caught was high, with in general a low number of birds ringed, of a high number of species. The 'birds/hr/metre' should not be taken as an absolute, but as a comparison of the productivity of different days of ringing, taking into account the number of hours of ringing and the number of nets. Using this measure the 15th April, in the morning, appears to have been the most productive with 20 birds ringed over a period of 5hrs.

3.4 Results of Walkover Surveys

Walkover surveys were used to augment the information that was already being collected via other surveys, and was mainly needed for resident and wintering species. These would include those species which may not necessarily be recorded during other surveys.

A total of 9 walkover surveys were carried out throughout the year, as shown below:

Month	**Number of Walkover Survey visits**	**Main observations**
January	2	50+ Robins, 10+ Blackbirds, Flocks Goldfinch and Greenfinch. Black Redstart and Wren recorded
		Fewer Robins on second visit, also Dunnock recorded. Song Thrush, Stonechat, Chiff-chaff, Great tit and Blue tit recorded. Larger flocks Greenfinch and Goldfinch (over 20 of each)
February	2	Chukar, Wren, Dunnock, Robin nos. decreasing. Blackbirds, tits and finch flocks.
		Woodpigeon, good nos. of Robin (total 34 on mtn), Blackbirds, tits, finches Song thrush, House sparrow.
March	1	Some eagles on migration. Wren, Song Thrush, Lesser Whitethroat, Rock Nuthatch.
July	1	Pair short –toed eagles possibly breeding. Rock Nuthatch, tits, chiff-chaff
November	2	Flock of 60 Woodpigeons recorded by MAS
		Long-legged Buzzard, Common Buzzard, 16 woodpigeons. Robins, chiff-chaff, tits, Jays, finches
December	1	Larger finch numbers, YV Bulbul, Robins, Dunnock, Woodcock and Chukar.

Birds included in the table above are also described below in the bird species accounts. Birds only recorded during walkover surveys include Greenfinch, Dunnock, Song Thrush, Woodpigeon, Stonechat and Robin.

3.5 Species Descriptions

A list of all the species observed is below, with brief notes about each. All observations are from 2008 unless stated otherwise. The bird family and species order follows that given in Mullarney et al (1999), which is in general an evolutionary order, and is the order that has been followed throughout this report for ease of reference.

PELICANS

White Pelican *Pelecanus onocrotalus*

This species was only seen in the spring, during March and April, 2008, with the largest flock numbering 500 birds. During 2007, only 3 Pelicans were seen, in October.

STORKS

White Stork *Ciconia ciconia*

White Storks numbers differ depending on the season, with almost twice as many being seen in the spring as in the autumn. Groups were seen migrating in mid-March and mid-April, and mid-October during 2008, with a total of over 700 in Spring and over 400 in the Autumn. This pattern follows that of 2007, but with an even greater difference between the two seasons, although smaller numbers: a total of 267 in the spring but none in the autumn (A Rocha, 2007). From other anecdotal evidence it may be that White Storks follow different routes for spring and autumn migration.

Black Stork *Ciconia nigra*

Over 600 of this species were observed during spring, but fewer were observed during autumn.

BIRDS OF PREY

Unidentified Raptor Spp

Numbers of birds in this category depended very much on the viewing conditions and the experience of the observer. This category was used when there were raptors passing overhead, but they could not be identified. Seven were put into this category in the spring and 82 in the autumn, with 69 of these observed on the 14th October when conditions were difficult for observations with birds flying past at a very high altitude.

Griffon Vulture *Gyps fulvus*

Only two individuals of this species were seen during the survey visits: one in the spring during a breeding bird survey from the top of 'Route 1' on the 8th April, and the other was during autumn migration on 14th October.

Osprey *Pandion haliaetus*

No Ospreys were observed during spring, and there was only one seen during the Autumn migration period on the 3rd September.

Imperial Eagle *Aquila heliaca*

Just one of this species was positively identified on the 2nd April, and none were seen during the autumn.

Lesser Spotted Eagle *Aquila pomarina*
A total of 69 were observed during the spring with the peak day the 2nd of April when 43 were observed. The autumn migration period was much busier for this species, with over 2,000 observed with most of these seen on one day, on 3rd October.

Greater Spotted Eagle *Aquila clanga*
Five were observed during the spring migration on the 15th of April, and then 210 on the 24 September.

Steppe Eagle *Aquila nipalensis*
Only one Steppe Eagle was seen during the project, during the spring on the 15th September.

Short-toed Eagle *Circaetus gallicus*
This species was seen migrating mainly during March and April, and was less frequent in the autumn. Individuals and pairs were also observed on several occasions after the migration season, including on the 1st April when 2 were observed hunting and on the 27th July, which suggests that they may be breeding here.

Booted Eagle *Hieraatus pennatus*
None were observed during the spring but a total of 5 were seen during the autumn, as individuals and one pair, from late August to mid-October.

Eagle spp *Aquila spp*
During the spring 22 unidentifiable eagles were observed, and over 800 in the autumn. Many of those seen in the autumn could have been Lesser Spotted; however as it was not certain they have been allocated to the 'Eagle spp' section.

Black Kite *Milvus migrans*
This species was not seen in large flocks but usually in ones or twos. The largest flock was of 16 observed in mid-September.

Eurasian Marsh Harrier *Circus aeruginosus*
None of this species was identified during spring migration visits, but several individuals were seen during September and October. One was also photographed by MAS during April above Al Saleeb (the big cross above Route 1).

Hen Harrier *Circus cyanus*
There were no birds of this species positively identified at Jabal Moussa, although the 'ringtail harrier' could have included this species. 'Ringtail harrier' was seen once in March and then 3 were seen during September on 2 different occasions.

Montagu's Harrier *Circus pygargus*
None of this species were identified during spring migration, and there were 3 on two different days during September.

Harrier Spp
Harriers that could not be identified as one of the above three species were placed in this section.

Long-legged Buzzard *Buteo rufinus*
Several of this species were seen during spring with a total of 13 for the season, and 12 during the autumn.

Common Buzzard *Buteo buteo*
Common Buzzards were observed during spring between March and April, with 71 being seen on one day in March (a total of 90 during the spring migration season). On the 14th October over 50 were observed but apart from that numbers were fairly low with a total of 65 during the autumn migration season.

Honey Buzzard *Pernis apivorus*
Very few Honey Buzzards were observed during spring (3 seen in mid-April); however during the autumn migration this species was the most numerous migrant seen with over 8,800 observed in total over the autumn period and over 5,000 on one day (8 September 2008). This species migrates earlier than most of the other raptors and migration watches commenced in mid-August specifically for this species.

Buzzard Spp. *Buteo/Pernis spp*
Some buzzards could not be positively identified and these were put together as 'Buzzard spp'. A total of 151 were observed during the spring with 137 on one day (15th April). During the autumn migration just over 70 were seen, with 65 of these on the 14th October.

Raptor Spp. (non-*Falco*)
This group, recorded during migration surveys, would include species such as Buzzards and Eagles, Harriers, etc - any larger birds of prey which were not Falcons.

Eurasian Sparrowhawk *Accipiter nisus*
This species was positively identified on several occasions in Spring and Autumn, usually in single digit numbers.

Levant Sparrowhawk *Accipiter brevipes*
None of this species were positively identified in the spring and only 5 in the Autunn; however some of the 'Sparrowhawk species' may have been Levant Sparrowhawk.

Sparrowhawk Species *Accipiter spp.*
This section is for those birds seen that were positively identifiable as Sparrowhawks but that were too far away, or the conditions were not right, to be able to identify them as either Eurasian or Levant Sparrowhawks. A total of 21 Sparrowhawk spp. were seen in the spring and 48 in the autumn, with 30 on the 24 September.

Common Kestrel *Falco tinnunculus*
Just 1 Common Kestrel was observed during the spring migration, and 6 during the autumn, as 1 or 2 birds at a time.

Lesser Kestrel *Falco naumanni*
None of this species were observed during the spring and just 3 positively identified on the 14th October during the autumn migration.

Kestrel Spp *Falco tinnunculus* or *naumanni*
11 kestrels, which were unidentifiable to species level, were observed during the spring migration, and 23 during the autumn. A total of

Red-footed Falcon *Falco vespertinus*
Two were seen in the spring on 15th April and just 3 during the autumn migration.

Eurasian Hobby *Falco subbuteo*
No Hobbies were observed during the spring but 7 were seen on 14th October.

Peregrine Falcon *Falco peregrinus*
None were seen in the spring, and one was seen in the Autumn on the 29th September.

Falcon Spp *Falco spp.*
3 unidentified Falcon species were seen during the spring, and 62 in the autumn with 49 being seen on one day on the 14th October.

PARTRIDGES

Chukar *Alectoris chukar*
An estimated 3 pairs were breeding along Route 1 and 4 along Route 2. This species is described as a being common and widespread breeder, mainly between 1200 – 2000m (Ramadan-Jaradi et al 2008).

Common Quail *Coturnix coturnix*
Two were heard on 16th April from just off the southern side of Jabal Moussa, and could be possibly breeding here. They are most common in Lebanon as a passage migrant, but they are also recorded as an 'uncommon and localized migrant breeder' in some areas (Ramadan-Jaradi, 2008). Also during the ringing sessions tape lures of Quails used by hunters were heard.

Corncrake *Crex crex*
One individual of this species was observed on the 2nd September on the road between Yahchouch and Mchete, therefore not strictly on the mountain itself but nevertheless included in this report as it is an interesting species to find and also having been found nearby could potentially be found at Jabal Moussa. Corncrakes are uncommon passage migrants and declining in much of their breeding range.

CRANES

Common Crane *Grus grus*
Two large groups, 83 and 89, of this species were seen in the spring on two separate occasions in March and April. Only small groups were seen in autumn of 2008.

WADERS

Woodcock *Scolopax rusticola*
One Woodcock was flushed while walking along the road in the direction of Snoubar from Yahchouch. This is the only record of this species at Jabal Moussa. It is known from Lebanon as a passage migrant and winter visitor. It is a shy species and therefore could easily be under-recorded.

PIGEONS AND DOVES

Woodpigeon *Columba palumbus*
Not seen outside of the winter period, flocks of this bird were observed during November 2008 numbering up to 60, and smaller groups of 4 or 5 in early spring.

CUCKOOS
Cuckoos are both 'nest parasites' – i.e. they lay their eggs in other birds' nests, the Common Cuckoo generally lays its eggs in nests of various smaller passerines, whereas the Great Spotted Cuckoo tends to parasitise corvids (possibly Jays at Jabal Moussa).

Common Cuckoo *Cuculus canorus*
There were an estimated 2-3 breeding pairs of Cuckoo along Route 1, spread out along the mountainside, and 1-2 pairs at the base of Route 2. The Common Cuckoo is considered to be an uncommon and localized migrant breeder in Lebanon.

Great Spotted Cuckoo *Clamator glandarius*
Just one was seen on the 20th May 2008 along Route 2. From the available observations, it is considered to be an 'uncommon passage migrant' in most areas between mid-February and late April. The observation in late May is fairly late for a passage migrant, and it is possible therefore that this species could have bred. Observations of egg laying and breeding are rare: in 2001 above Aammiq (egg-laying) and breeding from Beirut in 1954 (breeding).

OWLS

Tawny Owl *Strix aluco*
This species was heard just off the southern slopes of the mountain, near the top of the Roman staircase. It is likely to breed here, although in small numbers.

SWIFTS

Common Swift *Apus apus*
Common Swift was seen in the spring, although it seemed to be more common in the autumn.

Alpine Swift *Apus melba*
Alpine Swift was not seen in the spring, however 9 individuals were seen on the 29th September.

HOOPOE

Hoopoe *Upupa epops*
Just one was observed on the 9th September in the southern area of the mountain, during migration watches. This species is a widespread resident and also a migrant.

BEE-EATERS

European Bee-eater *Merops apiaster*
Groups seen and heard migrating over Jabal Moussa in April, September and October.

WOODPECKERS

Eurasian Wryneck *Jynx torquilla*
Just one was seen on the 8th September just off the southern slopes of the mountain.

LARKS

Woodlark *Lullula arborea*
Just 2 were observed in April 2007, none were observed in 2008. It is a common breeding resident and in Lebanon this species is usually found in higher altitudes than Jabal Moussa, in the more montane zone, above 2000m. In the winter however birds are recorded as moving to lower areas.

HIRUNDINES – Swallows and Martins
It should be noted that Hirundine numbers will be much lower than expected, as the main focus of migration watches was for soaring birds, and therefore often if there were both soaring birds and other passerines, particularly hirundines, passing through, they could have been ignored. However all species below were seen at some point.

Hirundines were mainly identified to species level, although on the 8th of September 60 were observed which could not be allocated to a particular species.

Crag Martin *Ptyonoprogne rupestris*
This species was just seen on one occasion in the spring (2 individuals on the 15th April).

House Martin *Delichon urbica*
Seen in March and April and noted also in September on migration.

Sand Martin *Riparia riparia*
These were not noted in the spring but they were seen in late September and early October.

Barn Swallow *Hirundo rustica*
In the spring these were seen migrating through from mid-March until the end of April, and in the autumn from September to mid-October.

Red-Rumped Swallow *Hirundo daurica*
This species was only seen in mid-March, a total of 7 observed on two consecutive days.

PIPITS AND WAGTAILS

Tawny Pipit *Anthus campestris*
Two Tawny pipits were seen together on the 14th October, a little later than usually seen on passage, although some have been recorded overwintering in other areas (Ramadan-Jaradi et al 2008).

Water Pipit *Anthus spinoletta*
Just one was seen on the 10th April 2007, with none seen during 2008. It is recorded by Ramadan-Jaradi (2008) as being a widespread passage migrant and also seen in the winter near the coast.

Tree Pipit *Anthus trivialis*

None of this species was observed on any visit during 2008, however one was caught and ringed on the 23rd April, showing the value of ringing here. One was observed in the spring of 2007. Tree Pipits are considered to be common passage migrants, with fewer in the spring.

Yellow Wagtail *Motacilla flava*
Two of this wagtail species were recorded on migration during the autumn on 24th September. They are a passage migrant through Lebanon.

WREN

Wren *Troglodytes troglodytes*
Many individuals of this species were recorded singing along both routes, with 18 spaced fairly evenly along Route 1, to the top of the mountain, and 20 on Route 2, found mainly along the lower ¾ of the slope. Three wrens were ringed, 2 breeding males and one of unknown sex, all on the 2nd April. Low numbers of this species were seen between January and March (1-3 individuals). Wrens are considered a common breeding resident in Lebanon, as they are at Jabal Moussa.

BULBUL

Yellow-vented Bulbul *Pycnonotus xanthopygos*
These seemed to breed lower down the mountain, with one territory near the base of Route 1 and one at the start of Route 2.

ACCENTORS

Dunnock *Prunella modularis*
Small numbers (ones and twos) were seen during the winter up to mid-February. This species is a winter visitor and passage migrant through Lebanon.

THRUSHES

Robin *Erithacus rubecula*

This species is only seen as a winter visitor in Lebanon. It was not seen at all during 2007 surveys, but on 16th January 2008, over 50 were seen over one visit of just over 4 hrs to the northern slopes of the mountain. After this date, numbers of Robins gradually decreased with each visit until 12th March when just two were seen.

Nightingale *Luscinia megarhynchos*

Just one was heard singing at the start of Route 2 on the southern slopes of the mountain, but it was also seen during migration/walkover surveys on 9th September 2008, near the ringing area. This species mainly breeds at lower altitudes.

Thrush Nightingale *Luscinia luscinia*

This species was only recorded during ringing sessions, two were ringed on the 23rd April. Thrush Nightingale is considered to be a scarce spring migrant and rare in autumn.

Common Redstart *Phoenicurus phoenicurus*

This was only recorded during ringing sessions, when just one male was ringed on the 16th April. It is recorded as being fairly common as a passage migrant, and a 'scarce migrant breeder' (Ramadan-Jaradi et al 2008).

Black Redstart *Phoenicurus ochruros ssp. Semirufus*

This common breeding resident bird was found on both routes, with an estimated 3 territories on Route 1 and 1 territory on Route 2, in the centre of the route where the habitat becomes rockier. A number were also ringed (12). The subspecies found here is *semirufus* where the male has distinctly different colour markings from the nominate race, being very black above and having no white wing-patch. A bird was photographed by MAS on 22 October 2008 on the southern side of the mountain near Qahmez.

Northern Wheatear *Oenanthe oenanthe*

Northern Wheatears were seen in low numbers in spring and autumn. This species is a common migrant breeder, but usually in higher altitudes (1500-2500m – Ramadan-Jaradi et al 2008). It is considered to be common on autumn passage but uncommon in spring.

Black-eared Wheatear *Oenanthe hispanica*

This species was found in clusters along the lower rocky slopes of Route 1, where an estimated 3 territories were observed. 4-5 territories were observed along Route 2, in rockier places mainly on the upper slopes of this route.

Whinchat *Saxicola rubetra*

None of this passage migrant were observed in the spring, one was seen on the 8th September.

Stonechat *Saxicola torquata*
One was seen at the end of January on the northern side of the mountain.

Blue Rock Thrush *Monticola solitarius*
This thrush breeds mainly in rocky mountainous areas, and one territory was observed along Route 2. Low numbers were also seen on passage (one and two) in March and September.

Rock Thrush *Monticola saxatalis*
None were recorded during 2008, however one was observed in Spring 2007.

Song Thrush *Turdus philomelos*
Song Thrush was seen in the winter and the spring, between January and early April, in low numbers. It is not recorded as breeding in Lebanon, just as a winter visitor and a passage migrant (Ramadan-Jaradi et al 2008).

Blackbird *Turdus merula*
This is a common breeding resident bird, and 3-4 territories were recorded from Route 1 and 6 from Route 2. This species was seen in all seasons and appeared to be fairly widespread over the mountain. Higher numbers were observed in the winter (over 10 in one day on the northern slopes of the mountain).

WARBLERS

Cetti's Warbler *Cettia cetti*
Recorded only once, during late March 2007, this species is considered to be a common breeding resident in Lebanon, even though it is not common at Jabal Moussa.

Graceful Prinia *Prinia gracilis*
Also recorded only once, during mid May 2007. In Lebanon this species is considered to be a 'very common breeding resident'(Ramadan-Jaradi et al 2008), but generally up to 1000m which could explain the paucity of records for this species at Jabal Moussa.

Garden Warbler *Sylvia borin*

This species was not seen on any of the survey but one individual was ringed on the 23rd April. It is recorded as an 'uncommon but regular passage migrant in mid-late April' (Ramadan-Jaradi et al 2008), and this would agree with its status at Jabal Moussa.

Blackcap *Sylvia atricapilla*

Two Blackcap territories were recorded along Route 2, where one pair was seen on the lower slopes, and further along the route a female was seen behaving secretively, indicating a possible nest site. Just one Blackcap was seen in September during migration watches, but a high proportion of birds ringed were Blackcaps (19) which indicates that some at least, use Jabal Moussa as a stopover site while migrating.

Eastern Orphean Warbler *Sylvia hortensis*
Three territories for Eastern Orphean Warbler were recorded from Route 1 and just 1 territory at the top of Route 2. One was also heard singing several times near the ringing area, and one female was ringed, in breeding condition. This species is considered to be a relatively common migrant breeder in Lebanon from mid-March to mid-July (Ramadan-Jaradi et al, 2008), although it was not common at Jabal Moussa.

Lesser Whitethroat *Sylvia curruca*
This species is a common passage migrant and summer visitor to Lebanon. 4-5 territories were recorded along Route 1 and an estimated 8 along Route 2 during the breeding bird surveys. Numbers of non-singing birds were also seen during walkover and migration surveys during late March, April and late August. Twenty-eight Lesser Whitethroats were ringed, nearly 30% of the total. Of these it was possible to tell the sex of 15, meaning that the rest were either likely to be passing through (i.e. passage migrants) or were not breeding.

Sardinian Warbler *Sylvia melanocephala*
Two territories were recorded for this species along Route 1, and two along Route 2. Single birds were observed during February and April during walkover and migration surveys, and two males were ringed. This species is a common breeder in Lebanon and is found in most scrubby habitats although generally not at very high altitude (above 1600m), according to Ramadan-Jaradi et al 2008. At Jabal Moussa it is present but not common, probably as a passage migrant and also breeding.

Whitethroat *Sylvia communis*
Just one territory for Whitethroat was recorded along Route 2. It was not recorded during migration watches or walkover surveys, and just one was ringed on the 23rd April. This suggests that although it is found at Jabal Moussa, it is not a common breeder or passage migrant here. Its status in Lebanon is as a 'common and widespread migrant breeder' (Ramadan-Jaradi et al 2008).

Eastern Olivaceous Warbler *Hippolais pallida*
During breeding bird surveys, 3 territories were observed along Route 1 and 5-6 on Route 2. It is considered to be a common migrant breeder in Lebanon, and its status at Jabal Moussa is supported by this. None were observed during walkover or migration surveys.

Willow Warbler *Phylloscopus trochilus*
One was observed during breeding surveys about halfway up Route 2, but this species was not seen on walkover or migration surveys. Two were ringed on the 16th April, of age 4 (adult) and age 5 (bird born in 2007). This suggests this species is a passage migrant through Jabal Moussa and uses it as a stopover site.

Wood Warbler *Phylloscopus sibilatrix*
An adult of this species was only caught while ringing, on the 2nd of April, and not observed on any other survey, which makes it an interesting record. It is recorded by Ramadan-Jaradi et al as having formerly bred in Lebanon, but now is only a passage migrant in small numbers from late March to late May, and also in autumn.

Eastern Bonelli's Warbler *Phylloscopus orientalis*
This species was seen on the 8th April during a Route 1 breeding bird survey, and a male was also ringed on the 2nd April. Eastern Bonelli's Warbler is stated as being a 'scarce migrant breeder' in Lebanon (Ramadan-Jaradi, 2008) and therefore it is possible that this species is breeding here.

Chiffchaff *Phylloscopus collybita*
This summer visitor was fairly numerous, with 9 territories recorded on Route 1, and 6 on Route 2. On Route 2 territories were found at the lower altitudes, probably due to vegetation changes further up the slope. One was seen at the end of January, indicating that some overwinter here, and 2 on a walkover survey at the end of March. In early April several were seen (3-4) around the ringing area to the south of the mountain. Only 2 were ringed however. All this information together suggests that Chiffchaff winters in small numbers at Jabal Moussa, is a passage migrant through Jabal Moussa and is a fairly common breeder here. This is interesting to add to information given by Ramadan-Jaradi et al 2008, which reports the only confirmed breeding at two other places in Lebanon, Ehden and Tannourine.

FLYCATCHERS

Spotted Flycatcher *Muscicapa striata*
One was observed on 6th May (not singing) during a breeding bird survey, four on 19th August and another on the 2nd September during migration surveys – these were all observed near the southern edge of the mountain. During 2007 Spotted Flycatchers were also observed in May but in very low numbers. Although they are known as a relatively common passage migrant breeder, this species does not appear to be that numerous at Jabal Moussa.

TITS

Great Tit *Parus major*
Eight Great Tit territories were recorded on Route 1 and nine on Route 2. Considered by Ramadan – Jaradi et al to be a common breeding resident (Ramadan-Jaradi et al, 2008), the numbers at Jabal Moussa support this. Low numbers were seen from January to March (2s), and then in April numbers increased with an estimated 6 seen around the ringing area on the 1st April and then higher numbers seen on breeding surveys. It is not known whether the increase in numbers is due to birds within the country moving higher up the mountains as the weather gets warmer, or whether it is due to migrant birds. Current information suggests that it would be from birds within country as it is not recorded as a migrant species.

Coal Tit *Parus ater*
One Coal Tit territory was noted towards the top of Route 1. Three were observed on the 6th February, near Route 1. This is a common breeding resident bird in Lebanon, although at Jabal Moussa numbers were low. The habitat at Jabal Moussa is not ideal for this species, as they prefer lower river valleys and mixed woodland, and cedar forests. They were heard however during walkover surveys in the winter.

Blue Tit *Parus caeruleus*

This species has previously not been observed very frequently in Lebanon, and there are very few records of breeding (see Ramadan-Jaradi et al, 2008). However at Jabal Moussa Blue Tit was observed breeding in fairly good numbers on both routes. On Route 1, seven territories were observed, with at least two family parties (indicating definite breeding) and with birds carrying food. On Route 2, there were at least 3 territories, including a family party of 4 birds including 3 juveniles on the 20th May. This suggests that Blue Tits as a breeding species are much more common than previously thought. Blue Tits were also observed in January and February on the northern slopes of the mountain indicating that they also winter at Jabal Moussa. Six were ringed during April, a mixture of males and females. Around the ringing area, just off the southern slopes of Jabal Moussa, there were an estimated 20 plus Blue Tits on the 1st April. This suggests that they are also a passage migrant through Jabal Moussa, using it as a stopover site.

NUTHATCHES

Western Rock Nuthatch *Sitta neumayer*

Low numbers of Rock Nuthatch were seen in February and March, then during ringing on the 1st April it was estimated that more than 5 were within the general ringing area, and 6 the next day. On the 26th August, 8 were observed near the ringing area, and after that low numbers were observed on migration surveys. Two were ringed, one of which was a breeding female (the other of unknown sex). During breeding surveys, one territory was found on each route, and on the 27th July a nest was found on the southern slopes of the mountain. Taken together these results suggest that Rock Nuthatch is fairly numerous resident species, with higher numbers during spring and autumn passage – although this may be due to birds moving up and down the mountain with the warmer weather – as suggested by Ramadan-Jaradi et al 2008.

SHRIKES

Red-backed Shrike *Lanius collurio*

None were observed during winter or spring migration surveys, or during breeding surveys. Two were observed on the 26th August and 1 on the 9th September during autumn migration surveys. As there was no evidence of breeding here, it is considered that Red-backed Shrike is likely to be a passage migrant through Jabal Moussa.

Masked Shrike *Lanius nubicus*

None were observed during migration or walkover surveys, but a pair was possibly breeding on Route 1, observed during breeding surveys.

CORVIDS

Jay *Garrulus glandarius*

Up to 6 at a time were observed in January and February during winter walkover surveys on the southern slopes of the mountain. Two territories were noted during breeding surveys along Route 2. No particular passage movement was noted although 6 again were observed on the 26th August during autumn migration surveys. This species is a resident breeder in Lebanon and in Jabal Moussa.

Hooded Crow *Corvus cornix*

Although this is a common species in Lebanon, it was not noted at Jabal Moussa in 2008, and in 2007 was only heard during the spring.

ORIOLES

Golden Oriole *Oriolus oriolus*

This species was not observed at Jabal Moussa until early September when one was seen on the 2nd September, and then four a week later. This species breeds only in low numbers in Lebanon and is generally seen more on passage. This seems also to be true for Jabal Moussa.

SPARROWS

House Sparrow *Passer domesticus*

A small group was seen on 20th February on the northern side of the mountain, and then 3 on the 26th August. None were observed breeding.

Rock Sparrow *Petronia petronia*

There was 1 territory at the top of Route 2, and also possibly breeding along Route 1. A group of 12 were seen on the 8th September, in the vicinity of Route 2, also at the top of the slope. Rock Sparrow is a resident and breeding bird, but in varying numbers.

FINCHES

Chaffinch *Fringilla coelebs*

This was a very common breeding bird along both routes, with 18 recorded territories along Route 1 and 7 on Route 2. They were also observed in fairly good numbers on winter walkover surveys along the northern side of the mountain in January and February, in mixed flocks with Greenfinches. One breeding male was ringed in mid-April.

Brambling *Fringilla montifringilla*

No Bramblings were observed during bird surveys although this species was photographed by MAS on several different occasions, on the 24th November (male and female) above Al Saleeb (the big cross above Route1).

Linnet *Carduelis cannabina*

This species was not recorded during 2008, however two were observed in 2007 (A Rocha, 2007).

Goldfinch *Carduelis carduelis*

There were no signs of breeding of this species, however groups were seen during ringing sessions, up to 8 on one occasion. Small groups were also seen during the autumn in August. In Lebanon this species is recorded as a 'very common breeding resident', although very common in Winter from late November to mid-February (Ramadan-Jaradi et al 2008). It is not so common at Jabal Moussa although there are small flocks present particularly outside of the breeding season.

Greenfinch *Carduelis chloris*

This common and widespread resident was only breeding in a few places at Jabal Moussa, with just 3 territories recorded along Route 1. Fairly numerous in January and February in mixed flocks with Chaffinches, highest number recorded was 17.

BUNTINGS

Ortolan Bunting *Emberiza hortulana*
This species was recorded in the autumn of 2008 on the southern slopes of the mountain, just once on the 9th September. At Jabal Moussa is likely to be a passage migrant.

Rock Bunting *Emberiza cia*
One was recorded along Route 1 as possibly breeding, fairly near the top of the slope, and another pair at the top of Route 2. No other records were obtained from Jabal Moussa.

Black-headed Bunting *Emberiza melanocephala*
One territory was noted at the top of Route 2 during breeding bird surveys. Apart from this there were no records of this species. It is known to be a common breeding bird in Lebanon, but mainly in orchards, which could have restricted its range at Jabal Moussa.

4.0 CONCLUSIONS

4.1 Soaring Bird Migration

Further to discussions with BirdLife International on how best to extrapolate the soaring bird migration data, as only a section of the total number of birds would have been seen, BirdLife stated that the best way would be to multiply the total for each species by 2 or 3.

Extrapolating numbers recorded during 2008 gives the following results:

Family	Total Spring 2008	Extrapolated no. Spring 2008 (x2 - x3)	Total Autumn 2008	Extrapolated no. Autumn 2008 (x2 – x3)
Pelicans	525	1,050 – 1,575	0	0
Storks	1,365	2,730 – 4,095	711	1,418 – 2,127
Cranes	172	344 – 516	30	60 - 90
Birds of Prey	457	914 – 1,371	**13,982**	**27,964 – 41,946**

With extrapolation of total numbers in the autumn, even just doubling them more than meets the criteria for an Important Bird Area of Global importance:

'A4 iv *The site is known or thought to be a 'bottleneck' site where at least 20,000 storks (Ciconiidae) or raptors (Accipitriformes and Falconiformes) or cranes (Gruidae) regularly pass during spring or autumn migration.'*

Therefore under these criteria, the Jabal Moussa area is recommended for designation as an Important Bird Area.

The soaring migratory bird conclusions are the most important in this project, not least because their conservation in Lebanon directly affects many other countries where they migrate to and from, and pass through, every year.

There are however also other interesting conclusions to be drawn from the study at Jabal Moussa which further enhances its importance for birds, over different times of year:

4.2 Passage Migration of Other Species

Several species that are known for their scarcity on migration through Lebanon have been noted from Jabal Moussa, including Bonelli's Warbler, Wood Warbler and Garden Warbler. These species indicate the potential importance of Jabal Moussa as a stopover site for migrating passerines. There were also numbers of other passage migrants, which although not necessarily scarce in Lebanon, again indicate the importance of this site for bird migration. Species such as Quail, Great Spotted Cuckoo, Wryneck, Swifts, Bee-eaters and hirundines, Water and Tree Pipits, Thrush Nightingale, Common Redstart, Whinchat, Rock Thrush and warblers such as Lesser Whitethroat (which also breeds here), Garden, Willow and Wood Warblers, Spotted Flycatcher, Red-backed Shrike, Golden Oriole and Ortolan Bunting all migrate through Jabal Moussa and use it as a stopover site. Corncrake is a scarce and declining migrant and was also seen near to Jabal Moussa in the autumn.

4.3 Breeding Birds at Jabal Moussa

In addition to those species which are passage migrants through Jabal Moussa, a number of birds are summer visitors and breed here, such as Common Cuckoo, Nightingale, and a number of warblers such as Blackcap, Eastern Orphean Warbler, Lesser Whitethroat, Whitethroat, Eastern Olivaceous

Warbler, Eastern Bonelli's Warbler (possible breeder) and Chiff-chaff. Eastern Bonelli's Warbler is considered to be a scarce migrant breeder, so records from Jabal Moussa for this species are of particular interest, and Chiff-chaff is only confirmed from a couple of places in Lebanon (see species accounts) and therefore evidence of breeding is also noteworthy.

Of the resident birds of Lebanon, those that breed at Jabal Moussa include Blue tit, for which there are very few previous records of breeding. An estimated 10 territories from both bird survey routes combined were counted. Other breeding resident birds include Chukar, Wren, Yellow-vented Bulbul, Black Redstart, Black-eared Wheatear, Blackbird, Great and Coal Tits, Western Rock Nuthatch, Chaffinch, Greenfinch and Rock Bunting.

4.4 Winter Visitors

Several species are present at Jabal Moussa only over the winter period and these include Woodcock, Woodpigeon, Dunnock, Robin and Song Thrush. In addition flocks of finches were observed in the winter such as Goldfinches, Chaffinches and Greenfinches.

4.5 Further Work

This study has shown the value of Jabal Moussa for birds particularly over the migration period but also at other times of year. It is certainly worthy of protection for its avifauna alone. Further work is always helpful with these types of studies, to further inform conservation efforts within the area. In this case perhaps the thing to concentrate on next would be on passage migrants as there are a number which were just recorded once or twice. This could be done through walkover surveys, breeding bird surveys, or ringing, or a combination of these.

4.6 Conservation Concerns

A new road has been built from the road where Route 1 begins, up to the monastery. This is already aiding hunters in gaining greater access to the rest of the mountain (hunters were seen at a visit there on the 8th December), causing disturbance as well as the potential devastation to migrating birds through the area.

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