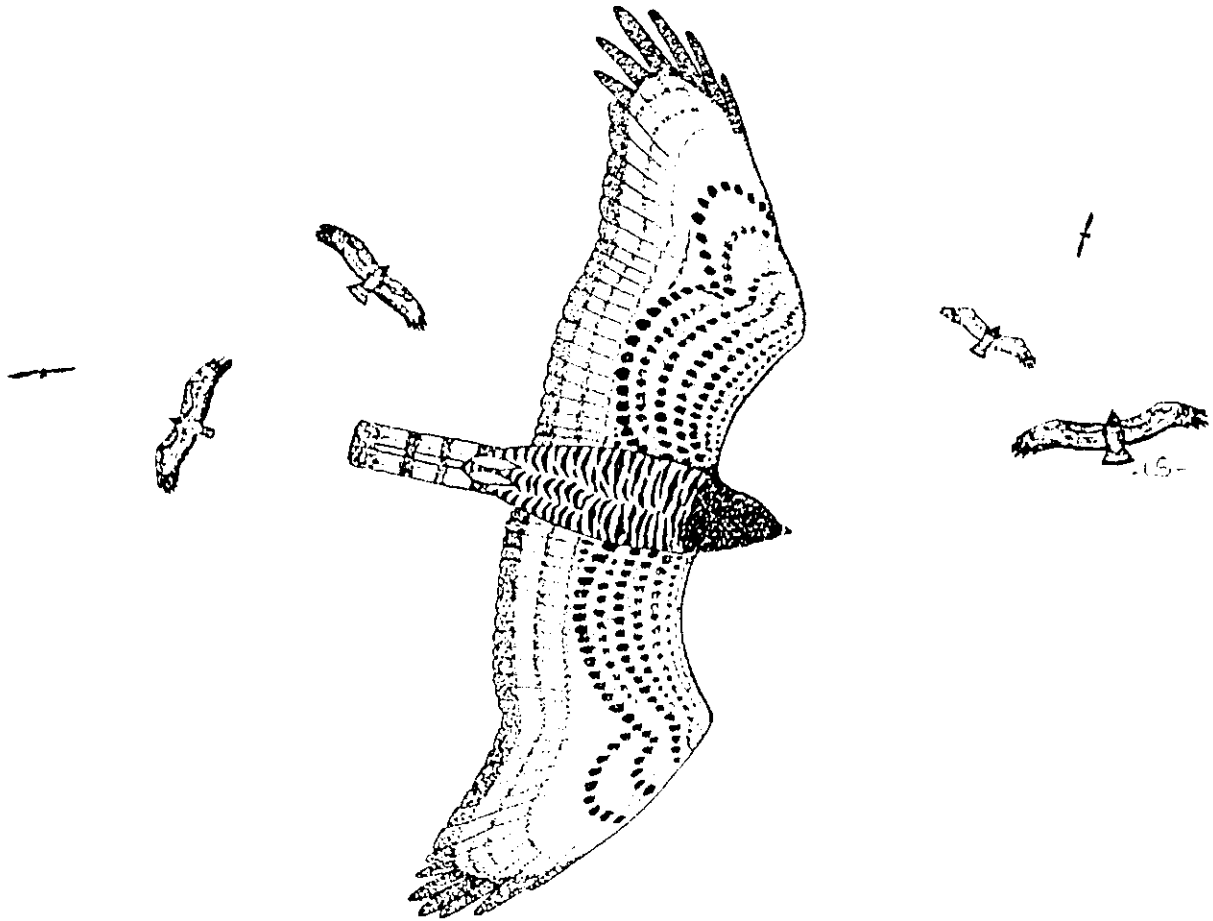


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الجمهورية اللبنانية
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Autumn Routes of Migrating Raptors and Other Soaring Birds in the Lebanon



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The Aammiq Project
Part of
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INTRODUCTION

The migration of large soaring birds through the Middle East is a well-documented phenomenon. Large soaring birds often depend on the use of warm, rising air currents found in thermals to provide the lift they need to stay airborne on their migrations between their breeding ground in the north and wintering sites in Africa. Where their routes are interrupted by large expanses of sea, where thermals do not form, large numbers of birds are concentrated in narrow corridors on their passage in both spring and autumn. In the Middle East detailed observations of this passage are now regular at a number of sites; well known observation points include the Bosphorus in Turkey, and around Suez in Egypt. There have been a number of small-scale observations made in the Lebanon by, for example, Nielsen and Christensen in 1968 and 1969, and MacFarlane in 1974 and 1975 (Nielsen and Christensen, 1970; MacFarlane, 1978). However, no large-scale survey has been attempted, and routes used by the birds are still incompletely known.

Conservation of many species of raptor and other soaring birds has been recognised internationally as a priority due to their global scarcity and known population declines (see Table 1). The counting of such large soaring birds during their migration serves two main conservation purposes. Firstly, thanks to the concentration of the entire population of these birds over narrow corridors as a consequence of their dependence on thermals, populations may be monitored with relative ease. Most of these species in their breeding and wintering grounds are dispersed over an extremely wide area at low densities making accurate population estimates, and hence monitoring for changes, extremely difficult. Secondly, it is very important to determine the routes used by these birds with precision to ensure their adequate protection. Large birds tend to have low reproductive rates and breed at low densities making them especially vulnerable to threats like illegal hunting in areas where they concentrate on passage. A single hunter sitting for a day on a suitable hillside in the Lebanon could easily shoot a number of eagles more than equivalent to that of the breeding population of a country like Greece, for example. It is clear, therefore, that the protection of these routes is a responsibility that the Lebanon must assume. With this in mind, and following initial observations in 1999 staff from the Aammiq project of A Rocha Lebanon undertook to organise a large-scale survey of the numbers and routes of birds passing through the Lebanon in autumn 2000.

Table 1. Migrants counted in the present survey and their conservation status (from Tucker & Heath, 1994)

English Name	Scientific Name	Conservation Status
White Pelican	<i>Pelecanus onocrotalus</i>	Unfavourable in Europe.
Black Stork	<i>Ciconia nigra</i>	Unfavourable in Europe.
White Stork	<i>Ciconia ciconia</i>	Unfavourable.
Honey Buzzard	<i>Pernis apivorus</i>	Favourable
Black Kite	<i>Milvus migrans</i>	Unfavourable in Europe.
Egyptian Vulture	<i>Neophron percnopterus</i>	Unfavourable in Europe.
Griffon Vulture	<i>Gyps fulvus</i>	Unfavourable in Europe.
Short-toed Eagle	<i>Circaetus gallicus</i>	Unfavourable in Europe.
Marsh Harrier	<i>Circus aeruginosus</i>	Favourable
Hen Harrier	<i>Circus cyaneus</i>	Unfavourable in Europe.
Pallid Harrier	<i>Circus macrourus</i>	Unfavourable in Europe.
Montagu's Harrier	<i>Circus pygargus</i>	Favourable
Goshawk	<i>Accipiter gentilis</i>	Favourable
Eurasian Sparrowhawk	<i>Accipiter nisus</i>	Favourable
Levant Sparrowhawk	<i>Accipiter brevipes</i>	Unfavourable.
Steppe Buzzard	<i>Buteo buteo</i>	Favourable
Long-legged Buzzard	<i>Buteo rufinus</i>	Unfavourable in Europe.
Lesser-spotted Eagle	<i>Aquila pomarina</i>	Unfavourable in Europe
Spotted Eagle	<i>Aquila clanga</i>	Globally Threatened
Steppe Eagle	<i>Aquila nipalensis</i>	Unfavourable in Europe.
Imperial Eagle	<i>Aquila heliaca</i>	Globally Threatened
Golden Eagle	<i>Aquila chrysaetos</i>	Unfavourable in Europe.

Table 1. ctd. Migrants counted in the present survey and their conservation status

English Name	Scientific Name	Conservation Status
Booted Eagle	<i>Hieraetus pennatus</i>	Unfavourable in Europe.
Bonelli's Eagle	<i>Hieraetus fasciatus</i>	Unfavourable in Europe.
Osprey	<i>Pandion haliaetus</i>	Unfavourable in Europe.
Lesser Kestrel	<i>Falco naumanni</i>	Globally threatened
Kestrel	<i>Falco tinnunculus</i>	Unfavourable in Europe.
Red-footed Falcon	<i>Falco vespertinus</i>	Unfavourable in Europe.
Hobby	<i>Falco subbuteo</i>	Favourable
Eleonora's Falcon	<i>Falco eleonora</i>	Unfavourable.
Lanner	<i>Falco biarmicus</i>	Unfavourable in Europe.
Peregrine	<i>Falco peregrinus</i>	Unfavourable in Europe.
Common Crane	<i>Grus grus</i>	Unfavourable in Europe.

METHODS

There were two parts to the A Rocha survey of autumn 2000. One part was scheduled to run at a low level from late August throughout the autumn migration period into early November. A second phase was targeted to the period expected to be the time when most birds would be passing during the last week of September and first of October. Starting in late August observations of migrating birds were made continuously between 08.00 and around 18.00 once a week. Observations were made from a hillside where good numbers of birds were known to pass near Deir el Harf on the Ras el Metn road in the Metn hills above Beirut. Unfortunately, due to tensions in the region from mid-October, this extensive survey was curtailed then and observations of the final period of migration were not possible. During the period of intensive watching between 25th September to 6th October, observations were made on weekdays between 08.00 and around 18.00. During this period additional volunteers joined the survey from Britain and observations were made from five sites in a rough line across the country, using three sites on any one day. The sites used are detailed in Table 2, and shown in Appendix 1.

Table 2. Sites used during the intensive period of observations, 25th September to 6th October

Number	Site Name	Location	Site Description
1	Eastwood	33°51'N 35°34'E	Roof of Eastwood College, Mansouriyé.
2	Deir el Harf	33°52'N 35°41'E	Hillside described above on Ras el Metn Road
3	Ain Zahalta	33°44'N 35°42'E	Roof of Ain Zahalta Evangelical School, Ain Zahalta
4	Aana	33°41'N 35°45'E	Roof of private house in Aana, western Bekaa
5	Aanjar	33°43'N 35°56'E	Roof of Armenian Evangelical School, Aanjar, eastern Bekaa

Observations made both during the intensive period, and on the weekly counts involved identification of every species of soaring bird or other raptor observed. Numbers of individuals were recorded, together with an indication of the distance at which birds passed from the observer and the approximate direction of their flight. Where birds were seen at great distance and could not be specifically identified, they were identified to the lowest taxonomic level possible.

RESULTS AND DISCUSSION

Dates

The first day of the survey, on 31st August, recorded a passage of 3398 birds over Deir el Harf, including 3387 Honey Buzzards. This suggests that for this species, at least, passage began earlier in August, an observation corresponding with that of Ramadan-Jaradi and Ramadan-Jaradi (1999). The unfortunate curtailment of observations in mid-October meant that for some late migrating species, notably the Steppe Buzzard *Buteo buteo* and Eurasian Sparrowhawk *Accipiter nisus* an unknown proportion of individuals will have passed after the period ended. These gaps in records should be noted when comparing totals from this survey with those of other locations along the flyway.

Nevertheless, for the principle migrant species it is clear that the period of passage through the Lebanon is an extended one. Table 3 records the dates of peak passage recorded for the migrants with over 500 individuals recorded during the survey.

Table 3. Dates of peak passage for selected species.

English Name	Scientific Name	Peak Passage Period
White Pelican	<i>Pelecanus onocrotalus</i>	Even numbers throughout survey
Honey Buzzard	<i>Pernis apivorus</i>	Late August to early September
Levant Sparrowhawk	<i>Accipiter brevipes</i>	Mid September
Steppe Buzzard	<i>Buteo buteo</i>	Early to mid October
Lesser-spotted Eagle	<i>Aquila pomarina</i>	Late September to early October
Red-footed Falcon	<i>Falco vespertinus</i>	Late September

As Lebanon has a responsibility for all these birds any measures designed to protect their passage through the country must last through the entire passage period for these species it is clear that such measures must be in place from mid August to late October.

Weather

Weather conditions are known to affect the numbers of migrants that move on any one day. With the exception of the 28th and 29th September and again on the last count on 12th October weather conditions were favourable for migration, with varying strengths of wind. In line with poor weather conditions lower numbers were seen on the given days than on days with better weather. Following the improvement of conditions on 30th September large numbers of birds were observed passing through that afternoon and the following morning, unfortunately corresponding with days when systematic counts were not taking place. Minimum estimates of the passage on these days were made, however, and can be added to the totals from the systematic counts.

Totals

A total of 16 904 birds of some 33 species were counted during the survey. The species total includes 29 species of raptor. The most common raptors counted were the Honey Buzzard *Pernis apivorus* and Lesser Spotted Eagle *Aquila pomarina* each with 4046 individuals counted. The next most abundant species was the Levant Sparrowhawk *Accipiter brevipes* with only 2721 individuals, whilst excluding raptors the most abundant of the other birds was the White Pelican with 1365 individuals counted. Totals of all raptors counted on each day of the survey are recorded in Appendix 2. An additional observation was made on the afternoon of 30th September when at least 7 000 birds, probably mostly Lesser Spotted Eagles were estimated to have passed over Aana and the western Bekaa. This passage continued the following morning when another 3 000 birds (again mostly Lesser Spotted Eagles, with lower numbers of Steppe Buzzards) were seen following the Barouk Ridge above Aana. This peak passage corresponded with an improvement in weather conditions following two days of bad weather with poor thermal conditions.

A minimum estimate of total passage during the intensive survey may be estimated by calculating the average daily totals for each site and multiplying by the number of days in the survey. This number can be further improved by adding the approximate 10 000 extra birds that passed over Aana on the 30th September and 1st October instead of using that site's average for those two days. This gives an overall estimate of around 30 500 individuals passing through Lebanon during the 12 day period 25th September to 6th October. See Table 4 for details of totals at each site.

Table 4. Totals per site and estimated total passage.

Site	Total number counted	Days counted	Estimated total
Eastwood	925	7	1584
Deir el Harf	4153	6	8304
Ain Zahalta	1379	5	3240
Aana	2183	6	13660 (includes 10000)
Aanjar	2166	6	3708

It is now necessary to estimate the passage during the other times in the passage period when numbers were counted once per week at one site. A tolerably accurate estimate may be achieved by linear interpolation of observed totals if daily variation in numbers is not excessive. Totals never varied by more than 25% on a day to day basis at this site during the intensive period suggesting this may indeed be a reasonable method for estimation. Interpolation between all observed days from 31st August to 12th

October gives a total estimate of over 41 200 birds for the site at Deir el Harf. Daily averages at this site during the intensive period of watching were 692 birds, compared with an average of only 277 over the other sites. Thus passage over Deir el Harf during the intensive period of watching represented 38.4% of the total passage over the Lebanon. Assuming this proportion to be the same throughout the passage period and combining this with the estimate of total passage over this site, an estimate of overall passage over the Lebanon may be made. This estimate suggests a passage of 107 000 birds through the country between 31st August and 12th October 2000. With autumn passage of these species probably starting around two weeks before and ending around two weeks after this survey, it is clear that this total is lower than that actually passing during the entire passage period.

Routes

From the numbers of birds watched at each location it is plain that there is a general spread of migrating birds across the Lebanon. That said, there was a notable concentration of around 40% of the total numbers watched from the site at Deir el Harf in the Metn. Birds at this site arrived from two principal directions, one from due north, another from the north-east over Bois de Bologne. Birds arriving from both these directions tended to depart on a south-westerly direction. The protection of birds passing on this route must clearly be a priority for their conservation in the Lebanon. Smaller concentrations were also noted following the Barouk Ridge, and down the eastern edge of the Bekaa. However, the main routes used may further be elucidated from references made by other observers. Nielsen and Christensen (1970) highlighted a passage over Harissa. MacFarlane watched two streams of raptors from Bikfaya, which he believed to converge somewhere south of there. Benson (1970) reports large numbers of birds passing below Aley. It seems likely from our results that there is a westerly route passing from Harissa in a southerly direction to Deir el Harf, which then turns somewhat south-west to pass below Aley. This route would appear to follow land of a height between 500 and 1000m above sea level, and thus passes inland and at higher altitude than that of Beirut and Mansouriyé. This route is joined by a second stream arriving from the north-east at Deir el Harf. Thus it would appear that MacFarlane observed these two routes before they connected. Benson recorded the birds after the two streams connected, and Nielsen and Christensen saw only one of the routes.

As the concentration of birds reported above clearly passes the entire length of the country as well as passing over the routes here documented, it is interesting to speculate where the birds arrive from and how they leave to the south. Observations from Syria suggest that there is a route running along the Alawite Mountains (Pymon, 1953), a stream that is likely to continue south into Lebanon and then down the western slopes of Mt. Lebanon, presumably becoming the stream first noticed at Harissa in this country. Thus the westerly route is likely to run at a similar altitude along the western slopes of Mt. Lebanon. MacFarlane noticed significant numbers of birds passing over El Qaa in the northern Bekaa in 1974. These birds were set on a course to pass between Jebal Sannine and Qornet es Sauda, and this presumably marks the route used by birds seen arriving from the north east at Deir el Harf. Once both these streams have converged and passed south of Aley, the next observations are from Palestine. Counts in a line east from Haifa suggest most birds remain at an altitude of around 500m, suggesting that the stream continues at around the same altitude all the way from Aley through southern Lebanon. Clearly further surveys are needed to verify the continuation of these routes before they can be properly protected at other points on their route. These routes are shown in the map forming Appendix 1.

CONCLUSIONS AND RECOMMENDATIONS

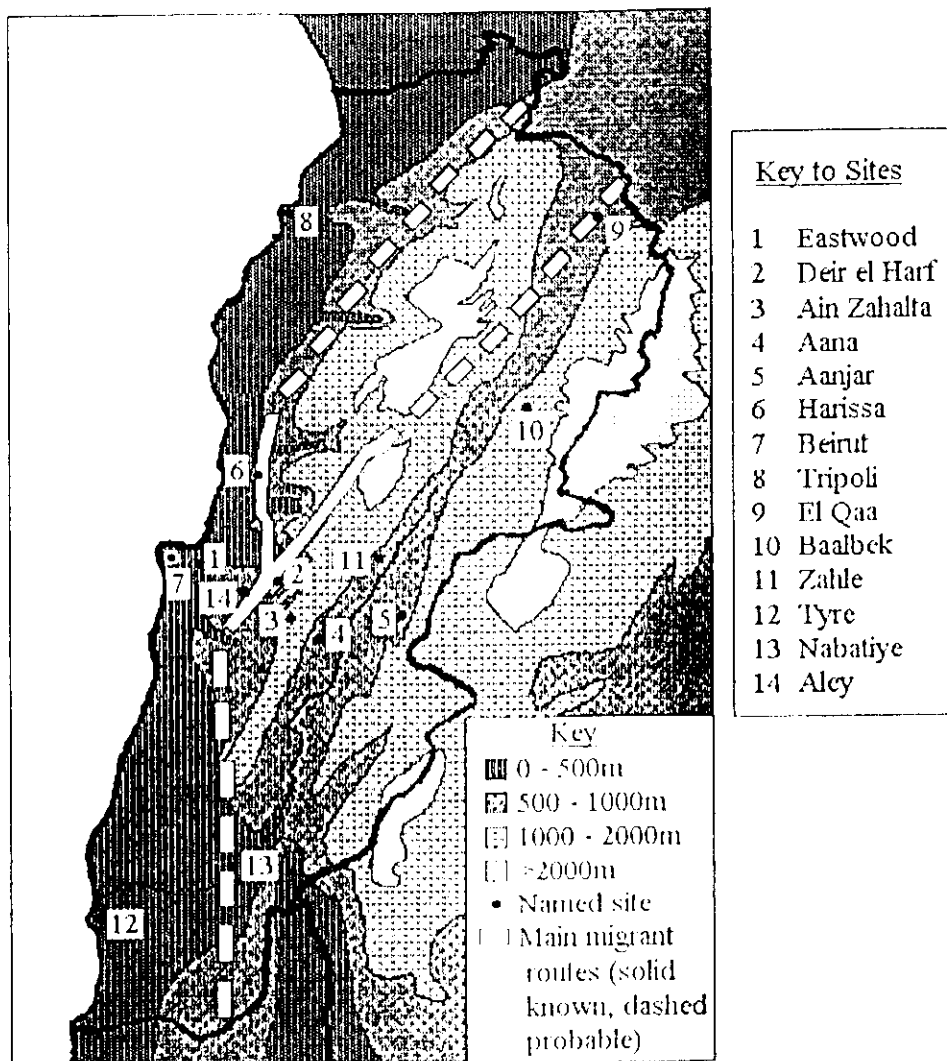
Internationally important numbers of raptors and other large birds pass through the Lebanon during the autumn passage. Many of these birds have a vulnerable conservation status and are in need of adequate conservation measures whilst on passage through the Lebanon. Passage appears to begin in August and continues to at least late October. The current survey has revealed a large concentration of birds in a narrow corridor along the western slopes of the Mount Lebanon range known to pass near Harissa, Bikfaya, Deir el Harf and Aley. This concentration is joined at Deir el Harf by a second stream probably coming from the northern Bekaa, crossing the Mount Lebanon range between Sannine and Qornet es Sauda. Smaller concentrations were found along the Barouk ridge and down the eastern side of the Bekaa valley. In order to adequately fulfil the responsibilities this passage bestows on the Lebanon it is imperative that the hunting ban is rigorously enforced during the periods of passage along these routes where the birds are at their most vulnerable. Further studies of the routes used south of Aley and north of Bikfaya and Harissa would allow determination of the most sensitive sites along these routes where protection should be ensured.

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APPENDIX I

Map of Lebanon showing counting sites and main routes used by migrating birds over the country during autumn 2000



APPENDIX 2

Totals of all species recorded during autumn 2000.

Species	31 Aug	06 Sep	13 Sep	21 Sep	25 Sep	26 Sep	27 Sep	28 Sep	29 Sep	02 Oct	03 Oct	04 Oct	05 Oct	06 Oct	12 Oct	Total
Accipiter sp.					1			2		1	5	2	1	2	1	15
Black Kite				2		3	8	22	27	3	112	29	13	23		242
Black Stork	1				1		1	14	17			76	4	58		172
Bonelli's Eagle				1					1							2
Booted Eagle	1			11		1	3	5	2	2	3	3	2			33
Buzzard sp.		1	1				7	6	8	2	49	44	30	8		156
Common Crane														21		21
Eagle sp.				1	2	7	16	5	5		2	2	1	3	1	45
Egyptian Vulture											1					1
Eleonora's Falcon		1	2	1		3	3	4	1	1	2	1		1		20
Eurasian Sparrowhawk			2	4	3	5	8	2	9	13	29	23	5	26	37	166
Falcon sp.		2	1		27	5	36	10	11	3	18	31	6	1	3	154
Golden Eagle						1								1		2
Goshawk					2	1	1	3	2	2	3					12
Greater Spotted Eagle				1							2		1		1	5
Grey Heron								10								10
Griffon Vulture											2					2
Harrier sp.			3	3	5	6	9	35	3		6	3	7	3	2	85
Hen Harrier									1							1
Hobby	1	2	6	4	6	6	5	17	5	6	7	15	2	4	2	88
Honey Buzzard	3387	112	98	179	6	20	28	97	18	21	41	23	1	12	3	4046
Imperial Eagle						2	1				1					4
Kestrel	2		2	2	5	9	9	15	12	6	10	25	12	16	5	130
Kestrel sp.			2	4	2	5	7	3	14		4	29	8	11	2	91
Lanner Falcon				1			1			1	1					4
Lesser Kestrel			1					1	1		1	7		4		15
Lesser Spotted Eagle			30	184	167	116	758	206	27	1384	284	160	504	215	11	4046
Levant Sparrowhawk			116	1762	21	32	404	70	215	14	70	4		13		2721
Long-legged Buzzard			1	1	6	6	10	6	9	7	6	8	7	4		71
Marsh Harrier			12	9	1	17	46	47	47	27	17	17	19	8	3	270
Montagu's Harrier	2	1	3	3		1	1	3			1					15
Osprey							1	3	1							5
Pallid Harrier				1			1	1	2	1	6	1	3			16
Peregrine Falcon								1								1
Raptor sp.						2	2	13	15	6	18	5	2	6		69
Red-footed Falcon				10	29	168	400	173	42	4	45	12	10	20	11	924
Short-toed Eagle	3	3	1	14	11	7	42	46	26	47	100	60	19	57	1	437
Sparrowhawk sp.			1	5	2	1	16	8	19	13	20	10		4	1	100
Steppe Buzzard	1		1	1	3	3	47	12	37	42	483	263	62	315	14	1284
Steppe Eagle				2							1		1	5	1	10
Stork sp.							12		2							14
White Pelican						310			925				130			1365
White Stork								3	40			1				44
Grand Total	3398	122	283	2206	298	738	1883	841	1545	1606	1350	854	850	841	99	16914