

**RESULTS OF SURVEYS AND MONITORING OF COUPLES OF GOLDEN EAGLE  
*AQUILA CHRYSAETOS* AND BEARDED VULTURE *GYPÆTUS BARBATUS* IN THE  
REGION OF ISSYK-KUL**

*This research is aimed to study the Endangeroud Red Book golden eagle *Aquila chrysaetos* and bearded vulture *Gypaetus barbatus* in the Issyk-Kul region (nothern ridge of Terskey Ala-Too and Sarychat-Ertash reserve).*

**Overview**

Bastien Chaix and Vereschagin Alexander Petrovich, are conducting a study on the Golden Eagle and the Bearded Vulture in Kyrgyzstan mountains.

The main objectives of this research are to study the distribution and density, the reproduction (phenology, reproductive rates) and the diet study of these two keys species in the ecosystem of Tien-Shan.

The main study area is in the region of Issyk-Kul, in the district of Jeti-Oguz and includes parts of Terskey Ala-Too and the Sarychat-Ertash State Reserve.

This study extends from 2009 to 2015, started in April 2009 by hiking and equestrian surveys aimed at the location of nesting sites. Then a monitoring of breeding pairs was allowed to know the number of young ready to fledge and a part of phenology during breeding period.

However, and despite the several requests for financing, this project has at present no funding and activities conducted to date are not flown as our own motivation and personal savings accumulated to implement this project.

Also, despite these gaps and financial difficulties, the results collected are positive. Only the District of Jeti-Oguz could be effectively explored but the discovery and monitoring of many couples could however be achieved in this sample' study area.

This research presents the results of research conducted in spring and summer 2009.

***Why to study the Golden Eagle and the Bearded Vulture in Kyrgyzstan?***

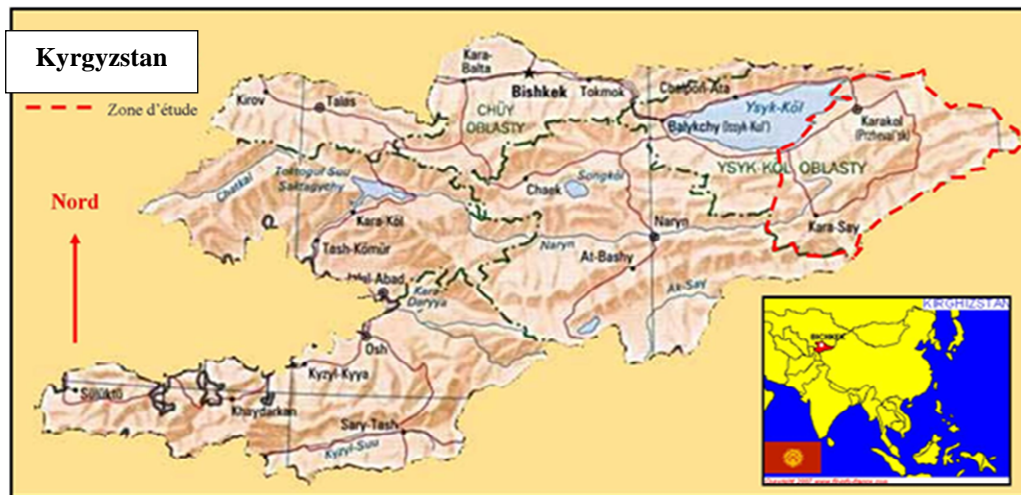
Though micro Bearded Vulture populations in Europe are very well attended, no one has virtually any data on the populations from Turkey to China and which would focus, however approximately 90% of the global population of Bearded vulture.

Similarly, the Central Asian subspecies *Aquila chrysaetos daphanea* of the Golden Eagle remains misunderstood in many ways such as density, nutrition, phenology ....

On the other hand, they are key species in the ecosystem and are at the top of the food chain. These birds are important indicators of good balance and good health of natural mountaineers.

In addition to providing new scientific data on these two species, this study would therefore have an idea of the real status of conservation of these birds because they are sensitive to habitat degradation, and both entered in the Red Book of endangered species of Kyrgyzstan.

***Methods*** Study area



Apart from some differences, the reproductive behavior of the bearded vulture and golden eagle is roughly the same and the methods used to locate nesting sites and check young individual vary little between the two species. Most surveys were conducted on foot except Karakol National Park and Sarychat-Ertash Reserve where both organizations lent us a horse.

Until late June, the surveys were designed to discover the nesting sites, old nests or nests occupied as well as outreach and gathering information from resource people (shepherds, guards, hunters, biologists ...).

Observations of birds were noted, particularly those concerning reproductive or territorial behavior (parades, bird with prey or branch in claws, territorial disputes, a couple flying together ...). This allows to gather information, by inference the location of potentially occupied area for reproduction, and finally the more precise localization of the occupied nest this year.

From late June to late July, surveys have mainly been aimed at monitoring sites already located, determining the number of young people ready to take flight and the study of phenology of the pre-flight period. Indeed, at the end of the breeding season visits to the nest by adults are much rare, less frequent parades and location of the nest and therefore difficult. Cons by juveniles in the nest are ready to fly, and reproductive success can be measured at this time on sites previously located in the spring.

The conduct of surveys was conducted according to the following schedule:

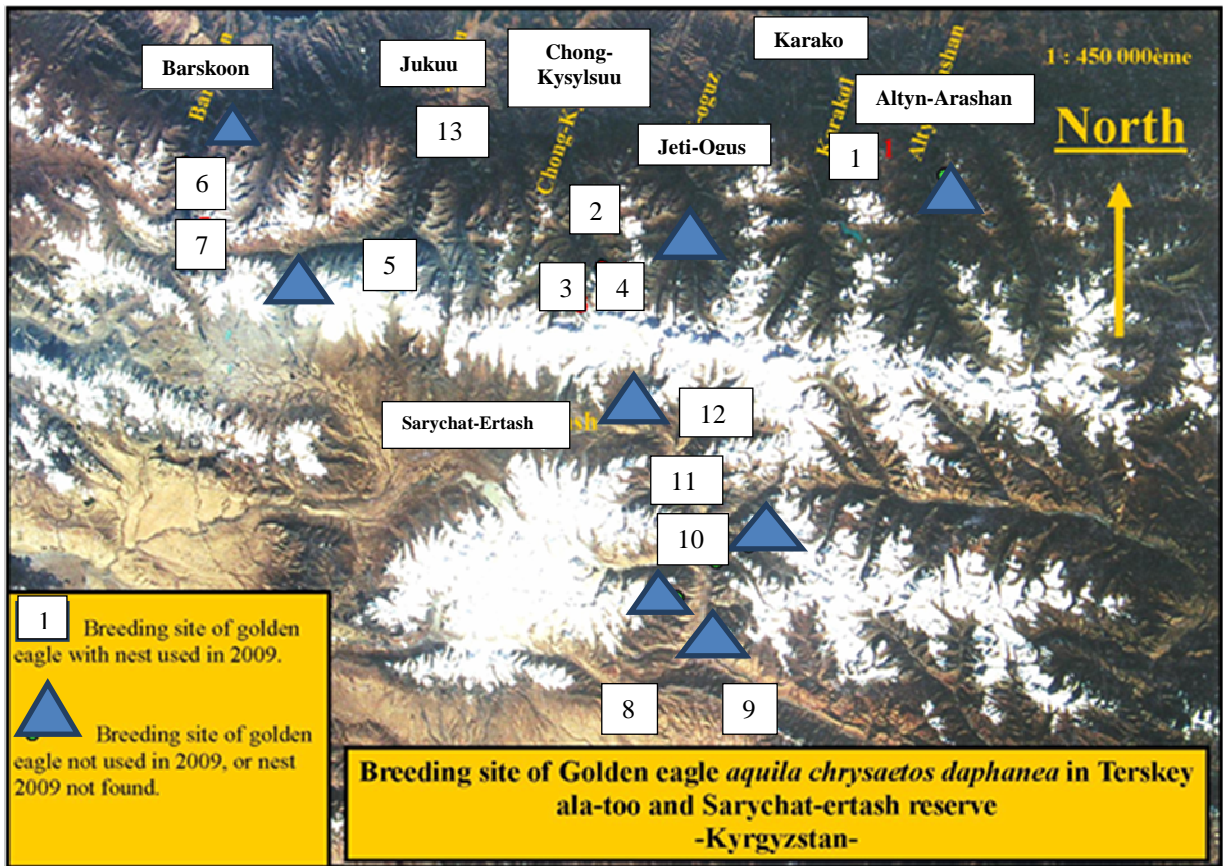
- 31/03/2009 Kichi-Kyzyl-suu
- 10/04/2009 Kashka-Suu, Karakol National Park
- 17-19/04/2009 Altyn-Arashan
- 24-26/04/2009 Chong-Kyzyl-suu valley
- 28/04- 04/05/2009 Jukuu valley
- 21-22/05/2009 Barskoon valley
- 27-29/05/2009 Barskoon valley
- 31/05 - 19/06/2009 Sarychat-Ertash reserve
- 30/06 - 01/07/2009 Chong Kyzyl-suu valley
- 11 - 23/07/2009 Sarychat-Ertash reserve
- 3-4/08/2009 Jukuu valley

The Highlands (Sirt) were just driving through to 6 times (23 24/05, 30/05, 22/06, 11/07, 23/07) but have to contact several individuals.

### **Results**

#### **Golden Eagle:** Locating nest sites

16 nesting sites of Golden Eagles were found. For 13 of them, the area occupied in 2009 has been found with nestlings.



**List and number of breeding sites in 2009:**

<b>Kashka-suu, Karakol National parc</b>	<b>1</b>
<b>Chong-Kyzyl-suu bas</b>	<b>2</b>
<b>Chong-Kyzyl-suu haut</b>	<b>3</b>
<b>Kashka-tor, Chong-Kyzyl-suu</b>	<b>4</b>
<b>Jukku bas</b>	<b>13</b>
<b>Jukuu</b>	<b>5</b>
<b>Barskoon bas</b>	<b>6</b>
<b>Barskoon haut</b>	<b>7</b>
<b>Koyendu</b>	<b>8</b>
<b>Solomo</b>	<b>9</b>
<b>Koiluu</b>	<b>10</b>
<b>Koiluu-Bordu</b>	<b>11</b>
<b>Bordu</b>	<b>12</b>
<b>Altyn-Arashan</b>	<b>14</b>
<b>Haute Jukuu</b>	<b>15</b>
<b>Jeti-Oguz</b>	<b>16</b>

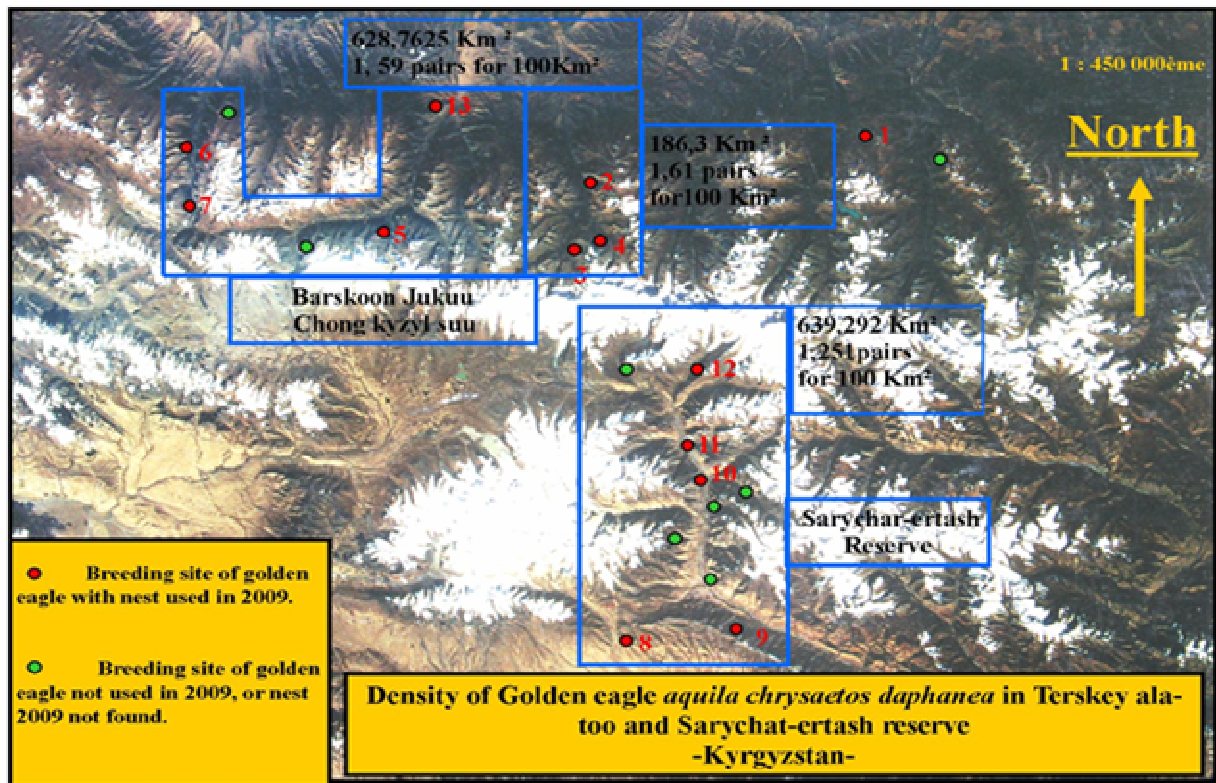
Other breeding sites were found with several nests present (2 in Sarychat-Ertash state reserve, small Koiluu and Sarytchki) without any pair of eagles there seems to be interested in 2009.

Finally, 3 cliffs seem highly interested in 3 pairs of eagles (Boroko, Jaman-suu, Barskoon below) without any nests there have been found.

see Appendix for photographs and location of different areas.:

### Rating density

The entire study area hasn't been prospected. However it is possible to make an assessment of the density in the valleys of Terskey Ala-Too (Chong-Kyzyl-suu, Jukuu, Barskoon) and Sarychat-Ertash reserve who have been actively explored.



### Terskey Ala-Too

Thus in the valleys between Barskoon and Chong-Kyzyl-suu, 7 breeding pairs in 2009 were found and 2 pairs which nest could be found.

The valleys side Kashka-suu, Jukutchak and Kichi-Kyzyl-suu have not been fully explored in this area but after suitable sites, the identified territory boundaries and densities encountered in the Valleys Chong Kyzyl-suu, Jukuu Barskoon where all the occupied territories have been identified, and it is estimated that 1 couple additional minimum is very probably present throughout the area.

This leads us to 10 the number of pairs present on the minimum area of 628.7625 km<sup>2</sup>.

This gives us a minimum density of 1 pair of 62, 876 km<sup>2</sup>.

Torque is 1.59 to 100 km<sup>2</sup>

If we limit the study to the valley Chong-Kyzyl-suu where 3 couples very close present, this also gives us 3 pairs for 186.3 kilometers <sup>2</sup> so, 62.1 km<sup>2</sup> per couple.

Torque is 1.61 to 100 km<sup>2</sup>.

### Sarychat-Ertash state reserve

In the Sarychat-Ertash state reserve 5 nesting pairs were found in the surveyed area plus 2 pairs present where the nest 2009 could not be found. It is possible that additional pair is present in the surveyed area at the level of Eshegart.

This brings 8 couples to 639.292 km<sup>2</sup>.

That makes a density of 79.91 km<sup>2</sup> per couple.

Torque is 1.251 to 100 km<sup>2</sup>.

Sites of Altyn-Arashan and Karakol, too far from the other were not taken into account when calculating densities.

These first results gave an initial idea of this density in different areas of study area and



need to be complemented by new exploration next year.

Natural habitats of valleys Barskoon, Jukuu, Chong-Kyzyl Suu are also found further east (Jeti-Oguz, Karakol, Altyn-Arashan) and provide similar habitats for Golden Eagles. It is very likely that there are similar densities.

Regarding Sarychat-Ertash reserve, the absence of poaching to the game species (hare ...) makes it an ideal area for golden eagles on both sides of the valley bottoms. However, the importance of glaciers and areas unsuitable for nesting in the highlands probably explains the slightly lower densities.

The mountains present on the central plateau (Sirte) have been insufficiently explored, but have far fewer nesting sites.

### Study phenology

Only the pre-flight could be studied in order to observe differences in the rapid development of juveniles between couples.

But such monitoring could provide only partial data that need to be supplemented by monitoring for years to come. Differences in precocious growth of juveniles were recorded as couples but they can't be correlated to any geographical difference (altitude, climate) between Terskey Ala-Too and Sarychat-Ertash reserve.

All young eagles monitored were still at nest at the end of July, though some of them were very big and ready to fly. The first fly observed was in Jukuu valley on the 03/08/2009.

A complete monitoring of reproduction would be desirable next year, during all the breeding season.



Young eagles on Koyendu, nest the 21/07/2009

### Reproduction Rate

The control of couples in the Sarychat-Ertash reserve in July was determined for each number of young ready to fledge.

For the couple of Solomo, eagle feathers were found fresh near the area usually used on this site and the couple is regularly present in flight, but no young is present in any of 4 areas known to site. For these reasons, a reproductive failure is likely.

Name of site	Number of site	Observation date	Number of young controlled
Chong-Kyzyl-suu – Kashka-tor	4	31/06/2009	Min. 1
Jukuu	5	04/08/2009	?
Koyendu	8	23/07/2009	2
Solomo	9	14/07/2009	?

<b>Koïluu</b>	<b>10</b>	<b>19/07/2009</b>	<b>2</b>
<b>Koïluu-Bordu</b>	<b>11</b>	<b>19/07/2009</b>	<b>2</b>
<b>Bordu</b>	<b>12</b>	<b>17/07/2009</b>	<b>1</b>
<b>Juku bas</b>	<b>13</b>	<b>04/08/2009</b>	<b>min. 1</b>

### Bearded Vulture

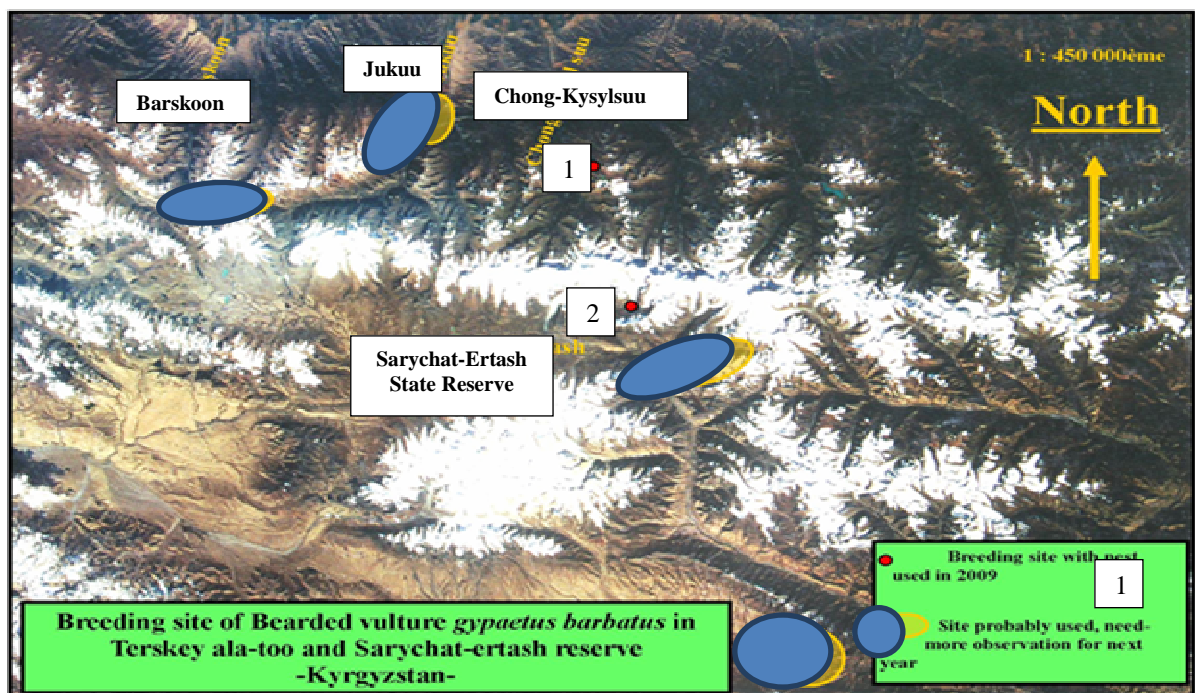
Only two pairs of Bearded Vultures have been located. Indeed, during these surveys (late), the goal was quickly find a large number of occupied areas, and we mainly focused on the easier case: the golden eagle.

Location couples

A couple with a young ready to fly checked the 30/06/2009 in the valley Chong-Kyzyl-suu.

A second nesting site and nest are present in the valley of Boroko (Sarychat-Ertash) with a couple and a young already flying 18/07/2009.

A probable site in small Bordu (Sarychat-Ertash) with couple, juvenile flying and many perches used and several territorial disputes observed let to consider a breeding site nearby.



Data collected from resource persons, necessity to control in 2010:

A nest site is present in the valley of Ak-Shirak from guards Reserve Sarychat-Ertash (not prospected area).

Two nesting sites are present in Naryn reserve (Naryn Region) from the guards of the reserve.

Data harvesting with Mr Davletbakov Askar Temirbekovitch, ornithologist at the Academy of Sciences in Bishkek. Necessity to control in 2010. Data outside of sample area:

A couple at the neck of Dolon, Naryn Oblast.

A couple in the Valley Alamedin south of Bishkek.

A couple in the valley Ala-Archa south of Bishkek in 1997.

A couple in the Valley Sokulouk south of Bishkek.

A couple in the region of Thy in the valley south of Ottuk.

On the other hand, a breeding pair with young in the nest has been monitored by Mr Davletbakov June 4, 2009 in the Talas region, at the place called Kara-Bulak.

### Distribution / density

The data collected are insufficient to calculate densities. However, the Bearded vulture (adult) seems evenly distributed between the two areas explored.

It is not the same for immature (see Chapter about immature).

### Reproduction / Phenology:

The two couples found had both a young. One was ready for flight on 30.06.2009, the second already stealing 18/07/2009. This species is earlier than the eagle on the study area.

As for the golden eagle, follow earlier couples is desirable next year.

### Comments immature

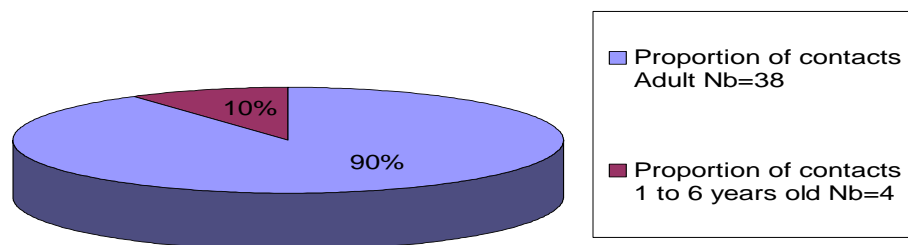
The observations of immature of Bearded vultures were wide disparity between the two areas explored, focusing mainly on the highland zone (Sirte) and reserve Sarychat-Ertash.

Indeed, the proportion of immature comments is 10% compared to that of adults for the valleys of Issyk-kul (Terskey Ala-Too), while it is 53% in the Sirt and Sarychat-Ertash reserve.

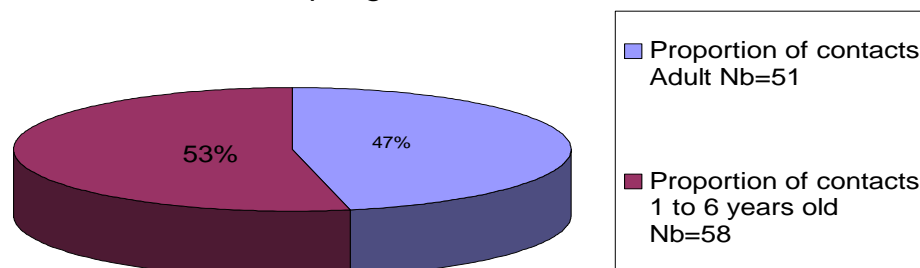
This most likely reflects the importance of food resources in the area of highlands (argali, ibex), while the populations of wild ungulates are very low in the valleys humanized and actively poached of Terskey Ala-Too.

So, the highland' area seems to be a preferential gathering zone for immature. This remains to be confirmed in other grades. For next year, an individual identification by photo-identification (study of molts and staining) would assess the number of birds seen.

Proportion of contacts adult/young in Terskey-ala-too  
for *Gypaetus barbatus*  
-spring & summer 2009-



Proportion of contacts adult/young in central Tien  
Shan for *Gypaetus barbatus*  
-spring & summer 2009-



### Discussion

For logistical and financial reasons the entire study area hasn't been prospected and fields of study were limited. The pedestrian surveys have proved a tedious waste of time.

On the other hand, those surveys when we concentrated on the first signs of nesting and harvested them involved us in most cases with golden eagle. Once this understood we explored another area where we met the new indices of nesting golden eagles. For these reasons, the bearded vulture has been somewhat neglected.

The objectives of this first season is mainly the discovery of nesting sites, the parties concerning the study of reproduction (reproductive rate, phenology) and food (diet) could be achieved.

However the objectives of finding a sample of couples to study them in the coming years has been reached for the golden eagle. Surveys in winter and spring 2010, aimed only bearded vulture will allow finding new sample nests of this species.

Several requests for funding have been initiated for this study (PETZL Foundation, Christiensen Fund, Fauna and Flora International), and if they succeed it would be important next year to start prospecting and especially the monitoring of sites throughout the complete breeding season in order to collect data on the phenology of reproduction (hatching date, laying date, flying date, reproductive rates). This via direct observations and the putting of camera trap nearby nest.

It is also planned go down in cliffs to study the diet of different pairs in autumn 2010 to provide data on the diet of these species in Tien-Shan.

These preliminary results are only the beginnings of a working line and must be completed.

So for 2010 it would be important to begin exploration earlier, when the beginning of breeding period (February) in order to enhance the exploration for the bearded vulture.

Prospecting other parts of Kyrgyzstan in order to estimate densities in Golden Eagle and Bearded Vulture and have an overview of the distribution in Kyrgyzstan.

Place several camera traps near nests in order to study the course of reproduction (Phenology), reproductive success and diet of different pairs.

Rappelling down in breeding site, so as to reap the relief food and nutrition study.

Have a budget "travel" (rental horses, cars) ,so as to achieve effective monitoring of all couples in the spring and summer (reproductive rate, phenology) and expand geographically surveys.