

**Wildlife Conservation Society
Afghanistan Biodiversity Conservation Project**

**Wakhan Avifauna Survey
priority species for conservation and survey of autumn
migration**



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Abbreviations and Glossary

biome-restricted – occurring only in one single biome or mainly in one single biome with very limited distribution in other biomes

CR – critically endangered

EN – endangered

globally threatened species – any species with an IUCN code other than LC

IUCN – International Union for the Conservation of Nature

LC – least concern

NT – near-threatened

VU – vulnerable

WCS – Wildlife Conservation Society

Executive Summary

The Wakhan area in extreme north-east Afghanistan is home to a unique flora and fauna that has been conserved thanks to its remoteness. The Wildlife Conservation Society is leading efforts to declare parts of the Wakhan corridor a protected area. While Marco Polo Sheep *Ovis ammon polii* and Snow Leopard *Uncia uncia* are at the center of conservation efforts, the Wildlife Conservation Society has also been actively collecting data on the avifauna of the Wakhan area to guide the process of delineation and designation of protected areas.

Information on the birds of the Wakhan area is very limited. Much of the published information was in form of species lists for the whole area, giving little details about the exact locations where a certain species was recorded or the numbers seen. Most recently, three expeditions of the Wildlife Conservation Society also collected data on the status of different bird species, and these have given more geographical details and also information on abundance. Certainly, the limited number of studies is not enough to give us an exact picture of the avifauna. Many more species will be added to the Wakhan bird list and probably some will have to be revised as there is a certain amount of disagreement in the species found by different authors. Based on only three expeditions – two of which were focusing on mammals and not birds – our knowledge of the small-scale distribution of many species within the Wakhan area is even more limited, and this includes enigmatic and conspicuous species like the high-altitude specialists Himalayan Snowcock *Tetraogallus himalayensis* or Snow Pigeon *Columba leuconota*.

However limited our knowledge, we know of several aspects of the local avifauna that are of importance for the conservation of birds beyond the Wakhan. The occurrence of several high-altitude specialists and of a sizeable colony of Bar-headed Geese *Anser indicus* on Zarkul (a lake) are by themselves proof of the high conservation value of the area. Further, there were reports that large numbers of birds would migrate through the area and use it as a stop-over site.

In order to contribute to the body of information to guide the process of delineation of protected areas, the present study aimed at:

1. developing a list of priority species for the conservation of birds in the Wakhan,
2. investigating the importance of the Great Pamir and Wakhan valleys as a migration flyway,
3. assessing different habitat types as to their significance for the avifauna of the Wakhan,
4. assessing different geographical parts of the Wakhan in terms of their significance for the avifauna, and
5. starting activities to gain a quantitative understanding of the avifauna of the Wakhan.

To define priority species for bird conservation in the Wakhan, I used three criteria: the global conservation status of the species, the abundance of the species in Afghanistan, and the likely status and abundance of the species in the Wakhan area. Based on these three criteria, I determined, for each species, the level of importance of the population in the Wakhan area for the conservation of the species in a wider context. Four levels of importance were used: (i) no particular importance, (ii) regional/subnational, (iii) national, and (iv) international importance. For at least nine species, the populations in the Wakhan are of international importance: Bar-headed Goose, Egyptian Vulture *Neophron percnopterus*, Saker Falcon *Falco cherrugg*, Lesser Kestrel *Falco naumanni*, Himalayan Snowcock, Snow Pigeon, Yellow-eyed Dove *Columba eversmanni*, Mountain Chiffchaff *Phylloscopus sindianus*, and Spotted Great Rosefinch *Carpodacus rubicilla severtzovi*.

To investigate the importance of the visited area for migrating birds, systematic counts of active migration of large birds were conducted. Systematic counts of migrating large birds – while short in duration – did not yield a single migrating bird. Waterbird counts, transects and index counts did reveal many migrants on stop-over, including a few observations of species of conservation concern. While the riverine thickets in the larger valleys are especially important stop-over sites for migrant

birds, the main significance of the Wakhan area for bird conservation appears to lie in its population of resident and breeding birds.



Typical landscape and view of the Hindukush mountains in the Wakhan corridor.

To achieve objectives 3 to 5, waterbird counts, transect counts and less standardized index counts were conducted. Waterbird counts were conducted on two lakes, Ghaznikul and Zarkul, and on seven sections of rivers of different size. Ghaznikul and Zarkul (at least the two ends of it) were found to be of high importance for conservation – first of all due to large numbers of Bar-headed Geese and Common Mergansers *Mergus merganser*. Ghaznikul held many more birds than Zarkul at the time of our visit and probably this difference is consistent. The Great Pamir river and other larger rivers are also likely to hold large numbers of Common Merganser.

Twenty-one transect counts were conducted in six different habitat types. A total of 228 observations of single birds or flocks were made and the analysis showed that the density and diversity of birds were highest in riverine thickets at this time of the year. A second habitat that hosted a high diversity of birds were coarse rubble slopes. In both of these habitats, not only total diversity, but also the number of species of conservation concern were over-proportionate. In sedge meadows and alpine steppes there seem to be less birds and a lower diversity of birds at this season.

The results of the non-standardized index counts corresponded very well with the results of the transect counts: the mean number of species of conservation concern was highest in riverine thickets, in cultivated land and in coarse rubble slopes. Sedge meadows, alpine steppes and fine rubble slopes showed the least diversity.

In conclusion, the present study showed evidence that riverine thickets and rubble slopes – the latter often at high elevation – are particularly valuable habitats within the Wakhan. The main Wakhan and Panj valleys seem to be particularly valuable areas. Future research will show whether this is also true at other seasons, especially during the breeding season. It would be worth conducting future ornithological expeditions during the breeding season and specifically investigating the status of a set of species that have been recorded in the Wakhan, but the exact status of which is unknown, including Saker Falcon, Ibisbill *Ibidorhynchus struthersi*, Pallas's *Syrrhaptes paradoxus* and Tibetan Sandgrouse *S. tibetanus*, Scaly-bellied *Picus squamatus*, Himalayan *Dendrocopos himalayensis* and White-winged Woodpeckers *D. leucopterus* and others.

Introduction

The Wakhan corridor is a narrow strip of land extending between the Hindu Kush range and the river Panj (called Greater Pamir River in its upper reach) from the region of Ishkashim in the west for about 280 km east up to the border with China. The geography, geology and climate of the area have been summarised by Petocz (1978a). The area is a high-altitude ecosystem with very rugged mountain ranges namely the Hindu Kush and the Greater Pamir range and more gently undulating high altitude steppes and deserts in the Little Pamir and the Greater Pamir valley.

The Wakhan is famous for its population of Marco Polo Sheep *Ovis ammon polii* and Snow Leopard *Uncia uncia*. A healthy population of the former inspired the creation of a game reserve during the times of Nadir Shah and these two species are also at the core of recent efforts to create a suite of protected areas. The Wildlife Conservation Society (WCS) has taken the lead on these efforts, and recently Habib (2006) investigated the status of the mammals in the Wakhan.

Petocz (1978a) identified five main habitat types to classify the flora of the Wakhan: sedge meadows, alpine steppes, alpine heaths, rubble slopes and gullies. A further important habitat type are the riverine thickets dominated by *Hippophae rhamnoides* and *Salix sp.* These habitat types will mostly be used in this report, too. In part three of his series of reports, Petocz (1978b) pointed out the problem of overgrazing in the hunting reserve and discussed possible amendments to it. More recently, Bedunah (2006) reviewed the state of rangelands in Afghanistan and also pointed out a high level of overgrazing as one of the overriding factors.

To inform the process of designating protected areas in the Wakhan, WCS is also gathering information about the avifauna of the Wakhan. Little information is so far available on the birds of the Wakhan. The first ornithological expedition in the Wakhan was carried out by Biddulph and Stoliczka, and written up by Sharpe (1891). Biddulph and Stoliczka visited the area in April 1874. They collected at least 40 species – some of which have not been encountered since. From the locations mentioned in this book and from the species collected it seems that they spent most time in the valley bottoms and along the rivers, where they encountered migrant birds rather than the specialists of the high mountains. The most remarkable report is of four Sociable Lapwings *Vanellus gregarius* – a species which nowadays is considered critically endangered by Birdlife International (2006a). Other species of conservation concern found by Biddulph and Stoliczka include Bar-headed Goose *Anser indicus* and Great Rosefinch *Carpodacus rubicilla severtzovi*. It took a whole century for further ornithological work to be carried out in the Wakhan: Petocz (1978a) compiled a list of birds found in the Wakhan, this time encompassing not just spring season but more or less year-round observations in many different parts of the Wakhan area. He listed 115 (not 117 as commonly cited) species for the Wakhan, including several high-altitude specialists that Sharpe had not yet reported. Petocz's work was the main basis for Evans (1994) to classify two distinct parts of the Wakhan as Important Bird Areas (IBAs). Important reasons to classify these two areas as IBAs include the uniqueness of its avifauna for Afghanistan as a country and the Middle East as a region, the breeding colonies of Bar-headed Geese on Zarkul and Chaqmaqin lakes, as well as the occurrence of several rare and declining raptor species including Lesser Kestrel *Falco naumanni*, Saker Falcon *F. cherrug*, and Egyptian Vulture *Neophron percnopterus*. The Wakhan area, specifically the Little Pamir, was also reported to be an important migration flyway.

Twenty five years later, Fitzherbert & Mishra (2003) published a species list derived from anecdotal observations made during a two-week expedition to the Wakhan. Two reports by Ostrowski (2006, 2007) also contribute anecdotal observations of birds in the Wakhan. The first expedition in the Wakhan to concentrate on birds was conducted in late summer 2006 (Raza, unpub. manuscript). All of the latter expeditions have visited the Great Pamir and the Wakhan Valley, but not the Little Pamir. Except for Ostrowski, these expeditions also did not spend significant time in the lower Wakhan between Qala-i Panj and Ishkashem.

Taken together, these reports show that the Wakhan hosts a very valuable high-altitude avifauna. Several species occur only here within Afghanistan, and several rare species occur in good numbers. While generally there is agreement, some inconsistencies have arisen between the different reports. Many species have been found only once and could not be confirmed by other observers, and this includes species that would not have been expected to occur in this area. In a few cases, the named inconsistencies raise the issue of reliability of the data. Probably some species will have to be revised in the future and certainly many more species will be added to the Wakhan bird list. Data on the frequency with which different species occur – even qualitative indications of abundance – are very limited. Also the geographical distribution of birds was mostly described in terms of just three distinct areas: the Great Pamir, the Wakhan Valley and the Little Pamir. More detailed information about where certain species occur is scarce.

Several of the previous reports have focused on the total species number of the Wakhan or particular parts of it. Total number of species in general tends to decrease at high altitude and this has been shown for the Wakhan area by Raza (unpub. manuscript 2006). However, concluding from this that the lower-lying areas were of higher importance to bird protection is misleading, as it is probable that they host many widespread and even ubiquitous species including Northern Pintail *Anas acuta*, Common Teal *Anas crecca*, Common Swift *Apus apus*, Barn Swallow *Hirundo rustica*, Common Myna *Acridotheres tristis*, or Black-billed Magpie *Pica pica*. True high-altitude habitats probably host less of these wide-spread species. The high-altitude habitats may hold equal or higher numbers of specialised and rare species, but this would be blurred by a large number of more widespread species found at lower areas. The best way to assess which areas are more valuable will be to agree on priority species and targets for conservation and then to rigorously identify the most valuable areas based on these criteria and applying a complementary species approach (Williams et al. 2006) or an irreplaceability approach (Pressey et al. 1994).

Based on the above it is clear that ornithological information on the Wakhan area is still scarce and that, more specifically, data to judge the value of distinct parts of the Wakhan area for bird conservation is missing almost completely. This led – in addition to activities related to capacity building – to the formulation of two scientific goals, namely:

- 1) to develop priorities for the conservation of the avifauna of the Wakhan,
- 2) to gain a better understanding of the avifauna of the Wakhan (Greater Pamir Valley, Greater Pamir proposed Protected Area and Wakhan Valley) with the goal to inform the process of boundary definition for a protected area, and
- 3) to investigate different habitat types and distinct geographical areas in terms of their bird diversity and value for bird conservation.

These three goals comprise a whole set of objectives attached to the mission. It was planned to:

- a. develop a list of priority species for the conservation of birds in the Wakhan,
- b. investigate the importance of the Great Pamir and Wakhan valleys as a migration flyway,
- c. assess different habitat types as to their significance for the avifauna of the Wakhan,
- d. assess different geographical parts of the Wakhan in terms of their significance for the avifauna, and
- e. start activities to gain a quantitative understanding of the avifauna of the Wakhan.

After developing criteria for setting conservation priorities in the Wakhan area, I applied these to define, for each species, a level of priority for conservation. Thereafter, all analyses were based on this list of priorities, and species of low conservation priority were be considered to a lesser degree in the analysis.

Methods

Priority species for bird conservation

Birdlife International (2006b, see also Evans 1994) has developed a relatively standardised methodology to select areas with highest value for bird conservation, so-called Important Bird Areas (IBAs). The methods will not be described in detail here. Most importantly, it identifies areas hosting globally threatened and/or endemic species, areas where significant communities of biome-restricted species occur and areas with large congregations of birds. The selection of IBAs is also an iterative process based on other candidate IBAs in the same country and region. Therefore it is not directly applicable to an isolated region. I have taken the IBA criteria as a basis, and further tried to include the national perspective.

A list of bird species of the Wakhan was compiled. For each species, the global conservation status (IUCN code) and/or whether it is biome-restricted were recorded according to BirdLife International (2006a). Every species with an IUCN code other than "least concern" (LC) and every biome-restricted species was considered a species of conservation concern. Additionally for each species an estimate of its abundance within Afghanistan was recorded, using three levels of abundance. This was based on literature (Meinertzhagen 1938a, 1938b, Niethammer 1967, Paludan 1959, Rasmussen & Anderton 2004), on results of an ornithological expedition to Hazarajat in December 2006 (pers. obs.) and on the status of the species in areas close to the Afghan border in Tajikistan and Iran (pers. obs.).

Furthermore, for each species, its status in Wakhan was recorded – based on the literature cited in the introduction and based on the status of these species on the Tajik sides of the Wakhan and Great Pamir Valleys (Abdusalyamov 1971, 1973, 1977, pers. obs.). In some cases, this was completed with information about the status of the species in bordering regions of Pakistan (Roberts 1991, 1992).

Based on the above three criteria (global status of threat, status in Afghanistan and regularity and numbers found in Wakhan), it was decided whether the Wakhan area is of particular importance for the conservation of a particular species. The importance of the Wakhan area for the conservation of each species was coded with one of four levels: no particular importance, regional/subnational importance, national importance and international importance. Thus each species is assigned a level of importance for conservation.

- Any globally threatened species (IUCN status other than LC) that is likely to occur regularly in numbers in the Wakhan was considered to be of international importance. A species was also assigned international importance if it is biome-restricted and if the numbers found in the Wakhan area are thought to be large in comparison with numbers found in neighbouring areas (e.g. Bar-headed Goose and Himalayan Snowcock *Tetraogallus himalayensis*).
- Globally threatened or biome-restricted species that occur less regularly or only in very small relative numbers in the Wakhan were considered to be of national importance. Also of national importance are species which are rare in Afghanistan, but which occur in good numbers in the Wakhan (eg., Common Merganser *Mergus merganser*).

In the analysis of our own data, mainly species for which the Wakhan area is of national or international conservation importance were considered. The approach taken to assess the importance of the Wakhan area for a particular species has subjective aspects to it and can certainly be criticized. However, I am convinced that future approaches to prioritise certain bird species for conservation purposes in the Wakhan area will show good reproducibility. Some issues are dealt with in the Discussion section.

Large bird migration count

For large bird migration counts, we stopped at places with a good overview, especially with good view to the direction where migrating birds would come from. All these places were close to the valley bottom to assure that migrating birds would be seen against the sky rather than against the slopes of a mountain, where they would be much more difficult to detect. The horizon was constantly

searched with binoculars to find migrating large birds. Large bird migration counts were done at Goz Khun on 13th September, 15.15h to 17.15h, between Nakhchirshitk and Alisu on 23rd September, 11.10h to 11.20h and at Ghaznikul on 25th September, 13.00h to 13.30h.

In addition to these systematic counts, much of the time spent riding between different camp sites was also used to scan the sky by naked eye for migrating raptors and other large birds. While this does not allow for quantitative estimates, it would be helpful in assessing whether any significant migration is going on through the area.

Waterbird Counts

We conducted waterbird counts of three small lakes in the Shikargah proposed protected area, of Ghaznikul and Zarkul (two large lakes), of two sections of the Great Pamir River, and of two sections of the Qarasu River. Counts in sections of the Great Pamir River further down had initially been planned, but due to the difficult and dangerous access to the river in the lower parts they were not executed.

For the waterbird counts of the two large lakes, possible viewpoints and the areas that could be viewed were identified in advance on overhead images. On the ground, only few changes were made to account for the position of the sun. The waterbird counts on the lakes were carried out using binoculars and two fieldscopes. The waterbird counts on the Great Pamir River were made on two sections. These were chosen quasi-randomly on the map before seeing the river, restricting the choice to sections that could be reached with a maximum of two hours' detour from our route.

Mountain Stream Counts

We also wanted to do counts of birds associated with small mountain streams, including Wagtails *Motacilla spp.*, Blue Whistling-Thrush *Myophonus caeruleus*, and Dippers *Cinclus spp.* For this purpose we took a convenience sample of small mountain streams, walked along these and counted every bird encountered. We focused especially on the rocks and pebbles along the riverbed, but also counting any other birds that were seen. We were also interested in counting birds in the bushes alongside mountains streams, because this linear structure in the landscape would not be covered with the transect counts but still is a very common and possibly important habitat. Coverage was close to complete for those birds associated with the rocks and pebbles along the riverbed, while it was considerably lower for birds hiding in the *Salix* and *Rosa* thickets along the mountain streams. Where trees or bushes were present, we counted all birds that we could find up to the edge of the trees or bushes. Where trees or bushes were missing, we counted to the edge of any natural limit to the riverbed (edge of lush vegetation, edge of erosion, etc.), or if no clear natural limit was present to a maximum of 10 m from the stream. Where the water-dependent vegetation was extensive, such that the distinct vegetation covered an area rather than just a narrow band along the stream, transect counts were conducted.

Counts along mountain streams were carried out on Sinin River on 15th September, on lower Istimoch River on 16th September, on Istimoch River below Qabalgat on 17th September (two), near Darabeg on 17th September, and near Dehqankhana on 2nd October. These counts were 6.5 km in total length.

Transect counts

In order to make first steps on the way to quantitative estimates on the birds in the Wakhan area, transect counts in six main habitat types were conducted. These habitat types were adapted from Petocz (1978a): sedge meadows, alpine steppes, alpine heaths, fine rubble slopes, coarse rubble slopes, and riverine thickets. Twenty one transects totalling 29.3 km were conducted. Starting points and endpoints of transects were chosen from a distance in order to avoid being influenced by presence or absence of any birds. Transects were as straight as possible taking into account insurmountable obstacles. Transect were laid such that they would be in relatively homogeneous habitat and thus could be assigned to one type of habitat. They did not follow linear structures like rivers or ridges for

long distances, but of course could cross such linear structures.

For the transects, we applied the distance sampling method (Buckland et al. 1993). Distance sampling allows to calculate the absolute density of birds along the transect, taking into account imperfect detection. Key assumptions of this method are that all birds on the transect line itself and immediately next to it are detected and that the perpendicular distance of any bird to the transect line is measured accurately (Rosenstock et al. 2002). Every bird heard or seen during the transect count was recorded, and the perpendicular distance of the bird to the transect line was measured using a rangefinder. Birds that were flushed were recorded at the point from where they had been flushed.

Data were double-entered in OpenOffice Spreadsheet and analysed using DISTANCE (Thomas et al. 2004). DISTANCE is a programme made specifically for the analysis of data from distance sampling transects and can be used to fit detection probability functions as well as for the calculation of absolute densities. Based on the very limited cover that five out of the six habitat types offer, one function for detection probability was fitted for all five habitats types. For the riverine thickets – offering much more cover than the other habitat types – a separate detection probability function was fitted. Bird species were grouped in four ecotypes relating to their foraging behaviour and size: sallying species (mainly perch-to-ground), skulkers, ground-gleaners (mainly granivorous species) and larger species (mainly corvids and doves). For each ecotype, two detection probability functions were fitted – one for the open habitats and one for the riverine thickets. Thus a total of eight functions were fitted. Similar approaches to increase the number of observations available for the fitting of one function have been used by Roth (2004).

With this approach, DISTANCE yielded estimates for encounter rates of each of these ecotypes. In order to be able to make quantitative estimates of the number of individuals per km², the encounter rate of the corresponding ecotype was multiplied with the mean flock size for the habitat in question (equal to one for all except the ground-gleaners). This yielded an density of individuals per km² for each ecotype and for each habitat type. To further make estimates for particular species, this density of individuals was multiplied by the proportion of all individuals of the corresponding ecotype that was attributable to the particular species. Species-specific densities of individuals were calculated only for those 13 species that are of conservation priority and were encountered on transects.

Less standardised index counts

During transfers from one campsite to another, on the way to and from endpoints of transects and in our spare time, we noted all birds that were seen. These index counts were recorded separate for each section or location with on average 2.9 sections per day. Data of the species of conservation priority were then recoded to presence/absence data for each section. For analysis by geographical distribution, the Wakhan was divided into five geographical areas, namely (i) the Panj Valley from Ishkashim to Goz Khun, (ii) the Wakhan Valley, (iii) the Great Pamir Valley from Goz Khun to Alisu, (iv) the Great Pamir Valley from Alisu to Zarkul and (v) the higher ground and ridges of the Great Pamir range (see Table 1 and Appendix 4). The proportion of sections, in which the species was found was calculated for each geographical area separately. These data were not collected in a standardised way and no calculation of encounter rates or densities was attempted.

Table 1. The five main geographical areas used in the analysis and their main characteristics.

Geographical area	Characteristics	Elevation range of observations [m asl]
Panj Valley	Broad valley with cultivated areas, woodlands around villages and along rivers.	2500 – 2850
Wakhan Valley	Cultivated areas, riverine thickets and the gravelly riverbed (latter not surveyed in detail). Dry slopes.	2950 – 3500
lower Great Pamir V.	Great Pamir river in a gorge over large areas, steep side valleys, eroded slopes.	2900 – 4100
upper Great Pamir V.	Wide valley with extended flat steppes and marshy areas.	3800 – 4300
Great Pamir Range	Rugged ridges, screes, alpine heaths, mountain lakes, sedge meadows.	3850 – 4900 (mostly above 4200)

Results

Priority species for bird conservation

The full list of bird species recorded in the Wakhan area and the level of priority for conservation, which they were assigned, is given in Appendix 1. Nine species were judged to have populations in the Wakhan that are of international importance: Bar-headed Goose, Egyptian Vulture, Saker Falcon, Lesser Kestrel, Himalayan Snowcock, Yellow-eyed Dove *Columba eversmanni*, Snow Pigeon *Columba leuconota*, Mountain Chiffchaff *Phylloscopus sindianus* and Great Rosefinch.

Large bird migration count

The two-hour large bird migration count at Goz Khun and the shorter counts between Nakhchirshitk and Alisu and at Ghaznikul did not yield a single raptor or other large bird in migration. Also during the additional efforts that were made to find migrating raptors or other large birds, only very limited numbers were seen. The only actively migrating large birds were a Montagu's Harrier *Circus pygargus* near Elghanak on 23rd September, a Western Marsh Harrier *Circus aeruginosus* at Ghaznikul on 25th September and a Booted Eagle *Aquila pennata* near Dehqankhana on 2nd October.

Waterbird Counts

Three of the eight small lakes (three to four very small water bodies not counted here) in the Shikargah proposed protected area were subject to a waterbird count (37.082°N/73.040°E; 37.094°N/73.030°E; 37.094°N/73.022°E). One of the three lakes was virtually devoid of any birds. On the other two lakes, there was one Green Sandpiper *Tringa ochropus* and seven Wagtails *Motacilla* of all four "usual" species. Furthermore, during the counts of the lakes, it was felt that their surroundings held higher densities of birds (mainly White-winged Redstarts *Phoenicurus erythrogaster*, but possibly also Brandt's Mountain Finch *Leucosticte brandti*). However, this could not be quantified exactly.

On Ghaznikul, an estimated two thirds of the water surface could be viewed and all waterbirds counted. There were a total of 1721 waterbirds of 18 species. A further seven individual birds that were directly associated with the water were counted (wagtails, warblers, Bluethroat *Luscinia svecica*). Most notable among the waterbirds were 175 Bar-headed Geese, 88 Ruddy Shelduck *Tadorna ferruginea*, 100 Wigeon *Anas penelope*, and 14 Common Mergansers (Table 2). Given that only two thirds of the water surface could be viewed and assuming that the number of waterbirds increases linearly with the surface, a total of c. 2,594 waterbirds was estimated for the whole of Ghaznikul. At Zarkul c. 90% of the water surface could be viewed. On Zarkul, the total number of waterbirds was 1,209 out of 19 species. Most notable were 102 Ruddy Shelduck and 398 Common Mergansers (Table 2). Nine Bar-headed Geese were rather less than expected. Twenty eight individual birds that were directly associated with the water were counted in addition (wagtails, warblers, bluethroat, drinking larks). The distribution of birds over Zarkul was very irregular with birds concentrated at both ends. More than 95% of all Common Mergansers (381 ind.) were seen in a very small area within 1 km of the outflow of the lake, where also 16 Ruddy Shelduck, and 4 Great Black-headed Gulls *Larus ichthyæetus* were recorded. The number of Common Mergansers exceeds the threshold value for an IBA in Central Asia (200 ind.) by almost a factor of two. Eighty five Ruddy Shelduck and 550 Common Coot *Fulica atra* along with 5 Brown-headed Gulls were at the eastern end of the lake.

The two sections of the Great Pamir River that we counted were near Ghormatek and near Beshkanak (starting points 37.316°N/73.075°E and 37.447°N/73.365°E). The section at Ghormatek was 3 km long, while the section at Beshkanak could not be extended to 3 km because there was a tributary with too much water to be crossed; therefore it was only 1.6 km long. At Ghormatek, only two waterbirds in the strict sense were counted. At Beshkanak, there were 52 true waterbirds. In total 52 and 81 birds associated directly with the water were counted at Ghormatek and Beshkanak, respectively. On both sections, White Wagtails *Motacilla alba (personata)* were particularly common. Table 3 shows the

results of the waterbird counts on the Great Pamir and Qarasu river sections.

Table 2: Results of waterbird counts on large lakes. Actual counts and extrapolated estimates based on surface are shown.

Species	Count		Estimated total	
	Ghaznikul	Zarkul	Ghaznikul	Zarkul
Great Crested Grebe	0	1	0	1.1
Grey Heron	9	13	13.5	14.4
Bar-headed Goose	175	9	262.5	10.0
Ruddy Shelduck	88	102	132	113.3
Wigeon	100	0	150	0.0
Gadwall	7	0	10.5	0.0
Common Teal	31	2	46.5	2.2
Northern Pintail	547	10	820.5	11.1
Garganey	1	1	1.5	1.1
Northern Shoveler	37	0	55.5	0.0
Unid duck	320	0	480	0.0
Common Merganser	14	398	21	442.2
Common Coot	250	595	375	661.1
Grey Plover	1	0	1.5	0.0
Northern Lapwing	0	1	0	1.1
Little Stint	7	4	10.5	4.4
Common Snipe	0	1	0	1.1
Ruff	7	4	10.5	4.4
Greenshank	0	2	0	2.2
Wood Sandpiper	0	1	0	1.1
Common Sandpiper	0	1	0	1.1
Red-necked Phalarope	2	0	3	0.0
Little Gull	1	1	1.5	1.1
Brown-headed Gull	12	23	18	25.6
Great Black-headed Gull	63	39	94.5	43.3
Unid gull	49	1	73.5	1.1

Table 3. Results of the waterbird counts on rivers, standardised to 1 km length*

Species	Ghormatek	Beshkanak	Qarasu1	Qarasu2
Common Teal	0	0	2.3	0
Common Merganser	0	23	0	6
Little Stint	0	3.1	0	0
Ruff	0	1.9	0	0
Greenshank	0	1.3	0	0
Wood Sandpiper	0	0	0	1.3
Green Sandpiper	0	0.63	0	0
Common Sandpiper	0.32	0	0	0.67
Brown-headed Gull	0	0	0	6.7
Great Black-headed Gull	0.32	2.5	0	2
Unid. Gull	0	0	0	2
Hume's Short-toed Lark	0.32	0	0	0.67
Horned Lark	0	9.4	0	10
Citrine Wagtail	0.96	0	0	1.3
Masked (White) Wagtail	9.3	5.6	0	0
Grey Wagtail	0	0.63	0	0
Bluethroat	2.2	1.9	1.5	2.7
Other	0.35	0.63	0	1.3
Total Birds	13.8	41.9	3.9	34.7

*Waterbird counts were carried out on two sections of the Great Pamir River (left, 3 km and 1.6 km long) and two sections of the Qarasu River (right, 1.3 and 1.5 km long). Numbers of individuals per km are shown.

The two sections of the Qarasu River that were counted were convenience samples (the Qarasu River had hindered us from completing a longer section on the Greater Pamir River at Beshkanak). They were 1.3 and 1.5 km long. The Qarasu in this section is a slow, meandering river with mostly grassy shores. There were 3 and 28 true waterbirds on these sections respectively.

Mountain Stream Counts

It became clear that the linear structure of mountain streams was rather heterogeneous. At least two types need to be differentiated: those mountain streams with significant coverage of *Salix sp*, *Hippophae rhamnoides*, *Tamarix sp* and/or *Rosus sp* and those without trees or bushes.

In the field it was obvious that birds were concentrated along the mountain streams – especially migrant warblers in areas where there were riverine thickets along the mountain streams. Away from the rivers the landscape was very dry (driest season of the year) and there was hardly any cover available. On a total length of 6.5 km, 114 individual birds were counted (Table 4). This compares to 554 birds counted on 29.3 km of transect counts. Keep in mind that during counts along mountain streams only the birds within the band of vegetation that is directly influenced by the presence of the river are counted, whereas transects were carried out in areas of more homogeneous habitat and birds were counted as far as they could be detected.

Table 4. Results of counts along mountain streams (standardised to 1 km length).

	Riverine thicket	Riverine thicket	Riverine thicket	Open, stony/sedge meadow	Open, stony/sedge meadow	
Eurasian Sparrowhawk	0	1.4	0	0	0	0
Common Quail	0	0	1.5	0	0	0
Hill Pigeon	0.7	0	0	0	0	0
Oriental Turtle Dove	0.7	0	12	0	0	0
Grey Wagtail	0.7	0	1.5	2.3	0	0
Masked (White) Wagtail	0	0	1.5	1.8	6	6
Bluethroat	0.7	1.4	1.5	0.9	1.3	1.3
White-tailed Rubythroat	0	0	0	0.5	0	0
Black Redstart	0	0	0	0.5	0	0
White-winged Redstart	0	0	12	0	0	0
Siberian Stonechat	0.7	0	0	0	0.7	0.7
Isabelline Wheatear	0	0	0	0	1.3	1.3
Black-throated Thrush	0	0	1.5	0	0	0
Blue Whistling-Thrush	0.7	1.4	0	0	0.7	0.7
White-bellied Dipper	0	0	0	0.5	1.3	1.3
Brown Dipper	0.7	1.4	0	0.5	2	2
Lesser Whitethroat <i>curruca</i>	0	0	7.5	0	0	0
Greenish Warbler	2.1	0	0	0	0	0
Hume's Leaf Warbler	2.1	8.6	1.5	0	0	0
Long-tailed Shrike	0	1.4	0	0	0	0
Red-billed Chough	0	0	0	0.9	0	0
Twite	0	0	0	1.8	0	0
Common Rosefinch	3.5	7.1	0	1.8	1.3	1.3
Rock Bunting	0	0	4.5	0	0	0
Unid duck	0	0	1.5	0	0	0
Unid insectivore	1.4	0	0	0	0	0

Transect counts

Twenty one transects totalling 29.3 km were carried out. A total of 228 individual birds and flocks were observed, belonging to 32 species. Before fitting detection probabilities, the number of observations was plotted against distance (Fig 1) to check for any heaping that would interfere with function fitting (Buckland et al. 1993). The number of observations decreased monotonously with

distance as long as the distance was below 150 m. Above 150 m an indication of heaping was found. As a result, data were truncated at a perpendicular distance of 149 m. This led to the exclusion of 20 observations. To fit the detection probability functions, 208 observations were used. Flocks were only observed for the ground-gleaning bird type and therefore only this detection curve took into account clustering due to flocking. Table 5 shows the estimated observation densities for both habitat types and for all four bird ecotypes. For all ecotypes except the ground-gleaners, this equals the density of individuals. For the ground-gleaners, the mean flock size needs to be taken into account. The mean flock size was about eight individuals. Note that confidence intervals for observation densities are wide and in some cases extremely wide.

Table 5. Encounter rates (observations/km²) of bird ecotypes by habitat type*

	Estimated density (observations/km ²)	Lower limit of 95% confidence interval	Upper limit of 95% confidence interval
Sedge Meadows			
sallying	16	1	230
skulker	0	na	na
ground-gleaner	91	undefined	undefined
Large birds	0	na	na
Alpine Steppe			
sallying	9	2	39
skulker	3	0.6	12
ground-gleaner	7	2	20
Large birds	1	0.1	6
Alpine Heath			
sallying	52	25	111
skulker	0	na	na
ground-gleaner	0	na	na
Large birds	0	na	na
Fine Rubble Slopes			
sallying	0	na	na
skulker	0	na	na
ground-gleaner	6	1	32
Large birds	13	3	59
Coarse Rubble Slopes			
sallying	54	18	161
skulker	6	1	30
ground-gleaner	23	6	82
Large birds	1	0.3	7
Riverine thickets			
sallying	27	7	102
skulker	544	158	1874
ground-gleaner	168	0.3	100000
Large birds	124	29	539

*Encounter rates are defined as number of observations (either a flock or a single individual) per km², estimated using DISTANCE based on data from transect counts.

Estimates of densities of individuals are presented in Table 6 for species of conservation priority in the Wakhan. Density estimates for two habitats (alpine heaths and fine rubble slopes) are based on few observations and thus less reliable. Independent of this, the results show clearly that the habitats vary enormously with several species of conservation concern occurring exclusively or predominantly in one habitat type. Not surprisingly, the riverine thickets differ most strongly from all other habitats in terms of the occurrence of these 13 species. In addition to riverine thickets, coarse rubble slopes and alpine heath host many species that are restricted to one or two different habitats only. From these data, it seems that sedge meadows neither host high densities nor high diversity of birds – with the exception of Hume's Short-toed Lark *Calandrella acutirostris*, for which the highest density was estimated in this habitat. The highest number of species of conservation priority was seen on transects

in coarse rubble slopes (seven) and alpine steppes (six). For one species in alpine steppes (White-capped Water Redstart *Chaimarrornis leucocephalus*), this was probably an artefact, as the species was along a small river which was crossed during the transect and probably did not depend on the kind of habitat that surrounded the river. Moreover both the number of transects and the total length of transects conducted in alpine steppes exceeded the number and total length of transects in any other habitat (7 transects of 16.7 km length in alpine steppes compared to 2.8 transects of 2.5 km on average for other habitats). No species of conservation priority was observed on the single transect that was conducted in a Fine Rubble Slope.

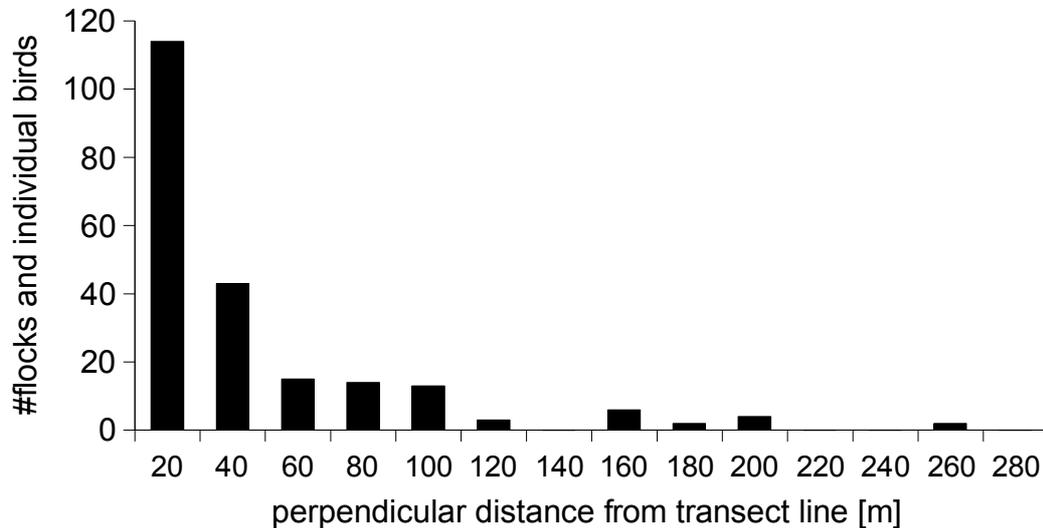


Fig. 1. Number of independent observations (either a flock or a single bird) recorded on transects, by distance from the transect line (n=228).

Table 6. Estimated density (individuals/km²) of 13 species of conservation priority by habitat type.

	Sedge Meadows	Alpine Steppes	Alpine Heaths	Fine Rubble Slopes	Coarse Rubble Slopes	Riverine Thickets
Oriental Turtle Dove	0	0	0	0	0	65.26
Hume's Short-toed Lark	62.26	1.69	0	0	0	0
Altai Accentor	0	0	0	0	15	0
Brown Accentor	0	3.32	5.78	0	10.5	0
White-capped Water Redstart	0	0.95	0	0	0	0
White-winged Redstart	8	0.47	17.33	0	12	16.88
Desert Wheatear	0	0.95	17.33	0	1.5	0
Siberian Stonechat	0	0	5.78	0	4.5	0
Mountain Chiffchaff	0	0	0	0	0	75.02
Hume's Leaf Warbler	0	0	0	0	0	112.55
Yellow-breasted Tit	0	0	0	0	0	56.25
Brandt's Mountain Finch	0	36.22	0	0	150.85	0
Great Rosefinch	0	0	0	0	0.81	0

Less standardised index counts

Outside the standardized counts, 52 species of importance to conservation were recorded. The mean number of species of conservation priority observed on one section was highest in the Wakhan and Panj valleys (Appendix 2). These two geographical areas were also the ones where the probability to encounter one of the species of maximum conservation priority (importance for conservation = 3) was highest, although this was relatively similar in all geographical areas. It has to be noted that in the Wakhan Valley substantially more time was spent on average on one section than in the other areas. Species of conservation concern which were recorded in the Wakhan and Panj valleys include

Yellow-eyed Dove, Red-tailed Wheatear *Oenanthe chrysopygia*, Mountain Chiffchaff, and Yellow-breasted Tit *Parus flavipectus*. The higher ground and the ridges of the Great Pamir range were intermediate in terms of the mean number of species of importance to conservation as well as in terms of the probability to encounter a species of maximum importance to conservation. However, 3 out of 9 species of highest conservation concern have been found in the area from Istimoch to Shikargah. This is a high total for a relatively small area and a short survey time.

The same type of analysis as described above for the five distinct geographical areas of the Wakhan was also conducted with seven habitat types. The habitat types used were the six types using for the transect counts plus additionally "cultivated land." as in the latter habitat many birds were seen, but it was not included in the original plans to conduct transect counts. The mean number of species of importance for conservation observed per transect was 5.36 for riverine thickets, 4.33 for cultivated land, and 4.2 for coarse rubble slopes. For the other four habitat types, the values were between 1.93 and 2.5.

Discussion

Priority species for bird conservation

For many species, the available data are limited and it is not easy to judge their exact status in the Wakhan corridor. Further, even the global IUCN status codes are regularly adjusted either because the situation has changed or because previous information was incomplete. Therefore it will be unavoidable to correct some of the codes for conservation priority that were assigned here. There are a few species for which the data situation is particularly limited and which I briefly discuss here.

There is distinct disagreement over the status of the Saker Falcon in the Wakhan. Rasmussen & Anderton (2005) state that it is "common" in the Wakhan, while the four expeditions of WCS staff yielded only two records. On this trip we were unable to find any Saker Falcon but found a juvenile Barbary Falcon *Falco babylonicus* instead, which additionally raises the question of correct identification. Identification of large falcons is notoriously difficult due to highly variable plumages and often short or distant observations. Future visitors to the Wakhan should be particularly vigilant to contribute to the clarification of the status of the Saker Falcon, a globally vulnerable species.

Raza (unpub. manuscript 2006) and Ostrowski (2007) both recorded Ibisbill *Ibidorhynchus struthersi* recently. Both records were outside the breeding season, but breeding of this species in the Wakhan is very well possible. The species is relatively rare throughout its range and – if proven to occur regularly in the Wakhan – should be of conservation concern.

Previous authors have reported either Pallas's or Tibetan Sandgrouse. Unfortunately, we were unable to find any sandgrouse on this expedition. It is possible that one of the two species was reported erroneously. Tibetan Sandgrouse is more likely to occur from its known distribution, as it is known to occur in nearby China and in Tajikistan. However, there are old records of Pallas's Sandgrouse from Kashgaria, too. A clarification of the species and numbers that are involved in the Wakhan would be important, as both species are biome-restricted and occur in relatively small numbers throughout their range. Any of these two species breeding in the Wakhan should be considered to be of (at least) national importance for conservation, as none of the two occurs anywhere else in Afghanistan.

Ostrowski (2006) recorded Scaly-bellied Woodpecker *Picus squamatus* from Brethkarf/Istimoch and from Qala-i Panja. Investigating the exact status of this rare and biome-restricted species would be very important, as it could also be of high conservation concern.

Among the woodpeckers, there is a second open question. Raza (unpub. manuscript 2006) and Ostrowski (2007) both reported Himalayan Woodpecker *Dendrocopos himalayensis*. In Kret, we briefly saw a woodpecker, which looked more like a White-winged Woodpecker *Dendrocopos*

leucopterus. While our views were not good enough to positively identify the bird, there is an additional reason to carefully check the identity of any *Dendrocopos* woodpecker in the Wakhan area: White-winged Woodpecker is known to occur as far south as Garmchashma (south of Khorogh) in Tajikistan, from where they could easily reach the Wakhan.

Large bird migration counts

The three large bird migration counts that were conducted did not yield a single observation, and the additional less standardised observation on migration of large birds also did not produce any indication of significant migration of raptors or other large birds along the Greater Pamir and Wakhan valleys nor across the Greater Pamir range. From this it can safely be concluded that there are no major numbers of large birds migrating through these areas at this season. In southwestern Tajikistan there are good numbers of raptors migrating at this season, suggesting that for raptor migration the timing was not an issue. Oriental Honey Buzzard *Pernis ptilorhyncus*, Black-eared Kite *Milvus (migrans) melanotis*, Marsh Harrier *Circus aeruginosus* and Booted Eagle *Aquila pennata* migrate through the wider region at this season and would have been expected if the Greater Pamir and Wakhan valleys constituted major migration routes. None of the available reports mentions any major migration events in the Great Pamir. The only report of the Wakhan area being a major flyway for migrating birds is from Petocz (1978a), who writes that Common Crane *Grus grus* was reported by locals to occur in the Little Pamir in "huge flights" and Steppe Eagle *Aquila [rapax] nipalensis* also occurred on migration. One potential reasons for this discrepancy are differences between the Greater Pamir and the Little Pamir, which could be based on the physiography including the Aqsu valley in Tajikistan that could act as a channelling feature leading birds towards the Little Pamir.

Waterbird Counts

The counts from Shikargah yielded very few birds, showing that these lakes are of limited importance for waterfowl. This is a common feature with high-altitude lakes that are often very poor in biomass production. The very low level of available biomass translates into lack of food for waterfowl. It can be expected that this is similar for other small lakes at very high altitudes in the Great Pamir range. That Raza (2006, unpub. manuscript) has recorded several species of duck in Shikargah does not change this conclusion – especially as they were widespread duck species. However, the impression that different species of songbirds, including White-winged Redstart, preferentially feed near the lakes should be followed up.

The two large lakes, Ghaznikul and Zarkul, are of high priority for conservation – mainly for a limited set of species, namely Bar-headed Goose, Common Merganser, Great Black-headed and Brown-headed Gulls, and to a certain extent Ruddy Shelduck. The good numbers of the mentioned species, for the conservation of which the Wakhan area is of national and even international importance, suggests that at least in late summer and early autumn Ghaznikul constitutes a particularly important area for bird conservation. During our expedition, the Afghan bird specialist of WCS told me that on previous visits to Ghaznikul he had seen similarly high numbers of birds (even though he could not remember having counted them) and consistently higher numbers than on Zarkul. This raises our confidence that it was not just this year, that bird numbers at Ghaznikul are high. Probably the whole lake is of very high importance, although the easternmost basin hosted less birds. For the future, and to understand the importance of Ghaznikul in more detail, it would be particularly important to know, at which time of the year the Bar-headed Geese shift from their breeding grounds on Zarkul to Ghaznikul and whether any geese moult (or even breed) at Ghaznikul. In addition to breeding, moulting is one of the crucial periods of the year for geese, as they are unable to fly for a certain period and thus are vulnerable.

The density of waterbirds is much lower on Zarkul. However, total numbers are high and the number of Common Mergansers recorded confirms that the lake qualifies as an IBA. Whether all parts of the lake are equally important is difficult to say from just one visit in autumn. It should be a priority to confirm that the Bar-headed Geese are still breeding, in what numbers they are breeding and on which

island(s) the colony is situated. Kleinn (2002) reports that there are 700-1,000 breeding birds (not pairs) on Zarkul. Such a large breeding colony would be truly unique for Central Asia. It is, however, unclear on what evidence this is based. The area near the colony and any areas that are used by numbers of Bar-headed Geese for feeding and resting during the breeding and moulting season should be of utmost priority for conservation. Furthermore, information about breeding Great Black-headed or Brown-headed Gulls would be interesting. The Wakhan is of national importance for these two species and any breeding colonies should also be considered to be of high importance.

The waterbird counts carried out on the Great Pamir River were both carried out in a stretch where it flows somewhat more shallow and in a broader bed than in its lower part – the lower part which extends roughly from the mouth of the Alisu River down to the border bridge at Langar. Upstream from the described more shallow and broader part of the river, there is again a slightly faster flowing stretch from Zarkul down to about the level of Ghaznikul – a stretch which I haven't seen. At best, the counts can be assumed to be approximately representative of the 60 km stretch of river from the level of Ghaznikul to the mouth of the Alisu. Extrapolating the number of Common Mergansers and Great Black-headed Gulls from 4.5 km to 60 km would give a (very rough) estimate of 493 Common Mergansers and 67 Great Black-headed Gulls. Clearly, the reliability of such an estimate is very low. It is useful though in telling us that the river might potentially host considerable numbers of these birds. Other waterfowl, like Bar-headed Geese or Ruddy Shelduck, would find almost no suitable habitat in the rather fast-flowing river and are not expected to occur in significant numbers. As mentioned it was planned to conduct waterbird counts in the section from Goz Khun to the Alisu mouth, too. This was impossible due to the difficult and dangerous access. However, the river flows fast and in a narrow gorge over much of this section. Hardly any waterfowl should be expected to occur there. Species which probably do occur include Dippers *Cinclus sp.* and White-capped Water Redstart.

Mountain stream counts

The number of birds was higher along those mountain streams that were flanked by bushes (predominantly *Salix sp.*, *Tamarix sp.*, and *Hippophae rhamnoides*). The most common species were migrant Leaf Warblers *Phylloscopus sp.*, Lesser Whitethroat *Sylvia curruca* and White-winged Redstart. These species find very little cover in the mostly open habitats of the Wakhan area and it is therefore not surprising that they concentrate to a certain extent in any areas where bushes grow.

The observation of a White-tailed Rubythroat *Luscinia pectoralis* could either refer to a migrant, or be evidence of an existing breeding population. This bird was in the upper Istimoch Valley, near Qabalgar and searching this area in breeding season might prove rewarding.

Transect counts

The interpretation of the results of the transect counts and their analysis necessarily needs to be very careful at this stage. This was expected before the start of the study, but data from this survey can later be pooled with future data and in any case it was necessary to start to gather quantitative data – however vague first conclusions would be. The results are presented without confidence intervals, but these would in most cases be extremely wide. Thus patterns in the data should also be seen as hypotheses for future studies. Certain conclusions can be drawn if the observed patterns can be verified through other sources of information like the situation in comparable areas or knowledge about the biology of certain species.

From the densities of individuals, it seems that alpine heaths, coarse rubble slopes and riverine thickets are the habitats hosting most species of conservation priority and highest densities of these species. In the case of alpine steppes, the number of species of conservation priority could be overestimated relative to the estimates from other habitats, as more transects and longer transects will lead to higher number of species (especially while the number of transects is still small). The low estimate of density for several of these species in alpine steppes also suggests that they have been

observed only once or twice. Also, sedge meadows do not seem to be equally important for species of conservation priority as other habitats. Only one transect was conducted in fine rubble slopes and therefore this result should not be over-interpreted at this stage.

Less standardised index counts

The data collected through index counts indicates that during the time of our visit, the two large valleys – Wakhan Valley and Panj Valley – were the most valuable areas. A certain degree of confounding may have been introduced into this analysis because the time spent on one section was clearly longer in the Wakhan Valley than in other areas. Moreover, a lot of time was spent around Sarhad-e Baroghil, where particularly good numbers and a high diversity of birds were observed during our visit. Whether this is a more general trend, is unclear at this stage. The higher number of species may partly be due to the fact that towards the end of our visit, the mountains were already covered in snow and for example White-winged Redstarts had started descending in large numbers to the riversides, where they were clearly less numerous at the beginning of our visit. Similar to the birds, the research team was also forced down into the valleys. However, this should not be considered an artefact, but represents a biological pattern. It is likely that the valley bottoms and more specifically the riverine thickets are an important wintering habitat for many resident breeders. Another valuable area was the higher ground and the ridges of the Great Pamir, where three out of nine of the species of international importance for conservation were found. Snow Pigeon is possibly largely restricted to this area within the Wakhan. However, unfortunately little is known about the exact whereabouts of Snow Pigeon in the Wakhan. Understanding in which areas Snow Pigeon (and other high-altitude specialists like Himalayan Snowcock and Great Rosefinch) occur and in which areas they do not occur should be a priority.

The analysis of the index counts by habitat – similar to the transect counts – also pointed towards a high importance of riverine thickets and coarse rubble slopes. Furthermore, cultivated land at Sarhad-e Baroghil also hosted a high number of species of conservation concern. In some places, the riverine thickets are degraded due to intensive logging. Given that at least in autumn they constitute one of the most important habitats, WCS may need to address this issue. Most notable in the riverine thickets were two migrant Yellow-eyed Doves in a flock of Oriental Turtle Doves *Streptopelia orientalis*. On the same day when the Yellow-eyed Doves were seen among Oriental Turtle Doves, a trader from Jurm was seen hunting Oriental Turtle Doves and killing three out of a flock of around 20. There is thus a very real threat to the Yellow-eyed Doves from hunting. This species was also listed by Petocz (1978a). Based on the report by Petocz and my own observation, I consider it likely that the species passes through the Wakhan on a regular basis during migration. The Wakhan could thus be of particular importance for this globally threatened (IUCN code: vulnerable) species. However, Evans (1994) does not list the species in the description of the IBAs in the Wakhan – even though globally threatened species would mandatorily be mentioned. A possibility is that Evans considered the records by Petocz unreliable. In this context it is noteworthy, that Petocz never mentioned the much commoner and superficially similar Hill Pigeon *Columba rupestris* in his reports – shedding some doubt on his records of Yellow-eyed Dove.

In addition to direct observations, further evidence for a few species of international or national conservation concern were found, but due to the season are difficult to interpret. These include very high density of droppings of Himalayan Snowcock in the mountain ridges south of Jabar Khan and Nakhchirshitk. Does this area host large numbers of this species at certain times of the year? If so, this particular area could be of high priority. Especially critical periods in the year are winter and breeding season.

Conclusions

The Wakhan area hosts a unique avifauna of high value for conservation. The value of the Greater Pamir and the Wakhan valleys for conservation is mainly based on the resident specialists of the different high-altitude habitats and on a small number of species occurring in good numbers at Zarkul and Ghaznikul and possibly other water bodies. The area also hosts migrants that are of conservation concern, but their importance for conservation is not quite as high as the importance of the breeding birds.

The habitats that are of particularly high conservation value in autumn are riverine thickets and coarse rubble slopes. Cultivated land is also used by a number of species of conservation concern. Of these three habitats, the riverine thickets are under most intense pressure. Particularly valuable riverine thickets are found along the lower reaches of the Great Pamir and Wakhan rivers and – after their confluence – along a certain stretch of the Panj River. The most notable species that occur here are Mountain Chiffchaff, Yellow-breasted Tit, White-winged Redstart and Great Rosefinch, which feed on berries in winter. Immediately next to the riverine thickets, dry rocky habitats host a different community of birds including the biome-restricted Rufous-tailed Wheatear, the endangered Egyptian Vulture and the Saker Falcon.

The most urgent future research includes the clarification of:

- the number of Bar-headed Geese breeding
- the breeding status of Egyptian Vulture
- the breeding status of Saker Falcon
- the exact distribution and areas of concentration of the Himalayan Snowcock
- the breeding status of Ibisbill
- the identification of the Sandgrouse which occur
- the breeding status of Scaly-bellied Woodpecker
- the identification of the black-and-white woodpeckers that occur
- the exact distribution of the Snow Pigeon
- the breeding status of Mountain Chiffchaff and numbers involved
- the exact distribution of the Great Rosefinch.

For these questions, it is most appropriate to target expeditions in late spring and early summer. These data will also allow researchers and conservation managers to identify the most valuable areas with higher reliability and will possibly confirm that the Great Pamir proposed protected area is one of these hotspots.

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Appendix 1

List of Bird Species of the Wakhan and their Priority for Conservation

English Species Name	Scientific Species Name	IUCN status	Biome-restricted	Status in Wakhan	Abundance in AFG	Importance for conservation
Great Crested Grebe	<i>Podiceps cristatus</i>	LC	no	pm, wv?	1	0
Grey Heron	<i>Ardea cinerea</i>	LC	no	pm	2	0
Black-crowned Night Heron	<i>Nycticorax nycticorax</i>	LC	no	pm	1	0
Bar-headed Goose	<i>Anser indicus</i>	LC	yes	MB	0	3
Ruddy Shelduck	<i>Tadorna ferruginea</i>	LC	no	MB	2	1
Wigeon	<i>Anas penelope</i>	LC	yes	pm	2	1
Gadwall	<i>Anas strepera</i>	LC	no	pm	2	0
Common Teal	<i>Anas crecca</i>	LC	no	PM	2	0
Mallard	<i>Anas platyrhynchos</i>	LC	no	pm	2	0
Northern Pintail	<i>Anas acuta</i>	LC	no	PM	2	0
Garganey	<i>Anas querquedula</i>	LC	no	pm	2	0
Northern Shoveler	<i>Anas clypeata</i>	LC	no	PM	2	0
Common Pochard	<i>Aythya ferina</i>	LC	no	pm	2	0
Ferruginous Duck	<i>Aythya nyroca</i>	NT	yes	pm?	1	?
Common Merganser	<i>Mergus merganser</i>	LC	no	MB	0	2
Black-eared Kite	<i>Milvus (migrans) lineatus</i>	LC (t)	no (t)	pm	2	0
Bearded Vulture	<i>Gypaetus barbatus</i>	LC	no	RB	2	0
Egyptian Vulture	<i>Neophron percnopterus</i>	EN	no	rb	1	3
Himalayan Vulture	<i>Gyps himalayensis</i>	LC	yes	RB	1	2
Cinereous Vulture	<i>Aegypius monachus</i>	NT	no	pm?	0	2
Western Marsh-Harrier	<i>Circus aeruginosus</i>	LC	no	pm	2	0
Montagu's Harrier	<i>Circus pygargus</i>	LC	no	pm	2	0
Steppe Buzzard	<i>Buteo (buteo) vulpinus</i>	LC	no	pm	2	0
Long-legged Buzzard	<i>Buteo rufinus</i>	LC	no	rb	2	0
Eurasian Sparrowhawk	<i>Accipiter nisus</i>	LC	no	PM	2	0
Oriental Honey-Buzzard	<i>Pernis ptilorhynchus</i>	LC	no	pm	0	1
Golden Eagle	<i>Aquila chrysaetos</i>	LC	no	RB	2	0
Eastern Imperial Eagle	<i>Aquila heliaca</i>	VU	yes	pm?	0	?
Steppe Eagle	<i>Aquila nipalensis</i>	LC	yes	PM? pm	1	0 to 1
Bonelli's Eagle	<i>Hieraetus pennatus</i>	LC	no	pm	2	0
Booted Eagle	<i>Hieraetus fasciatus</i>	LC	no	v?	0	?
Short-toed Eagle	<i>Circaetus gallicus</i>	LC	no	pm	1	0
Lesser Kestrel	<i>Falco naumanni</i>	VU	no	mb?, pm	0	3
Common Kestrel	<i>Falco tinnunculus</i>	LC	no	RB	2	0
Merlin	<i>Falco columbarius</i>	LC	no	pm	1	0
Eurasian Hobby	<i>Falco subbuteo</i>	LC	no	pm	2	0
Barbary Falcon	<i>Falco pelegrinoides</i>	LC	no	mb?, pm	0	1 to 2
Saker Falcon	<i>Falco cherrug???</i>	VU	no	rb	0	3
Laggar Falcon	<i>Falco jugger</i>	NT	yes	doubtful	?	0
Gyr Falcon	<i>Falco rusticolus</i>	LC	no	doubtful	?	0
Himalayan Snowcock	<i>Tetraogallus himalayensis</i>	LC	yes	RB	2	3
Chucar	<i>Alectoris chukar</i>	LC	no	RB	2	0
Common Quail	<i>Coturnix coturnix</i>	LC	no	pm	2	0
Common Crane	<i>Grus grus</i>	LC	no	pm	2	0 to 1
Baillon's Crake	<i>Porzana pusilla</i>	LC	no	PM	2	1
Common Moorhen	<i>Gallinula chloropus</i>	LC	no	pm	2	0
Common Coot	<i>Fulica atra</i>	LC	no	PM	2	0
Ibisbill	<i>Ibidorhyncha struthersi</i>	LC	yes	rb?	0	1 to 3
Black-winged Stilt	<i>Himantopus himantopus</i>	LC	no	pm	2	0
Little Ringed Plover	<i>Charadrius dubius</i>	LC	no	pm	2	0
Lesser Sand Plover	<i>Charadrius mongolus</i>	LC	yes	MB? pm	0	2
Greater Sand Plover	<i>Charadrius leschenaultii</i>	LC	yes	v?	0	0

English Species Name	Scientific Species Name	IUCN status	Biome-restricted	Status in Wakhan	Abundance in AFG	Importance for conservation
Grey Plover	Pluvialis squatarola	LC	no	pm	0	0
Northern Lapwing	Vanellus vanellus	LC	no	pm	2	0
Sociable Lapwing	Vanellus gregarius	CR	yes	v	0	0
Little Stint	Calidris minuta	LC	no	PM	2	0
Temminck's Stint	Calidris temminckii	LC	no	PM? pm	1	1
Jack Snipe	Lymnocyptes minimus	LC	no	pm	2	0
Common Snipe	Gallinago gallinago	LC	no	PM	2	0
Woodcock	Scolopax rusticola	LC	no	pm	2	0
Black-tailed Godwit	Limosa limosa	NT	no	v?	0	?
Eurasian Curlew	Numenius arquata	LC	no	pm	1	0
Ruff	Philomachus pugnax	LC	no	PM	2	0
Common Redshank	Tringa totanus	LC	no	MB	1	1
Common Greenshank	Tringa nebularia	LC	no	pm	2	0
Green Sandpiper	Tringa ochropus	LC	yes	pm	2	0
Wood Sandpiper	Tringa glareola	LC	no	PM	2	0
Common Sandpiper	Actitis hypoleucos	LC	no	mb, pm	2	0
Red-necked Phalarope	Phalaropus lobatus	LC	no	pm	1	1
Little Gull	Larus minutus	LC	no	pm	0	1
Brown-headed Gull	Larus brunnicephalus	LC	yes	mb, pm	0	2
Heuglin's Gull	Larus heuglini	LC	no	pm?	1	0
Great Black-headed Gull	Larus ichtyaetus	LC	yes	MB, pm	0	2
Common Tern	Sterna hirundo	LC	no	mb	2	1
Unid Sandgrouse	Syrhaptes spec	LC	yes	rb	0	2 to 3
Rock Dove	Columba livia	LC	no	RB	2	0
Hill Pigeon	Columba rupestris	LC	no	RB	1	2
Snow Pigeon	Columba leuconota	LC	yes	rb	0	3
Yellow-eyed Dove	Columba eversmanni	VU	yes	pm	1	3
Common Wood-Pigeon	Columba palumbus	LC	no	pm	2	0
Eurasian Turtle Dove	Streptopelia turtur	LC	no	pm	2	0
Oriental Turtle Dove	Streptopelia orientalis	LC	no	PM	1	1
Common Cuckoo	Cuculus canorus	LC	no	pm	2	0
Pallid Scops Owl	Otus brucei	LC	yes	mb? pm	1	?
Eurasian Scops Owl	Otus scops	LC	no	pm	2	0
Eurasian Eagle Owl	Bubo bubo	LC	no	rb	2	0
Long-eared Owl	Asio otus	LC	no	rb?, pm	0	1 to 2
Eurasian Nightjar	Caprimulgus europaeus	LC	no	mb?, pm	2	0 to 1
Common Swift	Apus apus	LC	no	MB?	2	0
Alpine Swift	Apus melba	LC	no	mb, pm	2	0
Little Swift	Apus affinis	LC	no	v?	0	0
Common Kingfisher	Alcedo atthis	LC	no	rb?, pm	2	0
Eurasian Roller	Coracias garrulus	LC	no	pm	2	0
Eurasian Bee-eater	Merops apiaster	LC	no	pm	2	0
Hoopoe	Upupa epops	LC	no	MB, PM	2	0
Wryneck	Jynx torquilla	LC	no	pm	1	0
Unid Pied Woodpecker	Dendrocopos spec.	LC	yes	rb?	0	2
Scaly-bellied Woodpecker	Picus squamatus	LC	yes	rb? pm?	0	1 to 2
Greater Short-toed Lark	Calandrella brachydactyla	LC	no	v?	2	0
Hume's Short-toed Lark	Calandrella acutirostris	LC	yes	MB, PM	1	2
Oriental Skylark	Alauda gulgula	LC	no	MB?, PM	2	0
Eurasian Skylark	Alauda arvensis	LC	no	?	2	0
Horned Lark	Eremophila alpestris	LC	no	RB	2	0
Crested Lark	Galerida cristata	LC	no	?	2	0
Pale Sand Martin	Riparia diluta	LC (t)	yes (t)	pm	0	0 to 1
Crag Martin	Ptyonoprogne rupestris	LC	no	RB	2	0

English Species Name	Scientific Species Name	IUCN status	Biome-restricted	Status in Wakhan	Abundance in AFG	Importance for conservation
Wire-tailed Swallow	<i>Hirundo smithii</i>	LC	no	v?	1	0
Common House Martin	<i>Delichon urbica</i>	LC	no	pm	2	0
Richard's Pipit	<i>Anthus richardi</i>	LC	no	pm	0	0
Tawny Pipit	<i>Anthus campestris</i>	LC	no	mb?, pm	2	0 to 1
Long-billed Pipit	<i>Anthus similis</i>	LC	no	doubtful	0	0
Tree Pipit	<i>Anthus trivialis</i>	LC	no	PM	2	0
Olive-backed Pipit	<i>Anthus hodgsoni</i>	LC	no	doubtful	?	0
Red-throated Pipit	<i>Anthus cervinus</i>	LC	no	pm	0	0
Rosy Pipit	<i>Anthus roseus</i>	LC	yes	mb?, pm	0	1 to 2
Water Pipit	<i>Anthus spinoletta</i>	LC	yes	MB	2	1
Yellow Wagtail	<i>Motacilla flava</i>	LC	no	pm	2	0
Citrine Wagtail	<i>Motacilla citreola citreola</i>	LC	no	MB?, PM	2	0 to 1
Grey Wagtail	<i>Motacilla cinerea</i>	LC	no	RB	2	0
Masked White Wagtail	<i>Motacilla (alba) personata</i>	LC (t)	no (t)	MB, PM	2	0
White Wagtail	<i>Motacilla (alba) alba group</i>	LC	no	pm	2	0
Brown Accentor	<i>Prunella fulvescens</i>	LC	yes	RB	2	1
Black-throated Accentor	<i>Prunella atrogularis</i>	LC	yes	mb?, pm	1	2
Alpine Accentor	<i>Prunella collaris</i>	LC	yes	rb?	0	1 to 2
Altai Accentor	<i>Prunella himalayana</i>	LC	yes	RB	0	2 to 3
Bluethroat	<i>Luscinia svecica</i>	LC	no	PM	2	0
White-tailed Rubythroat	<i>Luscinia pectoralis</i>	LC	yes	mb?, pm	0	1 to 2
Rufous-backed Redstart	<i>Phoenicurus erythronotus</i>	LC	yes	pm	1	1
Black Redstart	<i>Phoenicurus ochrurus</i>	LC	no	MB, PM	2	0
White-winged Redstart	<i>Phoenicurus erythrogaster</i>	LC	yes	RB	0	2
Common Redstart	<i>Phoenicurus phoenicurus</i>	LC	no	pm	0	0
White-capped Water Redstart	<i>Chaimarrornis leucocephalus</i>	LC	no	rb	0	2
Siberian Stonechat	<i>Saxicola (torquata) maura</i>	LC	no	mb?, PM	2	0 to 1
Isabelline Wheatear	<i>Oenanthe isabellina</i>	LC	no	mb, pm	2	0
Northern Wheatear	<i>Oenanthe oenanthe</i>	LC	no	pm	2	0
Pied Wheatear	<i>Oenanthe pleschanka</i>	LC	no	pm	2	0
Desert Wheatear	<i>Oenanthe deserti</i>	LC	no	mb, pm	2	1
Red-tailed Wheatear	<i>Oenanthe (x.) chrysopygia</i>	LC	yes	mb, pm	1	2
Hume's Wheatear	<i>Oenanthe alboniger????</i>	LC	yes	?	0	?
Blue Rock Thrush	<i>Monticola solitarius</i>	LC	no	mb, pm	2	0
Blue Whistling Thrush	<i>Myophonus caeruleus</i>	LC	no	rb? mb?	2	1
Black-throated Thrush	<i>Turdus atrogularis</i>	LC	no	pm, wv	2	0
White-throated Dipper	<i>Cinclus cinclus leucogaster</i>	LC	no	rb	2	0
Brown Dipper	<i>Cinclus pallasi</i>	LC	no	RB	2	0
Cetti's Warbler	<i>Cettia cetti</i>	LC	no	mb?, pm	1	0
Grashopper Warbler	<i>Locustella naevia</i>	LC	no	PM	1	0
Moustached Warbler	<i>Acrocephalus melanopogon</i>	LC	no	pm	0	1
Paddyfield Warbler	<i>Acrocephalus agricola</i>	LC	no	pm	1	1
Blyth's Reed Warbler	<i>Acrocephalus dumetorum</i>	LC	no	pm	2	0
Booted Warbler	<i>Hippolais (caligata) caligata</i>	LC	no	?	0	0
Sykes's Warbler	<i>Hippolais (caligata) rama</i>	LC	yes	pm	1	1
Barred Warbler	<i>Sylvia nisoria</i>	LC	no	pm	1	0
Lesser Whitethroat	<i>Sylvia curruca</i>	LC	no	PM	2	0
Hume's Whitethroat	<i>Sylvia althaea</i>	LC	yes	pm?	1	0 to 1
Greater Whitethroat	<i>Sylvia communis</i>	LC	no	pm	2	0
Greenish Warbler	<i>Phylloscopus trochiloides</i>	LC	no	pm	2	0
Hume's Leaf Warbler	<i>Phylloscopus humei</i>	LC	yes	mb? PM	2	1
Brooks's Leaf Warbler	<i>Phylloscopus subviridis</i>	LC	yes	pm? v?	0	?
Mountain Chiffchaff	<i>Phylloscopus sindianus</i>	LC	yes	MB? pm	0	3
Siberian Chiffchaff	<i>Phylloscopus (collybita) tristis</i>	LC	no	PM	2	0

English Species Name	Scientific Species Name	IUCN status	Biome-restricted	Status in Wakhan	Abundance in AFG	Importance for conservation
Spotted Flycatcher	Muscicapa striata	LC	no	pm	2	0
Red-breasted Flycatcher	Ficedula (parva) parva	LC	no	pm	2	0
Willow Tit	Parus montanus???	LC	no	doubtful	-	0
Yellow-breasted Tit	Parus flavipectus	LC	yes	rb	0	2
Eastern Rock Nuthatch	Sitta tephronota	LC	yes	rb	2	1
Wallcreeper	Tichodroma muraria	LC	yes	RB	2	1
Asian Golden Oriole	Oriolus (oriolus) kundoo	LC (t)	no (t)	mb? pm	2	1
Asian Paradise-flycatcher	Terpsiphone paradisi	LC	no	mb? pm	1	0
Isabelline Shrike	Lanius isabellinus subsp	LC	no	pm	2	0
Red-backed Shrike	Lanius collurio	LC	no	pm	0	0
Long-tailed Shrike	Lanius schach	LC	no	mb? PM	2	0
Lesser Grey Shrike	Lanius minor	LC	no	pm	1	0
Steppe Grey Shrike	L. meridionalis pallidirostris	LC (t)	yes (t)	pm	1	1
Common Starling	Sturnus vulgaris	LC	no	pm	2	0
Rosy Starling	Sturnus roseus	LC	no	pm	2	0
Common Myna	Acridotheres tristis	LC	no	rb?	2	0
Black-billed Magpie	Pica pica	LC	no	RB	2	0
Alpine Chough	Pyrrhocorax graculus	LC	yes	RB	2	1
Red-billed Chough	Pyrrhocorax pyrrhocorax	LC	no	RB	2	0
(Oriental) Carrion Crow	Corvus (corone) orientalis	LC (t)	yes (t)	RB	2	1
Common Raven	Corvus corax	LC	no	RB	1	1
Brown-necked Raven	Corvus ruficollis	LC	yes	v?	1	0
Plain Mountain Finch	Leucosticte nemoricola	LC	yes	rb	0	1
Brandt's Mountain Finch	Leucosticte brandti	LC	yes	RB	0	2
Bactrian (House) Sparrow	Passer indicus bactrianus	LC	yes	mb? pm	2	0
Tree Sparrow	Passer montanus	LC	no	RB	2	0
Rock Sparrow	Petronia petronia	LC	no	rb?	0	1
White-winged Snowfinch	Montifringilla nivalis	LC	yes	rb, RB?	2	1
Red-fronted Serin	Serinus pusillus	LC	yes	rb?	2	1
Twite	Carduelis flavirostris	LC	no	RB	2	0
Mongolian Trumpeter Finch	Bucanetes mongolicus	LC	no	RB	2	0
Crimson-winged Finch	Rhodopechys sanguinea	LC	yes	rb	1	2
Common Rosefinch	Carpodacus erythrinus	LC	no	MB, PM	2	0
Great Rosefinch	Carpodacus rubicilla	LC	yes	rb	0	3
Corn Bunting	Miliaria calandra	LC	no	v?	1	0
White-capped Bunting	Emberiza stewarti	LC	yes	mb? PM	1	2
Rock Bunting	Emberiza cia	LC	no	RB	2	0
Grey-necked Bunting	Emberiza buchanani	LC	yes	mb, pm	2	1
Little Bunting	Emberiza pusilla	LC	no	pm	0	0
Red-headed Bunting	Emberiza bruniceps	LC*	no*	mb?, pm	2	0
Snow Bunting	Plectrophenax nivalis	LC	no	v?	0	0

Key

IUCN status: LC=least concern, NT=near-threatened, VU=vulnerable, EN=endangered, CR=critically endangered.

Status: mb=migrant breeder, pm=passage migrant, rb=resident breeder, v=vagrant, wv=winter visitor. Capitals indicate that the species occurs in high absolute numbers, lower case indicates low numbers.

Abundance in Afghanistan: 0=rare or localised, 1=scarce to uncommon, 2=common to abundant and widespread.

Importance for conservation: 0=no particular, 1=regional/subnational, 2=national, 3=international importance.

(t) taxonomic treatment here differs from the one adopted by BirdLife International, IUCN codes and biome-restriction completed based on available published information.

*considered as biome-restricted by BirdLife Int., however occurs in other biomes (Eurasian high montane) over large areas and in high numbers in TJK (own obs.) and is therefore considered non-restricted here.

Appendix 2

Results of Index Counts – shown is the proportion of sections on which each bird species was recorded, by geographical areas

Species	Importance	Panj Valley	Wakhan Valley	Lower Pamir Valley	Upper Pamir Valley	Great Pamir range
Ruddy Shelduck	1	0	0	0	0	0
Oriental Honey-Buzzard	1	0.07	0	0	0	0.06
Baillon's Crake	1	0	0.36	0	0.07	0
Temminck's Stint	1	0.14	0	0	0	0
Red-necked Phalarope	1	0	0.07	0	0.07	0
Oriental Turtle Dove	1	0.21	0.71	0.1	0.07	0.06
Brown Accentor	1	0	0.43	0	0.07	0.67
Desert Wheatear	1	0.07	0	0	0.07	0.22
Rufous-backed Redstart	1	0	0.14	0	0	0
Blue Whistling Thrush	1	0.29	0.07	0.4	0	0
Moustached Warbler	1	0.07	0	0	0	0
Paddyfield Warbler	1	0.07	0	0	0.07	0
Sykes's Warbler	1	0	0	0.1	0	0
Hume's Leaf Warbler	1	0.57	0.57	0.3	0.07	0
Goldcrest	1	0.07	0	0	0	0
Wallcreeper	1	0.14	0.07	0.1	0	0
Eastern Rock Nuthatch	1	0.07	0.07	0	0	0
Asian Golden Oriole	1	0.14	0	0	0	0
Steppe Grey Shrike (Saxaul Shr)	1	0	0	0.1	0	0
Alpine Chough	1	0	0.07	0.2	0	0
Carrion Crow	1	0.36	0.14	0	0	0
Common Raven	1	0.14	0	0.1	0.27	0.11
Rock Petronia	1	0	0.07	0	0	0
Red-fronted Serin	1	0	0.07	0	0	0
Plain Mountain Finch	1	0	0	0	0	0.06
Grey-necked Bunting	1	0	0.29	0.1	0	0.06
Common Merganser	2	0	0	0	0.07	0
Himalayan Griffon	2	0	0.21	0.1	0.07	0
Cinereous Vulture	2	0	0	0	0	0.06
Barbary Falcon	2	0	0.14	0	0	0
Lesser Sand Plover	2	0	0	0	0.07	0
Great Black-headed Gull	2	0	0	0	0.13	0
Hill Pigeon	2	0.07	0	0.5	0	0
Long-eared Owl	2	0.07	0	0	0	0
Unid. Woodpecker	2	0	0.07	0	0	0
Hume's Short-toed Lark	2	0.07	0.29	0	0.73	0.06
Rosy Pipit	2	0	0.07	0	0	0
Alpine Accentor	2	0	0	0	0	0.06
Altai Accentor	2	0	0	0	0	0.17
Black-throated Accentor	2	0	0.29	0	0	0
Red-tailed Wheatear	2	0.21	0.07	0	0	0
White-winged Redstart	2	0.21	0.71	0.1	0	0.89
White-capped Water Redstart	2	0	0.14	0.1	0	0.06
Yellow-breasted Tit	2	0.29	0.21	0.1	0	0
Brandt's Mountain Finch	2	0	0	0	0	0.44
White-capped Bunting	2	0	0.29	0	0	0
Egyptian Vulture	3	0.21	0	0	0	0
Lesser Kestrel	3	0	0.07	0	0	0
Himalayan Snowcock	3	0	0	0	0	0.06
Yellow-eyed Dove	3	0	0.07	0	0	0
Snow Pigeon	3	0	0	0	0	0.06
Mountain Chiffchaff	3	0.21	0.07	0.1	0	0
Mean number of species of concern per section		3.79	5.86	2.5	1.8	3.06

Annotated Checklist of Species of National or International Importance for Conservation – only species observed on this survey are listed

Bar-headed Goose *Anser indicus*

We counted 175 ind. on Ghaznikul, where we surveyed about two third of the total surface, on 25th September. Nine ind. were counted on Zarkul, where we surveyed about 90% of the surface, on 26th.

Common Merganser *Mergus merganser*

On 23rd September, 3 ind. were recorded in Tulibay. Thirty seven ind. were observed on the river Panj near Beshkanak, 9 on the river Qarasu and 9 on Ghaznikul – all on 24th September. Five were observed on Ghaznikul the next day and 398 on Zarkul on 26th September.

Egyptian Vulture *Neophron percnopterus*

One adult was feeding on a carcass east of Khandud on 13th September, and two adults were observed the same day at Goz Khun. The next day, an adult and a juvenile were recorded at Goz Khun.

Himalayan Vulture *Gyps himalayensis*

One ind. each was observed at Nakhchirshitk and above the Alisu pass on 13th September. Six were recorded between Sarhad and Dehqankhana on 3rd October, one at Chilqand on 4th, and a different individual west of Chilqand on 5th.

Cinereous Vulture *Aegypius monachus*

One ind. was observed at Sar Maqur on 28th September.

Barbary Falcon *Falco pelegrinoides*

A juvenile bird was observed at Sarhad on 1st October and probably the same ind. at Chilqand on 4th.

Lesser Kestrel *Falco naumanni*

One ind. was hunting above an area of *Hippophae* bushes at Chilqand on 4th October.

Himalayan Snowcock *Tetraogallus himalayensis*

Seven ind. were observed in three different flocks above Darabeg on 18th September. Droppings were found at the same locality on the same day and the following day at Shikargah. Large amounts of droppings were found south of Tor Buluq at around 4200 m asl on 20th and south of Nakhchirshitk at around 4800 m asl on 21st September. The large number of droppings in the area of Tor Buluq and Nakhchirshitk could indicate that many Himalayan Snowcock use this area at certain times of the year.

Lesser Sand Plover *Charadrius mongolus*

One bird was feeding along a small pool at Elghanak on 23rd September.

Great Black-headed Gull *Larus ichtyaetus*

One 1st-winter bird was seen over the river Panj near Ghormatek on 22nd, an adult was near Tulibay the following day, four were on the river Panj near Beshkanak and three on the river Qarasu on 24th September. During the waterbird count on Ghaznikul on 25th, 63 ind. were counted. Five were at Dhevethuk on 26th. On Zarkul, 38 were counted on 26th and one on 27th.

Brown-headed Gull *Larus brunnicephalus*

Ten ind. were on the river Qarasu and 2 on Ghaznikul on 24th September. Ten were on Ghaznikul on 25th. On Zarkul, 4 were counted on 26th and 19 ind. on 27th.

Hill Pigeon *Columba rupestris*

One ind. was observed at Ishkashim on 12th, 62 between Goz Khun and Sinin on 15th, and 4 at Sinin on 16th September.

Snow Pigeon *Columba leuconota*

Ten ind were observed by Naqibullah Mostafawi near Qabalgar on 17th September.

Yellow-eyed Dove *Columba eversmanni*

An adult and a juvenile were seen among Oriental Turtle Doves at Sarhad-e Baroghil on 4th October. The birds were feeding mostly among sparse *Tamarisk* bushes on the edge of the riverbed rather than on cultivated land.

Unid Pied Woodpecker *Dendrocopos sp.*

A female pied Woodpecker was observed at Kret on 5th October. The bird had clean black and white patterning and a large amount of white in the wing and thus looked like a White-winged Woodpecker *Dendrocopos leucopterus*. However, as this species has not been previously recorded in the Wakhan and as the observation was only brief, its definite identity has to remain open. Previous reports have mentioned Himalayan Woodpecker *Dendrocopos himalayensis*. It seems unlikely, that two species of pied Woodpeckers would occur in an area with so little woodland and future observers should try to clarify which species does (or do) occur.

Hume's Short-toed Lark *Calandrella acutirostris*

A common species of which almost 300 ind. were seen and which was seen on about half of all days. It was most commonly recorded in the Jermasirt Steppe, around the lakes Ghaznikul and Zarkul, and at Sarhad-e Baroghil on cultivated fields.

White-winged Redstart *Phoenicurus erythrogaster*

A widespread species, of which a total of 246 ind. were counted. In September, it was common only at high altitude around Darabeg, in the Great Pamir proposed protected area, and around Shaur pass. At this time, only single individuals were seen in the riverine thickets around Goz Khun. The species was missing completely in the Great Pamir Valley east of the Jermasirt Steppe. After the first snowfall at the beginning of October, the species was commonly seen in the Wakhan valley in riverine vegetation and around thickets among cultivated land.

White-capped Water Redstart *Chaimarrornis leucocephalus*

One adult was at the mouth of the Istimoch river on 17th September. Two adult birds were seen at Fa Big, near Watsiroom, and 1 on the Sarhad River, on 30th. Six ind. were counted along a short stretch of the Sarhad River on 3rd October, and 2 were at Sargaz on 6th October.

Red-tailed Wheatear *Oenanthe (xanthoprymna) chrysopygia*

Two ind. were observed between Ishkashim and Khandud and 3 between Qala-i Panj and Goz Khun on 13th September. Three ind. were at Goz Khun on 15th. One was near Kret on 5th October.

Mountain Chiffchaff *Phylloscopus sindianus*

Mountain Chiffchaff can hardly be differentiated by plumage characters from Siberian Chiffchaff *Phylloscopus (collybita) tristis*, which is a common migrant in the area. Therefore, only singing birds were identified at species level. Five ind. were at Goz Khun on 13th September and 6 the following day. One was recorded at Sinin on 15th, and the last one at Dehqankhana on 3rd October. Chiffchaffs of either of the two species were observed virtually everywhere in larger riverine thickets.

Black-throated Accentor *Prunella atrogularis*

One ind. was seen at Chilqand on 4th October, 1 at Sarhad on 5th and at Sargaz 1 on 6th and 7th (presumably the same ind.). The species had not previously been recorded for the Wakhan, but could

even be a breeding bird in habitats similar to the *Hippophae* thickets at Chilqand.

Altai Accentor *Prunella himalayensis*

Six ind. were seen above Darabeg on 18th and 12 ind. in Shikargah Valley on 19th September.

Yellow-breasted Tit *Parus flavipectus*

Five ind. were recorded in the forest-like gardens in Ishkashim on 12th September, 3 at Goz Khun on 14th, 3 at Sinin on 16th, 1 at Dehqankhana on 3rd October, 1 at Chilqand on 4th, 3 at Kret on 5th, 3 in a small forest west of Khandud on 8th and 3 again in Ishkashim on 8th October.

Brandt's Mountain Finch *Leucosticte brandti*

A very numerous species with over 550 ind. recorded in total. More than half of these birds were observed in a few large flocks in the Shikargah proposed protected area. Other areas holding many Brandt's Mountain Finches were Darabeg and the Shaur pass.

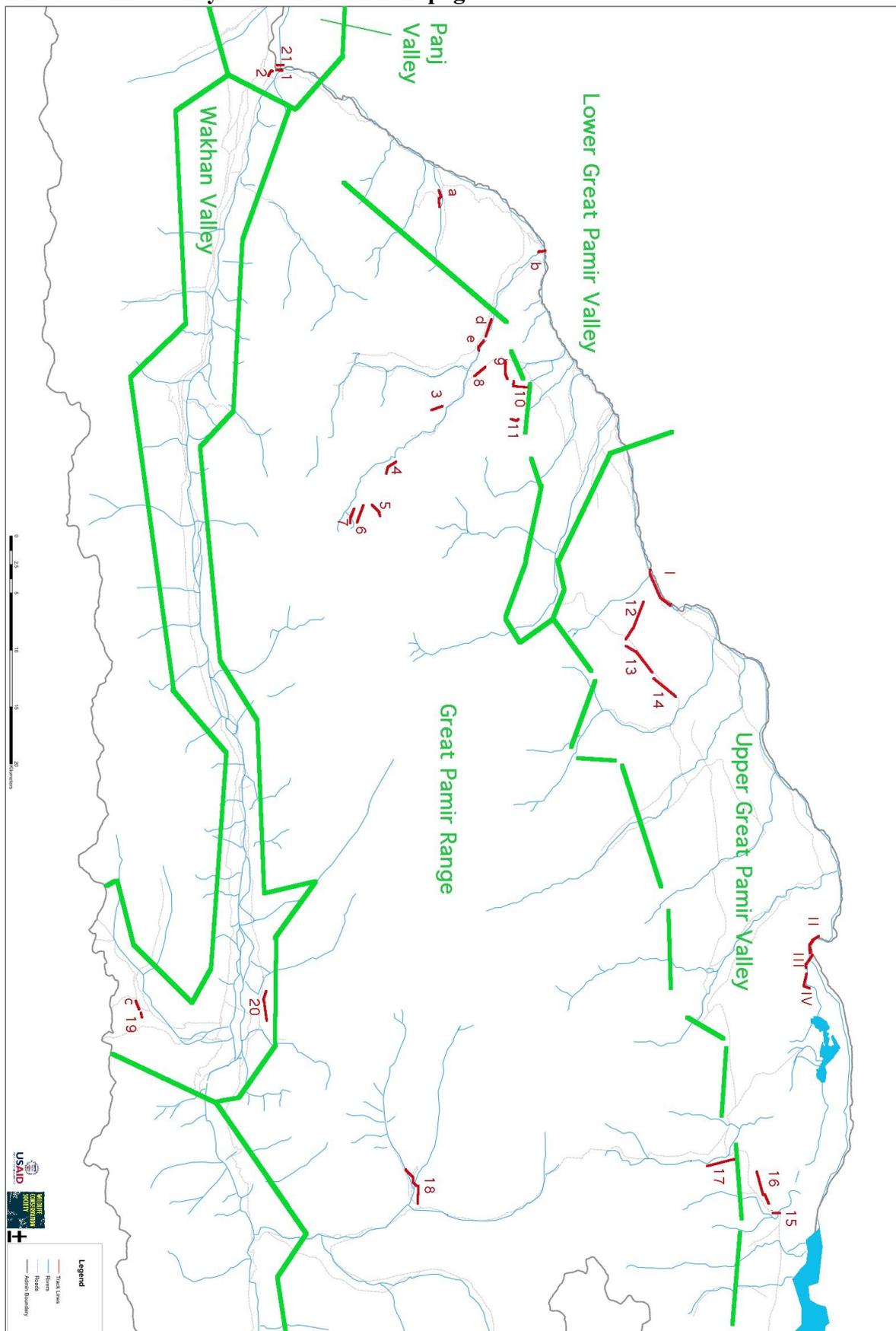
Great Rosefinch *Carpodacus rubicilla servertzovi*

One female-type bird was singing in the Shikargah proposed protected area on 19th September.

White-capped Bunting *Emberiza stewarti*

Three ind. at Sarhad-e Baroghil on 2nd October, 4 ind. at Chilqand on 4th, 3 ind. at Kret on 6th and 2 at Sargaz on 7th. The species had not previously been recorded in the Wakhan, but again, Chilqand and other areas in the Wakhan Valley might actually fit the species' habitat needs for breeding.

Study Area with Main Geographical Divisions and Localities of Standardised Bird Counts – key to localities on next page



Key to map (previous page)

Transects

- 1 Goz Khun
- 2 Goz Khun
- 3 Darabeg
- 4 between Darabeg and Shikargah
- 5 Shikargah, Chapdara
- 6 Shikargah, between Chap- and Rastdara
- 7 Shikargah, Rastdara
- 8 Qabalgar
- 9 Top of Qabalgar Pass
- 10 South of Tor Buloq
- 11 South of Nakhchirshitk
- 12 Jabar Khan to Ghormatek
- 13 Jabar Khan
- 14 Bai Tibut
- 15 Sar Maqur
- 16 Sar Maqur to lower Shaur
- 17 Shaur Valley
- 18 Watsirom to Fa Big
- 19 Dehqankhana
- 20 Chilqand
- 21 Goz Khun

Waterbird counts on rivers

- I Great Pamir River at Ghormatek
- II Great Pamir River at Beshkanak
- III Qarasu River, first section
- IV Qarasu River, second section

Counts along mountain streams

- a Sinin River
- b Istimoch River near mouth
- c Dehqankhana
- d Istimoch River, upper part (first section)
- e Istimoch River, upper part (second section)

Appendix 5:

Itinerary

<i>Date</i>	<i>Localities</i>
12 Sep 2007	Fayzabad – Ishkashim, observations in Ishkashim
13 Sep 2007	Ishkashim – Goz Khun,
14 Sep 2007	Goz Khun
15 Sep 2007	Goz Khun – Sinin
16 Sep 2007	Sinin – Istimoch
17 Sep 2007	Istimoch – Qabalgah – Darabeg
18 Sep 2007	Darabeg – Shikargah Chapdara
19 Sep 2007	Shikargah Chapdara – Rastdara – Darabeg
20 Sep 2007	Darabeg – Tor Buloq – Nakhchirshitk
21 Sep 2007	Nakhchirshitk – Alisu – Jabar Khan
22 Sep 2007	Jabar Khan, steppe and Great Pamir River
23 Sep 2007	Jabar Khan – Tulibay – Elghanak – Beshkanak
24 Sep 2007	Beshkanak – Ghaznikul lake – Ghaznikul camp
25 Sep 2007	Ghaznikul
26 Sep 2007	Ghaznikul camp – Zarkul – Qarajelgha
27 Sep 2007	Qarajelgha – Zarkul E end – Qarajelgha – Sar Maqur
28 Sep 2007	Sar Maqur – Shaur Valley
29 Sep 2007	Shaur Valley – Shaur Pass – Watsirom
30 Sep 2007	Watsirom – Fa Big – Chapdara – Sarhade Baroghil
01 Oct 2007	Sarhad-e Baroghil
02 Oct 2007	Sarhad-e Baroghil – Dehqankhana – Zartigar – Sarhade Baroghil
03 Oct 2007	Sarhad-e Baroghil – Chilqand – Sarhade Baroghil
04 Oct 2007	Sarhad-e Baroghil
05 Oct 2007	Sarhad-e Baroghil – Kret
06 Oct 2007	Kret – Sargaz – Kepkut
07 Oct 2007	Sargaz – Goz Khun
08 Oct 2007	Goz Khun – Ishkashim