

Working report of the project
«COMMUNITY BASED CONSERVATION AND MANAGEMENT OF MOUNTAIN UNGULATES IN TAJIKISTAN»

Assessment of population status of goitered gazelle or jeyran (*Gazella subgutturosa*) north of Kayrakkum Reservoir (Tajikistan, Sughd Oblast)



Prepared by:

Stefan Michel, CIM-Expert of the NGO "Nature Protection Team", Khorog, GBAO, Tajikistan

Abdusattor Saidov and Shahnoza Mirzobakhodurova, Institute for Zoology and Parasitology of the Academy of Sciences of the Republic of Tajikistan

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Table of Content

Introduction..... 3
Study area 4
Methods 6
Results 6
Information from stakeholders..... 10
Conclusions and recommendations..... 10
Acknowledgements..... 12
References 12

Introduction

The goitered gazelle or jeyran (*Gazella subgutturosa*) is included in the Red Book of the Tajik SSR (1988). In the IUCN Red List (Mallon 2008) the species is considered vulnerable: "Numbers were estimated at 120,000–140,000 in Mallon and Kingswood (2001) and the taxon has a very wide distribution across the Middle East and Asia. However, populations throughout the range are subject to illegal hunting and habitat loss. Declines are widely reported and continuing. The population in Turkmenistan has almost disappeared in recent years. The largest population in Kazakhstan, formerly numbering c. 20,000, has also drastically declined in the last few years. In Mongolia, a substantial proportion of the known global population remained until recently, but heavy poaching has wiped out almost all the large herds and cut the numbers by well over 50%. Overall the rate of decline is now estimated to have exceeded the figure of 30% over 10 years that qualifies for Vulnerable under criterion A2." In the Central Asian Republics of the former Soviet Union the species lost significant parts of its former range due to development of semi-deserts for cotton cultivation. In the Ferghana Valley the species is already extinct in Uzbekistan (oral information from various Uzbek scientists) and perhaps Kyrgyzstan (Mallon and Kingswood 2001 in Mallon 2008).



Fig. 1: Study area of gazelle assessment at the northern banks of Kayrakkum Reservoir

In Tajikistan according to NATIONAL BIODIVERSITY AND BIOSAFETY CENTER (2003) by the early 1990s the population of the goitered gazelle was estimated at 100-150. Due to poaching and habitat degradation ten years later, its population in the country was estimated not exceeding 80. At least two range areas are isolated from each other. One population exists in Southern Tajikistan, with a core area in the Zapovednik (strict reserve) Tigrovaya Balka and (potentially already extinct) in the Pyanj Karatau, and a second population in Northern Tajikistan, in Sughd Oblast, the Tajikistan part of the Ferghana Valley. The population in the latter area is the last surviving in a large area, including the Ferghana Valley of Uzbekistan and Kyrgyzstan and the Golodnaya Step in Uzbekistan and Kazakhstan, where due to development of irrigated agriculture and poaching the goitered gazelle is nowadays extinct.

The director of the Institute for Zoology and Parasitology of the Academy of Sciences of the Republic of Tajikistan, Abdusattor Saidov, initiated the conduction of a brief field assessment for identification of opportunities and needs for protection of the isolated and endangered population of goitered gazelles in Northern Tajikistan. This assessment was conducted from 17 till 19 December 2008 by the authors with private financing.

Study area

The study area consists of the hills and plains north of Kayrakkum Reservoir, at the right banks of the Syrdarya River in Tajikistan (see fig.1). The area actually surveyed was chosen on the basis of Ravshan Mirzoev's experience, inspector of the forestry agency Sughd, who guided the assessment team to the sides with highest likelihood of gazelle occurrence. The relief of the survey area is characterized by the Oqbel mountain range (up to 944 m) stretching along the Kayrakkum Reservoir from SW to NE and its foothills and alluvial plains, cut by several erosion gorges. In the South of the range a large plateau is surrounded by lower ridges. The soils are predominantly sandy-loamy with outcrops of rocks, in drain-less pans loamy-clayey. Due to soil texture and aridity most soils contain soluble salts in significant concentrations. The area does not have permanent water sources, except the Kayrakkum Reservoir. Streams in the mountains and hills as well as pools at clay pans are of temporal or seasonal character.

The vegetation of the study area is characterized by semi-desert vegetation dominated by semi-shrubs and shrubs. A schematic vegetation map is provided in fig. 2 (numbers referring to vegetation complexes shown in this map). The map and the following description are based on the digital Vegetation map of Kazakhstan and Middle Asia (within desert zone) in the scale of 1: 2,500,000.

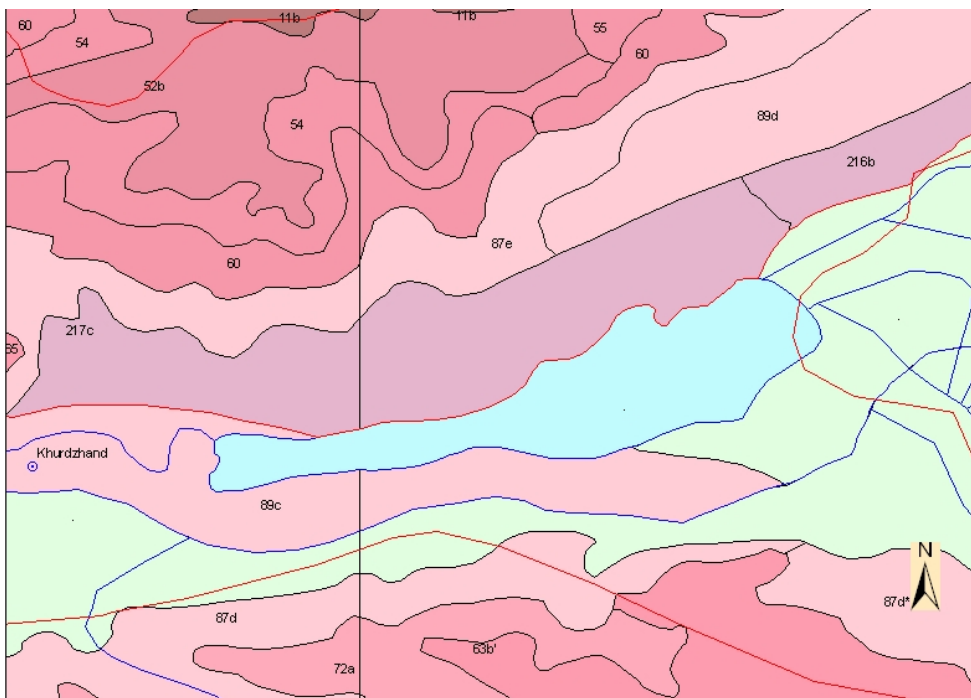


Fig. 2: Vegetation map of the study area and its surroundings (based on the digital Vegetation map of Kazakhstan and Middle Asia (within desert zone) in 1: 2 500 000 scale).

The vegetation types covering most of the study area are perennial saltwort communities with its predominance: Pelitophytic (plant communities growing on loamy soils) - 216. Ephemeroïd-perennial saltwort: b) *Salsola orientalis*, *Poa bulbosa*, *Artemisia diffusa*. And petrophytic (plant communities growing on stony soils and rocks) - 217. Series of ephemeroïd-sagebrush-perennial saltwort communities: c) *Salsola orientalis*, *S. arbusculiformis*, *S. gemmascens*, *Carex pachystylis*, *Poa bulbosa* with *Zygophyllum ferganense*. At the northern edges at plain relief dwarf semishrub-ephemeral-ephemeroïd low herb communities (*Poa bulbosa*, *Carex pachystylis*, *Artemisia spp.*, *Hammada*, *Ephemeræ*) dominate in two types - 87. Hemipetrophytic ephemeroïd-forb-sagebrush communities (*Artemisia spp.*, *Phlomis spp.*, *Poa bulbosa*, *Ephemeræ*), locally in combination with petrophytic shrub communities: e) *Artemisia namanganica*, with *Eremurus sogdianus*, *Cousinia microcarpa*, *Allochrusa paniculata* in combination with petrophytic shrub communities (West Tien Shan) and - 89. Hemihalophytic ephemeral-sagebrush-bulbous blue grass-ephemeroïd sedge communities with saltworts: d) with *Artemisia valida*, *Salsola sclerantha*.



Fig. 3 & 4: Habitat of goitered gazelle in the foothills of the Oqbel Range, at the shores of Kayrakkum reservoir. Photos: Stefan Michel.

Despite not explicitly mentioned in the vegetation map, the saxaul *Haloxylon ammodendron* plays an important role at many sites, locally forming woodlands of up to 3 m height. On the other hand large areas, in particular the clay pans are almost bare of vegetation.

The dominating land use in the area is livestock breeding. According to the inspector of the forest agency, RAVSHAN MIRZOEV about 2000 sheep and goats are grazing in the study area while the inspector of the Committee of environmental protection, GHAFURJON KARIMOV, estimates the number of small ruminants several times higher, at least seasonally. During the survey five livestock herds with animal numbers between 100 and 200 were observed. Among them at the hillsides close to the reservoir two herds of Angora goats were observed.

However, lack of permanent watering points away from the reservoir shore seems to limit the intensity of livestock grazing and, as far as visible, during the season of the assessment no signs of significant degradation of vegetation were registered.

Methods

The assessment was conducted by 4wd vehicle, in most cases using established car tracks. At three sites, foot walks were conducted for spotting gazelles from places not accessible by car. The surveys took place at three consecutive days, from noon till late evening. The survey routes were chosen by the local guide Ravshan Mirzoev based on accessibility of areas by car and likelihood of presence of the goitered gazelle. Thus the chosen survey areas do not fulfil the requirement of random selection and results should be taken as minimal numbers but not be extrapolated on the full survey territory.

Tracks of goitered gazelles were initially identified and interpreted by sex and age by RAVSHAN MIRZOEV, who observes the gazelles since many years in this area.

The survey team was equipped with binoculars 10x42 and a spotting scope 20-60x80. The survey route and points of observation were tracked by GPS. The length of tracks on the three days was 72 km, 82 km and 29 km respectively, in total 183 km. The visible stripe along the survey route varied due to relief and in some sections the car track run in a gorge, preventing the sight of animals. The actually surveyed area was therefore estimated based on topographic maps 1:100,000. The areas surveyed at the three consecutive days were 3,542 ha, 7,612 ha and 3,139 ha. The total surveyed area (overlapping areas counted only once) was 13,094 ha. The total actual and potential range areas were estimated on the basis of oral information, past observations by Shahnoza Mirzobakhodurova as well as observations and assessments of habitat suitability during the survey. The actual range area was estimated with 46,900 ha, under exclusion of the steepest part of the mountain ranges.

Results

The weather conditions varied during the survey time. The first day the heaven was covered by clouds but without precipitation, the temperature was 0°C and wind speed was 7 of western direction. The second day in the morning the ground was covered by about 2 cm snow. During the survey the distance of good sight 0.5 km, poor sight 1km. The ground was covered by 2.5 cm fresh snow; further slight snowfall affected the visibility of tracks. During the observation of one jeyran group at Suppetau in the late afternoon of 18 December 2008 the cloud cover was 8/8, wind speed 4 W, temperature -1°C, ground cover 3 cm fresh snow, no precipitation and good sight. The third day (19 December 2008) the heaven was completely covered by thin clouds, temperature was 0°C, and there was no wind, no precipitation and no significant snow cover.

During the survey in total 15 goitered gazelles in five groups were directly observed (incl. two animals possibly observed twice, GPS 35 and 361). Further at nine sites more or less fresh tracks and piles of faeces were found, belonging to 21 specimens (possible partly double counting with observed animals). The observed group size varied between one and seven animals, (average group size 3, median 2). The nine places with tracks or piles of faeces recorded also indicated group sizes of one to six specimens (average group size 3.5, median 3.5). For all groups, directly observed and tracks recorded, the average group size was 3.27, the median 3.

The density of observed jeyrans is with 0.11 per 100 ha survey area extremely low. Even under consideration of all tracks found the density would be only 0.27 per 100 ha survey area.

Only one group (point 42) could be observed for a longer time by using the spotting scope. The other groups were fleeing the vehicle or seen under poor light conditions. However, except three animals, the age and sex of the observed gazelles could be determined with sufficient confidence (see table 1). Among the identified specimen 46.7% were females, two (13.3%) were kids from 2008 and two were 1.5 years old males.

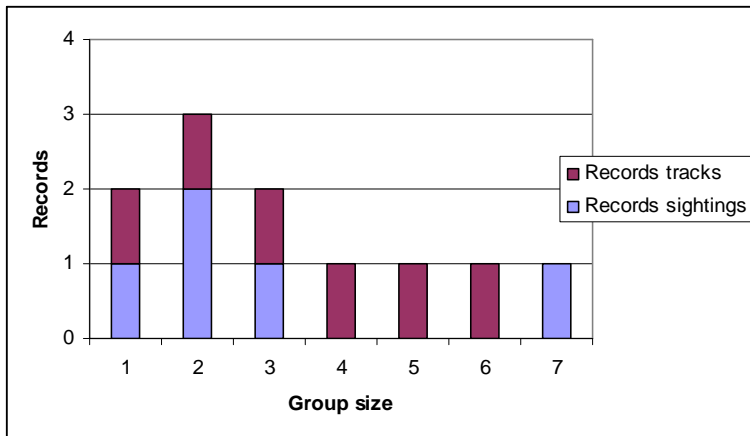


Fig. 5: Records of different group sizes.

Table 1: Composition of observed groups

GPS	Total number	Male unid. age	of	Male ad	Male 1.5 years	Female	Kids	unidentified
34	7				1	4	2	
35	2	1				1		
36	1							1
361	2							2
42	3				1	2		
Total	<u>15</u>	<u>1</u>		<u>0</u>	<u>2</u>	<u>7</u>	<u>2</u>	<u>3</u>



Fig. 6: Goitered gazelles (1 male 1.5 years, 2 adult females) at point 42. Photo: Stefan Michel.

RAVSHAN MIRZOEV as well determined age and partly even sex of gazelles from tracks (table 2). It is possible that some of the animals leaving the tracks have been as well recorded by observation. Point 28 is rather far from the other places of observation (4 - 9 km) but within several days the animals could easily have moved to another area. The tracks at points 29-32 could correspond to the animals observed at point 34, the tracks at point 55 - 57 to the animals observed the day before at point 36 and 361. While the tracks do not provide a completely reliable indication of the sex and age composition of the herds, the low percentage of kids from this year is confirmed.

Table 2: Composition of groups based on tracks

GPS	Total number	Male of unid. age	Male ad	Male 1.5 years	Female	Kids	Unidentif.	Age of track
28	3		1		2			7 days
29-32	4						4	fresh
40	6						6	fresh
55	1						1	fresh
56	5		1		2	2		fresh (+ old)
57	2						2	fresh (+ old)
Total	<u>21</u>		<u>2</u>		<u>4</u>	<u>2</u>	<u>13</u>	

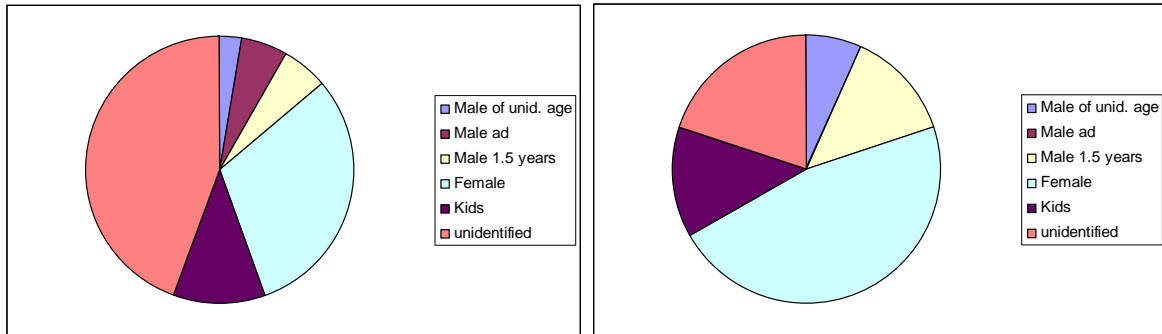
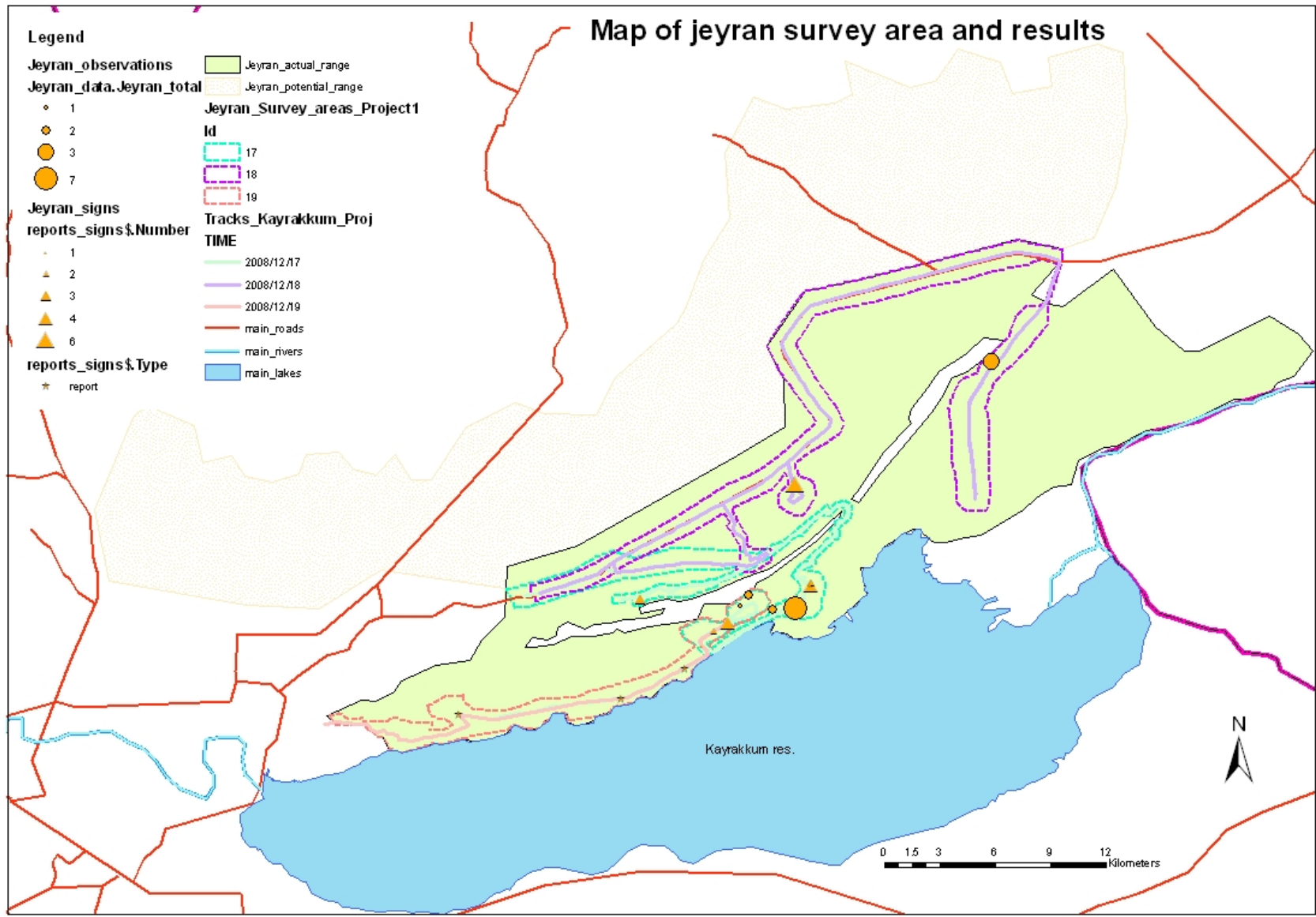


Fig. 7: Sex and age composition of all groups observed and tracks interpreted (left) and of observed groups (right).

The few observations made and tracks found during the assessment and the limitation on few days within one season allows only careful conclusions on habitat use by the goitered gazelle in the survey area. Jeyrans and tracks were found in areas of varying relief, ranging from alluvial plains and sand dunes at the bottom of hills to plateaus, slopes and small hillsides in rugged terrain. The vegetation cover varied between open areas with very few single shrubs and semi-shrubs at loamy pans and saxaul woodlands at sand dunes. Freshly used resting places were found at the top of a hill with good overview, according to RAVSHAN MIRZOEV a preferred relief type, as well as nearby at the bottom of an erosion gorge. It seems that rugged terrain and woodlands are preferred; while it was reported (MIRZOEV) that at the wide open and plain semi-deserts north of the survey areas goitered gazelle occur only sporadically and are considered almost absent.

The observed groups were seen at distances between 0.2 and 2 km from the observer and the car. The groups at 0.2 to 0.4 km distance immediately flew either into the saxaul woodland at the sand dunes or uphill into the hills. One group observed from the road at a distance of 0.4 km (fig. 6) did initially not flee, even when the car was stopped, but moved away at a leisurely pace when the observers left the car.

While the latter observation indicates, that at least this group was not hunted from car, the reaction of the other observed groups as well as tracks of an injured specimen indicate that poaching is threatening the population. Tracks of cars, of people with donkeys and dogs and empty cartridges as well indicate the movement of potential poachers in the area.



Information from stakeholders

During the field work the survey team was guided by RAVSHAN MIRZOEV (Ranger of Sughd Forestry). He estimates the goitered gazelle population in the area with about 30 animals. According to him poaching is the key limiting factor and the small numbers of juveniles and mature males is by his opinion immediately caused by poaching. After the birth season he observed higher numbers of kids than during the survey and the mortality during the first months is according to him caused by killing of the kids which are easier to hunt. Poaching happens at a plateau at the southern slopes of the Oqbel Range and at the trails between hills and the lake shore visited for drinking. The prevention of access to poachers by car to large areas would immediately significantly improve the protection status. In the near future a better control of the road along the northern shore of Kayrakkum Reservoir would prevent poaching at the trails to the watering points.

SADREDDIN SHARIFUTDINOV, Director of Agency for forestry and hunting management of the Republic of Tajikistan, Sughd forestry (Sughd Oblast, Khujand, Tel./fax +992-3422-63622, mob. +992-92-7771415) provided his point of view on the survival and necessary steps for protection of the gazelle population in the area. Even if the gazelle population survived the lawless time during and after the civil war, the present threat of poaching is significant. Most poachers are influential persons, "New Tajiks" and even collaborators of state security organs. Blocking access to some key areas may reduce the poaching by (30% to) 50%. Protection while passing to the watering points should be achieved by establishing of two check points with barriers at both sides of the road (i.e. from Sultonabad and from Asht) along the northern bank of the reservoir. The experience with so called "public inspectors" is mixed, as most of them tend to be either inactive or even to misuse the legitimating card for pursuing private nature utilization interests.

For the long term protection of the gazelle population in the area SADREDDIN SHARIFUTDINOV considers two options: A) The establishment of a strictly protected area (zapovednik). This would have the disadvantage that republican organs would be responsible for protection, which unlikely will be effective, while local people and organizations would have no stake in the protection of the area and the gazelles. B) Management of the area inhabited by the jeyran and of the entire northern banks of the Kayrakkum Reservoir as hunting concession. He is currently pursuing the establishment and formal registration of the NGO "Sayed – Association of Hunters, Fishers and nature lovers". This organization in future should become the manager of the area, which now belongs to the State land reserve and the Zone of flooding, i.e. does not have permanent official land-users. The management of the area should be financed from hunting fees for waterfowl and hares, in the long term perspective even special permits from the government for hunting on goitered gazelles might be thinkable.

Conclusions and recommendations

The data collected do not yet provide a precise estimate of the current population status of the goitered gazelle in Northern Tajikistan. The number of observed animals (15) and the number of tracks recorded (21) under consideration of potential repeated recording provides evidence about a minimum population of about 15-20 specimens. Under consideration of the only partial area coverage of the survey, the relief conditions making observations over large distances difficult, fleeing distances and poor sight conditions at one of the survey days the real population could be in the range of about 30 animals (0.064 per 100 ha) or slightly more. This population number is very low for an ungulate of this size, natural live expectancy and reproductive behaviour. As a general rule, conservationists believe that effective population sizes of 50 individuals are required for short-term conservation (say 10 years) and 500 individuals are needed for long-term conservation (say 100+ years) due to genetic, demographic, and environmental considerations.

More than the total population size, the sex and age structure of the observed groups provide serious reasons for concerns even about the short term survival of this jeyran population. Only two juvenile jeyran were recorded by direct observation and two by tracks, which even could be the same specimens due to the short distance between both points (4.3 km as the crow flies). Even if taken absolutely, four juveniles out of 36 records in total (11%) indicate a worrying low reproduction rate or extremely high mortality during the first summer. The low share of juveniles causes also concern as goitered gazelles regularly give birth to twins. PERELADOVA et al. (1998) found under semi-captive conditions in Uzbekistan that breeding success was correlated with meteorological conditions and was density-dependent. According to RAVSHAN MIRZOEV 2008 meteorological conditions were not

exceptional. The density of jeyrans in the area (observed 0.11 or 0.27 per 100 ha, estimated for the entire area 0.064 per 100 ha) is approximately one hundred times below the densities under which PERELADOVA ET AL. (1998) studied breeding success (11.3 to 23.8 per 100 ha). At the same time during the survey no adult males were directly reliable observed. The observation of groups containing of mature females, accompanied by young males of 1.5 years may together with the low number of juveniles indicate an acute shortage of mature males, causing a reproductive collapse of the population. In this situation mortality of remaining males due to poaching or natural incidents can cause the extinction of the population within few years.

Even if hunting is concentrated on waterfowl and hares, occasional and even targeted poaching of goitered gazelles is very likely. Direct evidence, reports from above mentioned stakeholders and the observed population structure indicate that poaching is the single important acute threat for the population and the key factor limiting its recovery. Further the likely over many years continuously low population numbers and high mortality in early age classes may have caused a genetic uniformity (genetic bottleneck) in the population which may have negative impacts on long term survival and recovery. The livestock presence currently found in the area does not seem to have a level threatening the gazelle population directly or limiting the population numbers. However, hunting pressure leads to high fleeing distances which cause that under shepherds' presence large areas can become effectively unusable for the gazelles.

Habitat conditions seem to be satisfactory and not a limiting factor. Access to water during the driest season is possible at the banks of Kayrakkum Reservoir, but is potentially a factor easing the access of poachers. Under proper protection the currently inhabited area of estimated 46.900 ha could be significantly extended and include all of the non-irrigated semi-desert lands of Sughd Oblast (approx. 97.100 ha). According to PERELADOVA ET AL. (1998) the semi-captive population in the Bukhara Breeding Centre in 1989 peaked at 1224 in 5126 ha (23.8 per 100 ha) of the reserve; in 1995 it was 580 (11.3 per 100 ha). Even under, compared to the enclosure in Bukhara, possibly worse habitat conditions in Sughd the potential population numbers in accordance to the habitat's carrying capacity here could be in the range of several thousand specimens of goitered gazelle.

The better understanding of the status of the jeyran population, its protection, recovery and potential future sustainable use some research and monitoring activities are recommended. The population numbers and sex and age structure should be monitored in annual surveys, preferably at the beginning of the winter season when animals are comparably easy to detect and juveniles can easy be distinguished from adults. The monitoring should be based on established transects or observation points covering representative or all significant areas. Utilization of high quality spotting scopes from points with good overview would provide more reliable data on sex and age composition of the groups. Additionally, immediately after the birth season, reproductive success should be assessed by direct observations. Comparison with the data from winter surveys would probably allow distinguishing low fecundity from juvenile mortality. Further it is recommended conducting genetic analysis from faecal samples. With the assistance of Ravshan Mirzoev, it should be easy to collect a representative number of fresh samples, preferably during the dry season as wetness destructs the DNA. The DNA analysis of faecal pellets allows estimates of the actual population numbers as well as the level of inbreeding and genetic diversity in the population.

The current critical condition of the jeyran population requires immediate action for protection if the risk of loosing should be reduced. Most urgent is the reduction of mortality caused by poaching, likely most important of mature males as well as of juveniles, which are both underrepresented in the groups observed. An activity of immediate effect would be the blocking of car access to important habitats. During the survey the digging of ditches at five sites was proposed and the effectiveness of the measure was confirmed by the head of the Sughd forestry agency and the inspector of Sughd Committee for environmental protection. It was decided to carry out these measures immediately with financing granted by Stefan Michel from the budget of NABU's (German Nature and Biodiversity Conservation Union) Federal Working Group Eurasia. For reducing poaching on gazelles approaching the banks of Kayrakkum Reservoir for drinking during the dry season, before the summer two barriers, controlled by inspectors, should be established and access especially at night be strictly controlled. Accompanying, some public awareness activities should be targeted on potential poachers as well as on local land users and villagers who could stop poachers from accessing the area.

In the midterm proper management of the actual jeyran habitats and the population should be established. The idea of the head of Sughd Forestry agency of establishing an association which would obtain the hunting rights

and management responsibilities or even the full land use rights of the area deserves full support. Assigning of official long term rights and responsibilities will allow the development of sustainable management approaches. In the short term it would be thinkable that the association may raise some donor funding for initial activities (e.g. management planning "okhotustroystvo"). Further, license fees for limited sport hunting (waterfowl, hares), sport fishing and provision of services for hunters and sport fishers can provide funds for protection activities benefiting the rehabilitation of the jeyran population. Under proper protection it is thinkable that both pheasant and goitered gazelle in the area can reach population levels providing the opportunity of strictly controlled hunting under exceptional permissions from the Government of Tajikistan. Incomes created by hunting fees should be shared for being immediately used for protection and management and for social development in communities in the vicinity of the jeyran habitats. In the long term it is thinkable that the goitered gazelle again inhabits all suitable semi-desert habitats in Tajikistan's part of the Ferghana Valley.

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