

**NATIONAL ACADEMY OF SCIENCES OF THE KYRGYZ REPUBLIC  
INSTITUTE OF BIOLOGY AND SOIL SCIENCES**

**REPORT ON VERTEBRATE WILDLIFE CENSUS AT THE KUMTOR MINE  
AND ON ADJOINING AREA 2017**



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## **Introduction**

The Kumtor deposit is located on the northern slope of the Ak-Shyirak mountain range in the Kumtor River basin, the left tributary of the Taragay River, at the elevation of 3685-3780 m above sea level. Road to the deposit runs through the Barskoon gorge.

To assess impact of the Kumtor mine operations on vertebrate fauna, wildlife censuses were conducted every month during 3-5 days recording species and group sizes of animals observed, as well as movement of animals through the mine site and adjoining area. Objective of wildlife censuses also included identification of indicator (endemic, rare and listed in the KR Red Book) species.

## **Purpose: Vertebrate wildlife census at the Kumtor mine and on adjoining area**

### **Objectives:**

1. Assessment of quantity of animals, as a basis for monitoring the condition of natural systems. Identification of species composition of the population of vertebrate animals, distribution by habitats, characteristics of stay at habitats, abundance of species (population density), common species, population trends (natural dynamics);
2. Assessment of impact of the mine's activity on vertebrate animals, especially on protected species – rare, endemic, endangered, listed in the Red Book species;
3. Identification of especially valuable habitats – areas of mass reproduction of specially protected species, foraging areas, rest areas of migratory species, migration routes (also identified outside the mine);
4. Identification of animal species especially sensitive to the mine's operations.

### **Methods of vertebrate wildlife census:**

During the vertebrate wildlife censuses, we also considered the following factors: sex attributes, sexual behavior of individuals in the population and forms of sexual dimorphism; sex ratio in the population and in individual families; onset of sexual maturity; features of individual development; lifetime of individuals; mortality in different age groups; number of young animals in litters.

Wildlife census was conducted on the pre-determined transects where location (start and end of transect) was recorded by the GPS-navigator. 10-zoom binoculars and 60-zoom telescope were used to identify to species level and count animals. The most common method of route

census was used to count birds. Our wildlife census was conducted from vehicle driving at a speed convenient for us along the pre-determined route passing through all the main habitats and facilities of the mine. We counted all birds observed on the census route, identified the birds by sounds or visual signs, regardless of the distance to them. All birds were identified to species level. All data were recorded in a census notebook. When signs of vital activity of mammals (burrows, tracks, excrements, etc.) were found, mammals were identified to species level. However, in many cases, presence of mammals on site was visually observed. Presence of individual animal species was recorded by various signs of their stay – paw prints on snow or ground, food remnants, flocks or feathers, paths, burrows and lairs, etc. Paw prints were classified by size into large with length of more than 5 cm (wolf, snow leopard), medium - at least 2 cm (marmots) and small – less than 2 cm (mouse-like mammals). The following parameters were recorded during each wildlife census:

- Date and time of wildlife census
- Location
- Weather (sunny, cloudy)
- Intensity of wind (weak, moderate, strong)
- Presence or absence of precipitation
- GPS coordinates.

**In addition, an aerial census was conducted with the use of a quadcopter DJI Inspire 2, X5S.** The apparatus flew around the areas of possible wildlife habitats and after that made photo and video recordings of the identified habitats.

Census works were conducted every month during several days throughout the year. Number of visits to site was 32 days.

The wildlife census was conducted on transects. In total, 12 transects were set up. Distribution of vertebrate animals was assessed according to certain criteria (see annex). Group sizes of observed birds and mammals were recorded in a special wildlife census record sheet (see annex).

### **Description of transects:**

#### **Within the mine**

**Transect 1** – this census area includes the Tailings Management Facility. The eastern, southern and western parts are a mad-made TMF wall with no vegetation cover. The northern part represents a steppe type of vegetation where mainly fescue-calamagrostis association (*Festuca alata* + *Calamagrostis tianschanica*) grows.

Coordinates of transect 1.

Item	North latitude	East longitude	Elevation above sea level
1	41°54'02.60"	78°07'55.61"	3672
2	41°54'20.08"	78°08'30.09"	3657
3	41°54'27.16"	78°09'01.86"	3657
4	41°54'44.18"	78°09'55.23"	3668
5	41°54'13.26"	78°09'59.59"	3669
6	41°35'46.78"	78°09'54.85"	3672
7	41°53'37.16"	78°08'41.42"	3640

**Transect 2** – this census route runs from the Kumtor bridge along the middle diversion ditch to the K-15 Security Check point. Steppe type of vegetation characterizes this habitat. Vegetation formation is presented by Fescue alata ( *Festuca alata* + *Poa litvinoviana*). Floristic composition is presented by fescue-bluegrass association. Some areas are affected by the production activity. In general, the habitat and the selected route are optimal for wildlife census.

Coordinates of transect 2.

Item	North latitude	East longitude	Elevation above sea level
1	41°53'43.15"	78°10'24.79"	3668
2	41°54'57.78"	78°10'26.83"	3700
3	41°54'47.90"	78°08'36.9"	3712
4	41°53'31.95"	78°08'09.56"	3633

**Transect 3** – this census route runs from the Camp to the Mill. Steppe and cushion type of vegetation characterizes this habitat. Vegetation formation is presented by Sibbaldia tetrandra ( *Sibbaldia tetrandra*). Floristic composition is presented by sibbaldia-fescuegrass association. Vegetation formation of saxifrage is presented by *Saxifraga hirculus*. Some areas of mixed vegetation formation are affected by the production activity. In general, the habitat and the selected route are optimal for wildlife census.

Coordinates of transect 3.

Item	North latitude	East longitude	Elevation above sea level
1	41°53'05.21"	78°09'54.50"	3670
2	41°52'27.84"	78°10'13.32"	3902
3	41°51'41.48"	78°11'27.36"	4000

**Transect 4** – this census route runs from the Camp to the Kichi-Sarytor gorge. Grassland and steppe type of vegetation characterizes the habitat where mainly edge-cobresia association grows. In general, the area of mixed vegetation formation is affected by the production activity, and only a small part remains unaffected. In general, the habitat and the selected route is suitable for wildlife census.

Coordinates of transect 4.

Item	North latitude	East longitude	Elevation above sea level
1	41°53'05.21"	78°09'54.50"	3670
2	41°52'42.91"	78°09'23.67"	3663
3	41°52'17.25"	78°07'29.36"	3620
4	41°51'20.18"	78°09'34.16"	3931

**Transect 5** – this census route runs from the Kichi-Sarytor gorge through the airport area to the Central Warehouse. Grassland and steppe type of vegetation characterizes the habitat where mainly sedge-cobresia and fescue associations grow. The area is affected by the production activity. In any case, the selected area is suitable for wildlife census.

Coordinates of transect 5.

Item	North latitude	East longitude	Elevation above sea level
1	41°52'11.68"	78°08'25.49"	3667
2	41°53'14.05"	78°08'45.99"	3638
3	41°53'02.66"	78°09'35.00"	3664

**Transect 6** – this census route runs from the Water Treatment Plant to the upper reaches of the Lysyi gorge. Steppe type of vegetation characterizes this habitat. Vegetation formation is presented by Fescue alata (Festuca alata + Poa litvinoviana). Some areas are affected by the production activity. In general, the habitat and the selected route are optimal for wildlife census.

Coordinates of transect 6.

Item	North latitude	East longitude	Elevation above sea level
1	41°53'33.46"	78°10'27.31"	3674
2	41°53'30.19"	78°11'37.00"	3726
3	41°53'13.64"	78°12'15.20"	3807
4	41°."	78°."	36
5	41°."	78°."	36

**Transect 7** – this census route runs from the Lysyi gorge to the headwaters of the Kumtor River. The habitat is presented by steppe and cryolithophyton. The steppe is presented by lyme grass (*Elymus tschimganicus*). Floristic composition is presented by lyme grass-motley association. On the left side of the route, the areas are significantly affected by the production activity. The Petrov Lake moraines are not affected. In general, the habitat and the selected route are optimal for wildlife census.

Coordinates of transect 7.

Item	North latitude	East longitude	Elevation above sea level
1	41°53'32.84"	78°11'44.79"	3734
2	41°54'03.54"	78°13'20.95"	3747
3	41°54'12.73"	78°12'15.07"	3699
4	41°54'38.77"	78°12'39.75"	3717

**Transect 8** – this census route runs from the headwaters of the Kumtor River to the Biodegradable Waste Processing Plant. Wildlife census at this area is conducted on the right side of the Kumtor River where slopes are presented by saz steppe vegetation. Mainly sedge-cobresia association grows at this area. The slope is not affected by the production activity. The selected habitat is optimal for wildlife census.

Coordinates of transect 8.

Item	North latitude	East longitude	Elevation above sea level
1	41°54'38.77"	78°12'39.75"	3717
2	41°54'12.60"	78°11'29.33"	3683
3	41°54'17.94"	78°10'32.64"	3688

**Transect 9** – this census route runs from the Upper Diversion Ditch. Saz steppe and cushion type of vegetation characterizes this habitat, where mainly black-flowered sedge (*Carex melanantha*) and sabbaldia-motley association (*Sibbaldia tetrandra* + *Festuca coelerescens* + *Poa lipskyi*) grow. Floristic composition is presented by sedge and sabbaldia-motley association. In general, the area of mixed vegetation formation is not affected by the production activity. The habitat and the selected route are good for wildlife census.

Coordinates of transect 9.

Item	North latitude	East longitude	Elevation above sea level
1	41°54'07.23"	78°07'46.84"	3702

2	41°55'59.99"	78°08'49.84"	3790
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### Outside the mine

**Transect 10** – this census route runs from the K-15 Security Checkpoint to the substation. Vegetation is presented by meadows, bluegrass formation (*Poa pratensis*), bluegrass and iris association (*Poa pratensis* + *Iris ruthenica*). Floristic composition is bluegrass and iris association. Vegetation type is sazes, presented by stenocarpous cobresia formation (*Kobresia stenocarpa*), cobresia-sedge association (*Kobresia humilis* + *C. melanantha*). Floristic composition is cobresia-sedge association. In general, vegetation cover is affected by uncontrolled grazing of livestock. The habitat and the selected route are good for wildlife census. Coordinates of transect 10.

Item	North latitude	East longitude	Elevation above sea level
1	41°53'18.54"	78°07'43.65"	3637
2	41°50'45.14"	77°48'03.99"	3758

**Transect 11** – this census route runs from the substation through the Sook pass to the Taragay River Bridge. Steppe and cushion type of vegetation characterizes this habitat. Vegetation formation is presented by Fescue alata (Festuca alata + Poa litvinoviana) and included in floristic composition of fescue-bluegrass association, and sabbaldia tetrandrous (Sabbaldia tetrandra), and included in floristic composition of sabbaldia-fescue association. In general, vegetation cover is affected by uncontrolled grazing of livestock. The habitat and the selected route are good for wildlife census.

Coordinates of transect 11.

Item	North latitude	East longitude	Elevation above sea level
1	41°49'46.68"	77°45'31.68"	3809
2	41°46'46.32"	77°45'40.97"	4008
3	41°40'31.97"	77°49'53.45"	3330

**Transect 12** – this census route runs from the Taragay River Bridge to the K-15 Security Checkpoint. Vegetation is presented by meadows, bluegrass formation (*Poa pratensis*), bluegrass and iris association (*Poa pratensis* + *Iris ruthenica*). Floristic composition is bluegrass and iris association. Vegetation type is sazes, presented by stenocarpous cobresia formation (*Kobresia stenocarpa*), cobresia-sedge association (*Kobresia humilis* + *C. melanantha*). Floristic composition is cobresia-sedge association. In general, vegetation cover is affected by

uncontrolled grazing of livestock. The habitat and the selected route are good for wildlife census.

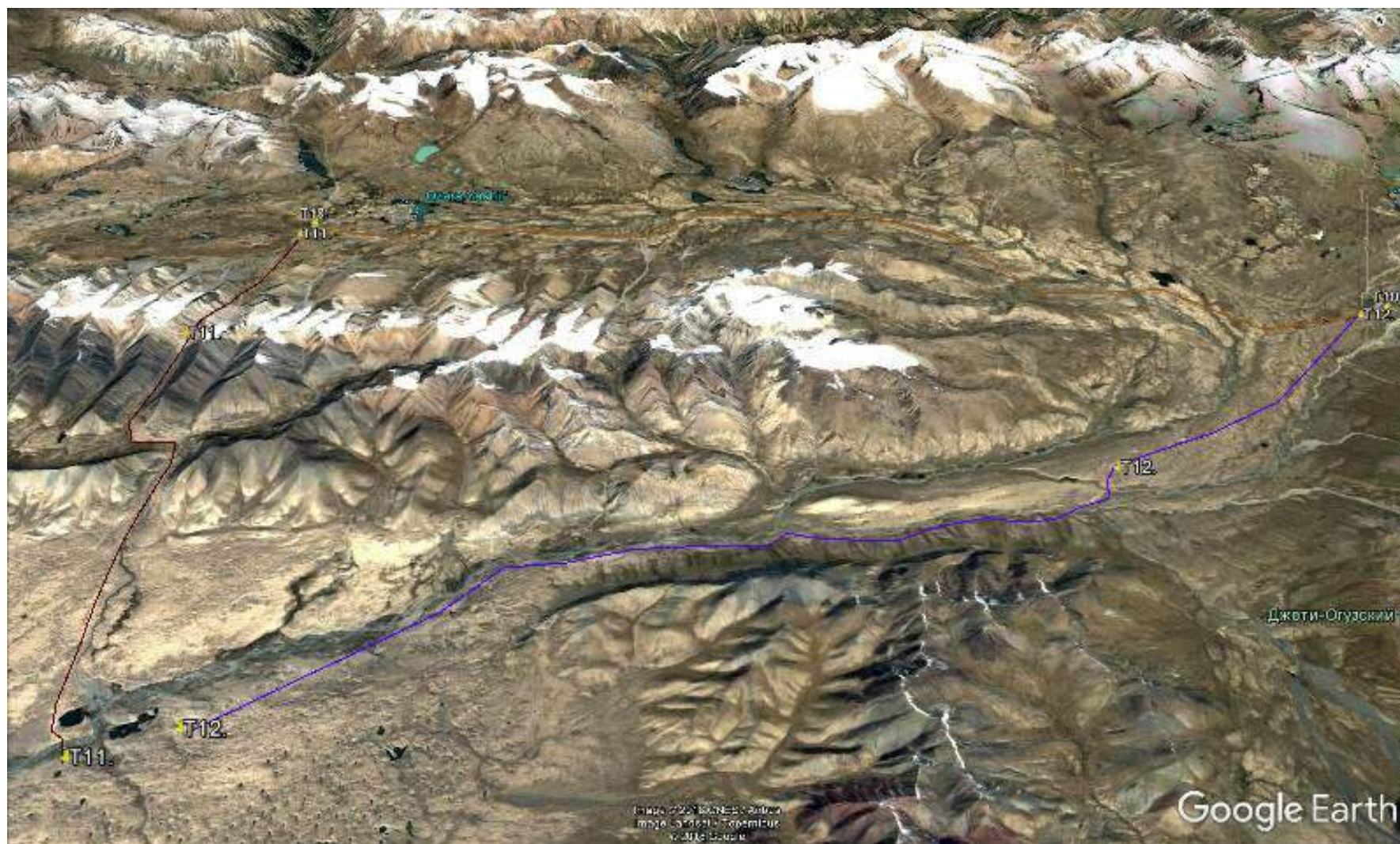
Coordinates of transect 12.

Item	North latitude	East longitude	Elevation above sea level
1	41°40'34.84"	77°50'20.57"	3314
2	41°48'14.40"	78°03'02.35"	3535
3	41°52'22.62"	78°05'56.55"	3642

Map of wildlife census route (transect) on site



Map of wildlife census route (transect) outside the mine on adjoining area



**Table 1.****Number of census days by months and census dates**

Year	2017 year												
Month	January	February	March	April	May	June	July	August	September	October	November	December	Total
Dates	21-27 01.2017	22-23 02.2017	25-27 03.2017	10-12 04.2017	27-28 05.2017	21-24 06.2017	15-16 07.2017	–	03-04 09.2017	13-15 10.2017	05-6 11.2017	8-10 12.2017	32 days
Hours	70	20	30	20	20	40	20	0	20	30	20	30	312 hours

As seen from the Table 1, the total number of visits to the mine was 32 days and 312 hours. In general, wildlife censuses were conducted during daylight hours. Censuses of predators were conducted at night. Given that wolves are most active mainly at nighttime, wildlife censuses were conducted at night at the same time when preventive measures to keep wolves away from the mine's area were taken to avoid attacks of predators on employees. At the same time, daily activity of mountain sheep was studied. Based on results of our observations species and quantity of birds and mammals observed were grouped by months (see tables 2, 3). During the entire period of observations, a total of 59 bird species was recorded (see table 6), including 4130 individuals at the mine and 1974 individuals on adjoining area, belonging to 8 orders and 18 families (see table 2). A total of 4 mammal species was recorded at the Kumtor mine and on adjoining area, including 1389 individuals at the mine and 608 individuals on adjoining area, belonging to 4 orders and 4 families (see table 3).

Table 2.

Classification	Group size	Quantity of species
<b>Order - Podiceps</b>	<b>1</b>	
<b>Family - Podicipidae</b>	<b>1</b>	<b>2</b>
<b>Order - Ciconiiformes</b>	<b>1</b>	
<b>Family - Ardeidae</b>	<b>1</b>	<b>2</b>
<b>Order - Anatidae</b>	<b>1</b>	
<b>Family - Anatinae</b>	<b>1</b>	<b>10</b>
<b>Order - Carnivora</b>	<b>1</b>	
<b>Family - Accipitridae</b>	<b>1</b>	<b>4</b>
<b>Family - Falconidae</b>	<b>1</b>	<b>2</b>
<b>Order - Charadriiformes</b>	<b>1</b>	
<b>Family - Charadriidae</b>	<b>1</b>	<b>6</b>
<b>Family - Laridae</b>	<b>1</b>	<b>2</b>
<b>Order - Strigiformes</b>	<b>1</b>	
<b>Family – Owlsh</b>	<b>1</b>	<b>1</b>
<b>Order - Coraciiformes</b>	<b>1</b>	
<b>Family - Upupidae</b>	<b>1</b>	<b>1</b>
<b>Order - Passeriformes</b>	<b>1</b>	
<b>Family - Alaudidae</b>	<b>1</b>	<b>2</b>
<b>Family - Hirundinidae</b>	<b>1</b>	<b>1</b>
<b>Family - Motacillidae</b>	<b>1</b>	<b>4</b>
<b>Family - Lanius</b>	<b>1</b>	<b>1</b>
<b>Family - Accentor</b>	<b>1</b>	<b>2</b>
<b>Family - Turdidae</b>	<b>1</b>	<b>7</b>
<b>Family - Sylviidae</b>	<b>1</b>	<b>1</b>
<b>Family – Fringillidae</b>	<b>1</b>	<b>3</b>
<b>Family - Ploceidae</b>	<b>1</b>	<b>1</b>
<b>Family - Sturnus</b>	<b>1</b>	<b>1</b>
<b>Family – Corvidae</b>	<b>1</b>	<b>6</b>

Table 3.

Classification	Group size	Quantity of species
<b>Order - Carnivora</b>	<b>1</b>	
<b>Family - Canidae</b>	<b>1</b>	<b>2</b>
<b>Order - Artiodactyla</b>	<b>1</b>	
<b>Family - Bovidae</b>	<b>1</b>	<b>2</b>
<b>Order - Rodentia</b>	<b>1</b>	
<b>Family - Sciuridae</b>	<b>1</b>	<b>1</b>
<b>Order - Lagomorpha</b>	<b>1</b>	
<b>Family - Leporidae</b>	<b>1</b>	<b>1</b>

**Table 4.****Species and quantity of birds observed by months**

<b>Month</b>	<b>Quantity of species</b>		<b>Total individuals</b>	
	<b>On site</b>	<b>Adjoining area</b>	<b>On site</b>	<b>Adjoining area</b>
<b>January</b>	<b>7</b>	<b>-</b>	<b>405</b>	<b>-</b>
<b>February</b>	<b>2</b>	<b>2</b>	<b>97</b>	<b>15</b>
<b>March</b>	<b>22</b>	<b>5</b>	<b>512</b>	<b>138</b>
<b>April</b>	<b>23</b>	<b>6</b>	<b>818</b>	<b>259</b>
<b>March</b>	<b>22</b>	<b>5</b>	<b>512</b>	<b>138</b>
<b>April</b>	<b>23</b>	<b>6</b>	<b>818</b>	<b>259</b>
<b>May</b>	<b>10</b>	<b>11</b>	<b>231</b>	<b>93</b>
<b>June</b>	<b>14</b>	<b>17</b>	<b>228</b>	<b>167</b>
<b>July</b>	<b>14</b>	<b>12</b>	<b>93</b>	<b>122</b>
<b>August</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>
<b>September</b>	<b>19</b>	<b>16</b>	<b>236</b>	<b>379</b>
<b>October</b>	<b>18</b>	<b>14</b>	<b>844</b>	<b>801</b>
<b>November</b>	<b>16</b>	<b>-</b>	<b>484</b>	<b>-</b>
<b>December</b>	<b>8</b>	<b>-</b>	<b>182</b>	<b>-</b>
<b>Total</b>	<b>58</b>	<b>50</b>	<b>4130</b>	<b>1974</b>

**Table 5.****Species and quantity of mammals observed by months**

<b>Month</b>	<b>Quantity of species</b>		<b>Total individuals</b>	
	<b>On site</b>	<b>Adjoining area</b>	<b>On site</b>	<b>Adjoining area</b>
<b>January</b>	<b>4</b>	<b>1</b>	<b>145</b>	<b>7</b>
<b>February</b>	<b>3</b>	<b>1</b>	<b>58</b>	<b>6</b>
<b>March</b>	<b>4</b>	<b>-</b>	<b>32</b>	<b>-</b>
<b>April</b>	<b>3</b>	<b>2</b>	<b>144</b>	<b>181</b>
<b>May</b>	<b>2</b>	<b>1</b>	<b>89</b>	<b>31</b>
<b>June</b>	<b>4</b>	<b>2</b>	<b>139</b>	<b>141</b>
<b>July</b>	<b>3</b>	<b>2</b>	<b>121</b>	<b>195</b>
<b>August</b>	<b>—</b>	<b>—</b>	<b>—</b>	<b>—</b>
<b>September</b>	<b>4</b>	<b>1</b>	<b>127</b>	<b>25</b>
<b>October</b>	<b>2</b>	<b>1</b>	<b>214</b>	<b>22</b>
<b>November</b>	<b>3</b>	<b>-</b>	<b>129</b>	<b>-</b>
<b>December</b>	<b>3</b>	<b>-</b>	<b>191</b>	<b>-</b>
<b>Total</b>	<b>4</b>	<b>4</b>	<b>1389</b>	<b>608</b>

## Birds on site

January - 21.01.2017

**7 bird species consisting of 405 individuals were recorded on site in January.**

<ul style="list-style-type: none"><li>• Common Raven – During two census days, 227 individuals were recorded mainly at the Landfill area and on adjoining areas. That is 113 birds were recorded every day. The largest group of Ravens was recorded on the transect 1.</li><li>• Alpine Chough – During two census days, 20 individuals were recorded, 10 individuals were recorded every day. This species was observed mainly on the transect 1, at the landfill area. Small number was observed on the transects 3, 4.</li><li>• Red-billed Chough – During two census days, 69 individuals were recorded, 34 birds were recorded every day. The main mass was observed at the Landfill area, on the transect 1, and 2-3 individuals were recorded on the transects 3, 5, 6.</li><li>• Brandt's Rosy-Finch – In total, 64 individuals were recorded. During two census days, 32 birds were recorded. These birds prefer to feed on steppe areas with a good grassland vegetation. This species was observed on the transects 1, 3, 6.</li></ul>	<ul style="list-style-type: none"><li>• Snow Finch – 16 individuals were recorded. During two census days, 8 birds were recorded every day. This species was observed mainly on construction facilities and on the transects 1, 3, 4, 6.</li><li>• Horned Lark – 5 individuals were recorded on steppe areas on the transect 1. In winter, this species is rare, because the main mass migrate to downstream areas with the less snow cover.</li><li>• Black-throated Thrush – 1 individual was recorded on the transect 5 at the Warehouses area. In summer and winter, this species is extremely rare at these areas. Possibly, this bird stopped there for a temporary rest during migration.</li></ul>
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Distribution of birds into ecological groups is as follows: birds of steppes – Horned Lark, birds of forest - Black-throated Thrush, birds of rocks and talus – Common Raven, Alpine Chough, Red-billed Chough, Brandt's Rosy-Finch and Snow Finch. Among them, seven species are sedentary according to distribution by habitats (see table 6).

**February 22-23.02.2017**

**2 bird species consisting of 97 individuals were recorded on site in February. 2 species consisting of 15 individuals were recorded outside the mine on adjoining area.**

<b>22.02.2017</b>	
<ul style="list-style-type: none"> <li>Common Raven – During the first census day a total of 90 individuals was recorded. The largest group was recorded on the transect 1 at the Landfill area. In addition, small groups of this species were observed on the transects 2, 3, 4, 5, 6, 7.</li> </ul>	<ul style="list-style-type: none"> <li>Red-billed Chough – In total, 7 species were recorded. All the birds observed were recorded on the transect 1 at the Landfill area.</li> </ul>
<b>23.02.2017</b>	
<ul style="list-style-type: none"> <li>Common Raven– In total, 10 species were recorded on the transect 9 outside the mine on adjoining area. The birds mostly prefer steppe areas closer to roadways.</li> </ul>	<ul style="list-style-type: none"> <li>Red-billed Chough – 5 species were recorded on adjoining area. All the birds observed were recorded on the transect 9.</li> </ul>

Distribution of birds into ecological groups is as follows: birds of rocks and talus – Common Raven and Red-billed Chough. Among them, 2 species are sedentary according to distribution by habitats (see table 6).

**22 bird species consisting of 512 individuals were recorded on site in March. 5 species consisting of 138 individuals were recorded outside the mine on adjoining area.**

<b>25.03.2017.</b>	
<ul style="list-style-type: none"> <li>Alpine Chough – In total, 38 species were recorded mainly on the transect 1 at the Landfill area. Small groups were recorded on another transects 4, 6, 7.</li> <li>Rook – 30 species were recorded. All the birds observed were recorded on the transect 1 at the Landfill area.</li> <li>Common Raven – In total, 121 individuals were</li> </ul>	<ul style="list-style-type: none"> <li>Northern Pintail – 3 species were recorded on the transect 1 at the TMF.</li> <li>Mallard – 2 species were recorded on the transect 1 at the TMF.</li> <li>Hoopoe – During the migration period 1 individual was</li> </ul>

<p>recorded. The largest group was recorded on the transect 1 at the Landfill area. Small groups were recorded on all transects.</p> <ul style="list-style-type: none"> <li>• Alpine Chough – 17 individuals were recorded. The largest group was recorded on the transect 3.</li> <li>• Red-billed Chough – In total, 12 individuals were recorded. All the birds observed were recorded on the transect 4.</li> <li>• Magpie – 1 individual was recorded on the transect 5 at the Central Warehouse area.</li> <li>• Snow Finch – In total, 10 individuals were recorded. 5 birds were recorded on the transect 3. 5 birds were recorded on the transect 5 at the Central Warehouse area.</li> <li>• Brandt's Rosy-Finch – In total, 30 individuals were recorded on steppe areas on the transect 3 along the Tailings Pipeline before the Mill.</li> <li>• Teal – 4 individuals were recorded on the transect 1 at the TMF.</li> </ul>	<p>recorded on the transect 2.</p> <ul style="list-style-type: none"> <li>• Water Pipit – 1 individual was recorded on the transect 6 at the Explosives Magazine area.</li> <li>• Guldenstadt's Redstart – 1 individual was recorded on the transect 6 at the Explosives Magazine area.</li> <li>• Turkestan Shrike – 1 individual was recorded on the transect 5 at the Central Warehouse area.</li> <li>• White Wagtail – 1 individual was recorded on the transect 2.</li> <li>• Common Starling – 1 individual was recorded on the transect 1 at the Landfill area.</li> </ul>
<b>26.03.2017.</b>	
<ul style="list-style-type: none"> <li>• Common Raven – During the second census day, 159 individuals were recorded. The largest group was recorded on the transect 1 at the Landfill area. Small groups were recorded on all transects.</li> <li>• Rook – 22 species were recorded on the transect 1 at the Landfill area.</li> <li>• Alpine Chough – 12 species were recorded on the transect 1 at the Landfill area.</li> <li>• Brandt's Rosy-Finch – 22 individuals were recorded on the transect 7 at the steppe areas.</li> <li>• Snow Finch – 10 individuals were recorded on the transect 5 at the Central Warehouse area.</li> <li>• Horned Lark – 20 individuals were recorded on the transect 2 at the steppe areas on the northern</li> </ul>	<ul style="list-style-type: none"> <li>• Plover – 1 individual was recorded on the transect 1 at the TMF TD5 observation point area.</li> <li>• Mallard – 1 individual was recorded on the transect 1 at the TMF.</li> <li>• Northern Pintail – During the morning monitoring, 1 carcass was recorded at the TMF.</li> <li>• Guldenstadt's Redstart – In total, 5 individuals were recorded. 2 individuals were recorded on the transect 6 and 3</li> </ul>

<p>side.</p> <ul style="list-style-type: none"> <li>• Black Redstart – 1 individual was recorded on the transect 3 at the Tailings Pipeline area.</li> <li>• Crested Lark – 1 individual was recorded on the transect 2.</li> </ul>	<p>individuals were recorded on the transect 3.</p> <ul style="list-style-type: none"> <li>• Red-billed Chough – all 12 individuals were recorded on the transect 3 at the Camp area.</li> </ul>
<b>27.03.2017.</b>	
<ul style="list-style-type: none"> <li>• Common Raven – In total, 108 individuals were recorded. The largest group was recorded on the transect 1, also small groups were recorded on all transects.</li> <li>• Alpine Chough – 17 individuals were recorded on the transects 1, 3, 4.</li> <li>• Rook – all 12 individuals were recorded on the transect 1 at the Landfill area.</li> <li>• Red-billed Chough – 2 individuals were recorded on the transect 3 opposite to the Camp.</li> <li>• Horned Lark – 2 individuals were recorded on the transect 2.</li> <li>• Snow Finch – 2 individuals were recorded on the transect 3 at the Camp area.</li> <li>• Brandt's Rosy-Finch – 20 individuals were recorded on the transect 6 at the Explosives Magazine area.</li> </ul>	<ul style="list-style-type: none"> <li>• Northern Pintail – 21 individuals were recorded on the transect 1 at the TMF.</li> <li>• Teal – During migration period, 35 individuals were recorded on the transect 1 in the TMF open water.</li> <li>• Mallard – 16 individuals were recorded at the same area on the transect 1 in the TMF open water.</li> <li>• Grey Heron – 4 individuals were recorded on the transect 1 on the TMF dry beach.</li> <li>• Ruddy Shelduck – 1 individual was recorded on the transect 2 in ponds.</li> </ul>
<b>Adjoining area</b>	
<ul style="list-style-type: none"> <li>• Common Raven – 3 individuals were recorded on the transect 10 on the road to the substation.</li> <li>• Horned Lark – 23 individuals were recorded on the transect 10 on the road to the substation.</li> <li>• Red-billed Chough – 41 individuals were recorded on the transects 10, 11.</li> </ul>	<ul style="list-style-type: none"> <li>• Rook – 1 individual was recorded on the transect 10 on the road.</li> <li>• Horned Lark – In total, 70 individuals were recorded on the transect 11.</li> </ul>

Distribution of birds into ecological groups is as follows: birds of rocks and talus – Common Raven, Red-billed Chough, Alpine Chough, Guldenstadt's Redstart, Snow Finch and

Brandt's Rosy-Finch, birds of forest – Magpie, Great Grey Shrike, Common Starling, Rook and Black Redstart, birds of meadows and steppes - Water Pipit and Horned Lark, synanthropic birds – Hoopoe and White Wagtail, aquatic and semiaquatic birds - Northern Pintail, Teal, Common Plover, Mallard, Grey Heron and Ruddy Shelduck. Among them, 8 species are sedentary, 6 species are nesting migratory (see table 6).



Photo 1. Common Raven on the transect 1 at the Landfill area

**23 bird species consisting of 818 individuals were recorded on site in April. 6 species consisting of 259 individuals were recorded outside the mine on adjoining area.**

April 10.04.2017.	
<ul style="list-style-type: none"> <li>• Black Kite – 3 individuals were recorded on the transect 1 at the Landfill area.</li> <li>• Ruddy Shelduck – 5 individuals were recorded on the transects 2, 4 in the lakes.</li> <li>• Common Raven – In total, 140 individuals were recorded. The largest group was recorded on the transect 1 at the Landfill area, also small groups</li> </ul>	<ul style="list-style-type: none"> <li>• Guldenstadt's Redstart – 3 individuals were recorded on the transect 6 at the Explosives Magazine area.</li> <li>• Turkestan Shrike – 1 individual was recorded on the transect 5 at the Central Warehouse area.</li> </ul>

<p>were recorded on all transects.</p> <ul style="list-style-type: none"> <li>• Alpine Chough – 12 individuals were recorded. The largest group was recorded on the transect 3.</li> <li>• Rook – 25 individuals were recorded, all the birds were observed on the transect 1 at the Landfill area.</li> <li>• Red-billed Chough – In total, 10 individuals were recorded. All the birds were observed on the transect 4.</li> <li>• Snow Finch – In total, 32 individuals were recorded, 5 birds were observed on the transect 3, 5 birds were observed on the transect 5 at the Central Warehouse area.</li> <li>• Brandt's Rosy-Finch – In total, 100 individuals were recorded on the transect 3 on the steppe areas along the Tailings Pipeline before the Mill.</li> <li>• Horned Lark – 4 individuals were recorded on the transect 2.</li> </ul>	<ul style="list-style-type: none"> <li>• White Wagtail – 21 individuals were recorded on the transect 2.</li> <li>• Horned Lark – 3 individuals were recorded on the transect 3.</li> <li>• Teal – 9 individuals were recorded on the transect 1 at the TMF area.</li> <li>• Chaffinch – 6 individuals were recorded on the transect 6 at the Central Warehouse area.</li> <li>• Black-throated Thrush – 1 individual was recorded on the transect 1.</li> </ul>
<b>Adjoining area</b>	
<ul style="list-style-type: none"> <li>• Ruddy Shelduck – 24 individuals were recorded on the transect 12 along the Taragay River.</li> <li>• Common Raven – 2 individuals were recorded on the transect 10 along the roadway.</li> <li>• Red-billed Chough – In total, 61 individuals were recorded on the transects 10, 12.</li> <li>• Horned Lark – 165 individuals were recorded on the transects 11, 12 at the steppe areas.</li> </ul>	<ul style="list-style-type: none"> <li>• Crested Lark – 1 individual was recorded on the transect 9.</li> <li>• Isabelline Wheatear – 2 individuals were recorded on the transect 12.</li> <li>• Guldenstadt's Redstart – 5 individuals were recorded on the transects 11, 12.</li> </ul>
<b>11.04.2017.</b>	
<ul style="list-style-type: none"> <li>• Lammergeier – 2 single individuals were recorded on the transects 1, 7.</li> <li>• Black Kite – 3 individuals were recorded on the transect 1 at the Landfill area.</li> <li>• Great Egret – 1 individual was recorded on the transect 1 at the TMF area.</li> </ul>	<ul style="list-style-type: none"> <li>• Red-billed Chough – 2 individuals were recorded on the transect 5 opposite to the Camp.</li> <li>• Snow Finch – 2 individuals were recorded on the transect 7</li> </ul>

<ul style="list-style-type: none"> <li>• Common Raven – In total, 165 individuals were recorded on the transect 1, small groups were also recorded on all transects.</li> <li>• Alpine Chough – 12 individuals were recorded on the transects 1, 3, 4.</li> <li>• Rook – all 15 individuals were recorded on the transect 1 at the Landfill area.</li> </ul>	<p>at the Camp area.</p> <ul style="list-style-type: none"> <li>• Crested Lark – 2 individuals were recorded on the transect 2.</li> <li>• Guldenstadt's Redstart – 4 individuals were recorded on the transects 3, 7 at the Tailings Pipeline and the Explosives Magazine areas.</li> </ul>
<b>12.04.2017.</b>	
<ul style="list-style-type: none"> <li>• Northern Pintail – 13 individuals were flying in the south-west direction.</li> <li>• Teal – 20 individuals were recorded on the transect 1 at the TMF area.</li> <li>• Red-crested Pochard – 2 individuals were recorded on the transect 1 at the TMF area.</li> <li>• Common Raven – 167 individuals were recorded on the transect 1 at the Landfill area.</li> <li>• Alpine Chough – 10 individuals were recorded on the transect 1 at the Landfill area.</li> <li>• Common Swallow – 4 individuals were flying in the north-east direction.</li> <li>• Red-billed Chough – 5 individuals were recorded on the transect 3 at the Camp area.</li> </ul>	<ul style="list-style-type: none"> <li>• Rook – 7 individuals were recorded on the transect 1 at the Landfill area.</li> <li>• Guldenstadt's Redstart – 2 individuals were recorded on the transect 3 at the Tailings Pipeline area.</li> <li>• White Wagtail – 1 individual was recorded on the transect 3 at the Camp area.</li> </ul>

Distribution of birds into ecological groups is as follows: birds of rocks and talus - Guldenstadt's Redstart, Common Raven, Alpine Chough, Red-billed Chough, Snow Finch and Brandt's Rosy-Finch, birds of forest - Black Kite, Turkestan Shrike, Rook, Chaffinch, Black-throated Thrush, birds of meadows and steppes – Horned Lark, Crested Lark, Isabelline Wheatear, synanthropic birds - White Wagtail and Common Swallow, aquatic and semiaquatic birds - Ruddy Shelduck, Teal, Great Egret, Northern Pintail, Teal and Red-crested Pochard. Among them, 8 species are sedentary, 13 species are nesting migratory, 2 species are wintering (see table 6).



Photo 2. Alpine Chough on the transect 1 at the Landfill area

**10 bird species consisting of 231 individuals were recorded on site in May. 11 species consisting of 93 individuals were recorded outside the mine on adjoining area.**

May 27.05.2017	
<ul style="list-style-type: none"> <li>• Tufted Duck – 5 individuals were recorded on the transect 1 at the TMF area.</li> <li>• Guldenstadt's Redstart – 1 individual was recorded on the transect 2 at the ETP area.</li> <li>• Ruddy Shelduck – 1 individual was recorded on the transect 2 in ponds located to the east of the TMF.</li> <li>• Common Raven – 1 individual was recorded on the transect 4 in Sary-Tor gorge. In addition, 1 individual was recorded on the transect 3 at the Mill area. 170 individuals were recorded on the transect 1 at the Landfill area.</li> <li>• Black Redstart – 1 individual was</li> </ul>	<ul style="list-style-type: none"> <li>• Snow Finch – 2 individuals were recorded on the transect 3 at the Tailings Pipeline area.</li> <li>• Red-billed Chough – 3 individuals were recorded on the transect 3 at the Tailings Pipeline area.</li> <li>• Guldenstadt's Redstart – 1 individual was recorded on the transect 3 at the workshops area.</li> <li>• Alpine Chough – 30 individuals were recorded on the transect 2 at the WTP area. 15 individuals were also recorded on the transect 3 at the Camp area.</li> </ul>

recorded on the transect 3 at the Mill area.	
<b>Adjoining area (outside the mine) 28.05.2017.</b>	
<ul style="list-style-type: none"> <li>• Common Raven – 30 individuals were recorded on the transect 10 along the roadway.</li> <li>• Ruddy Shelduck – 4 individuals on the transects 10, 11 in ponds along the roadway and before the Sook pass.</li> <li>• Alpine Chough – 11 individuals were recorded on the transect 10 at the steppe areas along the roadway.</li> <li>• Red-billed Chough – 9 individuals were recorded on the transect 10 before the Barskoon pass.</li> <li>• Guldenstadt's Redstart – 2 males were recorded on the transects 11,1 before the Sook pass.</li> </ul>	<ul style="list-style-type: none"> <li>• Tufted Duck – 3 males, 2 females were recorded on the transect 11 on the lakes.</li> <li>• Gadwall – 2 individuals were recorded on the transect 11 on the lakes of Taragay River.</li> <li>• Horned Lark – 22 individuals were recorded on the transects 11, 12.</li> <li>• Northern Shoveler – 2 males were recorded on the transect 11 on the lakes of Taragay River.</li> <li>• Lesser Sand Plover – 2 individuals were recorded on the transect 12 on lakes of confluence of Kumtor and Arabel Rivers.</li> </ul>

Distribution of birds into ecological groups is as follows: birds of rocks and talus - Snow Finch, Guldenstadt's Redstart, Red-billed Chough, Common Raven and Alpine Chough, aquatic and semiaquatic birds - Tufted Duck, Ruddy Shelduck, Gadwall, Northern Shoveler and Lesser Sand Plover, birds of meadows and steppes - Horned Lark, birds of forest - Black Redstart. Among them, 5 species are sedentary, 6 species are nesting migratory.

**14 bird species consisting of 228 individuals were recorded on site in June. 17 species consisting of 167 individuals were recorded outside the mine on adjoining area.**

<b>June 21.06.2017.</b>	
<ul style="list-style-type: none"> <li>• Common Raven – 8 individuals were recorded on the transect 3 at the Tailings Pipeline area.</li> </ul>	<ul style="list-style-type: none"> <li>• Guldenstadt's Redstart – 1 male was recorded on the transect 6 at the Explosives Magazine area.</li> </ul>
<b>22.06.2017.</b>	
<ul style="list-style-type: none"> <li>• Redshank – 11 individuals were loafing on the transect 1 on the Tailings Pond beach.</li> <li>• Northern Shoveler – 2 individuals were recorded on the transect 1.</li> <li>• Ruddy Shelduck – 1 individual was loafing on the transect 2 in the ponds located to the east of the TMF.</li> <li>• Snow Finch – 4 individuals were recorded on the transects 2, 6.</li> <li>• Green Sandpiper – 1 individual was recorded on the transect 2 on the tailings beach on the south of the TMF.</li> </ul>	<ul style="list-style-type: none"> <li>• Mallard – 5 individuals were recorded on the transect 2 in the ponds on the east of the TMF.</li> <li>• Snow Finch – 7 individuals were recorded on the transects 2, 3, 5.</li> <li>• Common Raven – 158 individuals were recorded on the transects 1, 5 at the Industrial Waste Dump and Warehouses areas.</li> <li>• Horned Lark – 3 individuals were recorded on the transect 5 at the Fuel Farm area.</li> <li>• Alpine Accentor – 1 individual was recorded on the transect 6 among scree debris.</li> <li>• Water Pipit – 5 individuals were recorded on the transects 6, 7 at the Explosive Magazine and Petrov Lake areas.</li> </ul>
<b>23.06.2017. Adjoining area (outside the mine)</b>	
<ul style="list-style-type: none"> <li>• Common Raven – 7 individuals were recorded on the transect 12 at the Kumtor River area.</li> <li>• Ruddy Shelduck – 4 individuals were recorded on the transect 12 in the lakes.</li> <li>• Snow Finch – 17 individuals were recorded on the transects 11, 12.</li> </ul>	<ul style="list-style-type: none"> <li>• Mongolian Bullfinch – a flock of 10 individuals was recorded on the transect 12 along the road.</li> <li>• Citrine Wagtail – 5 individuals were recorded on the transect 11.</li> <li>• Alpine Chough – 5 individuals were recorded on the transect 11.</li> </ul>

<ul style="list-style-type: none"> <li>• White Wagtail – 2 individuals were recorded on the transects 11, 12.</li> <li>• Horned Lark – 106 individuals were recorded on the transects 11, 12 along the road.</li> <li>• Lesser Sand Plover – 4 individuals were recorded on the transect 12 at the steppe areas along the road.</li> <li>• Common Kestrel – 1 individual was recorded on the transect 12, hunting on mouse-like rodents.</li> <li>• Red-billed Chough – 6 individuals were recorded on the transect 12.</li> </ul>	<ul style="list-style-type: none"> <li>• Isabelline Wheatear – 4 single individuals were recorded on the transect 12.</li> <li>• Tufted Duck – 1 individual was recorded on the transect 11 in the lake on the north of the Taragay River.</li> <li>• Gadwall – 1 individual was recorded on the transect 11 in the lake on the north of the Taragay River.</li> <li>• Redshank – 1 individual was recorded on the transect in the lake on the north of the Taragay River.</li> </ul>
<b>24.06.2017.</b>	
<ul style="list-style-type: none"> <li>• Guldenstadt's Redstart – 1 male was recorded on the transect 3 at the Pit area.</li> <li>• Alpine Chough – 1 individual was recorded on the transect 3 at the Pit area.</li> </ul>	<ul style="list-style-type: none"> <li>• Gadwall – 13 individuals were recorded on the transect 9 in the lakes at the Upper Diversion Ditch area.</li> </ul>

Distribution of birds into ecological groups is as follows: birds of rocks and talus - Common Raven, Snow Finch, Red-billed Chough, Alpine Chough, Alpine Accentor and Guldenstadt's Redstart, aquatic and semiaquatic birds – Redshank, Northern Shoveler, Ruddy Shelduck, Green Sandpiper, Tufted Duck, Gadwall, Lesser Sand Plover, birds of forest - Common Kestrel, birds of meadows and steppes – Horned Lark, Water Pipit, Mongolian Bullfinch, Citrine Wagtail and Isabelline Wheatear, synanthropic birds - White Wagtail. Among them, 4 species are sedentary, 13 species are nesting migratory (see table 6).

**10 bird species consisting of 93 individuals were recorded on site in July. 12 species consisting of 122 individuals were recorded outside the mine on adjoining area.**

<b>July 15.07.2017. Adjoining area (outside the mine)</b>	
<ul style="list-style-type: none"> <li>• Snow Finch – 20 individuals were recorded on the transect 10 along the</li> </ul>	<ul style="list-style-type: none"> <li>• Isabelline Wheatear – 4 individuals were recorded on the transect 11.</li> </ul>

<p>roadway.</p> <ul style="list-style-type: none"> <li>• Golden Eagle – 1 individual was recorded on the transect 10 along the foothill.</li> <li>• Common Raven – 1 individual was recorded on the transect 10 before the Barskoon pass.</li> <li>• Alpine Chough – 16 individuals were recorded on the transect 10, 11 before the Barskoon pass and the Sook pass.</li> <li>• Brandt's Rosy-Finch – 10 individuals were recorded on the transect 11.</li> <li>• Isabelline Wheatear – 6 individuals were recorded on the transect 11.</li> <li>• Horned Lark – 86 individuals were recorded on the transect 11, 12.</li> </ul>	<ul style="list-style-type: none"> <li>• Redshank – 2 individuals were recorded on the transect 12.</li> <li>• Citrine Wagtail – 2 males were recorded on the transect 12 on the Taragay River beach.</li> <li>• Ruddy Shelduck – 13 individuals were recorded on the transect 12 on the Taragay River beach.</li> <li>• Green Sandpiper – 2 individuals were recorded on the transect 12 on the Taragay River beach.</li> </ul>
<b>At the Kumtor Mine (on site)</b>	
<ul style="list-style-type: none"> <li>• Ruddy Shelduck – 2 individuals were flying in the south-west direction.</li> <li>• Common Raven – 4 individuals were recorded on the transect 4 at the Sary-Tor gorge.</li> <li>• Alpine Chough – 9 individuals were recorded on the transect 5.</li> </ul>	<ul style="list-style-type: none"> <li>• Guldenstadt's Redstart – 2 individuals were recorded on the transect 3 at the Tailings Pipeline area.</li> <li>• Himalayan Griffon – 1 individual was recorded on the transect 7 at the Petrov Lake area.</li> </ul>
<b>16.07.2017.</b>	
<ul style="list-style-type: none"> <li>• Ruddy Shelduck – 2 individuals were loafing on the transect 5 in ponds near the Central Warehouse.</li> <li>• Horned Lark – 1 individual was recorded on the transect 2 at the Upper Diversion Dith area.</li> <li>• Northern Shoveler – 2 individuals were recorded on the transect 1 in the TMF open water.</li> <li>• Brandt's Rosy-Finch – 50 individuals</li> </ul>	<ul style="list-style-type: none"> <li>• Ruddy Shelduck – 2 individuals were feeding on the transect 2 in the ponds on the east of the TMF.</li> <li>• Alpine Chough – 17 individuals were feeding on the transect 6 at the Dumps area.</li> <li>• Lammergeier – 1 individual was recorded on the transect 7 flying in search for food around the Petrov Lake.</li> </ul>

<p>were recorded on the transect 1 at the Landfill area.</p> <ul style="list-style-type: none"> <li>• Red-billed Chough – 2 individuals were recorded on the transect 1 at the Landfill area.</li> </ul>	
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Distribution of birds into ecological groups is as follows: birds of rocks and talus – Snow Finch, Golden Eagle, Common Raven, Alpine Chough, Brandt's Rosy-Finch, Guldenstadt's Redstart, Himalayan Griffon, Lammergeier and Red-billed Chough, aquatic and semiaquatic birds – Citrine Wagtail, Ruddy Shelduck, Green Sandpiper and Northern Shoveler, birds of meadows and steppes - Isabelline Wheatear and Horned Lark. Among them, 8 species are sedentary, 6 species are nesting migratory (see table 6).

**19 bird species consisting of 239 individuals were recorded on site in September. 16 species consisting of 279 individuals were recorded outside the mine on adjoining area.**

03.09.2017.	
<ul style="list-style-type: none"> <li>• Mallard – 1 individual was loafing on the transect 1 on the TMF open water.</li> <li>• Garganey – 2 individuals were loafing on the transect 1 on the TMF open water.</li> <li>• Horned Lark – 5 individuals were recorded on the transect 1 at the steppe areas.</li> <li>• Northern Pintail – 2 individuals were loafing on the transect 1 on the TMF open water.</li> <li>• White Wagtail – 1 individual was recorded on the transect 1 at the TD7 observation point area.</li> <li>• Gadwall -1 individual was loafing on the transect 1 on the TMF open water.</li> <li>• Common Raven – 60 individuals were</li> </ul>	<ul style="list-style-type: none"> <li>• Ruddy Shelduck – 2 individuals were feeding on the transect 2 in ponds on the east of the TMF.</li> <li>• Common Sandpiper – 1 individual was loafing on the transect 2 on the Tailings Pond beach.</li> <li>• White Wagtail – 1 individual was feeding on the transect 2 on the Tailings Pond beach.</li> <li>• Red-billed Chough – 2 individuals were feeding on the transect 2 at the WTP area.</li> <li>• Common Swallow – 4 individuals were flying in the western direction.</li> <li>• Northern Pintail – 3 individuals were loafing on the transect 1 on the TMF open water.</li> </ul>

feeding at the Landfill area on the transect 1. <ul style="list-style-type: none"> <li>Alpine Chough – 4 individuals were recorded on the transect 1 at the Landfill area.</li> </ul>	<ul style="list-style-type: none"> <li>Ruddy Shelduck – 1 individual was loafing on the transect 3 at the Camp area.</li> </ul>
<b>Adjoining area (outside the mine)</b>	
<ul style="list-style-type: none"> <li>Garganey – 40 individuals were feeding on the transect 10 in the lake located on the 3<sup>rd</sup> km along the road.</li> <li>Ruddy Shelduck – 2 individuals were feeding on the transect 10 in the lake located on the 3<sup>rd</sup> km along the road.</li> <li>Red-necked Phalarope – 12 individuals were feeding on the transect 10 in the lake located on the 3<sup>rd</sup> km along the road.</li> <li>Tree Pipit - 29 individuals were recorded on the transect 12 at the W1.5.1. Point area near the lakes.</li> <li>Northern Pintail – 13 individuals were recorded in the lake at the W1.5.1 point area.</li> <li>Small Snow Finch – 30 individuals were recorded on the road at the W1.5.1 point area.</li> <li>Horned Lark – 11 individuals were recorded on the transect 12 along the road.</li> <li>Common Kestrel – 1 individual was hunting on mouse-like mammals on the transect 12.</li> <li>Horned Lark – 110 individuals were recorded on the transect 12 along the road.</li> <li>White Wagtail – 5 individuals were recorded on the transect 12 on the road.</li> <li>Saker – 1 individual was recorded loafing</li> </ul>	<ul style="list-style-type: none"> <li>Tree Pipit – 20 individuals were recorded on the transect 12 on the road.</li> <li>Ruddy Shelduck – 2 individuals were recorded on the transect 12 in the lakes.</li> <li>Small Snow Finch - several flocks of 40 individuals in total were recorded on the transect 12 on the road.</li> <li>Northern Pintail – 6 individuals were feeding on the transect 11 in the lakes located downstream of the Taragay River bridge.</li> <li>Stonechat – 1 male was recorded on the transect 11 on the road.</li> <li>Small Snow Finch – 10 individuals were recorded on the transect 11 on the road.</li> <li>Horned Lark – 20 individuals were recorded on the transect 11 on the road.</li> <li>Yellow Wagtail – 1 individual was recorded on the transect 11 on the road.</li> <li>Guldenstadt's Redstart – 2 individuals were recorded on the transect 11 on the road.</li> <li>Tree Pipit – 10 individuals were recorded on the transect 11 on the road.</li> <li>Water Pipit – 5 individuals were recorded on the transect 11 on the road.</li> <li>Ruddy Shelduck – 2 individuals were recorded feeding on the transect 10 in the</li> </ul>

on the transect 12 on a high-voltage pole at the Taragay River bridge.	<p>lakes along the road.</p> <ul style="list-style-type: none"> <li>• Alpine Chough – 4 individuals were recorded on the transect 10 along the road.</li> <li>• Common Kestrel - 2 individuals were recorded on the transect 10 along the road.</li> </ul>
<b>At the Kumtor Mine (on site)</b>	
<ul style="list-style-type: none"> <li>• Guldenstadt's Redstart – 1 male was recorded on the transect 3 at the Camp area.</li> <li>• White Wagtail - 1 individual was recorded on the transect 3 at the Camp area.</li> <li>• Ruddy Shelduck – 2 individuals were feeding on the transect 4 in the lake near the old Security Check Point.</li> <li>• Common Sandpiper – 3 individuals were feeding on the transect 4 in the lake near the old Security Check Point.</li> <li>• Mallard – 1 individual was loafing on the transect 1 at the TMF TD2 observation point area.</li> <li>• Garganey – 3 individuals were loafing on the transect 1 at the TMF TD2 observation point area.</li> <li>• Common Tern – 1 individual was loafing on the transect 1 on the TMF beach at the TD2 observation point area.</li> <li>• Horned Lark – 2 individuals were recorded on the transect 2 at the steppe areas.</li> <li>• Northern Pintail – 2 individuals were loafing on the transect 1 at the TMF TD2 observation point area.</li> </ul>	<ul style="list-style-type: none"> <li>• Tree Pipit – 5 individuals were recorded on the transect 9 in the lakes at the Upper Diversion Ditch.</li> <li>• Guldenstadt's Redstart – 2 individuals were recorded on the transect 3 at the Tailings Pipeline area.</li> <li>• Brandt's Rosy-Finch – 100 individuals were recorded on the transect 3 at the Tailings Pipeline area.</li> <li>• Tree Pipit – 10 individuals were recorded on the transect 3 at the Tailings Pipeline area.</li> <li>• Northern Shoveler – 5 females were loafing on the transect 7 at the Petrov Lake area.</li> <li>• Mallard – 17 individuals (2 females, 15 males) were feeding on the transect 2 in the lake on the east of the TMF.</li> <li>• Golden Eagle – 1 individual was flying in search of food on the east of WTP on the transect 2.</li> </ul>

Distribution of birds into ecological groups is as follows: birds of rocks and talus – Red-billed Chough, Guldenstadt's Redstart, Saker, Golden Eagle, Common Raven and Alpine Chough, aquatic and semiaquatic birds – Northern Pintail, Gadwall, Red-necked Phalarope, Common Sandpiper, Garganey, Common Tern and Northern Shoveler, birds of forest – Common Kestrel, birds of meadows and steppes – Horned Lark, Tree Pipit, Small Snow Finch, Stonechat, Yellow Wagtail and Water Pipit, synanthropic birds - White Wagtail and Common Swallow. Among them, 6 species are sedentary, 12 species are nesting migratory, 1 species is observed only during temporary stay (see table 6).

**18 bird species consisting of 844 individuals were recorded on site in October. 14 species consisting of 801 individuals were recorded outside the mine on adjoining area.**

October 13.10.2017	
<ul style="list-style-type: none"> <li>• Gadwall – 5 individuals were loafing on the transect 1 at the TMF.</li> <li>• Mallard - 12♂11♀ individuals were loafing on the transect 1 at the TMF.</li> <li>• Alpine Chough – 2 individuals were feeding on the transect 1 at the Landfill area.</li> <li>• Hooded Crow – 1 individual was feeding on the transect 1 at the Landfill area.</li> <li>• Black-throated Thrush – 1 individual was flying in the western direction.</li> <li>• Gadwall – 25 individuals were loafing on the transect 1 at the TMF.</li> <li>• Bluethroat – 1 individual was recorded on the Tailings Dam.</li> <li>• Common Raven – 5 individuals were loafing on the wet beach.</li> <li>• Mallard – 2 individuals were loafing on the transect 1 on the water at TD5 observation point.</li> <li>• Common Raven – 54 individuals were</li> </ul>	<ul style="list-style-type: none"> <li>• Horned Lark – 5 individuals were recorded on the road at the Upper Diversion Ditch.</li> <li>• Brandt's Rosy-Finch – 100 individuals were feeding on the road at the Upper Diversion Ditch.</li> <li>• Common Raven – 4 individuals were recorded at the Mill and the Workshop area.</li> <li>• Guldenstadt's Redstart – 1 individual was recorded at the Mill and the Workshop area.</li> <li>• Brandt's Rosy-Finch – 500 individuals were recorded at the Mill area.</li> <li>• Red-billed Chough – 3 individuals were recorded at the Mill area.</li> <li>• Common Raven – 3 individuals were recorded in the Sarytor gorge.</li> <li>• Red-billed Chough – 3 individuals were recorded in the Sarytor gorge.</li> <li>• Chaffinch – 2 individuals were recorded</li> </ul>

<p>feeding at the Landfill area.</p> <ul style="list-style-type: none"> <li>• Hooded crow – 2 individuals were feeding at the Landfill area.</li> <li>• Common Starling – 3 individuals were feeding on the transect 2 on the east of the TMF.</li> </ul>	<p>on the transect 4 at the Security Check Point area.</p>
<b>14.10.2017.</b>	
<ul style="list-style-type: none"> <li>• Mallard – 27 individuals were loafing on the transect 1 at the TMF TD 1 observation point area.</li> <li>• Black-headed Gull – 1 individual was recorded on the transect 1 on the dry beach at the TD1 observation point area.</li> <li>• Chaffinch – 1 individual was feeding on the transect 1 at the TD1 observation point area.</li> <li>• Gadwall - 3 individuals were loafing on the transect 1 at the TMF TD2 observation point area.</li> <li>• Mallard – 1 individual was loafing on the transect 1 at the TMF TD2 observation point area.</li> <li>• Brandt's Rosy-Finch – 30 individuals were feeding on the transect 2 at the steppe areas in the Middle Diversion Ditch.</li> </ul>	<ul style="list-style-type: none"> <li>• Chaffinch – 1 individual was feeding on the transect 2 at the steppe areas in the Middle Diversion Ditch.</li> <li>• Gadwall – 4 individuals were loafing on the transect 1 at the TMF TD 3 observation point area.</li> <li>• Common Raven – 16 individuals were drinking from the Tailings Pond on the transect 1 at the TD3 observation point area.</li> <li>• Alpine Chough – 5 individuals were feeding on the transect 1 at the Landfill area.</li> <li>• Chaffinch – 4 individuals were feeding on the transect 1 at the Landfill area.</li> <li>• Blackbird – 1 individual was recorded on the transect 5 at the Central Warehouse area.</li> </ul>
<b>Adjoining area (outside the mine)</b>	
<ul style="list-style-type: none"> <li>• Common Raven – 6 individuals were recorded on the transect 12 on the road.</li> <li>• Lammergeier – 1 individual was recorded on the transect 12 on the road.</li> <li>• Horned Lark – 160 individuals were recorded on the transect 12 on the road.</li> <li>• Chaffinch – 1 individual was recorded on</li> </ul>	<ul style="list-style-type: none"> <li>• Horned Grebe – 1 individual was recorded on the transect 11 in the lakes at the confluence of Sook and Taragay Rivers.</li> <li>• Great Crested Grebe – 1 individual was recorded on the transect 11 in the lakes at the confluence of Sook and Taragay Rivers.</li> </ul>

<p>the transect 12 on the road.</p> <ul style="list-style-type: none"> <li>• Red-billed Chough – 50 individuals were recorded on the transect 12 on the road.</li> <li>• Goosander – 5 individuals were recorded on the Taragay River.</li> <li>• Stonechat – 1 female was recorded on the transect 12 on the road.</li> <li>• Little Owl – 1 individual was recorded on the transect 12 on the road.</li> <li>• Gadwall – 1 individual was recorded on the transect 11 in the lakes at the confluence of the Sook and the Taragay Rivers.</li> <li>• Mallard -70 individuals were recorded on the transect 11 in the lakes at the confluence of Sook and Taragay Rivers.</li> </ul>	<ul style="list-style-type: none"> <li>• Alpine Chough and Red-billed Chough – 300 individuals were feeding on the transect 12 at the steppe areas.</li> <li>• Horned Lark – 200 individuals were recorded on the transect 11, 12 on the road.</li> <li>• Yellow Wagtail – 1 individual was recorded flying on the transect 11 in the western direction.</li> <li>• Common Kestrel – 1 individual was hunting on mouse-like rodents.</li> <li>• Guldenstadt's Redstart – 1 individual was recorded on the transect 11 on the roadside.</li> </ul>
<b>15.10.2017.</b>	
<ul style="list-style-type: none"> <li>• Grey Heron – 1 weak individual was recorded on the dry beach at the TD 7 observation point area, was attacked by 4 Common Ravens. The bird was not already trying to resist (carcass).</li> <li>• Greenish Warbler – 1 individual was feeding on the transect 1 at the Tailings Dam.</li> </ul>	<ul style="list-style-type: none"> <li>• Ruddy Shelduck – 2 individuals were bathing in the Tailings Pond.</li> </ul>

Distribution of birds into ecological groups is as follows: birds of rocks and talus – Brandt's Rosy-Finch, Alpine Chough, Common Raven, Lammergeier, Red-billed Chough and Guldenstadt's Redstart, aquatic and semiaquatic birds – Mallard, Gadwall, Black-headed Gull, Horned Grebe, Great Crested Grebe, Goosander, Grey Heron and Ruddy Shelduck, birds of forest – Hooded Crow, Black-throated Thrush, Chaffinch, Common Starling, Blackbird, Common Kestrel and Greenish Warbler, birds of meadows and steppes – Horned Lark and Yellow Wagtail. Among them, 6 species are sedentary, 11 species are nesting migratory, 1 species is wintering (see table 6).

**16 bird species consisting of 484 individuals were recorded on site in November. 14 species consisting of 801 individuals were recorded outside the mine on adjoining area.**

November 05.11.2017.	
<ul style="list-style-type: none"> <li>• Mallard - 3♂5♀ individuals were loafing on the transect 1 at the TMF TD2 observation point.</li> <li>• Alpine Chough – 2 individuals were feeding on the transect 1 at the Landfill area.</li> <li>• Common Raven – 58 individuals were feeding on the transect 1 at the Landfill area.</li> <li>• Common Raven – 7 individuals were drinking water at the TD3 observation point.</li> <li>• Hooded Crow – 2 individuals were feeding on the transect 1 at the Landfill area.</li> <li>• Alpine Chough – 12 individuals were feeding on the transect 1 at the Landfill area.</li> <li>• Brandt's Rosy-Finch – 50 individuals were feeding on the transect 2 at the steppe areas.</li> <li>• Red-billed Chough – 5 individuals were feeding on the transect 1 at the Landfill area.</li> <li>• Common Raven – 12 individuals were recorded on the transect 5 at the Workshop area.</li> <li>• Brandt's Rosy-Finch – 100 individuals were recorded at the Workshop area.</li> <li>• Red-billed Chough – 11 individuals were</li> </ul>	<ul style="list-style-type: none"> <li>• Alpine Chough – 12 individuals were recorded on the transect 3 on the slope at the Camp area.</li> <li>• Snow Finch – 4 individuals were recorded on the transect 3 at the Mill area.</li> <li>• Chaffinch – 7 individuals were recorded on the transect 3 at the Mill area.</li> <li>• Common Raven – 3 individuals were recorded on the transect 6 in the Lysyi Gorge.</li> <li>• Red-billed Chough – 5 individuals were recorded on the transect 6 in the Lysyi Gorge.</li> <li>• Brown Accentor – 2 individuals were recorded on the transect 6 in the Lysyi Gorge.</li> <li>• Black-throated Thrush – 2 individuals were recorded on the transect 6 in the Lysyi Gorge.</li> <li>• Chaffinch – 5 individuals were recorded on the transect 4 at the old Security Check Point area.</li> <li>• Snow Finch – 3 individuals were recorded on the transect 4 at the old Security Check Point area.</li> </ul>

recorded on the transect 3 at the Mill area.	
<b>November 06.11.2017.</b>	
<ul style="list-style-type: none"> <li>• Mallard – 16 individuals were loafing on the transect 1 at the TD2 observation point area.</li> <li>• Teal – 4 individuals were loafing on the transect 1 at the TD2 observation point area.</li> <li>• Horned Lark – 12 individuals were recorded on the transect 2 at the steppe areas.</li> <li>• Common Raven – 50 individuals were feeding on the transect 1 at the Landfill area.</li> <li>• Alpine Chough – 7 individuals were feeding on the transect 1 at the Landfill area.</li> <li>• Brandt's Rosy-Finch – 20 individuals were feeding on the transect 1 at the Landfill area.</li> </ul>	<b>Mill area</b> <ul style="list-style-type: none"> <li>• Lammergeier – 1 individual was flying above the WTP area on the transect 2.</li> <li>• Common Raven – 10 individuals were recorded on the transect 3 at the Mill area.</li> <li>• Horned Lark – 5 individuals were recorded on the transect 6 at the Explosives Magazine area.</li> <li>• Brandt's Rosy-Finch – 50 individuals were recorded on the transect 6 at the Explosives Magazine area.</li> </ul>

Distribution of birds into ecological groups is as follows: birds of rocks and talus – Alpine Chough, Snow Finch, Common Raven, Red-billed Chough, Brandt's Rosy-Finch and Lammergeier, aquatic and semiaquatic birds – Mallard and Teal, birds of forest – Chaffinch, Hooded Crow, Brown Accentor and Black-throated Thrush, birds of meadows and steppes – Horned Lark. Among them, 6 species are sedentary, 8 species are nesting migratory, 2 species are wintering (see table 6).

**16 bird species consisting of 484 individuals were recorded on site in December. 14 species consisting of 801 individuals were recorded outside the mine on adjoining area.**

<b>08.12.2017</b>	
• Common Raven – 49 individuals were	• Brown Accentor – 1 individual was

<p>feeding on the transect 1 at the Landfill area.</p> <ul style="list-style-type: none"> <li>• Alpine Chough – 7 individuals were feeding on the transect 1 at the Landfill area.</li> <li>• Red-billed Chough – 5 individuals were feeding on the transect 1 at the Landfill area.</li> <li>• Hooded Crow – 7 individuals were feeding on the transect 1 at the Landfill area.</li> <li>• Brandt's Rosy-Finch – 100 individuals were recorded at the Workshops area.</li> </ul>	<p>recorded on the transect 6 in the Lysyi Gorge.</p> <ul style="list-style-type: none"> <li>• Black-throated Thrush– 4 individuals were recorded on the transect 6 in the Lysyi Gorge.</li> <li>• Chaffinch – 9 individuals were recorded on the transect 1 at the Camp area.</li> </ul>
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Distribution of birds into ecological groups is as follows: birds of rocks and talus – Common Raven, Alpine Chough, Red-billed Chough and Brandt's Rosy-Finch, birds of forest – Brown Accentor, Black-throated Thrush, Chaffinch and Hooded Crow. Among them, 6 species are sedentary, 8 species are nesting migratory, 2 species are wintering (see table 6).



Photo 3. Himalayan Griffon recorded on the transect 11 on adjoining area

Table 6

## Species of birds recorded at the Kumtor Mine and on adjoining area in 2017

##	Species	Distribution	Species listed in the KR Red Book	IUCN criteria
1	Milvus migrans (Bodd.) – Black Kite	ns, mgr	–	–
2	Aquila chrysaetos (L.) – Golden Eagle	s	+	Category VI, Near Threatened, NT
3	Gyps himalayensis Hume – Himalayan Griffon	s	+	Category VII, Least Concern, LC
4	Gypaetus barbatus (L.) – Lammergeier	s	+	Category VI, Near Threatened, NT
5	Falco cherrug J.E.Gray – Saker	ns, mgr	+	Category IV, Endangered, EN
6	Falco tinnunculus L. – Common Kestrel	ns, mgr	–	–
7	Podiceps auritus (L.) - Horned Grebe	ns, mgr	–	–
8	Podiceps cristatus (L.) - Great Crested Grebe	ns, mgr	–	–
9	Egretta alba (L.) – Great Egret	wn	–	–
10	Ardea cinerea L. - Grey Heron	ns, mgr	–	–
11	Tadorna ferruginea (Pall.) –	ns, mgr	–	–

	Ruddy Shelduck			
12	Anas acuta L. – Northern Pintail	<b>ns, mgr</b>	–	–
13	Anas crecca L. - Teal	<b>ns, wn, s, mgr</b>	–	–
14	Anas querquedula L. – Garganey	<b>ns, mgr</b>	–	–
15	Anas platyrhynchos L. – Mallard	<b>ns, mgr</b>	–	–
16	Anas strepera L. - Gadwall	<b>ns, mgr</b>	–	–
17	Anas clypeata L. – Northern Shoveler	<b>ns, mgr</b>	–	–
18	Aythya ferina (L.) - Red-crested Pochard	<b>ns, mgr</b>	–	–
19	Aythya fuligula (L.) - Tufted Duck	<b>ns, mgr</b>	–	–
20	Mergus merganser L. - Goosander	<b>ns, mgr</b>	–	–
21	Charadrius mongolus Pall. – Lesser Sand Plover	<b>ns, mgr</b>	–	–
22	Vanellus vanellus (L.) – Peewit	<b>ns, mgr</b>	–	–
23	Tringa ochropus L. – Green Sandpiper	<b>ns, mgr</b>	–	–
24	Tringa totanus (L.) – Redshank	<b>ns, mgr</b>	–	–
25	Actitis hypoleucos (L.) – Common Sandpiper	<b>s</b>	–	–
26	Phalaropus lobatus (L.) – Red-necked Phalarope	<b>mgr</b>	–	–
27	Larus ridibundus L. – Black-headed Gull	<b>ns, mgr</b>	–	–

28	<i>Sterna hirundo</i> L. – Common Tern	<b>ns, mgr</b>	–	–
29	<i>Athene noctua</i> (Scop.) – Little Owl	<b>s</b>	–	–
30	<i>Upupa epops</i> L. – Hoopoe	<b>ns, mgr</b>	–	–
31	<i>Lanius phoenicuroides</i> Schallow	<b>ns, mgr</b>	–	–
32	<i>Pyrrhonorax graculus</i> (L.) – Alpine Chough	<b>s</b>	–	–
32	<i>Pyrrhonorax pyrrhonorax</i> (L.) – Red-billed Chough	<b>s</b>	–	–
34	<i>Pica pica</i> (L.) – Magpie	<b>s</b>	–	–
35	<i>Corvus frugilegus</i> L. – Rook	<b>s</b>	–	–
36	<i>Corvus corax</i> L. – Common Raven	<b>s</b>	–	–
37	<i>Corvus cornix</i> L. – Hooded Crow	<b>w</b>	–	–
38	<i>Galerida cristata</i> (L.) – Crested Lark	<b>s</b>	–	–
39	<i>Eremophila alpestris</i> (L.) – Horned Lark	<b>s</b>	–	–
40	<i>Hirundo rustica</i> L. – Common Swallow	<b>ns, mgr</b>	–	–
41	<i>Phylloscopus trochiloides</i> (Sundevall) – Greenish Warbler	<b>ns, mgr</b>	–	–
42	<i>Luscinia svecica</i> (L.) – Bluethroat	<b>ns, mgr</b>	–	–
43	<i>Saxicola torquata</i> (L.) – Stonechat	<b>ns, mgr</b>	–	–
44	<i>Phoenicurus</i>	<b>ns, mgr</b>	–	–

	erythrogaster (Güld.) – Guldenstadt's Redstart			
45	Phoenicurus ochruros (S.G.Gmelin) – Black Redstart	<b>ns, mgr</b>	–	–
46	Oenanthe isabellina (Temm.) – Isabelline Wheatear	<b>ns, mgr</b>	–	–
47	Turdus atrogularis Jarocki – Black-throated Thrush	<b>wn</b>	–	–
48	Turdus merula L. – Blackbird	<b>s</b>	–	–
49	Sturnus vulgaris L. – Common Starling	<b>ns, mgr</b>	–	–
50	Montifringilla nivalis (L.) – Snow Finch	<b>s</b>	–	–
51	Prunella collaris (Scop.) – Alpine Accentor	<b>ns, mgr</b>	–	–
52	Prunella fulvescens (Sev.) – Brown Accentor	<b>s</b>	–	–
53	Anthus spinoletta (L.) – Water Pipit	<b>ns, mgr</b>	–	–
54	Anthus trivialis (L.) – Tree Pipit	<b>ns, mgr</b>	–	–
54	Motacilla flava (L.) – Yellow Wagtail	<b>mgr</b>	–	–
56	Motacilla personata Gould – White Wagtail	<b>ns, mgr</b>	–	–
57	Fringilla coelebs (L.) – Chaffinch	<b>wn</b>	–	–
58	Bucanetes mongolicus (Swin.) – Mongolian Trumpeter	<b>ns, mgr</b>	–	–

	Bullfinch			
59	Leucosticte brandti – Brandt's Rosy-Finch	s	–	–

## Mammals

**4 mammal species consisting of 145 individuals were recorded on site in January. 1 species consisting of 7 individuals was recorded outside the mine on adjoining area.**

January 21.01.2017.	
<ul style="list-style-type: none"> <li>• Fox – 4 individuals were recorded on the transect 3 at the Camp area.</li> <li>• Fox – 2 individuals were recorded on the transect 3 at the Mill area.</li> <li>• Fox - 1 individual was catching mice on the dry beach at the TD1 observation point area.</li> <li>• Fox – 13 individuals were recorded at nighttime on the transect 2 at the Solid Domestic Landfill and WTP areas.</li> <li>• Wolf – 2 individuals were recorded on the transect 2 at the WTP area.</li> <li>• Wolf – 5 individuals were recorded on the transects 1, 8, moving from the Solid Domestic Landfill towards the Petrov Lake.</li> <li>• Wolf – 1 individual was recorded on the transect 1 at the TD3 observation point, was moving on ice, possibly, from the Solid Domestic Waste Lanfill.</li> <li>• Wolf – 10 individuals were recorded in the morning from 7 to 8 a.m. on the transect 8 – were moving towards the Petrov Lake.</li> <li>• Hare – 6 individuals and numerous tracks were recorded at night on the transect 7 at the Petrov Lake area.</li> </ul>	<ul style="list-style-type: none"> <li>• Argali - ♀- 8, lambs – 7, ♀ - 6, ♂ (young) – 3, ♂ (adult) – 6 (5-6 years). In total – 30 individuals were recorded on the transect 3 opposite to the camp.</li> <li>• Argali - ♀- 4, lambs – 2 (♀, ♂). In total - 6 individuals were recorded on the transect 5 at the Fuel Farm area.</li> <li>• Argali - 2♀ (young), 1♂ (adult 5-6 years). In total - 3 individuals were recorded at the WTP area.</li> <li>• Argali – ♀ - 1, lambs – 1, ♂ (young) – 2 (2 years). In total - 4 individuals were recorded on the transect 6 at the Water Collection area.</li> <li>• Argali - ♀- 7, lambs – 7, ♀ - 2 (2 years), ♂ (young) – 2 (2 years), ♂ (adult) – 2 (5-6 years). In total - 20 individuals were recorded on the transect 3 downstream of the Tailings Pipeline.</li> <li>• Argali - ♀- 10, lambs – 10, ♀ - 2 (2 years), ♂ (young) – 3 (2 years), ♂ (adult) – 1 (5-6 years). In total – 26 individuals were recorded on the transect 4, 5 in the Sary-Tor gorge and along the foothill.</li> </ul>

<ul style="list-style-type: none"> <li>Argali – ♀ - 4, lambs – 2, ♀ (young) – 4.</li> </ul> <p>In total - 10 individuals were recorded on the transect 5 at the Workshops area.</p>	
<b>Adjoining area (outside the mine)</b>	
<p>Argali – 7 individuals were recorded on the transect 10 on the southeastern slope after the K-15 Security Check Point.</p>	

**3 mammal species consisting of 58 individuals were recorded on site in February. 1 species consisting of 6 individuals was recorded outside the mine on adjoining area.**

<b>February 22.02.2017</b>	
<p><b>Workshop and Mill area:</b></p> <ul style="list-style-type: none"> <li>Argali (<i>Ovis ammon</i>), time - 11:29</li> </ul> <p>♀ adult – 16 individuals  L – 10 individuals  ♀ young – 2 individuals  ♂ young – 1 individual  ♂ adult – 0</p> <p>In total, 29 individuals were recorded on the transect 3 at the Mill area.</p> <ul style="list-style-type: none"> <li>Argali (<i>Ovis ammon</i>), time - 15:00, second group</li> </ul> <p>♀ adult – 12 individuals  L – 8 individuals  ♀ young – 0  ♂ young – 0  ♂ adult – 0</p> <p>In total, 20 individuals were recorded on the transect 3 at the Tailings Pipeline area. 5 individuals were resting on the ground, the rest ones were grazing.</p>	<ul style="list-style-type: none"> <li>Argali (<i>Ovis ammon</i>), time - 16:40</li> </ul> <p>♀ adult – 0  L – 0  ♀ young – 1 individual  ♂ young – 2 individuals  ♂ adult – 3 individuals</p> <p>In total, 6 individuals were recorded at the Tailings Pipeline area. All argalis observed were grazing.</p> <p>7 individuals were resting on the ground, the rest ones were grazing.</p> <ul style="list-style-type: none"> <li>Fox (<i>Vulpes vulpes</i>) – 2 individuals were recorded on the transect 3 at the Mill area.</li> <li>Wolf (<i>Canis lupus</i>) – 1 individual was recorded on the transect 3 downstream of the Tailings Pipeline.</li> </ul>

23.02.2017. Adjoining area	
<ul style="list-style-type: none"> <li>• Ibex (<i>Capra sibirica</i>)</li> </ul> <p>L – 2 individuals</p> <p>♀ young – 2 individuals</p> <p>♂ young – 2 individuals</p> <p>In total, 6 individuals were recorded on the transect 10 on the Barskoon pass.</p>	



Photo 4. Wolf recorded on the transect 2 at the Middle Diversion Ditch area

**4 mammal species consisting of 32 individuals were recorded on site in March. Wildlife census was not conducted on the adjoining area because of a thick snow cover.**

March 25.03.2017.	
<ul style="list-style-type: none"> <li>• Wolf – single fresh track was recorded on the transect 8 at the Petrov Lake area.</li> <li>• Hare – 5 fresh tracks were recorded on the transect 8 at the Petrov Lake area.</li> <li>• Argali (<i>Ovis ammon</i>), time - 10:29</li> </ul> <p>♀ adult – 6 individuals</p>	<ul style="list-style-type: none"> <li>• Argali (<i>Ovis ammon</i>), time - 10:00</li> </ul> <p>♀ adult – 5 individuals</p> <p>L – 3 individuals</p> <p>♀ young – 1 individual</p> <p>♂ young – 4 individuals</p> <p>♂ adult – 1 individual</p>

<p>L – 3 individuals</p> <p>♀ young – 3 individuals</p> <p>♂ young – 1 individuals</p> <p>In total, 13 individuals were recorded on the transect 7 in Lysyi gorge. 2 individuals were resting on the ground, the rest ones were grazing.</p> <p>When observed later, at 13:50, one argali was resting on the ground, the rest 12 argalis were grazing.</p> <ul style="list-style-type: none"> <li>• Snow Leopard (<i>Uncia uncia</i>) – fresh tracks were recorded on the transect 7 passing from the Lysyi gorge towards the Kuntor River headwaters.</li> </ul>	<p>In total, 14 individuals were recorded on the transect 3 at the Mill area. All the argalis observed were grazing.</p> <ul style="list-style-type: none"> <li>• Argali (<i>Ovis ammon</i>), time - 10:10</li> </ul> <p>♀ adult – 1 individual</p> <p>L – 2 individuals</p> <p>♀ young – 2 individuals</p> <p>The second group consisted of 5 individuals and was recorded on the transect 3 at the Mill area. All the argalis observed were grazing.</p> <ul style="list-style-type: none"> <li>• Argali (<i>Ovis ammon</i>), time - 10:20</li> </ul> <p>♀ adult – 6 individuals</p> <p>L – 1 individual</p> <p>♀ young – 1 individuals</p> <p>♂ young – 3 individuals</p> <p>The third group consisted of 11 individuals and was recorded on the transect 3 at the Mill area. One argali was resting on the ground, the rest ones were grazing.</p> <p>When observed later, at 13:20, four argalis were resting on the ground, the rest ones were not found.</p>
<b>26.03.2017.</b>	
<ul style="list-style-type: none"> <li>• Fox – 1 individual was recorded on the transect 1 at the Solid Domestic Landfill area.</li> <li>• Fox – 1 individual was recorded on the transect 1 on the dry beach at the TMF TD1 observation point area.</li> <li>• Fox – 1 individual was recorded on the transect 1 on the dry beach at the TMF TD3 observation point area.</li> <li>• Hare – 3 fresh tracks were recorded on the transect 7 at the Petrov Lake area.</li> </ul>	<ul style="list-style-type: none"> <li>• Argali (<i>Ovis ammon</i>), time - 14:00</li> </ul> <p>♀ adult – 1 individual</p> <p>L – 2 individuals</p> <p>♀ young – 1 individuals</p> <p>♂ young – 2 individuals</p> <p>In total, 6 individuals were recorded on the transect 3 at the Mill area. Two argalis were resting on the ground, the rest ones were grazing.</p> <ul style="list-style-type: none"> <li>• Argali (<i>Ovis ammon</i>), time - 11:00</li> </ul> <p>♀ adult – 5 individuals</p>

<ul style="list-style-type: none"> <li>• Fox – 1 individual was recorded on the transect 7 at the Petrov Lake area.</li> </ul> <p>Argali (<i>Ovis ammon</i>), time - 12:00</p> <p>♀ adult – 2 individuals</p> <p>♀ young – 1 individual</p> <p>♂ young – 3 individuals</p> <p>In total, 6 individuals were recorded on the transect 6 in the Lysyi gorge. One argali was resting on the ground, the rest ones were grazing. When observed later, at 17:00, all argalis were grazing.</p>	<p>L – 4 individuals</p> <p>♀ young – 1 individuals</p> <p>In total, 10 individuals were recorded on the transect 4 at the Kichi Sarytor area. Two argalis were resting on the ground, the rest ones were grazing. When observed later, at 17:27, four argalis were grazing. The rest ones were not found.</p>
<b>27.03.2017.</b>	
<ul style="list-style-type: none"> <li>• Hare – tracks were recorded on the transect 7 at the Petrov Lake area.</li> <li>• Argali (<i>Ovis ammon</i>), time - 9:40</li> </ul> <p>♀ adult – 5 individuals</p> <p>♂ – 4 individuals</p> <p>♀ young – 2 individuals</p> <p>In total, 11 individuals were recorded on the transect 6 at the Lysyi gorge area. All the argalis observed were grazing.</p>	

**3 mammal species consisting of 144 individuals were recorded on site in April. 2 species consisting of 181 individuals were recorded outside the mine on adjoining area.**

<b>April 10.04.2017.</b>	
<ul style="list-style-type: none"> <li>• Fox – 1 individual was recorded catching mice on the transect 1 at the TMF area.</li> <li>• Argali (<i>Ovis ammon</i>), time - 15:00</li> </ul> <p>♀ adult – 8 individuals</p> <p>♀ young – 2 individuals</p> <p>In total, 10 individuals were recorded on the transect 5 at the Workshop area. All the argalis observed were grazing.</p>	<ul style="list-style-type: none"> <li>• Argali (<i>Ovis ammon</i>), time - 15:15</li> </ul> <p>L – 2</p> <p>2 individuals were recorded on the transect 3 at the Mill area. When observed, the argalis were grazing.</p> <ul style="list-style-type: none"> <li>• Argali (<i>Ovis ammon</i>), time - 17:00</li> </ul> <p>♀ adult – 5 individuals</p> <p>♀ young – 6 individuals</p> <p>♂ young – 1 individual</p>

<ul style="list-style-type: none"> <li>• Hare – 1 individual was recorded on the transect 3 at the Camp area.</li> <li>• Fox – 2 single individuals were recorded on the transect 3 at the Camp area.</li> <li>• Argali (<i>Ovis ammon</i>), time - 17:30</li> </ul> <p>L – 1 individual</p> <p>♂ young – 1 individual</p> <p>In total, 2 individuals were recorded on the transect 6 in the Lysyi gorge. The Argalis observed were grazing.</p> <ul style="list-style-type: none"> <li>• Argali (<i>Ovis ammon</i>), time - 17:35</li> </ul> <p>♀ adult – 5 individuals</p> <p>♀ young – 2 individuals</p> <p>The second group was recorded on the transect 6 in the Lysiy gorge. In total, 7 argalis were recorded. All the argalis recorded were grazing.</p>	<p>♂ adult – 1 individual</p> <p>The second group was recorded on the transect 3 on the east of the Tailings Pipeline area. In total, 13 individuals were recorded. When observed, the argalis were grazing.</p> <ul style="list-style-type: none"> <li>• Argali (<i>Ovis ammon</i>), time - 17:10 at the distance of 300 meters from the second group.</li> </ul> <p>♀ adult – 9 individuals</p> <p>♀ young – 3 individuals</p> <p>In total, 12 argalis were recorded on the transect 3 on the east of the Tailings Pipeline area. When observed, the argalis were grazing.</p>
<b>Adjoining area</b>	
<ul style="list-style-type: none"> <li>• Grey Marmot – 6 individuals were recorded on the transect 10 along the road before 5<sup>th</sup> km.</li> <li>• Grey Marmot – 1 individual was recorded on the transect 10 along the road before 16<sup>th</sup> km.</li> </ul>	<ul style="list-style-type: none"> <li>• Grey Marmot – 122 individuals were recorded on the transect 11 between the Sook pass and the Taragay River.</li> <li>• Grey Marmot – 50 individuals were recorded on the transect 12 between the Taragay River and 10<sup>th</sup> km.</li> <li>• Hare – 2 individuals were recorded on the transect 12.</li> </ul>
<b>11.04.2017.</b>	
<ul style="list-style-type: none"> <li>• Fox – 2 individuals were recorded on the transect 1 at the TD1, 3 observation points area.</li> <li>• Argali (<i>Ovis ammon</i>), time - 9:50</li> </ul> <p>♀ adult – 5 individuals</p> <p>L – 1 individual</p> <p>♀ young – 1 individual</p>	<ul style="list-style-type: none"> <li>• Argali (<i>Ovis ammon</i>), time - 9:35</li> </ul> <p>♀ adult – 5 individuals</p> <p>L – 3 individuals</p> <p>♀ young – 3 individuals</p> <p>♂ young – 2 individuals</p> <p>In total, 13 individuals were recorded on the transect 3 at the Mill area. When observed,</p>

<p>In total, 7 individuals were recorded on the transect 6 in the Lysiy gorge. All the argalis recorded were resting on the ground.</p> <ul style="list-style-type: none"> <li>Argali (<i>Ovis ammon</i>), time - 9:55</li> </ul> <p>♀ adult – 4 individuals L – 2 individuals ♀ young – 1 individual</p> <p>The second group consisting of 7 individuals was recorded on the transect 6 at the Lysiy gorge area. All the argalis recorded were grazing.</p> <ul style="list-style-type: none"> <li>Argali (<i>Ovis ammon</i>), time - 15:15</li> </ul> <p>♀ adult – 1 individual L – 2 individuals ♀ young – 3 individuals ♂ young – 5 individuals ♂ adult – 3 individuals</p> <p>In total, 14 individuals were recorded on the transect 5 at the Contractor's Workshop area. When observed, the argalis were grazing.</p>	<p>the argalis were grazing.</p> <ul style="list-style-type: none"> <li>Argali (<i>Ovis ammon</i>) at the distance of 100 m from the first group.</li> </ul> <p>♀ adult – 12 individuals L – 2 individuals ♀ young – 3 individuals ♂ young – 4 individuals ♂ adult – 3 individuals</p> <p>In total, 24 individuals were recorded, 7 individuals were resting on the ground, and the rest ones were grazing.</p>
<b>12.04.2017.</b>	
<ul style="list-style-type: none"> <li>Argali (<i>Ovis ammon</i>), time - 9:50</li> </ul> <p>♀ adult – 5 individuals L – 1 individual ♀ young – 3 individuals ♂ young – 1 individual</p> <p>In total, 10 individuals were recorded on the transect 6 at the Lysiy gorge area. When observed, the argalis were grazing.</p> <ul style="list-style-type: none"> <li>Argali (<i>Ovis ammon</i>), time - 9:29</li> </ul> <p>L – 5 individuals</p> <p>In total, 3 individuals were recorded on the transect 3 at the Mill area. When observed, the argalis were grazing.</p>	<ul style="list-style-type: none"> <li>Argali (<i>Ovis ammon</i>), time - 16:30</li> </ul> <p>♀ adult – 4 individuals L – 6 individuals ♀ young – 2 individuals ♂ young – 1 individual ♂ adult –</p> <p>In total, 13 individuals were recorded on the transect 3 at the Mill area. When observed, the argalis were grazing.</p>



Photo 5. Argalis recorded on the transect 8 at the Crusher area

**2 mammal species consisting of 89 individuals were recorded on site in May. 1 species consisting of 31 individuals was recorded outside the mine on adjoining area.**

May 27.05.2017	
<ul style="list-style-type: none"> <li>• Grey Marmot – 4 individuals were recorded on the transect 1 at the TD2 observation point area.</li> <li>• Grey Marmot – 2 individuals were recorded on the transect 5 at the Kross-Ink Warehouses area.</li> <li>• Argali (<i>O. Ammon</i>), time - 10:00 ♀ adult – 1 L – 9 ♀ young – 1 In total, 11 individuals were recorded on the transect 4 in Sary-Tor gorge. All the argalis observed were grazing. <b>When observed later:</b> <ul style="list-style-type: none"> <li>• Argali (<i>O. ammon</i>)</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Argali (<i>O. ammon</i>) ♀ adult – 1 L – 4 Time - 15:58, the argalis were grazing.</li> <li>• Argali (<i>O. ammon</i>), time - 11:05. ♂ adult – 2 In total, 2 individuals were recorded on the transect 7 at the Petrov Lake area. The argalis were grazing.  When observed later: <ul style="list-style-type: none"> <li>• Argali (<i>O. ammon</i>) Time - 16:10, 1 argali was loafing, 3 argalis were grazing.</li> </ul> </li> </ul>

<p>♀ adult – 1 L – 9 ♀ young – 1 Time - 15:45, the argalis were grazing.</p> <p><b>Workshop and Mill area</b></p> <ul style="list-style-type: none"> <li>Argali (<i>O. ammon</i>)</li> </ul> <p>♀ adult – 6 L – 12 Time - 10:15, 4 argalis were loafing, 14 argalis were grazing.</p> <p><b>Another group</b></p> <p>♀ young – 2 (2 years) ♂ young – 1 (2 years), 1 (born last year). Time - 10:25, the argalis were grazing.</p>	<ul style="list-style-type: none"> <li>Argali (<i>O. ammon</i>), Time - 11:15.</li> </ul> <p>♂ adult – 4 individuals (2-3 year) 4 individuals were recorded on the transect 6 at the Lysiy gorge area.</p> <p>When observed, the argalis were grazing.</p> <ul style="list-style-type: none"> <li>Argali (<i>O. ammon</i>), Time - 16:15.</li> </ul> <p>♀ adult – 3 L – 3 ♂ young – 2 ♂ adult – 2 10 individuals were recorded on the transect 6 at the Lysiy gorge area.</p> <p>When observed, the argalis were grazing.</p> <ul style="list-style-type: none"> <li>Grey Marmot – 8 individuals were recorded on the transect 2 at the WTP area.</li> <li>Fox – 1 individual was recorded on the transect 2 at the WTP area.</li> </ul>
<b>28.05.2017. Adjoining area (outside the mine)</b>	
<ul style="list-style-type: none"> <li>Grey Marmot – 5 individuals were recorded on the transect 10 along the road before the 15<sup>th</sup> km.</li> <li>Grey Marmot – 4 individuals were recorded on the transect 10 before the Barskoon pass.</li> </ul>	<ul style="list-style-type: none"> <li>Grey Marmot – 20 individuals were recorded on the transect 11 between the Sook pass and the Taragay River bridge.</li> <li>Grey Marmot – 2 individuals were recorded on the transect 12, 10 km to the east from the Taragay River bridge.</li> </ul>
<b>At the mine</b>	
<ul style="list-style-type: none"> <li>Argali (<i>O. ammon</i>), Time - 14:29.</li> </ul> <p>♀ adult – 2 L – 2 In total, 4 individuals were recorded on the transect 6 at the Explosives Magazine area (western slope). When observed, the argalis were grazing.</p> <ul style="list-style-type: none"> <li>Argali (<i>O. ammon</i>), Time - 14:31.</li> </ul>	<ul style="list-style-type: none"> <li>Argali (<i>O. ammon</i>), Time - 14:45.</li> </ul> <p>♀ adult – 4 L – 3 In total, 7 individuals were recorded on the transect 3 at the Mill area. Females were grazing; lambs were loafing.</p> <ul style="list-style-type: none"> <li>Argali (<i>O. ammon</i>), Time - 14:45, the second group</li> </ul>

<p>♀ adult – 2 L – 2</p> <p>In total, 4 individuals were recorded on the transect 6 at the Explosives Magazine area (western slope).</p> <ul style="list-style-type: none"> <li>Argali (<i>O. ammon</i>), Time - 14:37.</li> </ul> <p>♀ young – 4 (born last year)</p> <p>In total, 4 individuals were recorded on the transect 3 between the Tailings Pipeline orifice stations 1 and 2. When observed, the argalis were grazing.</p>	<p>♀ adult – 7 L – 6</p> <p>In total, 13 individuals were recorded on the transect 3 at the Mill area. Females were grazing; lambs were loafing.</p>
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Photo 6. Fox recorded on the transect 3 at the Camp area

**4 mammal species consisting of 139 individuals were recorded on site in June. 2 species consisting of 141 individuals were recorded outside the mine on adjoining area.**

<b>June 21.06.2017. Cloudy, poor visibility.</b>	
<ul style="list-style-type: none"> <li>Fox – 1 individual was recorded on the transect 5 at the Kross-Ink Warehouses area.</li> <li>Argali (<i>O. Ammon</i>), Time - 17:03</li> </ul> <p>♀ adult – 10</p>	<ul style="list-style-type: none"> <li>Argali (<i>O. Ammon</i>), Time - 17:10</li> </ul> <p>♀ adult – 2 L – 2</p> <p>In total, 14 individuals were recorded on the transect 6 at the Explosives Magazine area.</p>

<p>L – 4</p> <p>In total, 14 individuals were recorded on the transect 3 at the end of the Tailings Pipeline. When observed, the argalis were grazing.</p>	<p>When observed, the argalis were grazing.</p> <ul style="list-style-type: none"> <li>• Grey Marmot – 4 individuals were recorded on the transect 7 at the Petrov Lake area.</li> </ul>
<p align="center"><b>22.06.2017. (Cloudy)</b></p>	
<ul style="list-style-type: none"> <li>• Argali (<i>O. Ammon</i>), Time - 9:07. ♂ adult – 2 (5-6 year)</li> </ul> <p>In total, 2 individuals were recorded on the transect 4 at the Sary-Tor gorge. When observed, the argalis were grazing.</p> <ul style="list-style-type: none"> <li>• Argali (<i>O. Ammon</i>), Time - 13:32. Another group ♀ young – 3 (2-3 year), 2 (born last year)</li> </ul> <p>In total, 3 individuals were recorded on the transect 4 at the Sary-Tor gorge. When observed, the argalis were grazing.</p> <ul style="list-style-type: none"> <li>• Argali (<i>O. Ammon</i>), Time - 9:44. ♂ adult – 5 (5-6 year)</li> </ul> <p>In total, 5 individuals were recorded on the transect 6 on the south of the water intake area. When observed, 1 argali was grazing, 4 argalis were loafing.</p> <ul style="list-style-type: none"> <li>• Fox – 1 individual was recorded on the transect 1 at the WTP area.</li> <li>• Grey Marmot – 2 individuals were recorded on the transect 6 at the WTP area.</li> <li>• Grey Marmot – 8 adults, 3 young marmots were recorded on the transect 6 at the Explosives Magazine area.</li> <li>• Grey Marmot – 10 individuals were recorded on the transect 7 before the Petrov Lake.</li> <li>•</li> </ul>	<ul style="list-style-type: none"> <li>• Grey Marmot – 5 individuals were recorded on the transect 8 at the Biodegradable Waste Processing Plant.</li> <li>• Fox – 1 individual was recorded on the transect 8 at the Biodegradable Waste Processing Plant.</li> <li>• Wolf – 1 individual (observed at 7 a.m.) was recorded on the transect 8 at the Biodegradable Waste Processing Plant.</li> <li>• Argali (<i>O. Ammon</i>), Time - 14:14. ♀ adult – 3 L – 3 ♀ young – 1 (born last year)</li> </ul> <p>In total, 7 individuals were recorded on the transect 3 at the end of the Tailings Pipeline. When observed, the argalis were grazing.</p> <p><b>When observed later:</b></p> <p><b>Sary-Tor</b></p> <ul style="list-style-type: none"> <li>• Argali (<i>O. Ammon</i>) ♂ adult – 5 argalis were grazing, time - 14:00</li> </ul> <p><b>Explosives Magazine</b></p> <ul style="list-style-type: none"> <li>• Argali (<i>O. Ammon</i>) ♀ adult – 4 L – 5</li> </ul> <p>Time - 14:25, the argalis were grazing.</p>

<b>23.06.2017. Adjoining area (outside the mine)</b>	
<ul style="list-style-type: none"> <li>Fox – 1 individual was recorded on the transect 12 on the road from the K-15 Security Check Point to W1.5.1 bridge.</li> <li>Grey Marmot – 29 individuals were recorded on the transect 12 on the census route before the confluence of Kumtor and Taragay Rivers.</li> </ul>	<ul style="list-style-type: none"> <li>Grey Marmot – 67 individuals were recorded on the transect 12 on the census route before the Taragay River bridge.</li> <li>Grey Marmot – 54 individuals were recorded on the transect 11 on the census route from the bridge to the Sook pass.</li> </ul>
<b>At the mine</b>	
<ul style="list-style-type: none"> <li>Argali (<i>O. Ammon</i>), Time - 15:40. ♀ adult – 6 L – 4 ♂ adult – 3 (4-5 year)</li> </ul> <p>In total, 13 individuals were recorded on the transect 4 in the Sary-Tor gorge. When observed, females and lambs were grazing, and males were loafing.</p> <ul style="list-style-type: none"> <li>Fox – 1 individual was recorded on the transect 3 at the Tailings Pipeline area.</li> <li>Argali (<i>O. Ammon</i>), Time - 16:25. ♀ adult – 4 L – 1</li> </ul> <p>In total – 5 individuals were recorded at the WTP area.</p> <p>When observed, the argalis were grazing.</p>	<ul style="list-style-type: none"> <li>Argali (<i>O. Ammon</i>), Time -16:30. ♀ adult – 7 L – 2</li> </ul> <p>In total, 9 individuals were recorded on the transect 6 at the Explosives Magazine area. When observed, 2 argalis were grazing, and the rest ones were loafing.</p> <ul style="list-style-type: none"> <li>Grey Marmot – 8 individuals were recorded on the transect 6 on the north of the Camp.</li> </ul>
<b>24.06.2017.</b>	
<ul style="list-style-type: none"> <li>Fox – 2 individuals were recorded on the transect 2 at the Kumtor Bridge area.</li> <li>Argali (<i>O. Ammon</i>), Time - 9:16. ♀ adult – 8 L – 2 ♂ adult – 2 (3-4 year)</li> </ul> <p>In total, 12 individuals were recorded on the transect 4 at the Sary-Tor gorge.</p>	<p>Another group</p> <ul style="list-style-type: none"> <li>Argali (<i>O. Ammon</i>), Time - 10:11. ♀ adult – 4 L – 4 ♂ young – 2 (born last year) ♂ adult – 2 (3 year)</li> </ul> <p>In total, 12 individuals were recorded on the transect 5 at the Lysiy gorge area.</p>

<p>When observed, the argalis were grazing.</p> <ul style="list-style-type: none"> <li>Argali (<i>O. Ammon</i>), Time - 10:05.</li> </ul> <p>♂ adult – 6 (4-5 year)</p> <p>In total, 6 individuals were recorded on the transect 5 at the Lysiy gorge area.</p> <p>When observed, the argalis were grazing (ran 100 m away).</p>	<p>When observed, the argalis were grazing.</p> <ul style="list-style-type: none"> <li>Argali (<i>O. Ammon</i>)</li> </ul> <p>♀ adult – 14</p> <p>L – 7</p> <p>♀ young – 1</p> <p>In total, 24 individuals were recorded on the transect 5 at the Lysiy gorge area.</p> <p>When observed, the argalis were grazing.</p> <p><b>When observed later:</b></p> <p><b>Sary-Tor gorge</b></p> <ul style="list-style-type: none"> <li>Argali (<i>O. Ammon</i>)</li> </ul> <p>♂ adult – 5 (2-3 year)</p> <p>Time - 13:58, the argalis were grazing.</p>
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**3 mammal species consisting of 121 individuals were recorded on site in July. 2 species consisting of 195 individuals were recorded outside the mine on adjoining area.**

<b>July 15.07.2017. Adjoining area (outside the mine)</b>	
<ul style="list-style-type: none"> <li>Grey Marmot – 4 individuals were recorded on the transect 10 on the census route to the 14<sup>th</sup> km.</li> <li>Argali (<i>O. Ammon</i>) – 10 individuals were recorded on the transect 10 on the census route on the 24<sup>th</sup> km, on the northern slope.</li> <li>Grey Marmot – 2 individuals were recorded on the transect 10 on the census route to the Barskoon pass.</li> </ul>	<ul style="list-style-type: none"> <li>Grey Marmot – 34 individuals were recorded on the transect 11 on the census route through the Sook pass.</li> <li>Grey Marmot – 81 individuals were recorded on the transect 11 on the census route to the Taragay River.</li> <li>Grey Marmot – 64 individuals were recorded on the transect 12 on the census route from the Taragay bridge to 9 km to the east.</li> </ul>
<b>At the Kumtor mine (on site)</b>	
<ul style="list-style-type: none"> <li>Argali (<i>O. Ammon</i>), Time - 15:30.</li> </ul> <p>♀ adult – 5</p>	<ul style="list-style-type: none"> <li>Argali (<i>O. Ammon</i>) Время 16:02.</li> </ul> <p>♀ adult – 3</p>

<p>♀ young – 1</p> <p>In total, 7 individuals were recorded on the transect 4 at the Sary-Tor gorge area. All the argalis observed were loafing.</p> <ul style="list-style-type: none"> <li>• Fox – 1 individual was recorded on the transect 5 at the Central Warehouse area.</li> <li>• Argali (<i>O. Ammon</i>), Time - 16:02.</li> </ul> <p>♀ adult – 12</p> <p>L – 7</p> <p>♀ young – 3</p> <p>♂ young – 2</p> <p>♂ adult – 5</p> <p>In total, 29 individuals were recorded on the transect 3 at the Tailings Pipeline area. Some of the observed argalis were loafing, and the rest ones were grazing.</p>	<p>♀ young – 1</p> <p>♂ adult – 6</p> <p>Second group. In total, 10 individuals were recorded on the transect 3 at the Tailings Pipeline area. Some of the observed argalis were loafing, and the rest ones were grazing.</p> <ul style="list-style-type: none"> <li>• Argali (<i>O. Ammon</i>), Time - 16:15</li> </ul> <p>♀ young – 1</p> <p>♂ young – 1</p> <p>In total, 2 individuals were recorded on the transect 6 at the Lysiy gorge area. All the argalis observed were grazing. One female was killed by wolf.</p> <ul style="list-style-type: none"> <li>• Grey Marmot – 25 individuals were recorded on the transect 7 at the Petrov Lake area.</li> <li>• Grey Marmot – 15 individuals were recorded on the transect 8 at the Biodegradable Waste Processing Plant area.</li> </ul>
<b>16.07.2017.</b>	
<ul style="list-style-type: none"> <li>• Fox – 1 individual was recorded on the transect 8 at the Biodegradable Waste Processing Plant area.</li> <li>• Grey Marmot – 20 individuals were recorded on the transect 1 at the TMF area.</li> <li>• Argali (<i>O. Ammon</i>), Time - 11:20</li> <li>• ♀ adult – 5</li> </ul> <p>L – 4</p> <p>♀ young – 1</p> <p>In total, 10 individuals were recorded on the transect 4 at <b>the old Security Check Point</b> area. All the argalis observed were grazing.</p>	<p><b>Mill area</b></p> <ul style="list-style-type: none"> <li>• Argali (<i>O. Ammon</i>)</li> </ul> <p>♀ adult – 6</p> <p>L – 2</p> <p>♀ young – 2</p> <p>♂ young – 1</p> <p>Time - 13:49, the argalis were loafing</p> <ul style="list-style-type: none"> <li>• Grey Marmot – 12 individuals were recorded on the transect 3 on the north of the Camp area.</li> <li>• Argali (<i>O. Ammon</i>), Time - 16:15</li> </ul> <p>♀ adult – 14</p> <p>L – 2</p>

<p><b><u>When observed later at 13:35, the whole group was loafing.</u></b></p> <p><b>Sary-Tor gorge</b></p> <ul style="list-style-type: none"> <li>Argali (<i>O. Ammon</i>) ♀ adult – 1</li> </ul> <p>Time - 13:26, the argali was loafing.</p>	<p>In total, 29 individuals were recorded on the transect 6 at <b>the Lysiy gorge</b> area. All the argalis observed were loafing.</p> <ul style="list-style-type: none"> <li>Argali (<i>O. Ammon</i>)</li> </ul> <p>♀ adult – 1</p> <p>In total, 1 individual was recorded on the transect 7 at the Petrov Lake area. The argali was loafing.</p>
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**4 mammal species consisting of 127 individuals were recorded on site in September.**  
**1 species consisting of 25 individuals was recorded outside the mine on adjoining area.**

<b>September 03.09.2017. At the mine</b>	
<ul style="list-style-type: none"> <li>Grey Marmot – 8 individuals were recorded on the transect 1 at the TMF area.</li> </ul>	<ul style="list-style-type: none"> <li>Argali (<i>O. ammon</i>), Time - 10:17</li> </ul> <p>♀ adult – 7</p> <p>L – 5</p> <p>♀ young – 1</p> <p>In total, 13 individuals were recorded on the transect 6 at the new WTP area. When observed, all the argalis were grazing and only 4 argalis were loafing.</p>
<b>Adjoining area (outside the mine)</b>	
<ul style="list-style-type: none"> <li>Grey Marmot – 24 individuals were recorded on the transect 12 on the census route after the confluence of the Taragay and the Kumtor Rivers.</li> </ul>	<ul style="list-style-type: none"> <li>Grey Marmot – 1 individual was recorded on the transect 11 on the census route on the 15<sup>th</sup> km after the Sook pass.</li> </ul>
<b>03.09.2017. At the mine</b>	
<ul style="list-style-type: none"> <li>Fox – 2 individuals were recorded on the transect 2 at the WTP area.</li> <li>Grey Marmot – 2 individuals were recorded on the transect 1 at the TMF area.</li> <li>Grey Marmot – 4 individuals were</li> </ul>	<p>Argali (<i>O. ammon</i>), Time - 11:15.</p> <p>♀ adult – 4 individuals were recorded on the transect 4 at the Sary-Tor gorge area. When observed, all the argalis were grazing.</p> <ul style="list-style-type: none"> <li>Fox – 1 individual was recorded on the transect 4 at the Sary-Tor gorge area.</li> </ul>

<p>recorded on the transect 9 at the Upper Diversion Ditch area.</p> <ul style="list-style-type: none"> <li>Argali (<i>O. Ammon</i>), Time - 9:32</li> </ul> <p>♀ adult – 5</p> <p>L – 2</p> <p>♂ adult – 1 (3-4 year)</p> <p>In total, 8 individuals were recorded on the transect 3 at the Tailings Pipeline area. When observed, all the argalis were grazing.</p> <ul style="list-style-type: none"> <li>Grey Marmot – 9 individuals were recorded on the transect 6 at the Lysiy gorge area.</li> <li>Argali (<i>O. ammon</i>), Time - 10:00.</li> </ul> <p>The argalis were at a far distance, therefore, only group size was recorded. Three groups were recorded - 10 individuals, 20 individuals, 16 individuals.</p> <p>In total, 46 individuals were recorded on the slope to the north of the Petrov Lake. The argalis were grazing.</p> <ul style="list-style-type: none"> <li>Grey Marmot – 10 individuals were recorded on the transect 7 at the Petrov Lake area.</li> </ul>	<ul style="list-style-type: none"> <li>Wolf – 1 individual was recorded on the transect 2 to the east of the WTP.</li> <li>Grey Marmot – 2 individuals were recorded on the transect 8 at the Upper Diversion Ditch area.</li> <li>Fox – 1 individual was recorded on the transect 8 at the Upper Diversion Ditch area.</li> <li>Argali (<i>O. ammon</i>), Time - 15:22</li> </ul> <p>♀ adult – 6</p> <p>L – 1</p> <p>♀ young – 2</p> <p>♂ young – 3</p> <p>♂ adult – 1</p> <p>In total, 13 individuals were recorded on the transect 3 at the Camp area. When observed, all the argalis were loafing.</p> <ul style="list-style-type: none"> <li>Fox – 1 individual was recorded on the transect 3 at the Camp area.</li> </ul>
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**2 mammal species consisting of 214 individuals were recorded on site in October. 1 species consisting of 22 individuals was recorded outside the mine on adjoining area.**

October 2017 13.10.2017	
<ul style="list-style-type: none"> <li>Fox – 1 individual was recorded on the transect 8 at the Upper Diversion Ditch area.</li> <li>Argali (<i>O. ammon</i>), Time - 9:31.</li> </ul> <p>First group</p> <p>♀ adult – 4</p>	<ul style="list-style-type: none"> <li>Argali (<i>O. ammon</i>), Time - 13:25</li> </ul> <p>11 individuals were grazing on the transect 7 on the west of the Petrov Lake.</p> <ul style="list-style-type: none"> <li>Argali (<i>O. ammon</i>), Time - 14:15.</li> </ul> <p>15 individuals were grazing on the transect 3 at the Tailings Pipeline area.</p>

<p>♀ young – 2</p> <p>L ♂ – 2.</p> <p>In total, 8 individuals were recorded on the transect 7 on the west of the Petrov Lake. When observed, all the argalis were grazing. When we came up 50 m closer, the argalis began to move away from us.</p> <ul style="list-style-type: none"> <li>Argali (<i>O. ammon</i>), Time - 9:32.</li> </ul> <p>Second group</p> <p>♀ adult – 11</p> <p>L – 6</p> <p>♀ young – 2</p> <p>In total, 19 individuals were recorded on the transect 7 on the northern side of the southern slope of the Petrov Lake. When observed, all the argalis were grazing.</p> <ul style="list-style-type: none"> <li>Argali (<i>O. ammon</i>), Time - 9:35.</li> </ul> <p>Third group</p> <p>♀ adult – 3</p> <p>L – 8</p> <p>In total, 11 individuals were recorded on the transect 7 at the Petrov Lake area. When observed, all the argalis were grazing.</p> <ul style="list-style-type: none"> <li>Argali (<i>O. ammon</i>), time - 11:01.</li> </ul> <p>♀ adult – 7</p> <p>L – 4</p> <p>♀ young – 1</p> <p>♂ young – 2 (3 year), 1 (born last year)</p> <p>♂ adult – 1</p> <p>In total, 15 individuals were recorded on the transect 3 to the west of the Camp. When observed, all the argalis were grazing.</p> <ul style="list-style-type: none"> <li>Argali (<i>O. ammon</i>), Time - 13:06, the argalis were resting on the ground and</li> </ul>	<p><b>When observed later:</b></p> <p><b>Sary-Tor gorge</b></p> <ul style="list-style-type: none"> <li>Argali (<i>O. ammon</i>), Time - 15:53</li> </ul> <p>8 individuals were grazing.</p> <p>9 individuals were grazing in the valley at the Sary-Tor gorge area.</p> <p>At 15:56, 14 individuals were recorded resting on the ground, 2 individuals were recorded grazing.</p> <p><b>Waste Dumps</b></p> <p>Argali (<i>O. ammon</i>)</p> <ul style="list-style-type: none"> <li>♀ adult – 3</li> </ul> <p>L – 4</p> <p>♀ young – 1</p> <p>♂ young – 1</p> <p>Time - 14:00, the argalis were grazing.</p> <p><b>Fuel Farm</b></p> <ul style="list-style-type: none"> <li>Argali (<i>O. ammon</i>)</li> <li>♀ adult – 8</li> </ul> <p>L – 5</p> <p>♀ young – 3</p> <p>♂ young – 2 (3 year)</p> <p>♂ adult – 2</p> <p>Time - 16:05, 4 individuals were loafing, and the rest ones were grazing.</p> <p><b>Petrov Lake</b></p> <ul style="list-style-type: none"> <li>Argali (<i>O. ammon</i>), Time - 16:26.</li> </ul> <p>8 individuals were loafing.</p>
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<p>grazing. The group size was 12 individuals. The argalis were recorded on the transect 4 at the Sary-Tor gorge area.</p> <ul style="list-style-type: none"> <li>Argali (<i>O. ammon</i>) – 14 individuals were grazing. Recorded on the transect 4 on the western slope of the Sary-Tor gorge.</li> </ul>	
<b>14.10.2017.</b>	
<ul style="list-style-type: none"> <li>Argali (<i>O. ammon</i>), Time - 9:30. ♀ adult – 3 ♀ young – 2 ♂ young – 3 In total, 8 individuals were recorded on the transect 2 at the pond area near the WTP. When observed, all the argalis were grazing.</li> <li>Argali (<i>O. ammon</i>) ♀ young – 1 The argali was recorded at the Petrov Lake area. When we came up closer, the argali ran away in the eastern direction.</li> <li>Argali (<i>O. ammon</i>), Time - 9:45. First group ♀ adult – 8 L – 8, including 2 males ♀ young – 2 ♂ young – 1 (2-3 year) In total, 19 individuals were recorded on the transect 3 to the west of the Tailings Pipeline area. When observed, all the argalis were grazing.</li> <li>Argali (<i>O. ammon</i>), Time - 9:54. Second group ♀ adult – 10 L – 4 ♀ young –</li> </ul>	<ul style="list-style-type: none"> <li>Argali (<i>O. ammon</i>) ♀ adult – Я – ♀ young – ♂ young – ♂ adult – In total, 27 individuals were recorded on the transect 5 at the foothill of the Sary-Tor gorge. 4 individuals were resting on the ground, and the rest ones were grazing. Argali (<i>O. ammon</i>), Time - 10:34. ♀ adult – 11 L – 5 ♀ young – 2 ♂ adult – 2 In total, 20 individuals were recorded on the transect 4 at the old Security Check Point area. All the argalis were loafing.</li> <li>Argali (<i>O. ammon</i>), Time - 10:15. ♀ adult – 7 L – 3 ♀ young – 3 In total, 13 individuals were recorded on the transect 4 at the Sary-Tor gorge area. All the argalis were grazing.</li> <li>Fox – 1 individual was recorded on the</li> </ul>

<p>♂ young – 3 (2 year), 1 (3 year)</p> <p>The argalis were recorded on the transect 3 at the Tailings Pipeline area. When observed, 3 individuals were grazing, and the rest ones were resting on the ground.</p> <ul style="list-style-type: none"> <li>• Argali (<i>O. ammon</i>), Time - 9:50.</li> </ul> <p>♀ adult – 6</p> <p>L – 4</p> <p>In total, 10 individuals were recorded on the transect 3 behind the Tailings Pipeline. When observed, 2 individuals were resting on the ground, and the rest ones were grazing.</p> <ul style="list-style-type: none"> <li>• Fox – 1 individual was recorded on the transect 3 at the Upper Tailings Pipeline area.</li> <li>• Argali (<i>O. ammon</i>), Time - 10:25.</li> <li>• ♀ adult – 13</li> </ul> <p>L – 10</p> <p>♀ young – 1</p> <p>♂ young – 2</p> <p>♂ adult – 5 (3-4 year)</p> <p>In total, 31 individuals were recorded on the transect 3 at the Camp area. When observed, all the argalis were grazing.</p>	<p>transect 4 at the Sary-Tor gorge area.</p>
<p><b>Outside the mine</b></p>	
<ul style="list-style-type: none"> <li>• Argali (<i>O. ammon</i>), Time - 10:43,</li> </ul> <p>First group was recorded at the distance of 3-4 km. Age and sex was impossible to determine. In total, 12 individuals were recorded on the transect 10, moving in the northern direction after the K-15 Security Checkpoint.</p>	<ul style="list-style-type: none"> <li>• Argali (<i>O. ammon</i>)</li> </ul> <p>Second group</p> <p>♀ adult – 6</p> <p>L – 3</p> <p>♀ young – 1</p> <p>♂ young –</p> <p>♂ adult – 10</p> <p>In total, 20 individuals were recorded on the transect 10. All the argalis were resting on the</p>

	ground.
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**3 mammal species consisting of 129 individuals were recorded on site in November.**

**Wildlife census outside the mine on adjoining areas was not conducted.**

November 05.11.2017. Weather: clear	
<ul style="list-style-type: none"> <li>• Fox – 2 individuals were recorded on the transect 1 to the north of the TD3 observation point.</li> <li>• Argali (<i>O. ammon</i>), Time - 8:48.</li> </ul> <p>L – 2 individuals</p> <p>♂ adult – 2 individuals (3-4 year)</p> <p>In total, 4 individuals were recorded on the transect 6 at the Lysiy gorge area. All the argalis were grazing.</p> <ul style="list-style-type: none"> <li>• Argali (<i>O. ammon</i>), Time - 10:03.</li> </ul> <p>♀ adult –</p> <p>L –</p> <p>♀ young –</p> <p>♂ young – 4 (3-4 year)</p> <p>♂ adult – 3 (3-4 year)</p> <p>In total, 7 individuals were recorded on the transect 7 on the northeastern slope of the Petrov Lake. All the argalis were grazing.</p> <ul style="list-style-type: none"> <li>• Argali (<i>O. ammon</i>), Time - 10:15</li> </ul> <p>♀ adult – 5</p> <p>L – 4</p> <p>♀ young – 3</p> <p>♂ young – 1 (2 year)</p> <p>♂ adult – 2 (6-7 year)</p> <p><b>In total</b>, 15 individuals were recorded on the transect 7 on the northwestern slope of the Petrov Lake. All the argalis were grazing.</p>	<ul style="list-style-type: none"> <li>• Fox – 2 individuals were recorded on the transect 2 at the WTP area.</li> <li>• Wolf – 1 individual was recorded on the transect 2 at the WTP area.</li> <li>• Argali (<i>O. ammon</i>), Time - 10:30.</li> </ul> <p>♀ adult – 7 individuals</p> <p>L – 4 individuals</p> <p>♀ young – 2 individuals</p> <p>♂ young –</p> <p>♂ adult – 4 (4-5 year)</p> <p>In total, 17 individuals were recorded on the transect 3 opposite to the Camp. 5 individuals were resting on the ground, and the rest ones were grazing.</p> <ul style="list-style-type: none"> <li>• Argali (<i>O. ammon</i>), Time - 16:00.</li> </ul> <p>♀ adult – 8 individuals</p> <p>L – 2 individuals</p> <p>♂ adult – 2 (5-6 year)</p> <p>In total, 12 individuals were recorded on the transect 5 at the foothill area of the Sary-Tor gorge. All the argalis were grazing.</p> <p><b>Another group at the same area</b></p> <p>Argali (<i>O. ammon</i>)</p> <p>♀ adult – 11</p> <p>L – 9</p> <p>In total, 20 individuals were recorded on the transect 5 at the foothill area of the Sary-Tor gorge. All the argalis were grazing.</p>

<b>November 06.11.2017. Weather: cloudy, snow, visibility 100 m</b>	
<ul style="list-style-type: none"> <li>Fox – 2 individuals were recorded on the transect 1 on the north of the TMF.</li> <li>Wolf – 1 individual was recorded on the transect 1 at the Solid Domestic Landfill.</li> <li>Argali (<i>O. ammon</i>), Time - 9:00</li> </ul> <p>♀ adult – 1 individual L – 1 individual ♂ adult – 4 (7-8 year)</p> <p>In total, 6 individuals were recorded on the transect 6 opposite to the Water Treatment Plant. The argalis were grazing.</p>	<p>Argali (<i>O. ammon</i>), Time - 11:03.</p> <p>♀ adult – 10 individuals L – 4 individuals ♂ adult – 9 (5-6 year)</p> <p>In total, 23 individuals were recorded on the transect 7 on the north of the TMF. 5 individuals were resting on the ground, and the rest ones were grazing.</p>

**3 mammal species consisting of 191 individuals were recorded on site in December.**

**Wildlife census outside the mine on adjoining areas was not conducted.**

<b>December 08.12.2017.</b>	
<ul style="list-style-type: none"> <li>Fox – 4 individuals were recorded on the transect 2 at the WTP area.</li> <li>Wolf – 4 individuals were recorded on the transect 2 at the WTP area.</li> <li>Argali (<i>O. ammon</i>), Time – 9:20.</li> </ul> <p>♀ adult – 23 L – 16 ♀ young – 12 ♂ young – 6 ♂ adult – 5</p> <p>In total, 62 individuals were recorded on the transect 3 at the northern slope area opposite to the Camp. 12 individuals were resting on the ground, and the rest ones were grazing.</p> <ul style="list-style-type: none"> <li>Argali (<i>O. ammon</i>), Time - 10:03</li> </ul>	<ul style="list-style-type: none"> <li>Argali (<i>O. ammon</i>), Time - 14:10.</li> </ul> <p>♀ adult – 5 L – 2 ♀ young – 2 ♂ adult – 1</p> <p>In total, 10 individuals were recorded on the transect 4 at the Kichi Sary-Tor gorge area. The argalis were grazing.</p> <ul style="list-style-type: none"> <li>Argali (<i>O. ammon</i>), Time - 15:48.</li> </ul> <p>♀ adult – 12 L – 9 ♀ young – 7 ♂ young – 2 ♂ adult – 4</p> <p>In total, 34 individuals were recorded on the transect 2 on the slopes to the north of the</p>

<p>♀ adult – 6 L – 3 ♀ young – 2 ♂ adult – 2 (4 year)</p> <p>In total, 13 individuals were recorded on the transect 7 on the northeastern slope of the Petrov Lake. All the argalis were grazing.</p>	<p>TD3 observation point. The argalis were grazing.</p>
<b>09.12.2017</b>	
<ul style="list-style-type: none"> <li>Argali (<i>O. ammon</i>), Time - 9:15.</li> </ul> <p>♀ adult – 2 L – 2</p> <p>In total, 4 individuals were recorded on the transect 5 at the Central Warehouse and Fuel Farm areas. The argalis were grazing.</p> <p>Argali (<i>O. ammon</i>), Time - 10:30.</p> <p>♀ adult – 4 L – 2 ♀ young – 1 ♂ adult – 1</p> <p>In total, 8 individuals were recorded on the transect 4 at the Kichi Sary-Tor gorge area. The argalis were grazing.</p>	<ul style="list-style-type: none"> <li>Argali (<i>O. ammon</i>), Time - 13:20.</li> </ul> <p>♀ adult – 2 L – 2</p> <p>In total, 4 individuals were recorded on the transect 5 <b>on the southern side of the K-15 Security Check Point</b>. The argalis were loafing.</p> <ul style="list-style-type: none"> <li>Fox – 4 individuals were recorded on the transect 2 at the WTP area.</li> <li>Wolf – 5 individuals were recorded on the transect 2 at the WTP area.</li> <li>Wolf – tracks of 2 individuals were recorded on the transect 8 at the Biodegradable Waste Processing Plant area.</li> </ul>
<b>10.12.2017</b>	
<ul style="list-style-type: none"> <li>Argali (<i>O. ammon</i>), Time - 8:30.</li> </ul> <p>♀ adult – 8 individuals L – 3 individuals ♂ adult – 2 (5-6 year)</p> <p>In total, 13 individuals were recorded on the transect 5 at the foothill area of the Sary-Tor gorge. All the argalis were grazing.</p>	<ul style="list-style-type: none"> <li>Argali (<i>O. ammon</i>), Time - 9:30.</li> </ul> <p>♀ adult – 8 individuals L – 3 individuals ♀ young – 4 individuals ♂ young – 3 individuals ♂ adult – 2 (5-6 year)</p> <p>In total, 20 individuals were recorded on the transect 8 on the slope to the west of the Petrov Lake. All the argalis were grazing.</p> <ul style="list-style-type: none"> <li>Wolf – 4 individuals were recorded on the</li> </ul>

	transect 8 on the slope to the west of the Petrov Lake.
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**Table 5**

**General list of mammal species recorded at the Kumtor mine and on adjoining area in 2017**

	Species	Distribution	Species listed in the KR Red Book
1	<i>Canis lupus</i> L. – Wolf	<b>sedentary</b>	
2	<i>Vulpes vulpes</i> (L.) – Common Fox	<b>sedentary</b>	
3	<i>Martes foina</i> (Erxleben) – Rock Marten	<b>sedentary</b>	+
4	<i>Mustela erminea</i> L. – Common Weasel	<b>sedentary</b>	
5	<i>Ovis ammon</i> L. – Argali	<b>sedentary</b>	+
6	<i>Capra sibirica</i> Pall. – Siberian Ibex	<b>sedentary</b>	
7	<i>Marmota baibacina</i> Kastschenko – Grey Marmot	<b>sedentary, hibernating</b>	
8	<i>Lepus lehmanni</i> Sev. – Tolai Hare	<b>sedentary</b>	

**Conclusions:**

**Birds**

During the census period in 2017, 59 bird species, including 4 species listed in the KR Red Book - Golden Eagle, Himalayan Griffon, Lammergeier and Saker, were identified at the Kumtor mine and on adjoining area. **The dominant species** include Common Raven and Brandt's Rosy-Finch. **The nesting species** include Brandt's Rosy-Finch, White Wagtail, Tree Pipit, Water Pipit, Brown Accentor, Alpine Accentor, Snow Finch, Isabelline Wheatear, Black Redstart, Guldenstadt's Redstart, Horned Lark, Common Raven, Red-billed Chough and Alpine Chough. **The rare species** include Great Crested Grebe, Great Egret, Grey Heron, Goosander, Lesser Sand Plover, Common Plover, Green Sandpiper, Redshank, Common Sandpiper, Red-necked Phalarope, Black-headed Gull, Common Tern, Little Owl, Hoopoe, Red-backed Shrike,

Greenish Leaf Warbler, Bluethroat and Stonechat. The rest species are common and observed only during spring and autumn migration.

During the census period, the following species were recorded at the Kumtor mine area for the first time: Goosander, Common Plover, Red-necked Phalarope, Black-headed Gull and Common Tern.

All recorded aquatic birds used the Tailings Management Facility as a temporary rest habitat during daylight hours.

In spring, the Tailings Pond is covered with ice until mid-May. Spring migration of most aquatic birds continues until mid-May. Therefore, the tailings pond cannot serve as an attractant (attractive habitat) for aquatic birds. In autumn, small number of birds use the Tailings Management Facility as a temporary rest habitat.

During spring and autumn migration, the Kumtor Mine area is an environmentally unfriendly habitat for aquatic birds because forage reserves are poor. This does not provide an opportunity to replenish energy reserves before continuing migration.

Several dead birds were found at the Tailings Management Facility area. Cause of death was unknown. Possibly, these were weak and emaciated birds.

In spring and autumn, migration of most aquatic and semi-aquatic birds passes through the valley part of Kyrgyzstan. Birds prefer to fly quickly along the mountain ranges and not to stay there for a long time.

In winter, large flocks of birds at the Landfill does not cause any harm to production operations at Kumtor. At the same time, production operations does not have any negative impact on these birds.

In the course of the wildlife study, it was found that dust deposition on vegetation cover both inside and outside the mine was insignificant. This is probably due to rather frequent precipitation and measures, taken by the KGC to reduce amount of dust produced on the road (for example, road watering). From this, it follows that the KGC production operations do not have any negative impact on birds nesting in steppe areas.

### **Mammals**

**Argali (*O. ammon*).** – The main habitats of Argalis at the mine recorded during the study are on the transect 3 at the Mill area, on the transects 4, 5 at the Sary-Tor gorge and foothill areas, on the transect 6 in the Lysiy gorge and on the transect 7 at the Petrov Lake area.

Population structure of Argali (*O. ammon*) at the Kumtor Mine and on adjoining area is variable. It varies considerably in different years. Age and sex composition in 2016-2017 yy. was as follows: proportion of young argalis was 28-29.4%, adult males – 15-17%; females – 33.8-47.6%. Maximum group size was 62 individuals, minimum – 4 individuals. Average group size

was 8.8 (in male groups – 4 individuals, in female groups – 4.8 individuals, in mixed groups – 7.8 individuals).

Argali reach sexual maturity at the age of 1.5. The year begins in the third decade of November and ends at the end of December. In most cases, one group consists of one adult male (over 5 years old) with an average number of females 1.9. Gestation period is 163-168 days. Delivery usually takes place in the third decade of April. High mortality level of lambs falls on the first days after birth. On average, in highlands only 40 % of females have lambs in June-August.

Dynamics of the population of mountain sheep on the territory of the mine depends on several factors effecting the population in complex: anthropogenic factors, in which the leading role belongs to transformation of the environment because of industrial construction, and natural factors, that may depend on wolves to a small extent.

Mountain goat, an Alpine Ibex – (*Capra sibirica*) – do not inhabit the territory of the mine because the existing habitats are not suitable for this species. We recorded this species outside the mine on adjoining area in the Sary-Moinok pass.

**Wolf (*Canis lupus*).** The main habitats of wolves were recorded on the transect 1 at the Solid Domestic Landfill and on the transect 7 at the Petrov Lake area.

In spring-autumn period, 8 wolves inhabit directly the Kumtor gold deposit area. One couple lives at the Kichi-Sarytor gorge area, and another couple lives in the northeastern part of the Petrov gorge. A den where pups are bred is located at the same area.

In autumn-winter period, wolves gather in large packs. Size of packs varies in different months – 27, 16, 9 and 7 individuals. In the daytime (during the day), wolves keep in the northeastern part of the Petrov gorge. When dusk falls (21-23 p.m.), wolves move to the Solid Domestic Landfill and adjoining area in search of food. In general, large pack of wolves hunt on argalis inhabiting the mine's area on the southern slopes of the Djuukuchak and the Petrov Lake areas.

The main habitats of wolves during the day, such as Batamaikan, Djuukuchak mountain areas and the western part of the Petrov Lake, are seldom visited by the Kumtor mine employees and, therefore, considered less hazardous.

Of all areas visited by wolves, Solid Domestic Landfill areas are considered the most hazardous. At present time, the Solid Domestic Landfill is equipped according to the modern requirements; however, in some places there are narrow holes along the perimeter of fencing which wolves use to enter the Landfill area and have an access to food waste. It is necessary to check the whole fencing and to close all holes.

**Grey Marmot** – (*Marmota baibacina*) – the main habitats of grey marmot are recorded at the following areas: on the transect 2 upstream of the WTP, on the transect 6 in the Lysyi gorge and on the transect 7 at the Petrov Lake area.

The total number of grey marmots at the Kumtor mine area is approximately 70 to 100 individuals. The existing population of marmots in the Lysyi and the Sary-Tor gorges suffered from the waste rock disposal (dumps) and, as a result, burrows of marmots were buried. This can have a negative impact on the population of marmots and lead to its death.

**Stone Marten** (*Martes foina*) – is listed in the KR Red Book. During the entire period of the wildlife census, this species was not recorded. However, according to the Kumtor employees, this species is observed at the mine.

Thus, wildlife protection at the mine's area is composed of the elements appropriate for preservation of the environment in general. These elements applied to the wild fauna consist of the activity aimed at preserving biodiversity, ensuring continuous existence of wildlife, as well as creating conditions for preservation of its representatives.

Industrial development of the Kumtor deposit is an example of one of the most advanced industries, where animals are taken under a strict protection and are not exposed to any anthropogenic impact. Despite the fact that heavy equipment operate on the territory of the mine, the animals, especially ungulates and predators, are not afraid of the presence of human activity, i. e. disturbance factor does not affect the wildlife. In some cases, on the contrary, during the hunting season animals from the nearby hunting areas move to the mine's area where they are in safety. This shows that the Kumtor mine operations do not have any adverse impact on the wildlife.

## **Recommendations**

In order to preserve the population of argalis and grey marmots inhabiting the Kumtor mine area, it is necessary to conduct reclamation works to restore forage reserves in places that were previously used for production needs.

Reclamation is a restoration of a pasture productivity for wild grazing animals and an improvement of environmental conditions.

Reclamation requires preparation of land for the intended use and restoration of fertility carried out after the first stage and including a set of agrotechnical and phytomeliorative measures aimed at revegetation of grass cover by sowing seeds of the local plant species.

In order to preserve the population of grey marmots that can die in the process of production operations conducted at their habitats, they should be caught and moved to another suitable habitats before any production operations start.

## References

1. Davletkeldiev A., Shukurov E., et al (revision), 2007. Red Book of the Kyrgyz Republic. Second edition – Bishkek: SAEPP, IBSS of the KR NAS, Environmental Movement of Kyrgyzstan “Aleine” – p. 544.
2. Ivanov V., Yanushevich A. (revision), 1959. Birds of Kyrgyzstan, volume 1. (Gaviiformes – Columbiformes) – Frunze: Edition of the Kyrgyz SSR Academy of Sciences – p. 228, illustration 23.
3. Ivanov V., Yanushevich A. (revision), 1960. Birds of Kyrgyzstan, volume 2. (Cuculiformes – Passeriformes) – Frunze: Edition of the Kyrgyz SSR Academy of Sciences – p. 273, illustration 22.
4. Inventory of Genetic Fund of Kyrgyzstan, volume IV, Type CHORDATA – Chordates. Bishkek, 2015, p. 83.
5. Yanushevich A., et al, 1972. Mammals of Kyrgyzstan – Frunze: Ilim – p. 464, table 180, figure 119 in the text.

## **Annex**

### **Degree of endimicity and nature of general distribution of species**

Represented by the following code names:

**e** – Endemic of Kyrgyzstan (not recorded on the territory of another states, or when more than 80% of habitat is located on the territory of Kyrgyzstan)

**co** – cospomolitan (distributed on most continents of the planet)

**se** – sub-endemic (habitat is limited to the territory of Central Asia, including Badakhshan, Kazakhstan, at 45 degree north latitude, Kashgaria and Xinjiang)

**ws** – widespread species

Code names of taxon categories by distribution are as follows:

**ac.** – acclimatized (specially introduced by human)

**inv.** – invasive (unintentionally introduced, accidentally introduced)

**ns.** – nesting

**wn.** – wintering

**flg.** – recorded during migration (seasonal migratory species)

**mgr.** – migratory

**vgr.** – vagrant (occasional visitor)

**s.** – sedentary

**hb.** – hibernating

Since 1963, the International Union for Conservation of Nature has been maintaining a list of threatened animals and plants (Red Book). Degrees of threat are as follows:

- Extinct (EX)
- Extinct in the Wild (EW)
- Critically Endangered (CR)
- Endangered (EN)
- Vulnerable (VU)
- Near Threatened (NT)
- Least Concern (LC)
- Data Deficient (DD)
- Not Evaluated (NE)

## Birds and Mammals Census Record Sheet

Table 1

(Underline the required and put numbers)

**Team of observers #:** \_\_\_\_\_ **Name** \_\_\_\_\_ **Item #:** \_\_\_\_\_

**Date:** \_\_\_\_\_ **Time:** \_\_\_\_\_ **Oblast:** \_\_\_\_\_

**Name of hunting farm:** \_\_\_\_\_ **Area:** \_\_\_\_\_

**GPS point #:** \_\_\_\_\_ **Coordinates:** N \_\_\_\_\_ E \_\_\_\_\_ **Elevation above sea level** \_\_\_\_\_

**Distance:** \_\_\_\_\_ (meter) **Direction (azimuth)** \_\_\_\_\_ (from 0 to 360° by compass)

**Species:** (Argali), (ibex), (roe), (wild boar), (maral)

(underline the required)

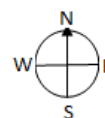
**Group number (including not identified species):** \_\_\_\_\_ **Sex/age:** females \_\_\_\_\_; lambs/goatlets under 12 months \_\_\_\_\_; year-old from 1 to 2 years \_\_\_\_\_; males: 2-3 years \_\_\_\_\_; 4 years and over \_\_\_\_\_ (among them 8 years and over \_\_\_\_\_)

**Behaviour:** feeding, loafing (lying/standing), vigilant, moving, running – (gallop), (slowly)

**Distance of running:** \_\_\_\_\_

**Location of animals:** watershed, upper slope, middle slope, lower slope, valley, and foothill.

**Exposition of slope:** – west, northwest, north, northeast, east, southeast, south, southwest.



**Incline:** (up to 10°) (up to 30°) (up to 50°) and more

**Weather:** clear, cloudy; **precipitation:** snow, rain; **wind:** western, northwestern, northern, northeastern, eastern, southeastern, southern, southwestern, no wind; **wind strength:** strong, weak, average.

**Soil:** - stone free, crushed stone, talus, containing stones, rocks

**Vegetation:** forest, light forest, shrubs, sub-shrubs, sazes, meadows, steppes, almost no vegetation

**Water:** river or stream, spring, lake

**Livestock grazing and other land use:** no, seasonal grazing (summer / winter), year-round grazing, hey-field.

**Presence of livestock:** goats (\_\_\_\_\_), sheep (\_\_\_\_\_), yaks (\_\_\_\_\_), cattle (\_\_\_\_\_), horses (\_\_\_\_\_)

**Findings:** dead individuals (\_\_\_\_\_), incomplete carcass (\_\_\_\_\_), fresh track (\_\_\_\_\_)

**Other data/notes:**

Observer:

Name	company, position	signature
_____	_____	_____
_____	_____	_____

## Birds Census Record Sheet

<b>Description of biotope:</b> <u>High Elevation</u> , Middle Elevation, Elevation above sea level <div style="display: flex; justify-content: space-between;"> <span>Low Elevation, Flat Plain</span> <span>High elevation steppe</span> </div>	
<b>Date:</b> June 20, 2017 <b>from</b> 07:00 <b>to</b> 09:00	
<b>Geographical coordinates or location</b>	
<b>Weather:</b> Clear, west wind	
<b>Record sheet #</b> 5 <b>Observer:</b> Sarygulov T.	
<b>Species</b> Lammergeier Isabelline Wheatear	<b>Number:</b> 1 1,1,1

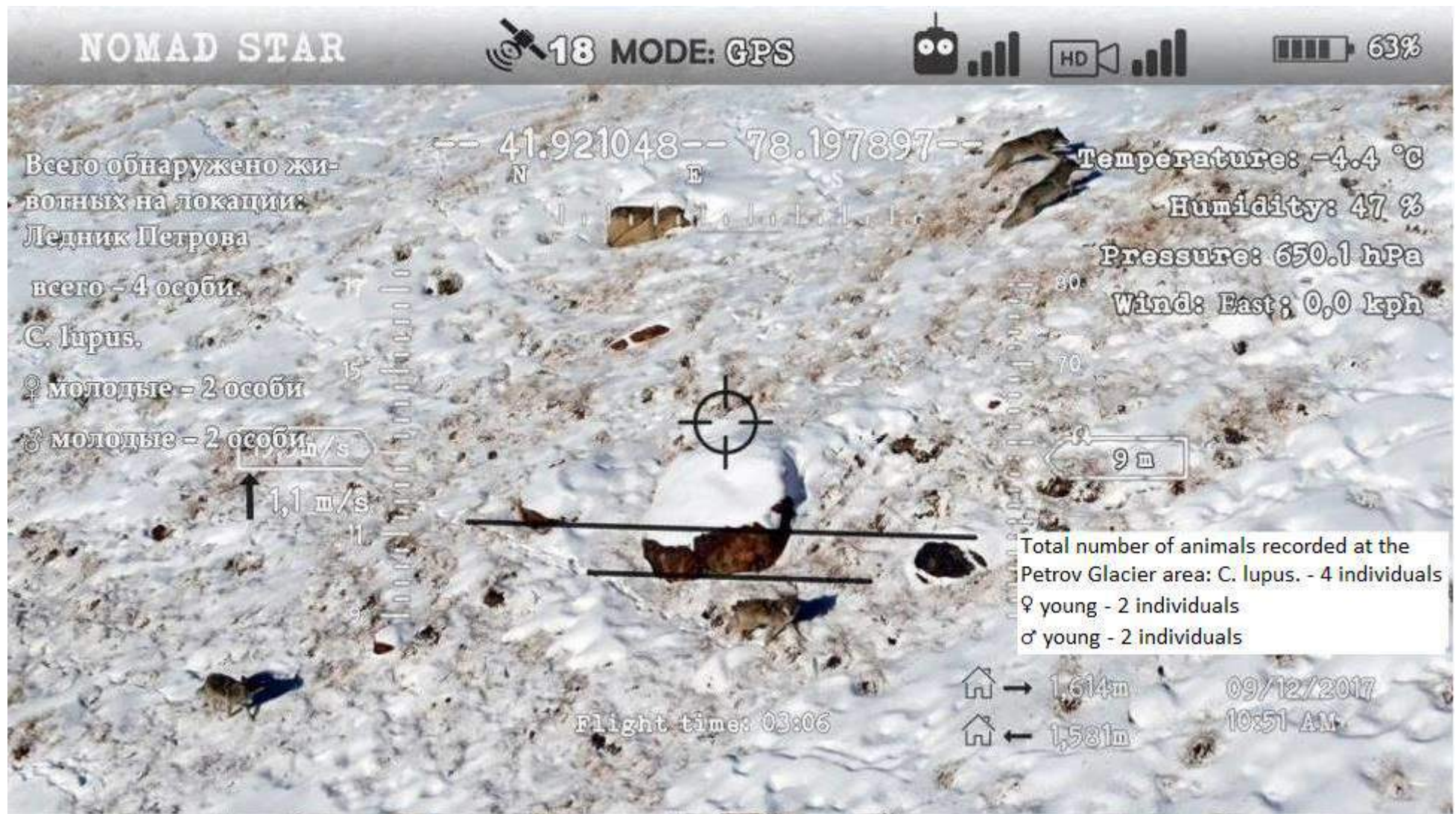


Photo 7. Aerial census of wolves on the transect 8 at the Crusher area

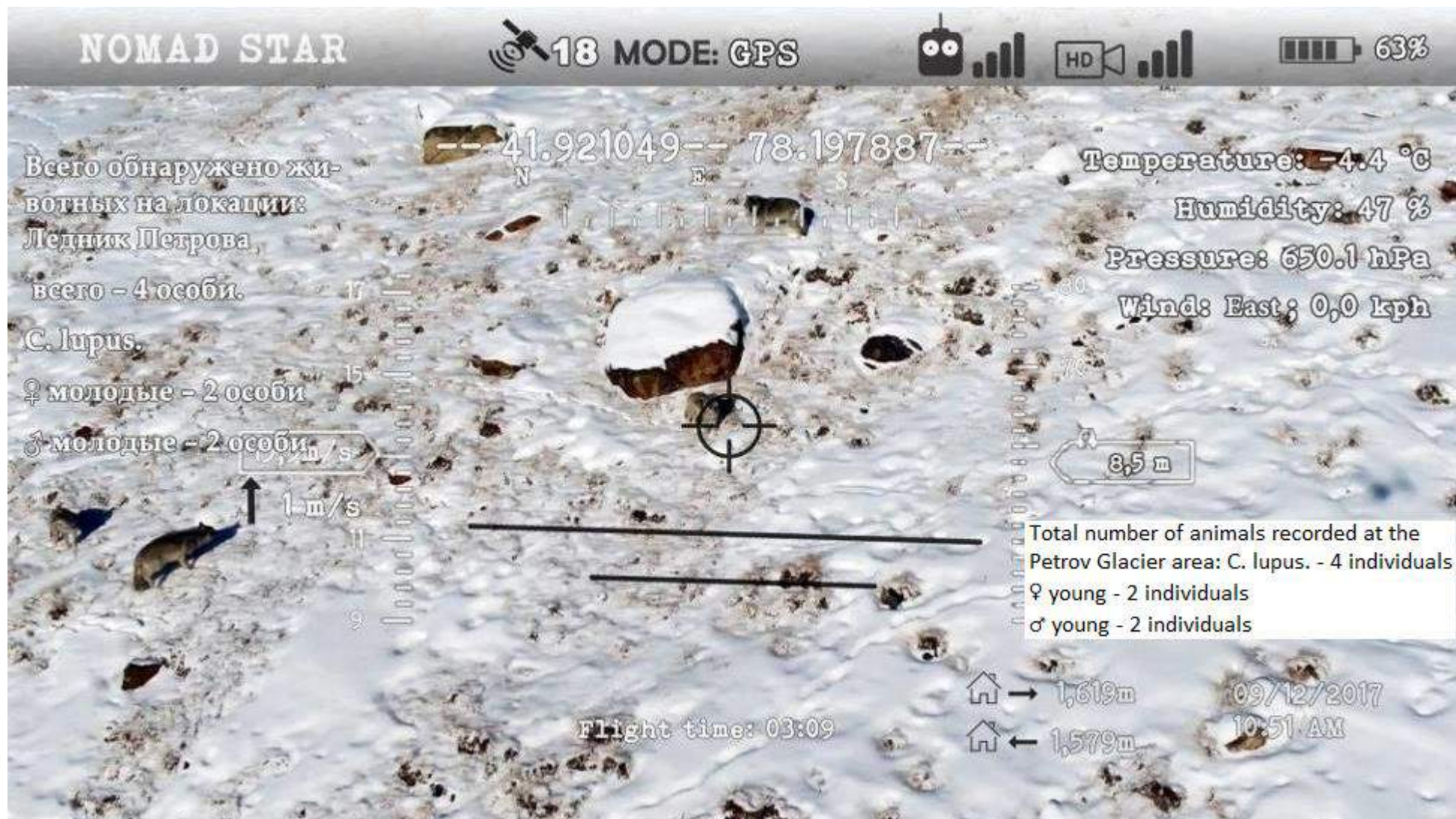


Photo 8. Aerial census of wolves on the transect 8 at the Crusher area

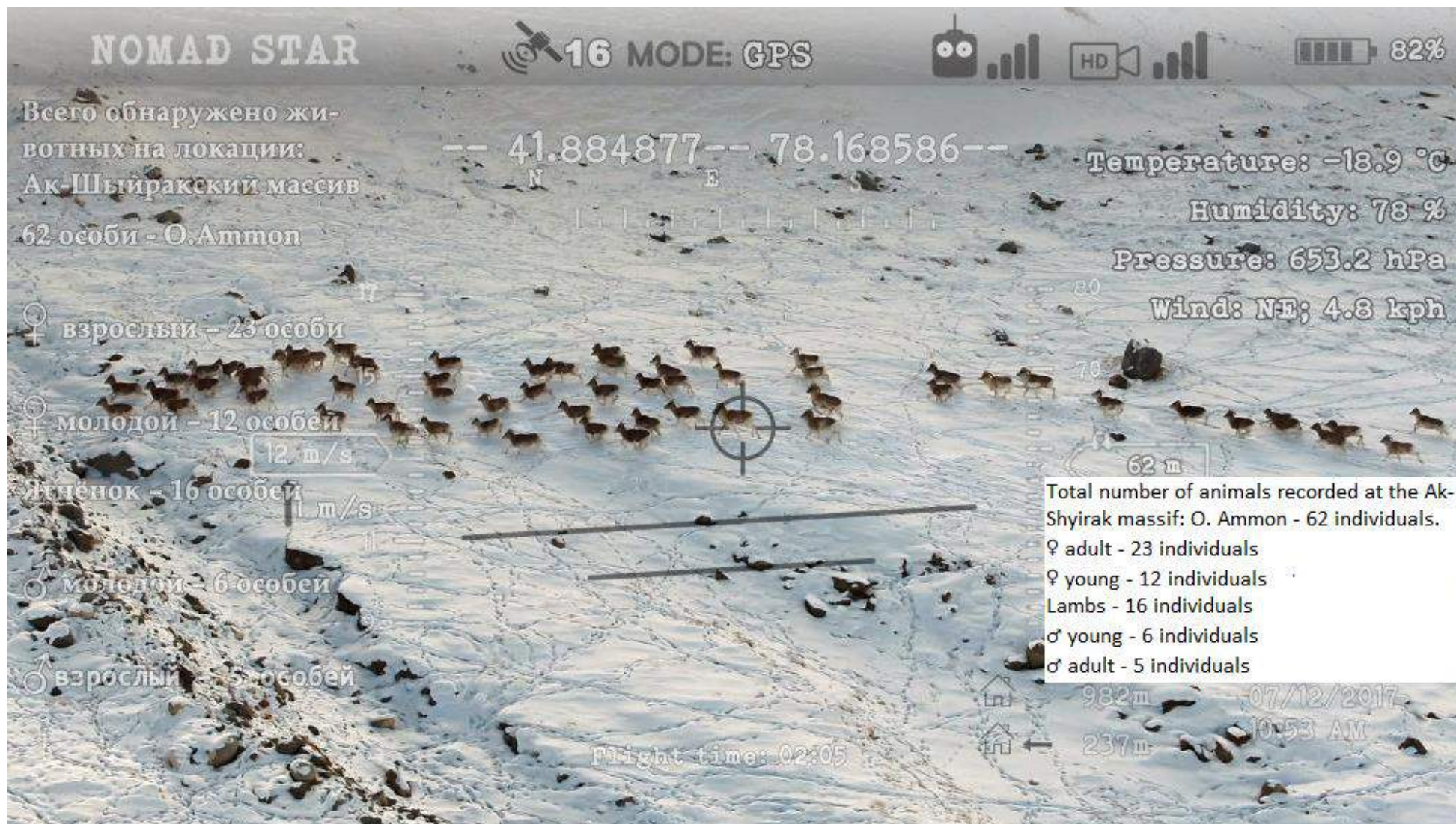


Photo 9. Aerial census of argalis on the transect 3 opposite to the Camp

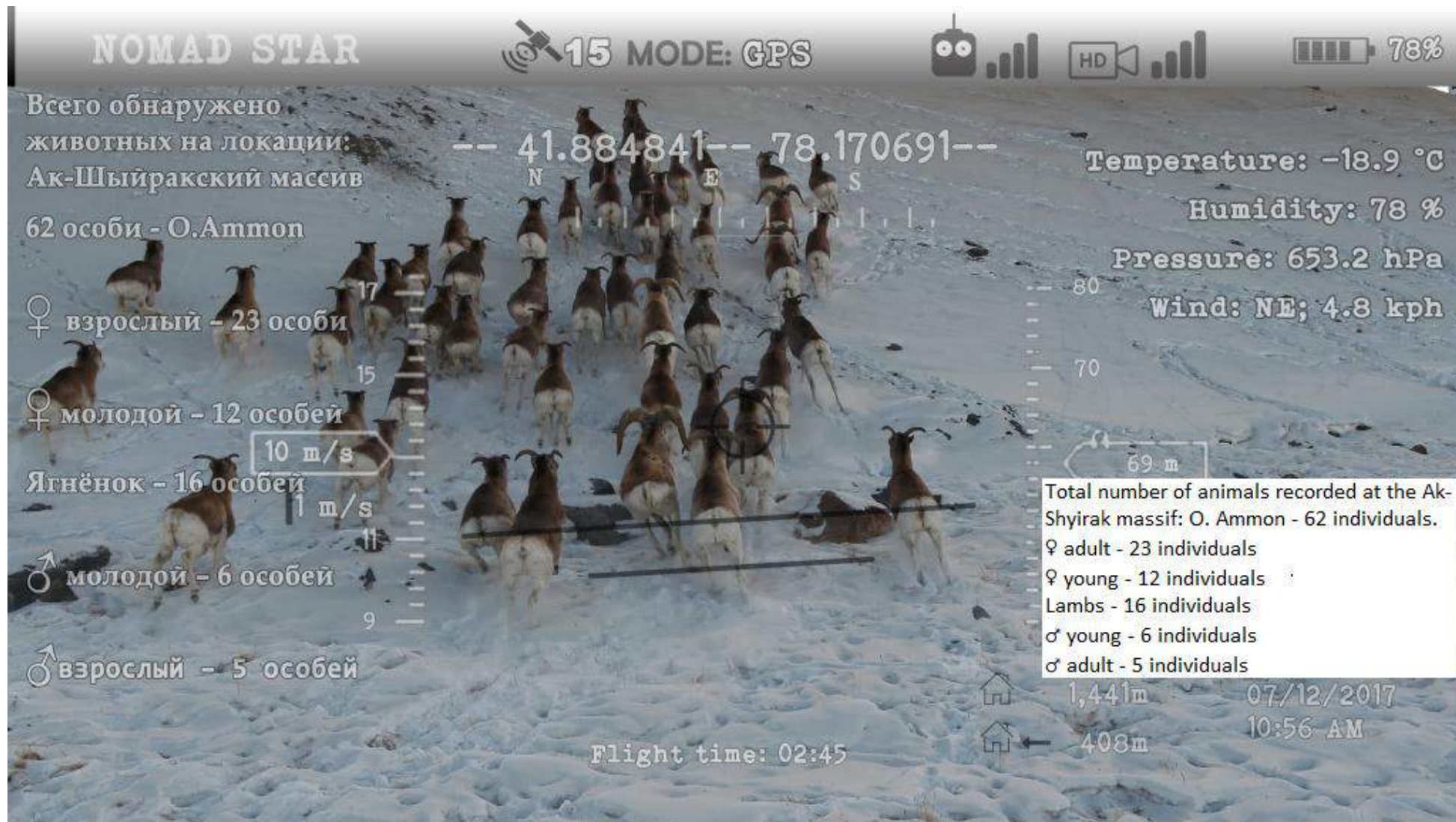


Photo 10. Aerial census of argalis on the transect 3 opposite to the Camp

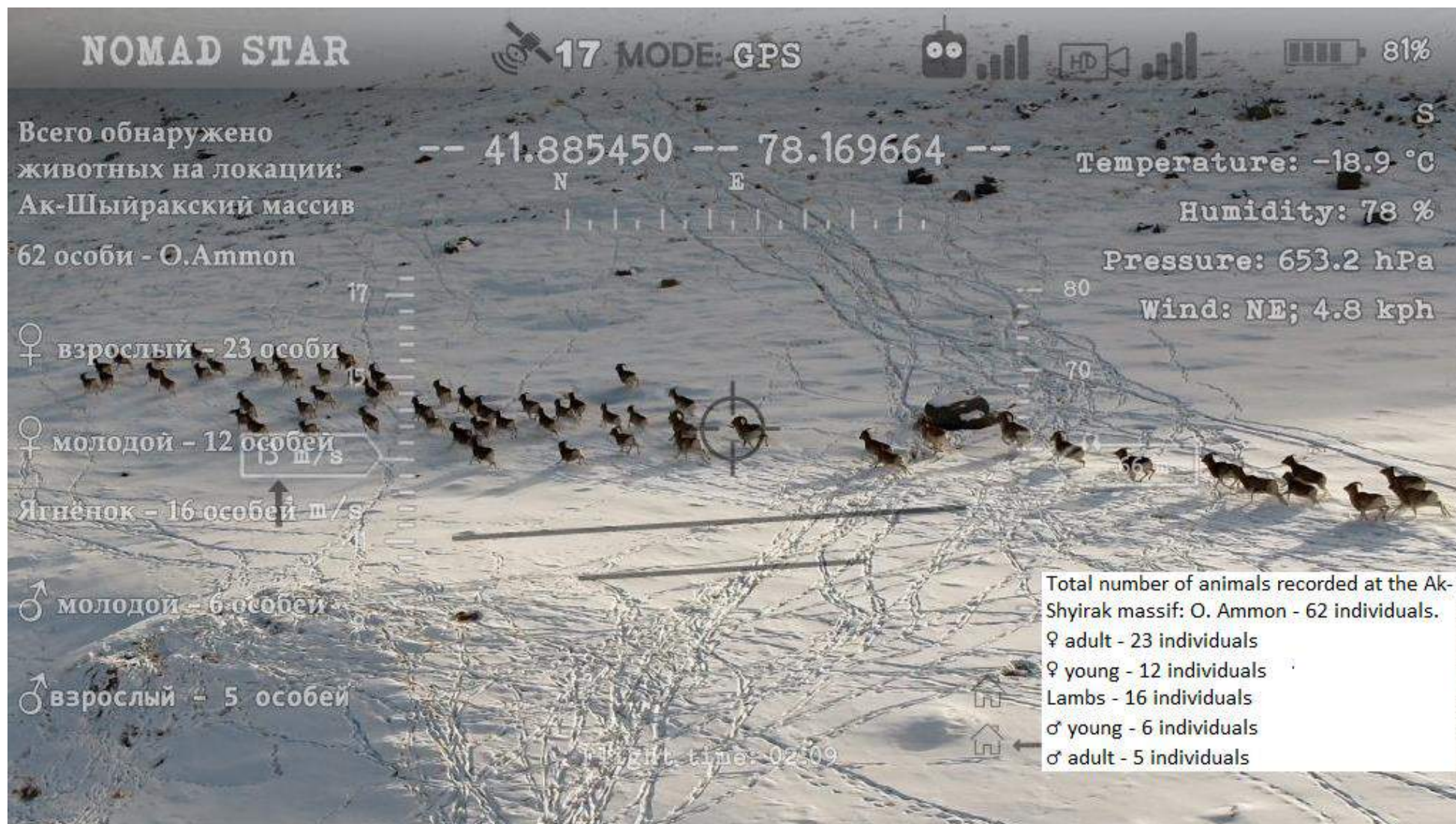


Photo 11. Aerial census of argalis on the transect 3 opposite to the Camp

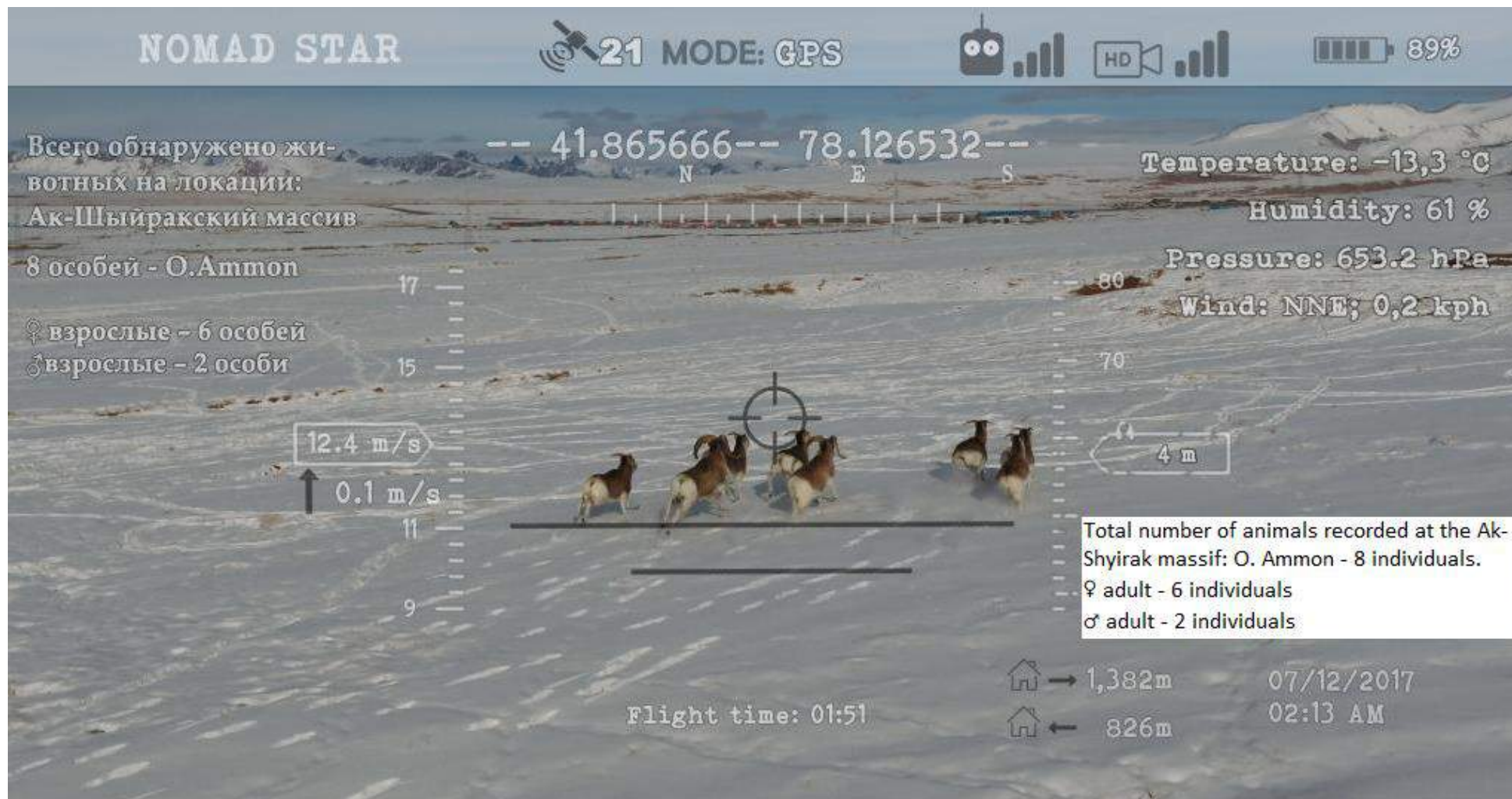


Photo 12. Aerial census of argalis on the transect 5 at the foothill area of the Sary-Tor gorge



Photo 13. Aerial census of argalis on the transect 5 at the foothill area of the Sary-Tor gorge



Photo 14. Aerial census of argalis on the transect 5 at the foothill area of the Sary-Tor gorge