«Reintroduction of kulan into the central steppe of Kazakhstan»

Progress report 01/2020

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1. Improvements at Alibi field station

Construction work was mainly carried out to improve the fence of the acclimatization enclosure, repairing damages that occurred over the winter. Those repairs were mainly necessary along the oxbow and in areas of temporary flooding where the height of the fence was now increased (Figure 1). The poles in the large corral were all checked for stability and weak or rotten once were stabilized again or replaced. Due to the latest decision to keep the kulans in the acclimatization enclosure for another winter, fresh hay was prepared (Figure 2).

Figure 1: Replacing the poles.

Figure 2: Harvesting hay.

In June, repairs were made to improve the crossing of the Uly-Zhylanshyk River, which was built in 2018 (Figure 3). Currently, this crossing is used by Altyn-Dala employees for patrolling during a fire-hazardous period and it also provides an alternative access road to the field station.

Figure 3: Improvement of Uly-Zhylanshyk river crossing.

2. Monitoring of kulans in the acclimatization enclosure

2.1. Behavioural monitoring

Two kulan arrived from Barsa Kelmes State Nature Reserve at Alibi in October 2019 and are currently being kept in the 55ha acclimatization enclosure in Alibi (Table 1). Monitoring of the 2 kulans in the acclimatization enclosure in Alibi was carried out by the four caretakers which work in alternating shifts of two at a time (Figure 4). Kulan observations are conducted daily and focus on body condition and behaviour. The caretakers also collected dung samples from the mare and extracted steroid metabolites in the field lab. However, analysis of the sample was postponed until additional samples are available from more kulan. Visual observation in late winter / early spring by the caretakers confirmed that the mare was not pregnant.

Table 1: Kulan transported in October 2019 from Barsa Kelmes Nature Reserve to the acclimatization enclosure at Alibi.

Kulan #	Sex	Age group	Age	With foals	Left eartag	Collar №3	Collar ID
BK_10_5	female	adult	>10	no	-	19	32671
BK_10_7	male	young adult	3-4	-	-	-	no collar

Figure 4. Observation of kulans in the acclimatization enclosure by the caretakers.

For behavioural observations the caretakers used instantaneous scan sampling (Altmann, 1974). They use binoculars and a telescope twice a day for 1-hour observation periods during which they note main behavioural categories at 5 minutes intervals. The main behavioural categories are: eating, walking, standing, lying, and others. They additionally recorded all the events of mutualistic (playing, leaving) and hostile (running, biting, kicks, fights) interactions during the entire hour of observation.

Since October 2019, the caretakers collected kulan behaviour over more than 600 hourly sessions.

Preliminary analysis suggests no major differences in the behaviour of the two kulans. They mostly fed and stood, while behaviours such as walking, vigilance, and lying were rare or very rare. In late May and early June, mating and aggressive behaviour by the male was noted, which forced the female to be in constant motion.

2.2. Body condition

However, neither kulan showed signs of poor body condition or injury, with the exception of occasional minor cuts on the body. The overall body condition the two kulans for the entire monitoring period was assessed as satisfactory to good.

2.3. Kulan use of water, shelter, and hay

Upon arrival, kulan used the oxbow lake for drinking (Figure 5). When the water froze, the caretakers crushed the ice into small cubes and put them out for kulan. Once snow covered the ground, the two kulan used snow to cover their daily water needs.

The caretakers laid out hay from mid-December on, but for the first two weeks the kulan practically did not touch the hay, except during periods of severe frosts (Figure 6). However, from January on hay was practically used every day, until the snow melt in early March.

Contrary to the previous group of kulan transported from Altyn Emel National Park (NP) in 2017, the two kulan from Barsa Kelmes SNR did never use the two shelters. Rather, during windy or rainy weather kulans used the reed thickets and shrub/willow stands for protection.

Figure 5: Kulans at the oxbow lake in the acclimatization enclosure near the place they tend to drink.

Figure 6: Kulans feeding on hay provided from December 2019 until March 2020.

3. Ground monitoring of GPS collared kulan

3.1. Ground monitoring

Since the beginning of 2020, monitoring of collared kulan transported in October 2017 and released in April 2018, was carried out twice a month. By January 2020, only one of the four adult females remained (#17 camera collar dropped after 1 year, and mare #4 and #5 were illegally killed in winter 2018 and 2019, respectively). The remaining mare (#9) had been together with an uncollared kulan in 2019.

Since 2019, ground monitoring has been intensified with two check-up trips scheduled each month, during which caretakers also record key stone species important for the Altyn Dala Conservation Initiative (ADCI). Key mammals include saiga, Siberian roe deer, wild boar, goitered gazelle, argali, wolf, jackal, red fox, corsac fox, steppe marmot, and marbled polecat and key birds include steppe and golden eagle, black vulture, pallied harrier, lesser kestrel, great and little bustard, sociable lapwing, black lark, white-winged lark, and demoiselle crane. The caretakers additionally record the number and species of all livestock encountered.

At the beginning of year, ground monitoring was delayed due to challenging weather conditions (after snow melted, roads were not accessible for movement across the steppe). Thereafter, caretakers conducted 8 kulan monitoring trips (Table 2). On 7 of these trips kulan mare #9 was together with a second, male kulan (most likely one of the foals, transported in 2017).

Table 2: Ground monitoring of released kulans in 2020.

Date	Time	Kulan ID	Latitude	Longitude	Kulan №	Comments
24.02.2020	14:20	BC9	49,43500	65,79674	2	No new foal (2nd kulan is a foal from 2017), photos
16.04.2020	7:45	BC9	49,89010	66,04994	2	photos
02.05.2020	09:00	BC9	49,70887	66,09185	2	No new foal, photos
18.05.2020	20:35	BC9	48,40994	64,44855	2	No new foal, photos
31.05.2020	17:00	BC9	48,24285	62,89521	2	Not found, only footprints
18.06.2020	20:25	BC9	48,48821	63,17706	2	No new foal, photos
01.07.2020	20:20	BC9	48,28801	63,61393	2	photos
17.07.2020	13:40	BC9	48,09883	63,35445	1	Female corpse found – most likely natural mortality of unknown cause (no sign of uncollared stallion)

On the 8 monitoring trip on July 17, the desiccated body of kulan mare #9 was found on the territory of Shalkar-Teniz sor (Figure 7). GPS locations suggested the kulan died on 8 July after four days of very localized movements. The absence of fresh car tracks, the lack of bullet holes and the condition of the body did not suggest any foul play (i.e. poaching). Due to the high temperatures (high 40s ^{o}C), no autopsy was possible.

Searching the wider surrounding did not reveal any signs of a second kulan and we assume that the two animals had already separated prior to the death of kulan mare #9.

Figure 7: Kulan corpse with collar # 9.

6.2. The movement of kulans

Satellite telemetry of the two kulan collared in Altyn Emel NP in 2017 and the six kulan collared in Barsa kelmes SNR in 2019 continues. The collars in Altyn Emel NP are scheduled to drop on 20 October 2020. A camera collar deployed in Barsa Kelmes was scheduled to drop in April 2020, but failed to do so (but the collar keeps monitoring the animals GPS locations).

Interestingly, kulan in Altyn Emel NP did venture quite far into the mountains this year. As in previous years, the two animals did not move to the eastern part of the protected area, but rather stayed in the western and central-western part. For a 1-year animation of kulan movements in Altyn Emel see: https://youtu.be/0Zja0-65d_4

In Barsa kelmes NR, kulan stay mainly in the Kaskakulan area, but go beyond the boundaries in the western, southern and partially northern directions (to the edge of the (formally) irrigated land). As of the end of July 2020, no one animal moved to the former island of Barsa kelmes in the west or crossed the border to Uzbekistan in the south. For a 1-year animation of kulan movements see: https://youtu.be/BHPNyYY7yrM

7. Counting Kulan with the use of a conservation drone

7.1. Pilot drone count for kulan and goitre gazelles in Altyn Emel NP

Prior to our pilot drone survey, the NP total count based on parallel ground transects had been conducted. The results of this ground count summed up to 5,276 goitered gazelles, 167argali, and 3,585 kulans; but no details on where animals groups were seen or how the numbers were calculated were available.

Prior to the drone survey, we submitted a flight plan, discussed and agreed on technical issues with the NP, and gave a presentation was for the park staff. The NP was particularly concerned about potential disturbance of wildlife. A first test of the response of animals to UAV flights was performed on saigas in December 2019. Our observations suggested that flights at an altitude of 150-200 meters can be picked up by animals and result in alert bahaviour (kulan, goitered gazelle). However, when flying above 200 meters, at which the UAV is no longer visible or audible for humans, the animals also did not show any obvious response.

The drone survey was carried out from 1 to 4 March 2020.During the survey, special attention was paid to minimizing the noise impact of the UAV on animals. We used a Supercam S350 unmanned aerial vehicle (UAV; http://unmanned.ru), which is a fixed winged drone with a wing-span of 3.2 m. The aircraft weighs 12 kg and is equipped with a 250 W electric brushless propeller. For imagery, we used a Sony α6000 camera (with an angle of view of 32º) and a lens with a fixed focal length of 50 mm (aperture f 1.8). We flew the drone at 450m above ground, resulting in an image ground resolution of 3.5cm/pixel (still good enough to identify the target species) and an average ground coverage of 141x211m. Images were taken at 3s intervals, resulting in a 40% overlap of successive images thus resulting in a continuous image coverage over the entire transect length at an average transect strip width of 210m (survey area = transect length x strip width; Figure 8).

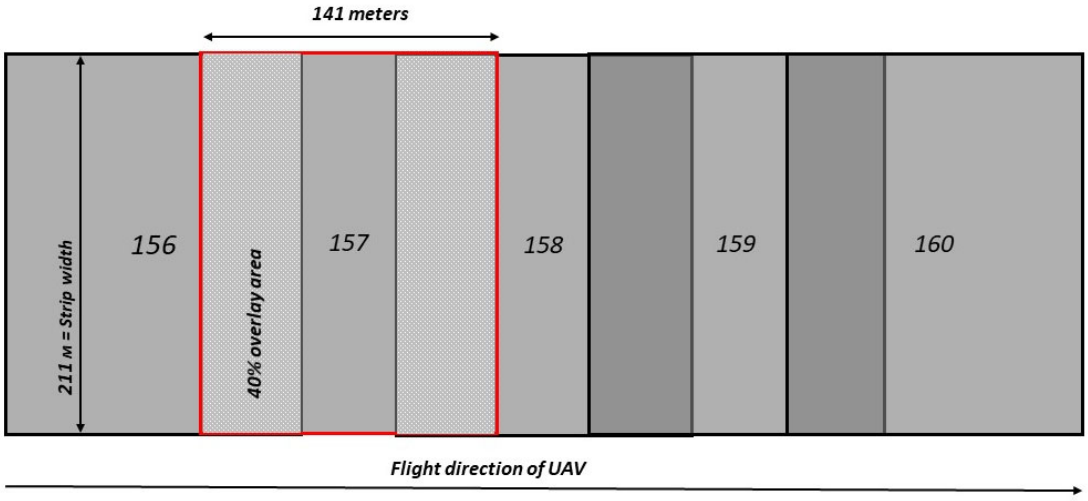

Figure 8: Image stripe size (count stripe) and image overlap.

The drone survey covered 13 straight transects were laid from south to north spaced 5km apart in the western part of Altyn Emel NP, resulting in an immediate survey area of 820 km^2. The western part is the area used by the collared kulan and has also identified as the core kulan area by the NP staff.

7.2. Preliminary results of the pilot survey

Total distance of the drone transects flown on-effort was 164 km (an additional 110 km were flown off-effort to and from launch point to transect start), resulting in an image area coverage of 34.4 km^2.

We recorded a total of 4,845 images were recorded during the drone survey. With each image, the drone records date, time, Lat & Long, altitude (above sea level, above launch point, above ground based on DEM), banking angle, tangage, azimuth, and speed. All images were manually inspected for wildlife by the team.

The team detected 211 goitered gazelles (range per image: 1-27; mean: 4.4, median: 4) in 27 images on 6 transects and 114 khulan in 14 images (range per image: 2-36, mean: 8.1, median: 5.5) on 4 transects (Figure 9).

It is planned to recount Altyn Emel NP at the end of August with the following adaptations:

- Two high resolution Sony DSC-RX1RM2 cameras for higher ground resolution and a wider strip width
- Larger survey area including the central and soth-eastern part of the NP
- Higher survey effort with a strip spacing of 1 km

Aiming for total transect length of 1,831 km, a strip area of 915 km^2 and a transect area of 1,475 km^2.

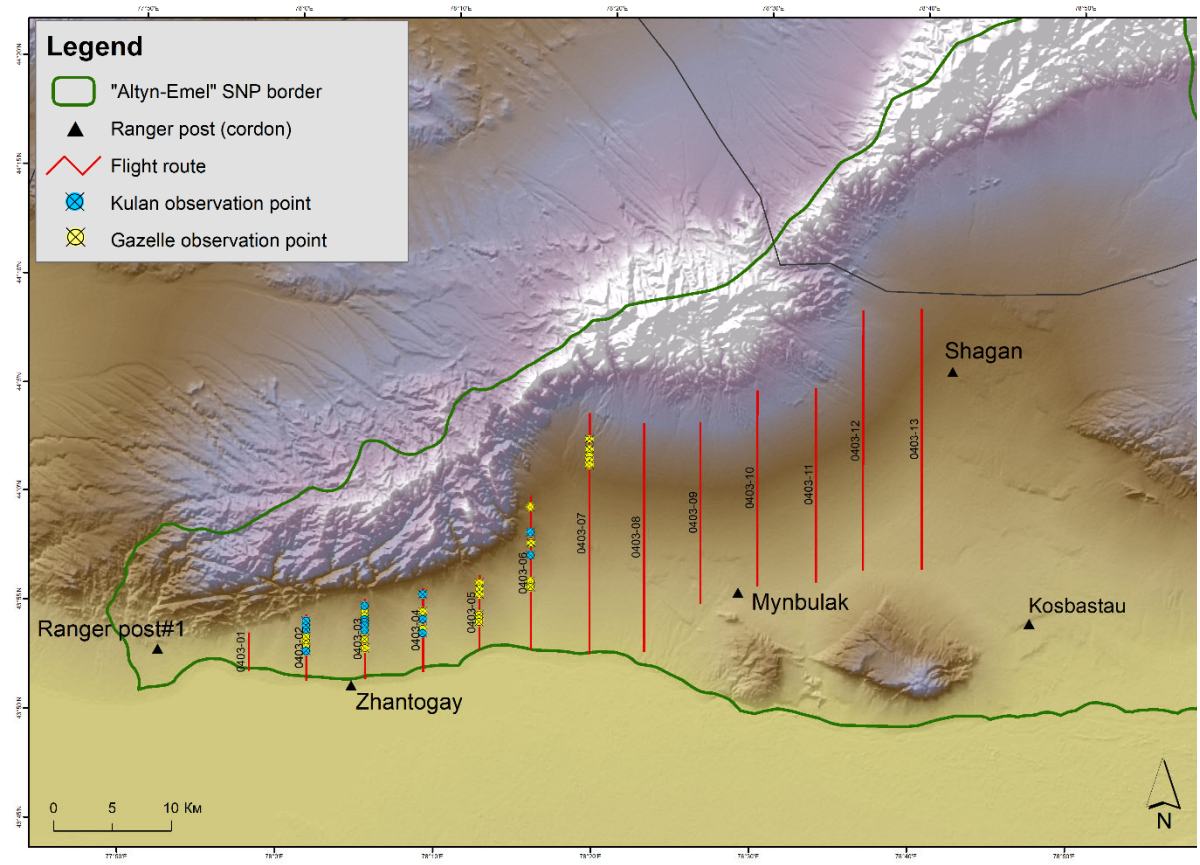

Figure 9: Flight routes of pilot survey in Altyn-Emel NP.

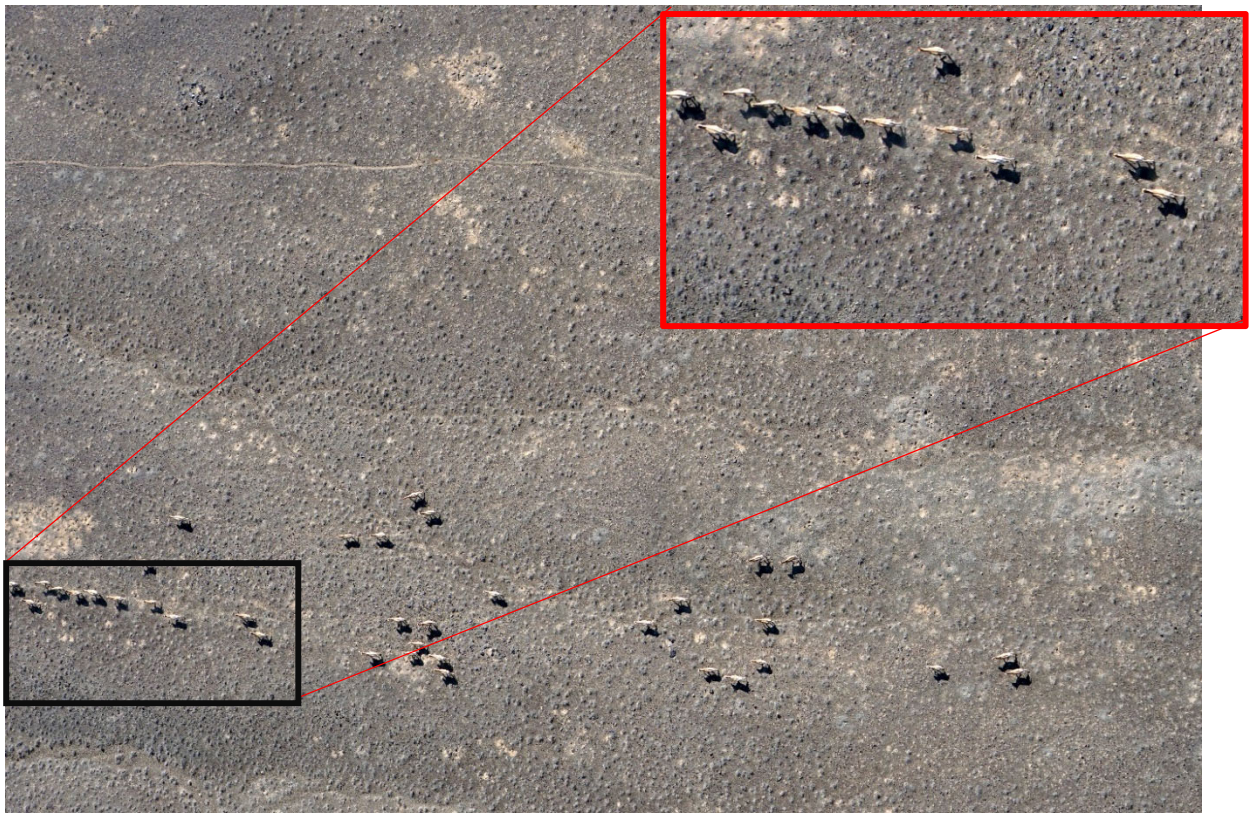

Figure 10: Kulan concentration photographed from a height of 450 meters.

Table 3. Number of goitered gazelles and kulans photographed during drone survey.

Date	Transect №	N images	N goitered gazelles	N kulans	Transect length (km)	Accounting area (km^2)
04.03.2020	0304-01	94	0	0	3.2	0.67
04.03.2020	0304-02	150	45	32	5.1	1.07
04.03.2020	0304-03	196	16	25	6.5	1.37
04.03.2020	0304-04	198	13	14	6.7	1.41
04.03.2020	0304-05	186	52	0	6.3	1.32
04.03.2020	0304-06	260	23	43	8.8	1.85
04.03.2020	0304-07	504	62	0	17.1	3.59
04.03.2020	0304-08	558	0	0	18.8	3.95
04.03.2020	0304-09	457	0	0	15.5	3.26
04.03.2020	0304-10	448	0	0	15.2	3.19
04.03.2020	0304-11	540	0	0	18.3	3.84
04.03.2020	0304-12	599	0	0	20.3	4.26
04.03.2020	0304-13	655	0	0	22.2	4.66
All			**211**	**114**	**164**	**34.44**

7.2. Counting in Barsa-Kelmes Nature reserve

From 16-18 July 2020, a drone survey was conducted in Barsa kelmes NR, with a launch site on Kaskakulan. This time the two new high resolution Sony DSC-RX1RM2 cameras were used rather than the Sony α6000 camera during the pilot count in Altyn Emel.

In total, we flew 19:56 hours during 8 flights for a distance of 1,700 km and took more than 25,00 images. During work with the drone on Kaskakulan, the team encountered 15 goitered gazelles and saw >200 kulan near the artesian springs.

Visual inspection of images is currently ongoing. State-of-the-art analysis, which will include information on habitat use of collared kulan, incorporate flight path details, and test different abundance estimate calculations will be conducted in fall together with researchers at the Norwegian Institute of Nature Research (NINA) for Barsa Kelmes, Altyn Emel, and the Ustyurt plateau.

Figure 10: UAV launch in Barsa Kelmes SNR in July 2020.

Table 5. Drone flight information Barsa Kelmes State Nature Reserve in July 2020.

No.	Flight duration	Battery drawdown	Temperature (°C)	Distance (km)	Number of images
Fligth #1	2:29	17.7	37	210	3352
Flight #2	2:27	17.1	39	216	3014
Flight #3	2:34	17.8	34	221	2822
Flight #4	2:26	17.8	40	210	3288
Flight #5	2:31	17.7	40	222	3028
Flight #6	2:24	18.0	33	200	3842
Flight #7	2:37	18.0	34	206	2920
Flight #8	2:28	17.3	40	215	3078
Total:	**19:56**			**1 700**	**25 344**

8. Media response

At the end of May, a trip was organized to the territory of the Reintroduction Center for the journalists of the newspaper “Kostanay Novosti” (Kostanay). As part of the trip, information about the project for the Reintroduction of kulan, as well as the work of the Center itself were provided. Link to the article: https://kstnews.kz/newspaper/903/item-59799

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