FLORA AND FAUNA SURVEY REPORT

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CONTENT

ABBREVIATIONS AND GLOSARY

BSM	Burrows of small mammals
FO	Bird flies over the area
KazSSR	Kazakh Soviet Socialist Republic
OHTL	Overhead transmission line
POWO	Plants of the World Online
S	Bird sits
Takyr	Nude soil
TB	Tortoise burrow
TPC	Total projective coverage of all the vegetation on the soil surface. Determined visually in percentage
TS	Tortoise shell
USSR	Union of Socialist Soviet Republics
WGS	World Geodetic System

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1 ANIMALS

1.1 METHODOLOGY

The purpose of the survey was to identify species and quantitative diversity of terrestrial vertebrates and invertebrates to determine the sensitivity of the surveyed territories (A and B), transmission lines corridors (C), ammonia pipeline corridor and 2 open storage areas near the port of Kuryk to the impacts of the proposed Project Hyrasia One. The hydrogen plant area (Kuryk Industrial site) was already assessed on 18-22 July 2023 and results are presented in Section 3.

From 11 to 22 June and from 24 September to 1 November 2024, the surveys were conducted along 854 km of routes using Berkut binoculars with x7 magnification, Levenhuk binoculars with x25 magnification and long-focus cameras.

From the survey routes, the birds were observed to a distance up to 2 km while driving along the roads at a slow steady speed with stops every kilometer for scanning. At 80 sample points (17 in Enbek, 16 in Talap, 10 in Teren oi, 19 in Rahym and 18 in Kanagat) that were considered as being different from the main landscape (Figure 1) - flat middle desert and dominant vegetation - and at each kilometer of the 33 km ammonia pipeline, surveys of 0.5x0.5 km areas were conducted by walking along parallel transects spaced 10 meters apart that enabled the observation of the entire area. Two open storage areas at the end of the ammonia pipeline were surveyed by driving along several transects with 200 to 500 m distance from each other, where the ground condition allowed (Figure 2). The overhead transmission line corridors (OHTLs) inside the biodiversity survey territories A and B were studied through visiting the different habitats. The OHTLs corridors in the territory C were surveyed from 8 points of expected higher sensitivity (Figure 1, Cat. C area focal points). There, an area survey was performed within 1 km radius for the land animals and 2 km radius for birds and raptor nests. The sample points U10a-U19a, B6a, B10a-B19a, L7a and L8a were added in the second survey to verify the spatial distribution of the animals that were noted in the first survey.

To evaluate the impact from habitat loss and displacement, a distribution and abundance survey was conducted in accordance with the NatureScot guidance [1]. To translate linear counts along representative transects with a 2 km observation extent into estimates of animal abundance per square kilometer, the Yu. S. Ravkin [2] methodology was used, which is recognized by the International Society of Zoological Sciences. The latter methodology, initially developed for the Altay forests, has also been successfully applied to other landscapes, including middle deserts defined as communities dominated by perennial semishrubs (mainly saltworts) and shrubs on grey-brown desert soils that freeze in winter, as described in the Explanatory Text to the Map "Vegetation of Kazakhstan and Middle Asia (Desert Region)" published in Saint Petersburg in 1995 [3].

An additional route through the main landscape was surveyed outside of the project territories from Beket Ata to Rahym to illustrate the transition between the western and eastern territories of the Project.

As a basis for potential nest searches within a 10 km radius of the planned wind turbine locations, target birds (protected birds with low maneuverability and birds of prey that are noted within the planned blades rotation area) were observed in detail during the breeding season to identify potential likely nesting places. It was noted, if they pair up and show nesting behaviour.

A walk-by bat detector was used to detect bat calls around the night camps, before the dusk made walking unsafe. The walks did not follow a particular pattern but focused on checking the habitats around the camps that could be used by bats hunting or roosting.

Additionally, during overnight stays, a camera trap was installed at each camp during the fauna survey.

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1 Scottish Natural Heritage (2017): Recommended bird survey methods to inform impact assessment of onshore wind farms. Version 2.

2 Ravkin, Yu. S. (1967): Towards the methodology of bird counting in forest landscapes. Nature of tick-borne encephalitis foci in Altai. Novosibirsk: Nauka. S. 66-75.

3 Rachkovskaya, E.I. (1995) Vegetation of Kazakhstan and Middle Asia(desert region). Saint Petersburg, Russia: Institute of Botany.

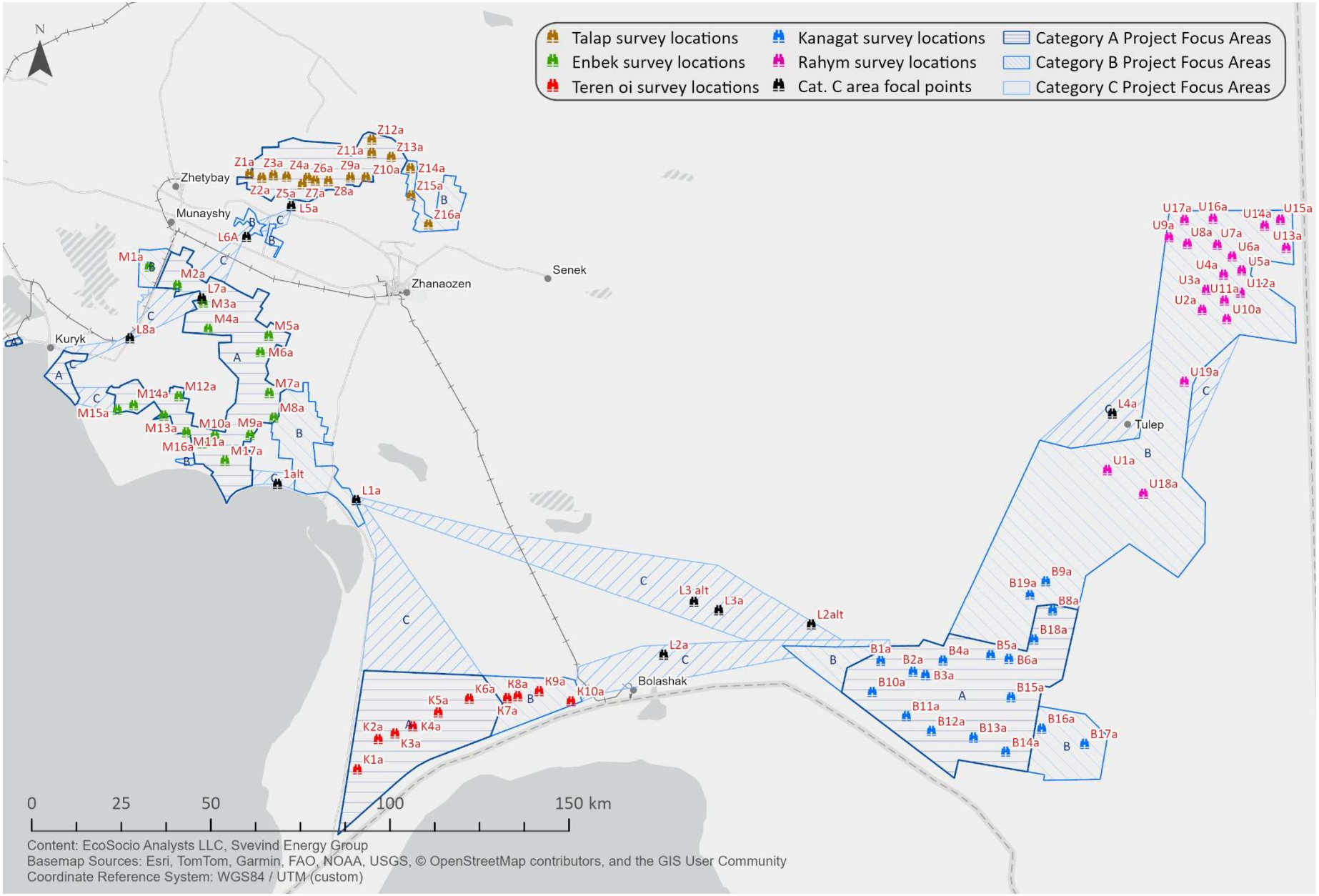

Figure 1 Overview of sample point locations of zoological surveys.

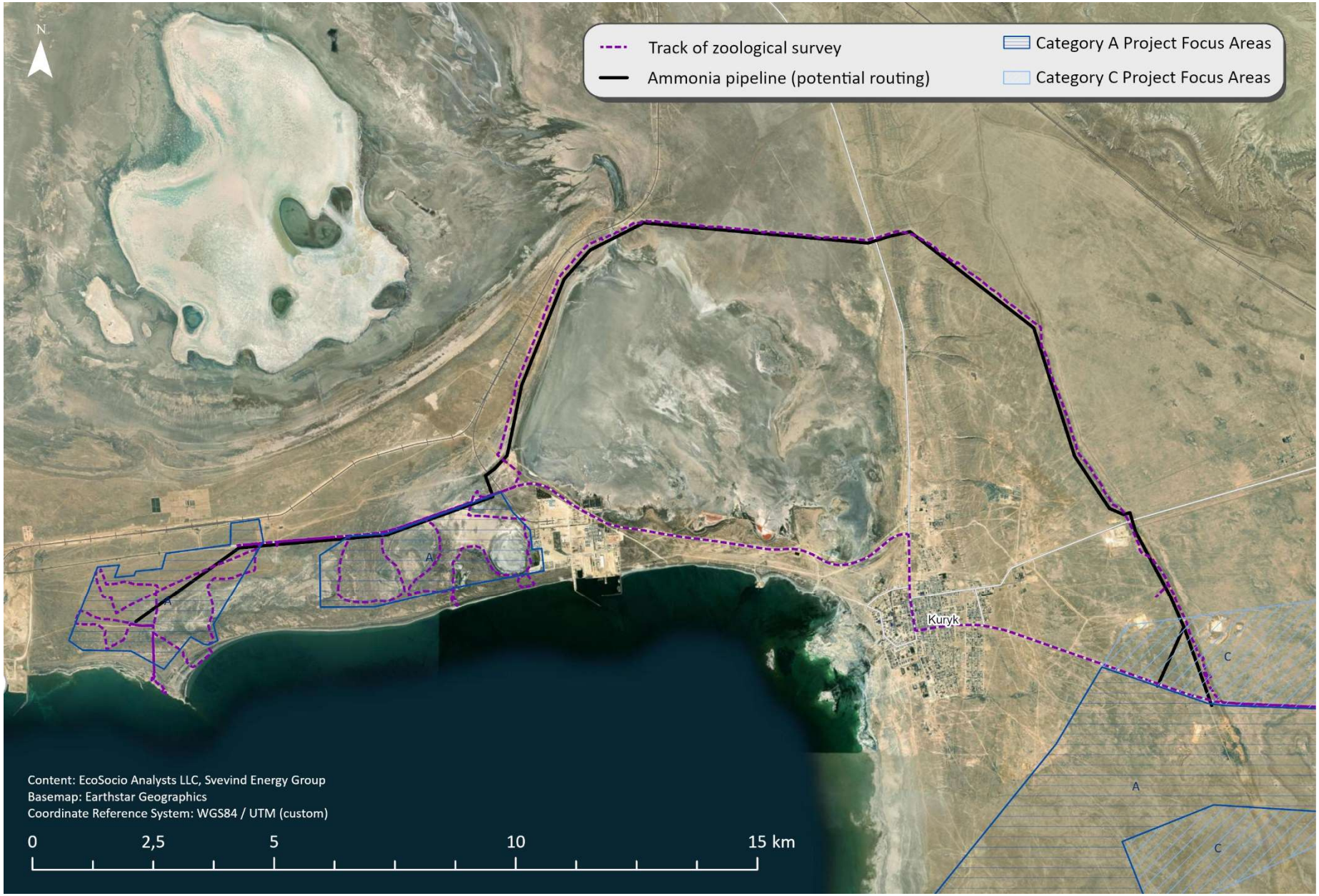

Figure 2 Zoological survey areas at the ammonia pipeline corridor and two open storage areas near Kuryk port.

Spiders (Arachnida) and insects (Insecta) were collected during the route surveys and in the habitats within a 50 m radius, using a distance of 5 m between spiral circles. Large insects were collected in entomological nets by mowing, small insects were collected using an exhauster. Soil insects were collected in trapping cups, in which beer-soaked rags and insect remains were placed [4]. To collect species with nocturnal or crepuscular activity, stones were turned over. Large and medium-sized insects with dense cover were drenched with vapours of ethyl acetate, which is less volatile and toxic than chloroform and leaves the insects supple and the insects retain their colour even after a long time. Small insects and those with soft chitinous cover were soaked in formalin. Special cushion (cardboard with dense cotton wool <1 cm thick) and bags were used for transport.

1.2 BIRDS

1.2.1 SUMMER

The analysis of field survey results shows an uneven distribution of avifauna in the study areas both in terms of number of species and abundance. The abundance of birds (Table 1) in the eastern districts (Beket-Ata - Rahym, Kanagat) significantly exceeds that of the western districts (Talap, Enbek, Teren oi). This is despite the fact that the latter are closer to the sea, which logically would imply a richer composition of avifauna.

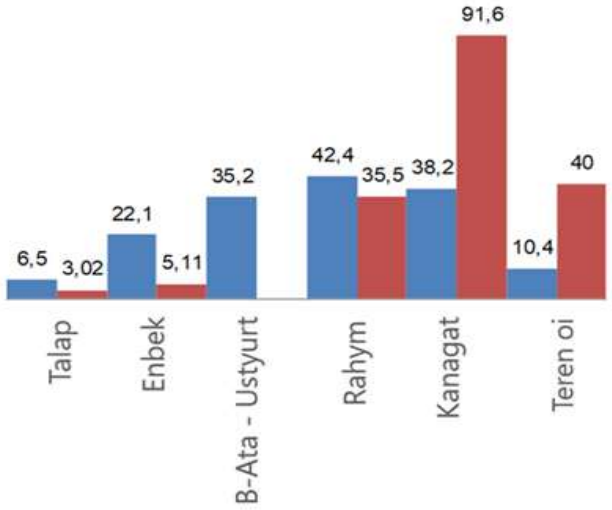

Figure 3 Abundance of birds per km2 on the main landscape (blue) and in the habitats that differed from the main landscape (brown) between points.

Table 1 Comparison of abundance (birds/km²) on routes between habitat points. The order of species is given according to Koblik E.A., Redkin Y.A., Arkhipov V.Y. List of Birds of the Russian Federation. Moscow: Partnership of scientific publications KMK, 2006. 256 pages. Threatened birds are highlighted in red according to iucnredlist.org (Version 2025-1) and redbook.kz (fourth edition of the Red Book).

Species English name	Species scientific name	Talap	Enbek	Beket-Ata / Rahym	Rahym	Kanagat	Teren oi	Average
Common kestrel	*Falco tinnunculus*	0.01					0.07	0.01
MacQueen's bustard	*Chlamydotis macqueenii*					0.05		0.01
Caspian plover	*Charadrius asiaticus*			0.2	0.96	1.33		0.42
Greater sand plover	*Charadrius leschenaultii*		0.02					0.00
Wood sandpiper	*Tringa glareola*	0.08						0.01
Green sandpiper	*Tringa ochropus*						0.16	0.03
Ruff	*Philomachus pugnax*					0.39	0.00	0.07
Black-tailed godwit	*Limosa limosa*						0.02	0.00
Rock dove	*Columba livia*		0.07					0.01
Black-bellied sandgrouse	*Pterocles orientalis*	0.38	0.23		0.03	0.02		0.11
Pallas's sandgrouse	*Syrrhaptes paradoxus*	0.35						0.06
Little owl	*Athene noctua*						0.02	0.00
Eurasian hoopoe	*Upupa epops*					0.22		0.04
Common swift	*Apus apus*					0.02	0.07	0.01
Barn swallow	*Hirundo rustica*	0.08	0.22					0.05
Greater short-toed lark	*Calandrella brachydactyla*							0.00
Mediterranean short-toed lark	*Calandrella rufescens*	4.46	19.62	23.9	32.19	24.36	2.54	17.84

[4] Paliy V.F. Methods of studying the fauna and phenology of insects // - Voronezh, 1970. Pages. 1-192 and Fasulati K.K. Field study of terrestrial invertebrates // VSH. - M. 1971. -Page 424.

Species English name	Species scientific name	Talap	Enbek	Beket-Ata / Rahym	Rahym	Kanagat	Teren oi	Average
Calandra lark	*Melanocorypha calandra*	1.07	1.68	0.6	4.47	6.02	3.46	2.88
Crested lark	*Galerida cristata*			9.8	2.11	3.59	0.38	2.65
Great Great grey shrike	*Lanius excubitor*					0.77	0.69	0.24
Rufous-tailed scrub robin	*Cercotrichas galactotes*				0.09			0.02
Western black-eared wheatear	*Oenanthe hispanica*				0.35			0.06
Isabelline wheatear	*Oenanthe isabellina*							0.00
Desert wheatear	*Oenanthe deserti*	0.08						0.01
Wheatear	*Oenanthe sp.*				0.26	0.22	0.46	0.16
Red-headed bunting	*Emberiza bruniceps*				0.18	0.22	0.31	0.12
Common raven	*Corvus corax*							0.00
Lark	*Alauda sp.*			0.4	1.58	0.92	0.23	0.52
Passerine	*Passeriformes sp.*	0.02	0.29	0.3	0.14		2.00	0.46
	Total	6,5	22.1	35.2	42.4	38.2	10.4	25.8

Figure 3 shows that the avifauna of the main landscape in the Talap, Enbek and Teren oi areas has a much lower abundance of birds than in the eastern part of the study area. The average abundance in the western part was 13 birds/km² while it was 38.6 birds/km² in the eastern part. The abundance at the habitat points in Talap and Enbek was also lower than in the east; but in Teren oi it was almost on par with Rahym.

Table 2 Birds diversity and numbers at sensitive locations in the OHTL corridors (L1 to L8). Additional locations (L1alt, L2alt and L3alt) were added close to the main hotspot where higher sensitivity to the Project impact was suspected.

Species English name	Species scientific name	L1a	L1 alt	L2a	L2 alt	L3a	L3 alt	L4a	L5a	L6a	L7a	L8a
Common buzzard	*Buteo buteo*					No birds				1	No birds	
European bee-eater	*Merops apiaster*									3		
blue-cheeked bee-eater	*Merops superciliosus*									1		
Barn swallow	*Hirundo rustica*									1		
Mediterranean short-toed lark	*Calandrella rufescens*	50		40	10			30		5		
Greater short-toed lark	*Calandrella brachydactyla*							5				
Calandra lark	*Melanocorypha calandra*	40						30	2	3		150
Crested lark	*Galerida cristata*						30					60
Wheatear	*Oenanthe sp.*	40										
Passerine	*Passeriformes sp.*							40				200
Brambling	*Fringilla montifringilla*											
Caspian gull	*Larus cachinnans*		1									
Sylviid warblers	*Sylviidae sp.*						10					
Rock dove	*Columba livia*											
Eastern black-eared wheatear	*Oenanthe melanoleuca*											

The reason for this may be the difference in the timing of nesting, which can significantly distort the results of the population counts. For instance, on 11-14 June 2024 in Talap and Enbek, passerines started mating; their fledglings had already migrated to wintering grounds. On Rahym and Kanagat fledglings were with parents, and chicks just emerging from the nest were observed. The higher abundance on Teren oi can be explained by later nesting than in Talap and Enbek. This is supported by family flocks (with fledglings). A Raven (Corvidae) family of 5 birds returned to its nest in the evening; a Kestrel nest contained chicks on 20 June 2024, which probably fledged on 21-22 June 2024.

Table 3 Birds per km of the routes and number of species in the study territories and the Beket-Ata area between the western and eastern territories.

Birds/km of routes		Species
Talap	0,6	16
Enbek	1,06	6
Teren oi	0,62	6
Beket-Ata	0,99	
Rahym	1,54	2
Kanagat	1,39	9

At the selected sensitive locations along the OHTL corridor routes, diversity was the highest at the L6 survey point with a combination of shrubs, base soils (takyrs - flat salt free surface void of vegetation), buildings and an existing powerline used by the birds of prey for scanning (Table 2). The density was the highest at the survey point L8a, which was located next to the cliffs.

During the observation of raptors in the Project Areas no nesting behaviour in their breeding season was noted. Therefore, it is assumed that the Project Areas are not used for raptors breeding and a raptors nests search in 10 km radius was not conducted. No raptor nests were found during the route transects.

The number of birds per kilometer of route in the main landscape also shows that the number of individuals was higher in the eastern territories (Table 3). However, in contrast to the abundance in the main landscape, the number of species in the selected specific habitats was higher in the western territories.

At the ammonia pipeline corridor, the birds' abundance and diversity was low due to the absence of water, low coverage of vegetation that had been degraded by human activities at many locations, presence of people, noise and night lights. A Common Kestrel, several seagulls and Barn Swallows were observed at the Kuryk waste dump 1.8 km west of the pipeline corridor (Table 4).
The open storage areas at the shore near Kuryk port had some concentration of passerine birds in the shrubs around the vegetation free saline depressions (sors).

Table 4 Birds diversity and abundance along the ammonia pipeline corridor and at the open storage areas and the shore near them. Residence form: R-resident, B-breeding, Bn-Breeding nearby, M-migrating.

Bird Order	Species scientific name	Species English name	Residence form	Birds/km pipeline route	Storage areas	Sea shore
Pelicaniformes	*Phalacrocorax carbo*	Great cormorant	Bn,M			40
Falconiformes	*Falco tinnunculus*	Common kestrel	Bn,M			1
Charadriiformes (shore birds)	*Charadrius alexandrinus*	Kentish plover	Bn,M			25
	Larus cachinnans	Caspian gull	Bn,M	0,1	6	12
	Sterna hirundo	Common tern	Bn.M	0,03	5	
	Gelochelidon nilotica	Gull-billed tern	Bn,M		2	
	Caprimulgus europaeus	European nightjar	Bn,M		1	
Caprimulgiformes	*Columba livia*	Rock pigeon	R	0,2	2	
Apodiformes	*Upupa epops*	Eurasian hoopoe	Bn,M	0,1		
Coraciiformes	*Hirundo rustica*	Barn swallow	Bn,M	1,2		
Passeriformes (sparrow like birds)	*Galerida cristata*	Crested lark	B,M	0,6		
	Sturnus roseus	Rosy starling	Bn,M	0,1		
	Oenanthe pleschanka	Pied wheatear	Bn,M	0,6		
	Oenanthe deserti	Desert wheatear	B,M	0,3		

1.2.2 AUTUMN

The direction of migration of the Passerine birds was not clearly defined. Migrations across territories were mainly in circles. The main mass of birds of the Passeriformes was made up of the Lark family, of which the Grey Skylark was the dominant one. The flight of the Grey Skylark was rarely recorded at a height of more than 5 m; the Steppe Skylark flew mainly at a height of 8-15 m, and the Tufted Lark - from 5 to 10 m.

Falcons, harriers and hawks hunt at the same altitude without flying within the expected blade rotation area (risk window). Raptors from the genera Eagles, Haliaeetus and Snake Eagles hunt at heights of 10-50 m, but during migration, if they are well-fed, they can fly the whole territory at a height of 200-400 m without descending to hunt. Eagles fly mostly through Rahym. Two uninhabited eagle nests were found on the old graves at U3a during the route transects in autumn.

The food of predators of the genus Buzzards Buteo is small mammals, mainly rodents; of the genus Eagles Aquila - hares and korsaks, but hungry birds catch gerbils, tortoises and hedgehogs. The Steppe and Common Merlin, Eurasian Hobby and Saker Falcon, Eurasian Sparrowhawk and Eurasian Goshawk

prey only on birds, almost always at low altitudes (5-10 m); the Great Cormorant feeds mostly on fish. The food of the Steppe and Common Kestrels is mainly small mammals and large insects but sometimes they hunt small birds. Among nocturnal birds of prey, the Little Owl is the main representative of the birds of the order Strigiformes. It hunts rodents and small birds. Its flight height rarely exceeds 15 m.

Observations of dragonflies and orthopteroids show that only large dragonflies - Aeshna Mosaic Darners and Anax - climb upwards more than 10 m, but they were found only in one occasion; Orthoptera species were not observed above 5 m.

1.3 OTHER VERTEBRATE AND INVERTEBRATE ANIMALS

Other animals are important as food for birds that may encounter turbine blades or power line conductors. Small rodents are the main part of this nutritive base for birds. Their low numbers and activity in summer explain the widespread low numbers of nesting birds of prey and snakes. Tortoises are the main source of food for the local raven (*Corvus corax)*. The Tolai Hare (*Lepus tolai)* is a significant food source for eagles only in Rahym. Local ravens and magpies feed on lizards. Gophers, corsaks and foxes are present in small numbers and do not form the basis of food for large birds of prey.

1.3.1 SUMMER

The western territories differed from the eastern territories regarding the presence of livestock. Within a radius of 2-3 km from each survey point there was a settlement of shepherds consisting of one dwelling, a watering place (well, with several water tanks from 1 to 10 m³), a cattle pen and other outbuildings. In general, the presence of cattle, dogs, cats and humans and their tracks scares away most of the animals. This general observation is confirmed by the absence of gazelle tracks in the western areas.

A low abundance and diversity of butterflies (out of 50 butterflies encountered, 90 % of them were from the family Pieridae) and dragonflies can not attract insectivorous birds to this area, which can feed only on a few beetles (Coleoptera) and grasshoppers (Orthoptera).

Table 5 Diversity and abundance of mammals and reptiles in the planned project territories in summer. Threatened species are highlighted in red according to iucnredlist.org (Version 2025-1) and redbook.kz (fourth edition of the Red Book).

Species English name	Species scientific name	Talap	Enbek	Kanagat	Rahym	Teren oi	Total
Small mammals borrows	*Gerbillinae*	0	58	144	198	200	600
Tortoise burrows	*Testudo horsfieldii*	8	67	117	160	200	552
Tortoise shell		0	0	46	41	114	201
Tortoise		0	0	0	0	2	2
Hedgehog	*Erinaceidae*	0	0	1	0	1	2
Tushkanchik	*Dipodidae*	0	0	0	1	0	1
Yellow ground squirrel	*Spermophilus fulvus*	0	1	0	2	1	4
Hare	*Lepus tolai*	0	0	2	21	1	24
Honey badger	*Mellivora capensis*	0	0	0	1	0	1[5]
Fox	*Vulpes vulpes*	0	1	0	1	2	4
Corsac fox	*Vulpes corsac*	1	1	0	0	0	2
Caracal	*Caracal caracal*	0	0	0	0	0	0[6]
Goitered gazelle	*Gazella subgutturosa*	0	0	1	3	0	4[7]
Lizards	*Lacertilia*	8	17	23	25	18	91
Snakes	*Serpentes*	0	0	0	1	0	1
Butterflies	*Lepidoptera*	0	12	6	24	8	50
Dragonflies	*Odonata*	0	1	0	0	3	4
Total:		17	158	340	480	552	1547

[5] In addition to a visual sighting in Rahym, two honey badger diggings were noticed in Teren Oi.

[6] No caracal was identified, although several caracal tracks were noticed.

[7] In addition to visual sightings, a few gazelle tracks were noticed in Rahym.

Table 6 Mammals and reptiles surveyed along the ammonia pipeline, on the open storage areas and at the shore.

Species English name	Species scientific name	Storage areas	Shore
Golden jackal	*Canis aureus*	0	Few footprints
Tolai hare	*Lepus tolai*	1	Droppings
Great gerbil	*Rhombomys opimus*	Many borrows	Footprints, burrows
Russian tortoise	*Testudo horsfieldii*	Shell, diggings	Diggings

Of the Hymenoptera order of insects, almost only ants were present, but even those were in small numbers, wasps were rare, and bumblebees were absent.

Two interesting findings were the registration of honey badger diggings and tracks of presumably a cheetah, which disappeared completely in the area and has never been seen since the 1950s. The reason for suspecting presence of cheetah were signs of claws in the track. It is known that out of cats (Felidae family), only cheetah cannot retract claws. Because the scientists accept only visual or photo evidence to consider a particular species presence in the area, this finding was not considered as valid.

Only diggings and a few shells of the Russian Tortoise and borrows of Big Gerbil were noticed at the open storage area. A Tolai Hare dropping and tracks of Jacals were recorded at the shore erosion terraces outside those areas. No animals were found along the potential ammonia pipeline routing (Table 6).

1.3.2 AUTUMN

The resumption of activity and increase in rodent numbers in autumn (sometimes 7-10 times higher than in summer) is partly responsible for the abundant autumn migration of predators, for which lizards and tortoises are only additional food after rodents. The highest number of small rodents and tortoise burrows was observed in Rahym and Teren oi territories, and the lowest in Talap territory. The Goitered Gazelle may migrate to its birthing grounds located at the junction of three countries, potentially passing through Rahym and Kanagat clusters during autumn.

Table 7 Diversity and abundance of mammals and reptiles in the planned project territories in autumn. Threatened species are highlighted in red according to iucnredlist.org (Version 2025-1) and redbook.kz (fourth edition of the Red Book).

Species English name	Species scientific name	Talap	Enbek	Kanagat	Rahym	Teren oi
Small mammals´ burrows	*Gerbillinae*	many	many	many	many	many
Tortoise burrows	*Testudo horsfieldii*	many	many	many	many	many
Tortoise shells		1	6	214	66	45
Tolai hares[8]	*Lepus tolai*	2	0	16	10	13
Great gerbil	*Rhombomys opimus*		1	0	0	2
Libyan jird	*Meriones libycus*	7	4	0	0	0
Five-toed jerboa	*Allactaga*	some	some	0	0	0
Yellow ground squirrel[9]	*Spermophilus fulvus*	0	0	2	0	0
Honey badger[10]	*Mellovora capensis*	0	0	0	0	0
Caracal[11]	*Caracal caracal*	0	0	0	0	0
Goitered gazelle[12]	*Gazella subgutturosa*	0	0	2	15	13
Corsac fox[13]	*Vulpes corsac*	0	1	0	0	0
Fox[14]	*Vulpes vulpes*	0	0	0	0	0
Hedgehog[15]	*Erinaceidae*	0	0	0	0	0

[8] Tracks, droppings, diggings and burrows and daytime nests of tolai hares were found in all areas.

[9] Burrows of yellow ground squirrels were found in all areas.

[10] No honey badger was sighted visually, although signs of its presence (diggings, burrows, droppings, tracks) were found in all areas.

[11] No caracal was identified, although several tracks were noticed in Kanagat, Rahym and Teren oi areas.

[12] In addition to visual sightings, tracks, droppings and bones of goitered gazelles were found in Teren oi, Rahym and Kanagat areas.

[13] 1 visual sighting registered by a camera trap; Tracks, droppings, diggings and burrows of corsac foxes were found in all areas.

[14] Tracks, droppings, diggings and burrows of foxes were found in all areas.

[15] Skins of hedgehogs were found in all areas.

Species English name	Species scientific name	Talap	Enbek	Kanagat	Rahym	Teren oi
Asian mouflon	*Ovis orientalis*	0	0	2	0	0
Lizard	*Lacertilia*	7	0	10	3	3
Multi-ocellated racerunner	*Eremias multiocellata*	0	0	10	0	0
Gecko	*Gekkonidae*	0	0	1	0	3
Agama	*Prynocephalus*	1	2	0	0	0
Snake	*Serpentes*	0	0	1	0	0
Butterflies	*Lepidoptera*	0	1	few	0	0
Dragonflies	*Odonata*	0	0	23	0	2

Rodent and tortoise abundance varies greatly at the surveyed sites, from complete absence to hundreds of individuals per 1 ha. In the bare soils (called “takyrs”) of Rahym, Kanagat and Teren oi territories, temporary impacts and displacement may be caused to colonies of Ellobius sp. On takyrs of Rahym and its vicinities it is necessary to carry out research on identification of the taxon of the mole vole (species, subspecies), because it is puzzling that colonies of 100-500 burrows are located exactly on takyrs devoid of vegetation, while the common mole vole *Ellobius Talpinus* (Pallas, 1770) feeds on plant roots.

Table 8 Mammals and reptiles surveyed along the ammonia pipeline, on the open storage areas and at the shore.

Species English name	Species scientific name	Ammonia pipeline	Storage areas	Shore
Tolai hare	*Lepus tolai*	Tracks, droppings	Droppings	No
Gerbillinae	*Rhombomys opimus*	9, calls	4, calls	No
Russian tortoise	*Testudo horsfieldii*	No	Burrows	No

Analyses of the terrestrial predators and birds of prey droppings (including of ravens) suggested that tortoises were their common food source. Nocturnal butterflies, beetles (one species undertakes mass migrations southwards in spring and autumn) and orthopteras were found to be the main source of food for birds (except for birds of prey) during migration.

Spiders (Arachnida) and insects (Insecta) were represented by coleopterans (beetles), hymenopterans (ants, termites, wasps), hemipterans (bugs), neuropterans (clades), anisopterans (dragonflies) and lepidopterans (butterflies and moths). As expected in a desert area, nocturnal lepidopterans dominated over diurnal species.

2 VEGETATION

2.1 METHODOLOGY

Field surveys were conducted from 12 to 21 May 2024 and from 2 to 11 September 2024 in accordance with the methods accepted by the scientific community[16]. The main objective was to describe the vegetation and assess its sensitivity in the Project Areas Talap, Enbek, Teren oi, Kanagat and Rahym, along the OHTL and ammonia pipeline corridor routes and in two open storage areas at the sea shore near Kuryk port. The hydrogen plant area (Kuryk Industrial site) was already assessed on 18-22 July 2023 and results are presented in Section 3.

The works were carried out in 3 phases:

- Preliminary desktop work in preparation for field surveys;
- Field surveys in the Project Areas;
- Desktop work on processing the field survey results and report preparation.

The following parameters were studied and recorded at each surveyed area:

- Coordinates (WGS 84), N/E
- Complete floristic composition of plant communities;
- Abundance of species using the Drude scale;
- Phase of phenological development;
- Life state of species;
- Height;
- Projective cover, determined by eye in %;
- Phytocoenotic role of species (dominant, subdominant, component);
- Signs of abnormal plant development;
- Disturbance factors and degree of anthropogenic transformation;
- Characterisation of relief;
- Name of soils;
- Nature and moisture regime;
- Presence of mosses and lichens.

In all main types of plant communities - phytocenoses, 10x10 m plots were defined. The internal regularities of plant interactions with each other and with the habitat were described. Detailed geobotanical description and photography were carried out according to the methods of field geobotanical research commonly accepted in Kazakhstan[17,18,19,20] using forms (Annex 2), including the following sections:

- *Plant community name*. Given by the percentage of dominant plant species (the main dominant stands last).
- *Relief*. A general characterisation of the topography and more detailed micro-relief is given.
- *Moisture conditions*. It is indicated: atmospheric, groundwater, flowing, stagnant, presence of run-off on slopes.
- *Soil*. Soil type and mechanical composition of upper horizons are indicated.

[16] Braun-Blanquet, J. (1964): Pflanzensoziologie // 3. Auflage. Wien, 1964 and Kulikova G.G. Basic geobotanical methods for studying vegetation. Moscow State University, 2006, 152 pages.

[17] Report of the Laboratory of Geobotany. Institute of botany and phytointroduction, Ministry of Education and Science of the Republic of Kazakhstan, Almaty, 2000. 168 pages

[18] Head N.P. Ogar and L.V. Shabanova, 1996. Report on research work on the theme: Anthropogenic transformation of vegetation of Kazakhstan (final).. 257 pages

[19] Field geobotany. Vol.3. - M.L: Academy of Sciences of the USSR press, 1964 531 pages

[20] Field Geobotany. Vol.4. - M.L: Academy of Sciences of the USSR press, 1972 137-330 pages

- *Projective coverage of soil by plants*. It is defined as a percentage of area occupied by projections of above-ground parts of all plants of phytocenosis as a whole. Projective coverage is expressed in %.
- *Floristic composition of the community*. Scientific names of plant species occurring in the community are listed. For each species the phytocoenotic role, abundance (using the Drude scale), projective cover (%), average height, phenophase, vitality, and location are given. A complete list of plants forming a phytocenoss (plants community) is compiled. The systematic affiliation of species is established using special plant identifiers [21,22,23]. Scientific names of plants (species, genus, family) are given according to Plants of the World Online [24]. Special attention is paid to populations of rare and endemic species, if present. The conservation status of species (rare, endemic) is given according to the Red Data Book of Plants of Kazakhstan[25].
- *Abundance*. This is a visual estimate of the number of individuals of each species in a community. It is determined using the Drude scale:
  - soc (socialis) - 'abundant', the plants are interlocked with their above-ground parts, forming a pure thicket, other species are very rare, isolated specimens;
  - cop3 (copiosus) - 'very abundant', plants are very abundant, they are the background;
  - cop2 - 'many', plants are frequent, numerous, scattered;
  - cop1 - 'quite a lot', plants are found occasionally, scattered;
  - sp (sparsus) - 'few', plants are found very rarely;
  - sol (solitarius) - 'single', very few plants, only a few specimens per sample area.
  - un (unicum) - 'single specimen'.
- *Vitality*. It characterises the degree of development or suppression of the species in the phytocenosis and was determined using the scale of A.A. Grossheim [26]:
  - 1 - severely depressed development;
  - 2 - depressed, vegetative development is below normal, the ability to bloom and fructify is not lost;
  - 3 - normal, vegetative development, flowering and fruition are normal;
  - 4- above normal, vegetative development is above normal; flowering and fruition are increased;
  - 5- lush development (increased development and increased flowering and fruition).
- *Surface condition*. Observations such as littering, overgrowth, dirt, burrows, stoniness and weeds are noted.

The methods of ecological assessment of the vegetation cover condition included, along with traditional ones[19,20,27], new methods developed in the geobotany laboratory of the Kazakhstan Institute of Botany and Phytointroduction[28].

The influence of anthropogenic factors was studied using the method of "anthropodynamic series"[29], in which, in order to identify anthropogenic changes in vegetation, the predominant type of anthropogenic impact is initially established - anthropogenic disturbance, transport impact, grazing, haying, etc. The

[21] Flora of Kazakhstan. Alma-Ata, Nauka, vol. 19, 1956-1966

[22] Illustrated identifier of plants of Kazakhstan. Vol.1. – Alma-Ata, 1969. 648 pages

[23] Illustrated identifier of plants of Kazakhstan. Vol.2. - Alma-Ata, 1972. 574 pages

[24] POWO. Plants of the World Online. Facilitated by the Royal Botanic Gardens, Kew. Available online: http://www.plantsoftheworldonline.org/

[25] Red Book of Kazakhstan, Part 1, Vol. 2. Plants. Astana: ArtPrint, 2014. 860 p.

[26] Bykov B.A. Geobotanical dictionary, Alma-Ata, 1973. C. 7273

[27] Field Geobotany. T. 1. - Moscow: Academy of Sciences of the USSR press, 1959. - 444 p; Field geobotany. T. 2. - M.L.: Academy of Sciences of the USSR press, 1960. -500 p. Field geobotany. T. 5. - L.; Nauka, 1976. - 320 p.

[28] Report on research work on the theme: Anthropogenic transformation of vegetation of Kazakhstan (final). Head N.P. Ogar and L.V. Shabanova. - Almaty, 1996. - 257 p.

[29] Г. Bizhanova, L.Y. Kurochkina. Mapping anthropogenic changes of Moyinkum pastures. Alma-Ata: Nauka KazSSR, 1989. 164p.

method is used to compare the type of anthropogenic impact. When using this method, descriptions of conditionally "background" (undisturbed or slightly disturbed) and disturbed communities of the same type are compared on plots selected on the basis of habitat similarity. The plots are selected so that their vegetation is disturbed in the same way. These similar communities are then ordered in descending order of the intensity of anthropogenic impact of a given species, down to 0. Particular attention was paid to the consideration of weed-ruderal species as indicators of transformation.

Changes in: a) species composition; b) phytocenotic role of species (projective cover, abundance and productivity); c) vitality, generativity, phenological state, habitus, degree of shoot damage, disturbance of cereal turf; d) condition of rags; e) presence and abundance of indicator species of vegetation transformation were taken as the main criteria of vegetation disturbance.

2.2 RESULTS

Over 31 dominant plant communities were described as a result of the assessment of 96 sample plots (24 in Teren oi, 12 in Kanagat, 10 in Rahym, 15 in Talap, 15 in Enbek, 8 along the ammonia pipeline corridor and in open storage areas, 12 along the OHTL corridors) and 1,120 km of the routes between them (Annex 2).

According to the latest scheme of botanical-geographical zoning[30], the territory of the Project Area is located in the Saharan-Gobi desert region, Irano-Turan sub-region, North-Turan (West North-Turan subprovince) and South-Turan (West South-Turan subprovince) provinces, in the middle and southern warm temperate deserts subzones of the desert zone.

In the middle desert subzone, West North-Turan subprovince, *Artemisia terraealbae* plays a significant role, but perennial solanaceous deserts predominate: biur-goon (*Anabasis salsa*), blackbay-leaved (*Oreosalsola arbusculiformis),* keurek (*Caroxylon orientale*), tasbiyurgun (*Nanophyton erinaceum*), hedgerow (*Anabasis brachiata*). Complexes of Anabasis salsa and white-earth wormwood communities, with dominance of one or the other, are widespread over significant areas. In the west of the subzone, *Artemisia gurganica* communities - endemic of Mangyshlak and Ustyurt plateau - are also present.

In the Karynzharyk massif, crossed by the OHTL corridor route west of Kanagat site, psammophytic variants are diverse in composition: psammophytic-shrub-semishrub (*Sophora conollyi, Astragalus karakugensis, Atraphaxis replicata, Convolvulus fruticosus, Xylosalsola arbuscula*), saxaul (*Haloxylon persicum, H. ammodendron*), and on the bound sands white-green chalky-hemlock (*Artemisia terraealbae*). *Haloxylon ammodendron* is in the Red Book of the Region, indicating danger of disappearance, under pressure by the local population that uses it as firewood.

Sarsazan co-communities dominate on solonchaks of Talap territory.

The remaining Project Areas are located in the West South-Turan subprovince stretching from the Caspian Sea in the west to the Amu Darya River in the east. Here, 40 % of the territory is occupied by wormwood deserts characteristic only for this subprovince, covered with *Artemisia kemrudica* communities, and perennial saltwort is characterised by the dominance of tetyr (*Salsola gemmascens*).

In the northern part of the subprovince, the Kazakh North-Turanian species *Anabasis salsa, A. brachiate*, and *Nanophyton erinaceum*, as well as the North-Turanian *Artemisia terraealbae*, are of high importance, mainly as co-dominants. The importance of *Caroxylon orientale* in the vegetation cover increases in this subprovince.

[30] Rachkovskaya E.I., Volkova E.A., Khramtsov V.N. Botanical Geography of Kazakhstan and Central Asia (within the desert region). St. Petersburg. 2003. 424 p.

2.2.1 TALAP

Most of the territory is represented by *Anabasis salsa* communities on grey-brown saline soils of undulating plains with hillocks. The vegetation of the territory has a weak to medium degree of disturbance due to grazing and motorized transport. Locally small areas (hillock tops, cattle camps) are disturbed to a high degree.

The average number of species in the communities was 10 species.

The majority of the study area is made up of biurgun communities (*Nanophyton erinaceum*). The total projective coverage (hereinafter referred to as TPC) of soil by vegetation is 20-25 % in phytocenoses disturbed to a weak degree. In case of anthropogenic load intensification, the TPC decreases to 15 % (moderately disturbed).

Biurgun communities form complexes. On rubbly soils, mainly with white-emergent sagebrush (Artemisia terrae-albae) with TPC of 25-30 % in weakly disturbed areas and 20-25 % in communities disturbed to a medium degree. On loamy soils Anabasis salsa are distributed in complex with keurek-biyurgun (*Caroxylon orientale, Anabasis salsa*) communities with TPC 25-30 % and keurek-wormwood (*Caroxylon orientale, Artemisia terrae-albae*) communities with TPC 30-35 % in slightly disturbed areas. Projective coverage of highly disturbed areas is 15-20 %.

In lowlands there are *Anabasis aphylla* communities with TPC 5-10 %, framing takyrs.

The vegetation cover of hillock tops, found on undulating plains, is practically destroyed due to vehicular traffic. It is represented by single plants and small groupings (*Oreosalsola arbusculiformis, Caroxylon orientale, Artemisia terrae-albae, Anabasis brachiata*).

The north-western part of the Talap site is represented by knobby fixed sands with spherical nodules, stretched in strips in the upper part of the slopes. Vegetation cover is represented by teresken (*Kraschenninikovia ceratoides*) communities, disturbed to a medium degree with TPC 15-20 %. Small territories with weed-grass groups (*Caroxylon nitrarium, Suaeda acuminata, Peganum harmala)* were detected in the pen areas and within 2-3 m radius from it. In the same part of the study area there were takyr depressions with single participation of hedgehog (*Anabasis brachiata*).

In the whole surveyed area, no such signs of abnormal plant development such as gigantism, chlorosis of leaves and growth of branches in the form of cones, or galls were detected.

Species listed in the Red Book of the Republic of Kazakhstan were not found.

The life condition of most components of phytocenoses was good. The exception were territories subjected to heavy grazing, where plants are bitten and are in an oppressed state. The phenological phase of species corresponded to the season.

Having analyzed the material obtained during field studies in spring and autumn periods, it can be concluded that the observed changes are seasonal in nature.

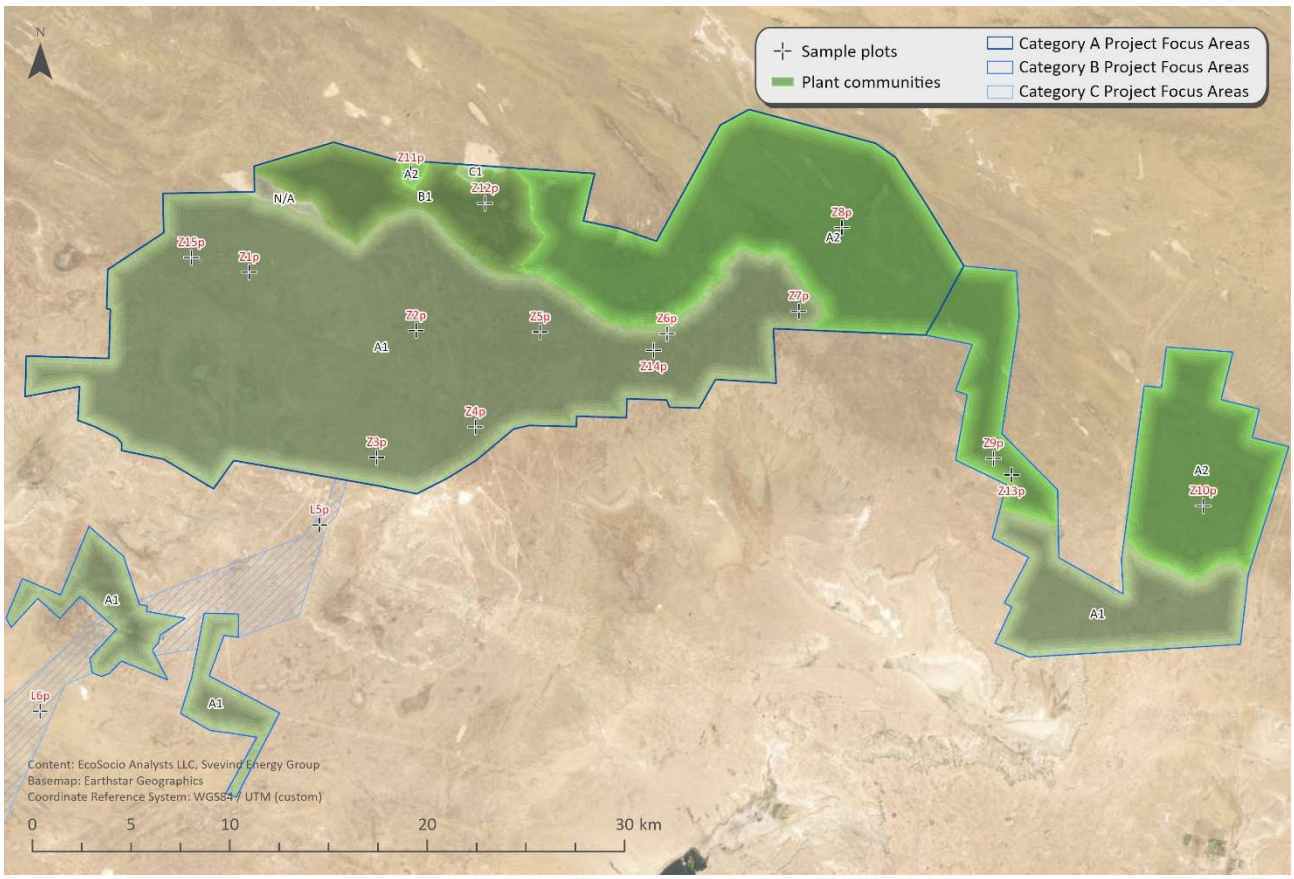

Figure 4 Talap vegetation map with location of 15 plots where typical vegetation was described (see Annex 2). The area is in the Middle Desert Subzone with 3 vegetation types with 4 communities:

A. Complex Anabasis deserts on undulating plains with hillocks with two plant communities:
   1. *Anabasis salsa* in combination with *Artemisia terrae-albae* on rubbly loamy soils;
   2. *Anabasis salsa* community in combination with Caroxylon orientale - *Anabasis salsa*, *A. aphylla – A. salsa*, Caroxylon orientale - *Artemisia terrae-albae* dominating communities on loamy soils;

B. Psammophyte deserts on the sandy hillocks with
   1. *Krascheninnikovia ceratoides* community on fixed sands

C. Takyr depressions with
   1. Isolated *Anabasis brachiata*

2.2.2 TEREN OI

The studied area is located on the Kenderli-Kayasan plateau, the vegetation of which is very heterogeneous, complex cover on grey-brown loamy solonetz soils prevails. Many communities are oligodominant: they are often formed by 3 or more co-dominant species. *Artemisia kemrudica, Caroxylon orientale* and *Caroxylon gemmascens* dominate in the vegetation cover, but *Anabasis salsa, Anabasis brachiata* and *Nanophyton erinaceum* also play an important role. The heterogeneity of the vegetation cover is reinforced by the combination of complexes with plant communities on numerous bozingen (convex or flat areas with hypsiferous soils). There are a large number of flat depressions and depressions occupied by takyrs.

Most of the territory is formed by complex deserts: *Artemisia kemrudica*, *Caroxylon orientale* with TPC 25-35 %; *Artemisia kemrudica*, *Anabasis salsa*, *Caroxylon orientale* with TPC 25-35 %, at weak degree of disturbance and 15-25 % at medium degree of disturbance; *Artemisia kemrudica, Caroxylon gemmascens* with TPC 30-35 %, *Anabasis salsa*, *Caroxylon gemmascens* – TPC 20-25 %; *Anabasis salsa Evernia esorediosa f. terrestris*, *Anabasis brachiate* groups on bozingen with 5-15 % coverage. Most of the area is slightly disturbed by motorised traffic (dirt road network), grazing and in some places by excavation. The communities listed above consist of 4-10 species.

Figure 5 Teren oi vegetation map with location of 24 plots where typical vegetation was described (see Annex 2). The area is in the Southern Desert Subzone with 3 vegetation types with 4 communities:

D. Complex *Artemisia kemrudica* and perennial saltwort deserts on grey-brown saline soils of slightly wavy and undulating plains
1. *Artemisia kemrudica, A. kemrudica, Anabasis salsa, C. orientale, C. gemmascens, A. salsa* on solonetz and hedgerow-lichen groupings on bozingen (*Evernia esorediosa f. Terrestris, Anabasis brachiata*)
2. *Caroxylon gemmascens, C. gemmascens, Anabasis salsa, Caroxylon orientale, A. salsa, Artemisia kemrudica, C. gemmascens, A. kemrudica* hedgerow-lichen groupings on bosingen (*Evernia esorediosa f. Terrestris, Anabasis brachiata*)

E. Severely disturbed areas (hayfields)
1. *Anabasis salsa, Caroxylon orientale* in place of *Artemisia kemrudica*

C. Takyr depressions with
1. *Caroxylon gemmascens, Anabasis salsa, Artemisia kemrudica, Ceratocarpus arenarius*

The southern and south-western part of the study area is dominated by complex perennial saltwort communities: *Caroxylon gemmascens, Caroxylon gemmascens, C. gemmascens, Anabasis salsa, Caroxylon orientale, Anabasis salsa, Artemisia kemrudica, C. gemmascens*. The total projective cover of such communities is not high and amounts to 20-30 %. The vegetation cover is disturbed to a weak degree under the influence of motor transport, and colonies of Big Gerbils are observed. The number of species in communities is 3-10 species. The above listed perennial saltwort communities form complexes with *A. kemrudica phytocenoses*, which have a higher TPC of 30-35 % and 2-4 species.

Takyrs are practically devoid of vegetation cover. The TPC ranges from less than 1 % to 2-3 %. Single plants and small groupings are represented by perennial saltwort (*Caroxylon gemmascens, Anabasis salsa),* wormwood (*Artemisia kemrudica*) and *Ceratocarpus arenarius*.

Severely disturbed areas under the influence of Big Gerbils are found, numerous colonies are presumably dead. Very sparse vegetation cover of 5-10 % is represented by perennial saltwort groups (*Nanophyton erinaceum, Anabasis brachiata*).

In the southern part of the Teren oi area, bosyngenes (specific vegetation communities first described at Bosyngen settlement) with hedgerow-lichen groups (*Evernia esorediosa f. Terrestris, Anabasis brachiata*) are also widespread.

Rarely occurring hillocks serve as a ‘’viewpoint‘’, a landmark and, as such, the tops, usually levelled, are heavily disturbed by road degradation. Only single plants can be found.

No signs of abnormal plant development such as gigantism, leaf chlorosis and cone-shaped branch growth were detected in the entire surveyed area. No species listed in the Red Book of the Republic of Kazakhstan were found.

The life state and phenological phase of many components of phytocenoses are normal. However, on a large area of the territory a dry state of Artemisia from 2-3 to 50-80 %, tetyrus from 5 to 60 % and keurek up to 80-90 % were observed. The examination of dry plants, including their root systems, did not reveal any signs of insect pests or anthropogenic factors. Based on studies of similar conditions of desert vegetation in Turkmenistan (E.N. Zverev), it is assumed that this condition was caused by a particularly dry period. When normal conditions are restored, desert vegetation gradually recovers.

2.2.3 KANAGAT AND RAHYM

The study area is located on the Ustyurt Plateau in the middle desert subzone. The peculiarity of the vegetation cover of the plateau lies in the dominance of *Anabasis salsa* communities. The vegetation cover of the plots was slightly disturbed by motorised traffic (dirt road network) and small colonies of Big Gerbils were observed in some places.

The *Anabasis salsa* communities are characterised by a total projective cover of 20-25 %. In *Caroxylon orientale* and *Anabasis salsa* communities, the total projective cover is slightly higher at 25-30 %. And in *Artemisia terrae-albae* with *Anabasis salsa* and *Artemisia kemrudica* with *Caroxylon orientale* it reaches 30-35 %. The number of identified species was 3-18.

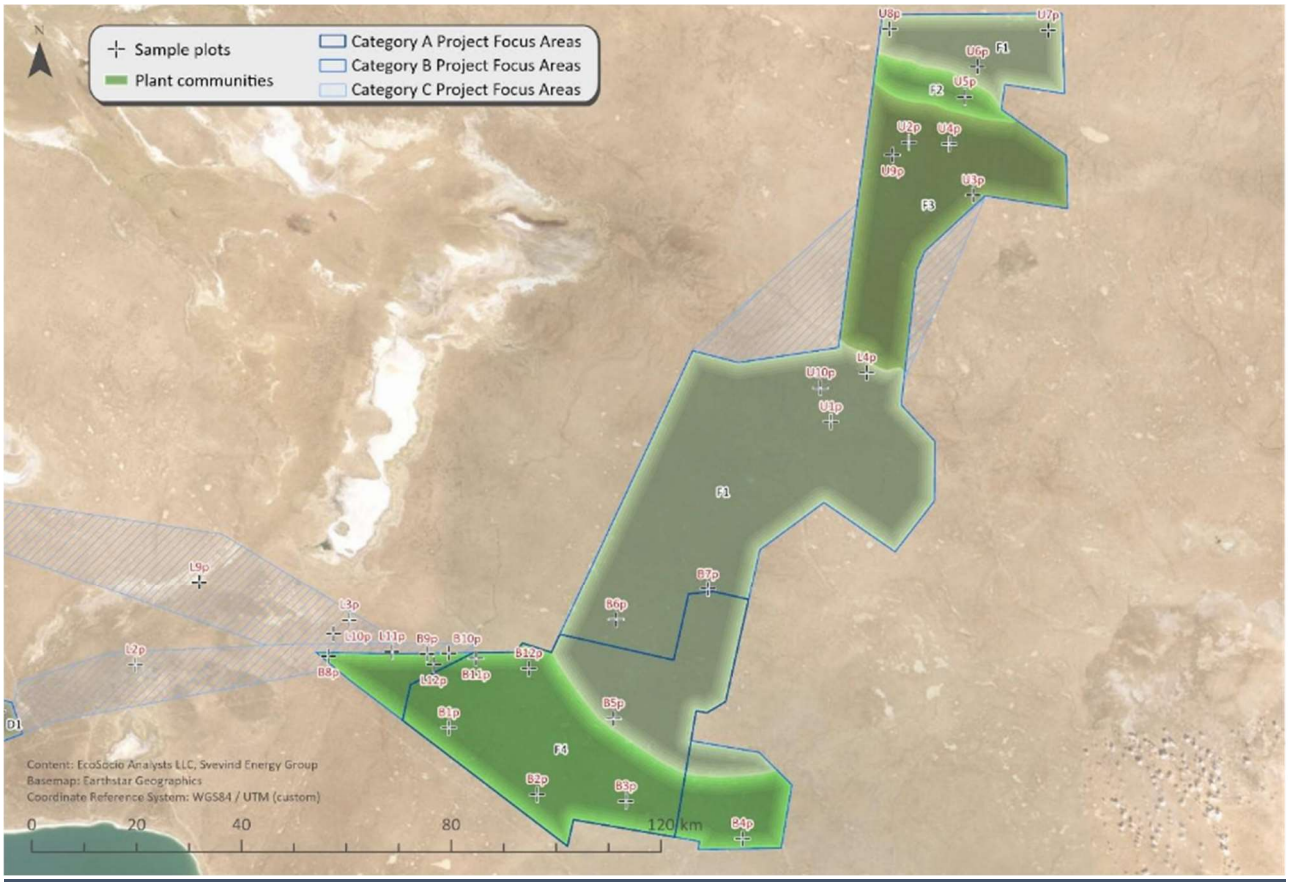

Figure 6 Kanagat and Rahym vegetation map with location of 22 plots where typical vegetation was described (see Annex 2). These areas are in the Middle Deserts Subzone with one type of vegetation with 4 communities:

F. Complex of *Anabasis salsa* communities on grey-brown loamy saline soils of undulating and slightly undulating plains
1. *Caroxylon orientale* and *Anabasis salsa*
2. *Anabasis brachiata* on tops of uplands on eroded soils

3. *Artemisia terrae-albae*
4. *Artemisia kemrudica, Caroxylon orientale* and *Haloxylon ammodendron*.

Sparse groupings of *Anabasis salsa* with *Caroxylon orientale* and *Evernia esorediosa f. Terrestris* and *Anabasis brachiata* are widespread in the surveyed area.

No signs of abnormal plant development such as gigantism, leaf chlorosis and cone-shaped branch growth were detected throughout the surveyed area. No species listed in the Red Book of the Republic of Kazakhstan were found.

The life state and phenological phase of most components of phytocenoses are normal. In small areas a dry state of *Artemisia kemrudica* and *Caroxylon orientale* from 40 to 90 % was observed. The examination of dry plants, including their root systems, did not reveal any signs of insect pests or anthropogenic factors. It was assumed that such condition was caused by a particularly dry period.

2.2.4 ENBEK

The Enbek site is characterised by a flat relief and is separated in the north-west from the Karagie depression by a chink ledge. The northern part of the study area coincides with the border of middle (North-Turanian) deserts, and the southern part with southern (South-Turanian) deserts. A complex structure of vegetation cover on grey-brown saline soils prevails. The dominant communities are *Artemisia terrae-albae* and *Anabasis salsa* communities in the subzone of middle deserts and *Anabasis salsa*, *Caroxylon orientale, Nanophyton erinaceum* communities in the subzone of southern deserts.

The vegetation cover in the middle desert subzone was mainly disturbed to a weak degree and was represented by a complex of *Artemisia terrae-albae* with *Caroxylon orientale*, *C. orientale, Nanophyton erinaceum and C. orientale*, *Anabasis brachiata* groupings on eroded soils. Projective coverage of Artemisia communities in weakly disturbed areas was 30-40 %, the number of species was 6-14. In *Anabasis salsa, Caroxylon orientale,* and *Nanophyton erinaceum* communities the TPC was lower and was 20-30 %, and in *Anabasis brachiata* up to 10 %. The main factors of vegetation disturbance are motor vehicle traffic and numerous unpaved roads, as well as little grazing. Significant areas are takyrs devoid of vegetation or overgrown with small groups of *Atraphaxis spinose* and *Artemisia gurganica*.

The southern part of the site was represented by *Anabasis salsa, Caroxylon orientale* and *Nanophyton erinaceum* communities dominated by *Caroxylon orientale* and *Caroxylon gemmascens* with a TPC of 20-30 %. The number of species was 8-15. There were takyr depressions and *Halocnemum strobilaceum* with *Eremopyrum orientale* communities. The projective cover was 25-35 % and the number of species was 6-7. The vegetation cover was slightly disturbed. In the southernmost part of the study area, a road was being constructed and the cover was either destroyed or if being at a distance from the road, it was moderately disturbed due to heavy dusting.

No signs of abnormal plant development such as gigantism, leaf chlorosis and cone-shaped branch growth were observed throughout the surveyed area. *Anabasis aphylla* galls were identified at the M1p survey point. The life status of most components of phytocenoses was normal. The phenological phase of species corresponded to the season.

Species included in the Red Book of the Republic of Kazakhstan were not found.

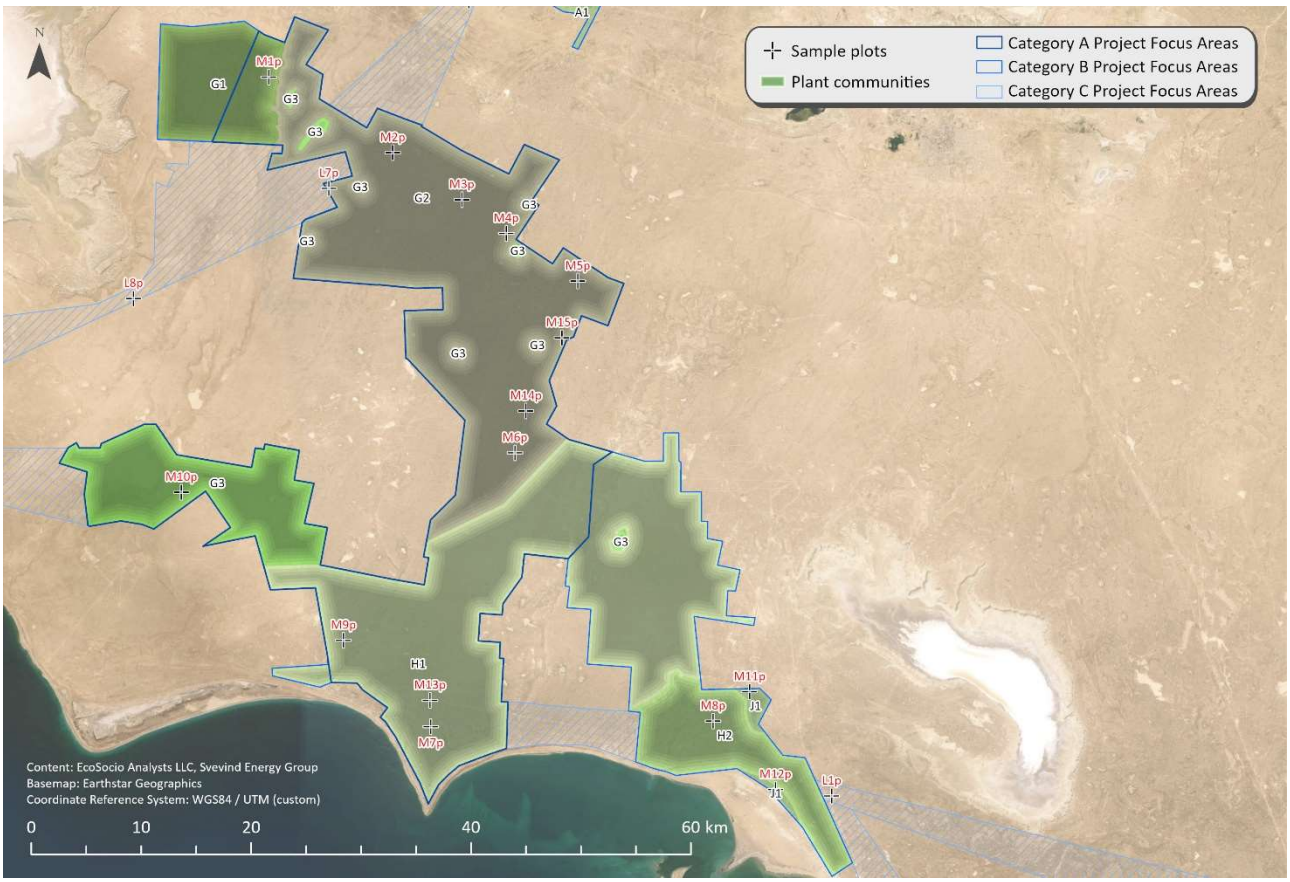

Figure 7 Enbek vegetation map with location of 15 plots where typical vegetation was described (see Annex 2). The area is in two Subzones with 4 vegetation types with 7 communities:
Middle Desert Subzone
G. Complex wormwood and perennial saltwort deserts on grey-brown saline soils of slightly undulating plains
1. *Artemisia terrae-albae* with *Anabasis aphylla*
2. *Artemisia terrae-albae*, *Caroxylon orientale* in complex with *Anabasis salsa, Caroxylon orientale, Nanophyton erinaceum*
3. *Nanophyton erinaceum, Caroxylon orientale* and *Caroxylon orientale* in complex with *Artemisia terrae-albae* and *Anabasis brachiate* groupings
Southern desert Subzone
H. Complex perennial saltwort deserts on grey-brown saline soils of slightly wavy and undulating plains
1. *Caroxylon orientale* and *Anabasis salsa*
2. *Caroxylon gemmascens* and *Nanophyton erinaceum* with *Artemisia kemrudica*
J. Solonchak depressions with
1. *Halocnemum strobilaceum, Eremopyrum orientale*
C. Takyr depressions with isolated plants of
3. *Atraphaxis spinosa, Artemisia gurganica*

2.2.5 Ammonia Pipeline and Open Storage Areas

The vegetation along the ammonia pipeline corridor has a low diversity and sparse soil coverage (<45 %). It grows under extreme conditions of reduced water supply, high temperatures and wind that increase evapotranspiration and strong soil salinity. Xerohalophytic shrubs, semi-shrubs, herbaceous perennials and annuals from *Chenopodiacea, Asteraceae, Poaceae, Cruciferae* and *Limoniaceae* families dominate the landscape. Ephemerals and ephemeroids appear in a short wet period in spring.

Salsola orientalis - Agropyron fragile or *Salsola orientalis* formations on loamy and sandy loam soils along the first half of the pipeline corridor are replaced with *Haloxylon aphyllum-Solanum* on saline soils of the second half. Here and on both storage areas, desert solonetz soil prevails. It supports perennial-*Solanum* and halophytic-*Alpine* formations. Perennial-*Solanum* formations are also present on brown, in some places on grey-brown or takyr-like soils but there *Artemisia* formations are interlinked with them.

The vegetation was damaged mainly from grazing, but in some places also due to compression from vehicles and earthworks. It was absent on the 30 m wide strip above an underground pipeline from an oil field to Kuryk port built in 2022.

Figure 8 Vegetation map of the ammonia pipeline corridor (black polyline) and 2 storage areas (blue polygons) with location of 8 plots where typical vegetation was described (see Annex 2). The area is in the Middle Desert Subzone with 6 vegetation types and 7 communities:

K. Undulating plain with slopes with
   1. *Artemisia terrae-albae*, *Oreosalsola arbusculiformis* with ephemerals on grey-brown saline soils with outcropping of parent rock

L. Seaside sandy plain with
   1. *Artemisia arenaria*, *Alhagi pseudalhagi* on weakly consolidated saline sands
   2. *Artemisia lercheana*, *Euphorbia seguieriana* on consolidated sands

M. Seaside sandy hilly plain with
   1. *Artemisia arenaria*, *Tamarix ramosissima* on weakly consolidated saline sands

N. Lowered hilly plain with
   1. *Artemisia lercheana*, *Convolvulus erinaceus*, *Aeluropus littoralis* on grey-brown sandy loam saline soils

J. Solonchaks that frame vegetation free sors with
   1. *Halocnemum strobilaceum* on saline sands

O. Settlement and industrial areas with
   1. Degradated vegetation of J1 and L2 and vegetation free areas

The pipeline corridor and storage areas were formed by sand from coquina limestone with sparse vegetation cover. The basis of the vegetation on weakly consolidated saline sands was made up of *Artemisia arenaria, Alhagi pseudalhagi, Artemisia arenaria* and *Tamarix ramosissima* on the tops of hillocks, of communities with 30-35 % of TPC in areas that are disturbed from a weak to a medium degree, and 25-30 % in medium disturbed areas. From 17 identified species, only Khiva saltwort (*Xylosalsola chiwensis*) was protected by the Kazakhstan Red Book under the category II – rare species that can be found in small numbers on restricted territories. It was found along the pipeline on the P7p and P8p vegetation assessment points (Figure 8).

In more consolidated sands, *Artemisia lercheana* has a dominant role, and forms communities with *Bassia prostrata* with 35-40 % TPC, which have a weak degree of disturbance. The *Artemisia lercheana* and *Euphorbia seguieriana* phytocenoses had 9 species with a TPC of 30-40 %.

The hillocky plateau was framing solonchak soils. It was covered by *Artemisia lercheana*, *Convolvulus erinaceus,* and *Aeluropus littoralis* communities with *Artemisia arenaria* participation, which are widespread. The TPC was 30-35 %, and the number of species was 14-15. The vegetation cover was in a status of medium disturbance.

The furthest survey point from the coastal plain P8p was located on an undulating plain 8 m above the sandy area, from which it was separated by a small cliff (chink). The vegetation cover was represented by perennial saltwort and wormwood communities with ephemerals (*Artemisia terrae-albae, Oreosalsola arbusculiformis),* which was in a weak degree of disturbance. The TPC was 20-25 % and the parent rock outcrops were 20 %.

No signs of abnormal plant development such as gigantism, chlorosis of leaves and growth of branches in the form of cones, or galls were detected in the whole surveyed area. The life status of most components of phytocenoses was normal. Phenological phase of species corresponded to the season.

2.2.6 Power Transmission Line Corridors

Geobotanical descriptions were made at 12 plots placed in the planned power transmission line corridors (Figure 9, Annex 2). A higher number of survey points was implemented south of the Ustyurt State Nature Reserve between Kanagat and Teren oi Project Areas (L9p to L12p) at places that were suspected to have a higher sensitivity to the powerline construction impact.

L1p was located on an undulating plain. The vegetation cover was formed by *Caroxylon gemmascens, Anabasis salsa* with *Artemisia terrae-albae, A. kemrudica* community on grey-brown saline soils. The TPC was 20-25 %, and the number of species was 12. A medium degree of disturbance was observed due to motor vehicle usage (dirt road network) and the proximity to power lines and a gas pipeline

L2p was located on ridgy-cellular sands of Karynzharyk. The vegetation cover was formed by *Haloxylon ammodendron,* and *Artemisia kemrudica*. The TPC was 25-35 %, and the number of species was 18. Moss *Syntrichia caninervis* was abundant, accounting for 5-10 % of the TPC. The plant community was slightly disturbed due to motor vehicles.

L3p was placed on an undulating plain with hillocks and takyrs in lowlands. The vegetation cover was represented by *Artemisia kemrudica,* Caroxylon gemmascens community on grey-brown saline soils. The TPC was 20-25 %, and the number of species was 11. The vegetation was slightly disturbed due to droughts and motor vehicles (dirt road network). Almost all wormwood vegetation was in a dry condition, probably due to years with a lack of precipitation. Less than 1 % of plants were alive.

L4p was located on an undulating plain. The vegetation cover, which was in a medium degree of disturbance, was formed by *Anabasis salsa* community on grey-brown loamy saline soils. The TPC was 15-20 %, and the number of species was 10. The main disturbance factors were motor transport (dirt road network), and grazing. Locally near the site in places of intersection of many roads there was a strong degree of disturbance and areas without vegetation.

L5p was located on an undulating plain. The vegetation cover, disturbed to a medium degree due to the influence of grazing and motor transport, was formed by *Anabasis salsa* community on grey-brown loamy saline soils. The TPC was 10-20 %, and the number of identified species was 8.

L6p was located on a slightly undulating plain. The vegetation cover was represented by an *Artemisia lercheana* (Krascheninnikovia ceratoides, Artemisia lercheana) community on sandy soils. The TPC was 30-35 %, and the number of species was 12. The survey point was located between various anthropogenic objects (pipeline rows, unpaved roads, power lines) and the status of the plants community was disturbed to a medium degree.

L7p was located on a slightly undulating plain. The vegetation cover was represented by *Caroxylon orientale*, *Anabasis salsa* and *Artemisia terrae-albae* community on grey-brown saline soils forming a complex with *Anabasis brachiate, Evernia esorediosa f. terrestris* on bosingen. The TPC was 25-30 % and 17-19 %, respectively. There was a weak degree of disturbance by grazing, motor vehicle use (dirt road network), and geological excavations close to the survey point. A total of 11 and 7 species were identified.

L8p was located on a slightly undulating plain. The vegetation cover was represented by *Caroxylon orientale* community on grey-brown saline soils. The TPC was 20-25 %, and the number of detected species was 12. The community was slightly disturbed by grazing. Excavations were observed near the point of description.

L9p was located on a plain between the chink of the Ustyurt Plateau and the Karynzharyk sands. The vegetation cover was formed by *Kalidium caspicum* community on solonchak soils. The TPC was 3-5 %, and the number of species was 3. A low degree of disturbance due to motor vehicle usage (network of unpaved roads) was observed.

L10p was located on a slightly undulating plain. The vegetation cover was formed by *Caroxylon gemmascens and Anabasis salsa* community on grey-brown loamy solonetz soils. The TPC was 35-40 %, and the number of species was 9. A low degree of disturbance due to dirt roads network was observed. 80 % of *Caroxylon gemmascens* was in a dry condition, probably due to the last dry years.

L11p was located on a slightly undulating plain. The vegetation cover was formed by *Anabasis salsa*, *Caroxylon orientale* community on takyr-like soils. The TPC was 5-10 %, and the number of species was 11. The vegetation was slightly disturbed due to abandoned colonies of Big Gerbils and dirt road network.

L12p was located on a slightly undulating plain. The vegetation cover was formed by *Anabasis salsa*, *Caroxylon orientale* community on grey-brown loamy soils. The TPC was 20-25 %, and the number of species was 9. A low degree of disturbance was observed due to burrowing animals colonies and motor transport (dirt road network).

No signs of abnormal plant development such as gigantism, leaf chlorosis and cone-shaped branch growth were detected at any of the surveyed sites. Species included in the Red Book of the Republic of Kazakhstan were not found.

The life status and phenological phase of most components of phytocenoses were normal. A dry condition of *Artemisia kemrudica* was observed on L3p, and *Caroxylon gemmascens* on L10p , probably due years with a lack of precipitation.

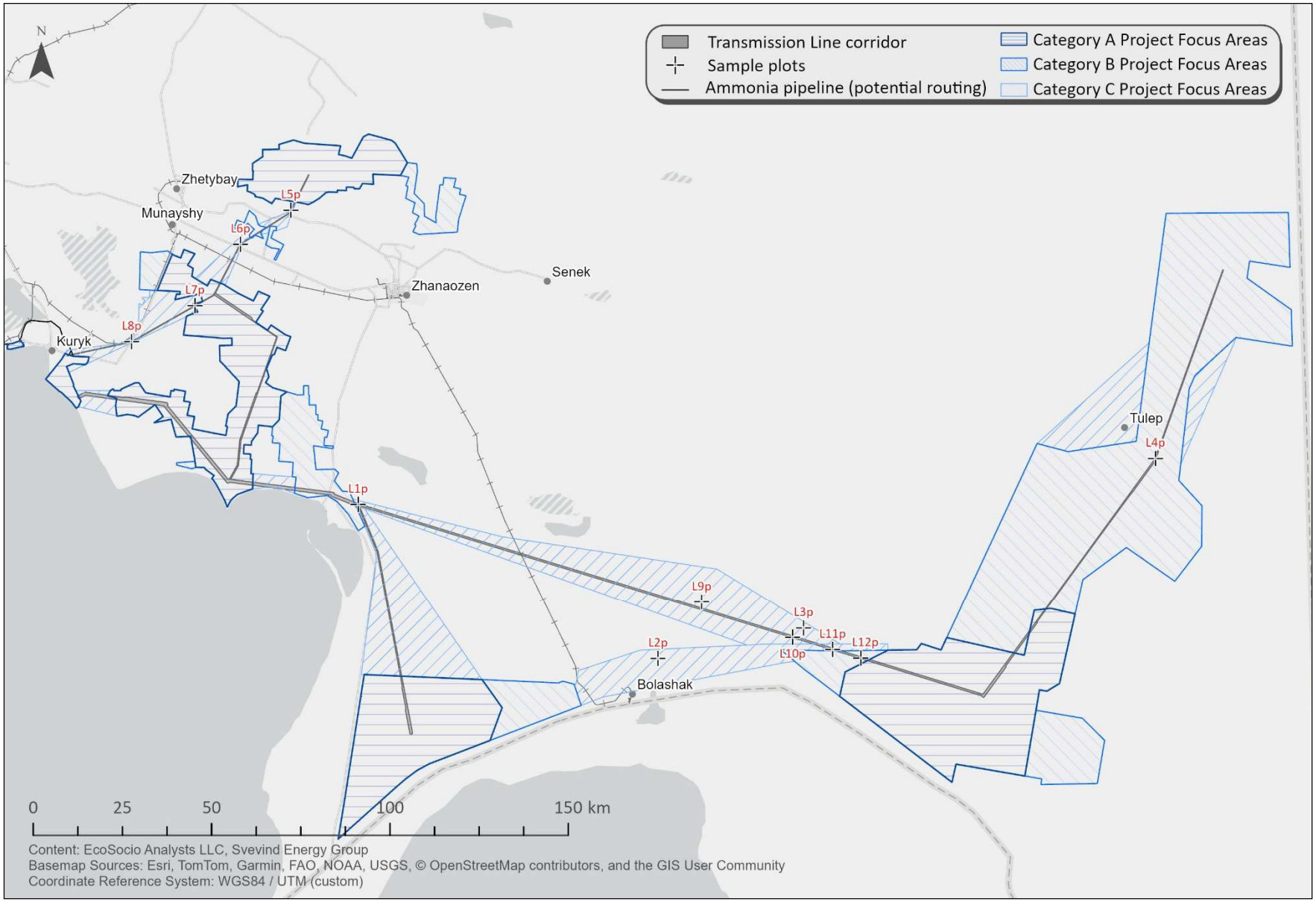

Figure 9 Location of 12 vegetation assessment plots in the transmission line corridors where vegetation was deemed to be more sensitive to the expected impact. See Annex 2 for their description.

2.2.7 CONCLUSION

No endemic or endangered plants were identified. Much of the tetyr, keurek and Kemrud's wormwood in the southern Project Area was in a dry condition. No anthropogenic impact was observed to cause this condition. A likely cause is insect pests of roots. It is also possible that such condition of the plants was caused by changes in climatic conditions. Over the last 3 years, cool and wet springs have been reported by the local population.

On the territory of Talap site, 15 geobotanical descriptions were made. The distinctive feature of the site was its spatial heterogeneity and complexity. Most of the territory was represented by *Anabasis salsa* communities, which under the influence of grazing and motor transport suffered from a weak to medium degree of disturbance. Locally, some small areas (tops of hillocks, cattle camps) were highly disturbed. No signs of abnormal plant development was identified. No species listed in the Red Book of the Republic of Kazakhstan were found. Life status of most components of phytocenoses was normal. Phenological phase of species corresponded to the season. Based on field descriptions, a vegetation map and a legend consisting of 4 numbers were developed.

24 geobotanical descriptions were made on the territory of the Teren oi site. The study area was located on the Kenderli-Kayasan plateau, with a very heterogeneous vegetation, and prevalence of a complex cover. Many communities were characterised by oligodominance: they were often formed by 3 or more co-dominant species. *Artemisia kemrudica*, *Caroxylon orientale* and *Caroxylon gemmascens* dominated the vegetation cover, but *Anabasis salsa*, *Anabasis brachiata* and *Nanophyton erinaceum* also played an important role. The heterogeneity of the vegetation cover was enhanced by the combination of complexes with communities on numerous bosyngen soils, and there was a large number of flat hollows and depressions occupied by takyrs. Most of the territory was slightly disturbed by motor transport, grazing and in some places by earthworks. Severely disturbed territories were found under the influence of Big Gerbils, and numerous colonies appeared to be abandoned. No signs of abnormal plant development were detected. No species listed in the Red Book of the Republic of Kazakhstan were found. The life status and phenological phase of many components of phytocenoses were normal. However, a dry state of Artemisia (up to 80 %), Tetyrus (up to 60 %) and Keurek (up to 90 %) were observed on a large area of the territory. The examination of dry plants, including their root systems, did not reveal any signs of insect pests or anthropogenic factors. Based on studies of similar conditions of desert vegetation in Turkmenistan, it was assumed that this condition was caused by a particularly dry period. When normal conditions are restored, the desert vegetation gradually recovers. Based on field observations, a vegetation map and a legend consisting of 4 numbers were developed.

On the territory of Kanagat and Rahym sites 22 geobotanical descriptions were made. The surveyed area was located on the Ustyurt plateau in the middle desert subzone. The peculiarity of the vegetation cover of the plateau consisted in the dominant position of *Anabasis salsa* communities, which formed complexes with *Caroxylon orientale*, *Artemisia terrae-albae*, and *Artemisia kemrudica* phytocenoses. The vegetation cover of the plots was slightly disturbed under the influence of motor transport (network of unpaved roads), and small colonies of Big Gerbils were observed in some places. Takyrs and bozingen soils with single plants were widespread. No signs of abnormal plant development were observed. Species included in the Red Book of the Republic of Kazakhstan were not found. The life status and phenological phase of most components of phytocenoses were normal. On small territories a dry state of *Artemisia kemrudica* and *Caroxylon orientale* from 40 to 90 % was observed. The examination of dry plants, including their root systems, did not reveal any signs of insect pests or anthropogenic factors. It was assumed that such condition was caused by a particularly dry period. Based on the field descriptions, a vegetation map and a legend consisting of 4 numbers were developed.

Fifteen geobotanical descriptions were made on the territory of the Enbek site. The site was characterised by a flat relief and coincides with the border of middle and southern deserts. A complex structure of

vegetation cover prevailed. *Artemisia terrae-albae* and *Anabasis salsa* communities dominated in the middle desert subzone and *Caroxylon orientale*, and *Caroxylon gemmascens* in the southern desert subzone. The vegetation cover was slightly disturbed under the influence of motor transport, weak grazing was observed. Significant areas were takyrs, devoid of vegetation or overgrown in small groups. In the southernmost part of the study area, a road was under construction and the cover was either destroyed or moderately disturbed by heavy dust at some distance from the road. No signs of abnormal plant development were found. *Anabasis aphylla* galls were observed at M1p. The life status of most components of phytocenoses was normal. The phenological phase of species corresponded to the season. Species listed in the Red Book of the Republic of Kazakhstan were not found. Based on field descriptions, a vegetation map and a legend consisting of 7 numbers were developed.

Eight geobotanical descriptions were made on the territory of the ammonia pipeline corridor and two open storage areas. The site was formed by seaside coquina sands with sparse vegetation cover. On weakly consolidated sands, the vegetation cover was formed by *Artemisia arenaria* communities, and on consolidated sands by *Artemisia lercheana*. The vegetation cover was in a transitional stage from weak to medium degree of disturbance. No signs of abnormal plant development were identified. At two survey points, P8p and P7p, a species listed in the Red Book of the Republic of Kazakhstan with the status of category II (rare species occurring in small numbers and in limited areas) - *Xylosalsola chiwensis* - was identified. The life status of most components of phytocenoses was normal. The phenological phase of species corresponded to the season. Based on field descriptions, a vegetation map and a legend with 7 numbers were developed.

For the power transmission line corridors, 12 geobotanical descriptions were made. Survey points L5p and L6p were located next to the Talap site, disturbed to a medium degree by grazing, motor vehicles (L5p) or by close proximity to anthropogenic objects (L6p). Survey points L7p and L1p were located at the boundaries of the Enbek site, and L8p between the Enbek site and Kuryk Industrial site. L7p and L8p were disturbed to a weak degree by grazing, and vehicle passage (dirt road network). L1p was moderately disturbed by grazing, and motor vehicles (dirt road network).

The vegetation cover of the following survey points was disturbed to a weak degree due to the impact of motor transport: L2p was located on the ridgy-cellular sands of Karynzharyk and was represented by *Haloxylon ammodendron* and *Artemisia kemrudica*; L9p was located on the plain between the chink of the Ustyurt Plateau and the sands of Karynzharyk and was formed by *Kalidium caspicum* community on solonchak; L3p was formed by an *Artemisia kemrudica* and *Caroxylon gemmascens* community; L10p was a takyr devoid of vegetation cover; L11p was formed by a *Caroxylon gemmascens* and *Anabasis salsa* community.

The survey points L4p and L12p are located on the Ustyurt Plateau. L4p was formed by an *Anabasis salsa* community, which was in a medium degree of disturbance, L12p was formed by an *Anabasis salsa* and *Caroxylon orientale* community,which was disturbed to a weak degree. No signs of abnormal plant development were detected. No species listed in the Red Book of the Republic of Kazakhstan were found. The life state and phenological phase of most components of phytocenoses were normal. A dry condition of *Artemisia kemrudica* was observed on L3p, and *Caroxylon gemmascens* on L10p , probably due to dry years.

3 KURYK AREA

The Kuryk Industrial area is located near the Caspian Sea at the edge of the coastal cliff, except for the water intake and discharge pipes that run down the cliff.

3.1 ANIMALS

Due to expected differences in impacts, the assessment methodology for Kuryk area differed from the methodology used for the rest of the Project Areas. The animals were surveyed on 18-22 July 2023. For the assessment of the larger area of possible impact, transects on a vehicle were surveyed and transects on foot and point counts were used at a particular habitat that was identified to have a higher sensitivity to the expected impact. The transects and point counts were conducted twice a day from 5:00 to 11:00 and from 18:00 to 22:00. To record nocturnal wildlife, point counts were conducted at night from 22:00 to 01:00. Binoculars MRC 12x50, a Yukon 100 telescope and the field identifier Birds of Kazakhstan were used for identification of species. A Nikon D7200 camera with Tamron 150-600 mm lens was used for photo-fixation.

A survey of the site and adjacent cliff and seashore recorded 24 species of birds, 3 species of reptiles, 3 species of mammals and one species of bat, whose presence was identified through finding of bat specific fecies (guano) in the uninhabited borrows at the cliff. The relative poverty of fauna is related to the absence of freshwater bodies and woody and shrubby vegetation in the area. However, as one of the bird migration routes from Siberia to Central Asia passes through the surveyed area, the number of migratory species may significantly increase mainly in the coastal part. The available literature indicates that an increase to 174 bird species [31] is possible.

[31] Belyalov O.V. Ornithological observations in Mangyshlak and Ustyurt in 2007 // Kazakhstan Ornithological Bulletin 2007. - Almaty, 2008. - P. 11-18;

Berezovikov N. N., Grachev V. A. To the autumn fauna of birds of cliff Donyztau (Northern Ustyurt)// Russian Ornithological Journal 2012, 21 (752): 955-957;

Varshavsky S.N. Changes in the ranges and abundance of birds in the Northern Aral Sea and Aktobe-Mugodzhar region over the past 50-60 years // Collection "The Second All-Union Ornithological Conference", vol. 3. M., Moscow State University, 1959a;

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Gavrilov E.I. Fauna and Distribution of Birds of Kazakhstan. - Almaty, 1999;

Gavrin V. F. Owl detachment// Birds of Kazakhstan, vol. 2, Alma-Ata, 1962: 708-778;

Gladkov N. A., Zaletaev V. S. About the bird fauna of Mangyshlak and Mangystau islands// Proceedings of the Institute of Biology of the Academy of Sciences of the Turkmen SSR, vol. 4 1956: 120-164;

Gubin B. M. Expedition to Southern Mangyshlak in April-May 2005 //Kazakhstan Ornithological Bulletin, Almaty, 2006: 5-12;

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Karyakin I.V. Saker Falcon on Ustyurt Plateau: brief results of 2003 expedition // Steppe Bulletin, 2004. No. 15. - P. 40-41;Karyakin I.V., Kovalenko A.V., Levin A.S., Pazhenkov A.S. Eurasian Eagle-Owl in the Aral-Caspian Region, Kazakhstan // Raptors Conservation, 2009, 16. - P. 53-86; Karyakin I. V., Kovalenko A.V., Levin A. S., Pazhenkov A. S. Eagles of the Aral-Caspian region, Kazakhstan//Feathered predators and their protection. 2011, №22: 92-152;

Kovshar V. A., Karpov F. F. The first winter meetings of the lesser white heron on Mangystau (Eastern Caspian)// Ornithological Bulletin of Kazakhstan and Central Asia. Issue 3, 2014a: 207;

Korelov M. N. Birds of prey// Birds of Kazakhstan, vol. 2. Alma-Ata, 1962;

The Red Data Book of the Republic of Kazakhstan. Vol.1, part 1. - Almaty, 2010. - 324 p.;

Levin A. S., Karyakin I. V. Results of the expedition to Mangyshlak and Ustyurt in 2004 // Kazakhstan Ornithological Bulletin 2004. - Almaty, 2005. - pp. 14-19;

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The main ecological value is in the shell-strewn cliff and the seashore and sea shoals to the west of the proposed plant site. Many ledges and niches create favorable conditions for nesting birds, bats, and the piles of large stones below are the habitat of jackals. The cliff extends along the entire western boundary of the site and terminates 1.3 km to the south of the site. The shallow sandbank is a nesting, feeding and resting area for migratory birds, some of which are listed in the Red Book of Kazakhstan and IUCN. In the middle of the bird migration period on 20-23 April 2023, the company Dostyk Advisory conducted a breeding bird mapping on the coastal strip adjacent to the planned industrial facility. The study recorded 66 bird species belonging to 28 families. Out of them 3 birds were assigned the category II protection status in Kazakhstan: Greater Flamingo (*Phoenicopterus roseus*), Black-Bellied Sandgrouse (*Pterocles orientalis*) and Eurasian Eagle-Owl (Bubo bubo stale pellets were found). The Brands's Hedgehog (Paraechinus hypomelas), whose skin was found, also has this category of protection.

Due to the presence of people, noise, pollutant emissions, light at night and unfamiliar odours during the construction period, some sedentary and migratory animals will be displaced from the site and surrounding area.

Table 9 Result of mammal, reptile and amphibian counts.

Type	Scientific name	Location	Quantity	Accounting type
Golden jackal	*Canis aureus*	Among the shoreline limestone bolders	7-10	Footprints, voice
Tolai hare	*Lepus tolai*	Graveyard 2 km NW of the plant	1	Visual
Bats	*Chiroptera Sp.*	Cliff 2.8 km north from the plant site	5-7	
Dice snake	*Natrix tessellata*	Zhilandy Cave 2.2 km west of the plant, Cliff slope and shoreline	3	
Steppe agama	*Trapelus sanguinolentus*	Kuryk waste dump	1	
Great gerbil	*Rhombomys opimus*	Small colony on the proposed plant site	-	Footprints, burrows
Russian tortoise	Testudo horsfieldii	Cliff slope 6.25 km south from the plant	1	Footprints

Out of the threatened animals, only the Russian Tortoise (listed in the IUCN Red List) was found at the cliff and the migrating bird Glossy Ibis was noted at the sea shoal 3 km northwest of the plant site. It is assigned to the second category of the Kazakhstan Red Book and to the ‘Least concern’ category by the

Molodovsky A.V. About the nesting of a large cormorant on the Southern Mangyshlak// Colonial nesting sites of near-water birds and their protection. M., 1975: 193.

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Pestov M.V., Saraev F.A., Terentiev V.A., Nurmuhambetov Zh.E. The Project Outcome “Assessment of the Impact of Medium Voltage Power Lines on Avifauna in Mangistau Region (Kazakhstan)”. – Raptors Conservation. 2015. № 31. P. 64-74.] DOI: 10.19074/1814-8654-2015-31-64-74;

Poslavsky A. N., Postnikov G. B., Samarin E. G. On wintering of birds in the Northern Caspian and Mangyshlak// Proceedings of the Institute of Zoology of the Academy of Sciences of the Kazakh SSR, 1964. vol. 24: 157-180;

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Ryabitsev V.K. Birds of the Urals, Cis-Urals Region and Western Siberia. Yekaterinburg, Ural University Press,

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Gavrilov E.I., Gavrilov E.I. " Birds of the Republic of Kazakhstan ". Almaty, 2005;

https://kz.birds.watch/index.php?l=ru.

IUCN. The second category is assigned to the animals that have relatively large population but whose numbers diminish catastrophically fast and the total disappearance is possible.

Table 10 Summary of birds observation with segregation into habitat types. Threatened species are shown in red.

Types of presence in the study area:M: Migrating; B: Breeding; Bn: Breeding nearby

Orders: Pe - Pelicaniformes (pelican like); Ci - Ciconiformes (stork like); Fa - Falconiformes (falcon like); Ca – Caprimulgiformes; Col – Columbiaformes; Ap – Apodiformes; Co - Coraciiformes (roller like); Up - Upupiformes

Order	Species Latin name	Species	Resi-dence form	Sea-shore	Cliff	Plat-eau
Pe	*Phalacrocorax carbo*	Great cormorant	Bn,M	200		
Ci	*Plegadis falcinellus*	Glossy ibis	M	1		
Fa	*Falco tinnunculus*	Common Kestrel	Bn,M	1		
Charadriiformes (shore birds)	*Charadrius alexandrinus*	Kentish Plover	Bn,M	70		
	Tringa totanus	Common redshank	M			25
	Tringa erythropus	Spotted redshank	M			20
	Xenus cinereus	Terek Sandpiper	M			25
	Calidris ferruginea	Curlew Sandpiper	M			10
	Gelochelidon nilotica	Gull-billed tern	M			20
	Limosa lapponica	Bar-tailed Godwit	M			40
	Larus cachinnans	Caspian gull	Bn,M			60
	Sterna hirundo	Common tern	Bn.M			20
	Gelochelidon nilotica	Gull-billed tern	Bn,M			2
Ca	*Caprimulgus europaeus*	European Nightjar	Bn,M			1
Col	*Columba livia*	Rock Pigeon	R		17	7
Ap	*Apus apus*	Northern Swift	Bn,M		30	
Up	*Upupa epops*	Eurasian hoopoe	Bn,M			*4*
Co	*Merops persicus*	Blue-cheeked bee-eater	Bn,M			2
Passeriformes	*Hirundo rustica*	Barn swallow	Bn,M			40
	Galerida cristata	Crested Lark	B,M			20
	Sturnus roseus	Rosy starling	Bn,M			3
	Oenanthe pleschanka	Pied wheatear	Bn,M			20
	Oenanthe deserti	Desert wheatear	B,M			10

Table 11 Results of the bird counts from view points and routes.

Date 18.07.2023 Start End: 06:00-23:00			
Weather Change:			
Day: +24	761	Low cloudiness	Wind - westerly 3,5 m/s Dry
Evening: +23	760	Clear	Wind from the west 3,2 m/s Dry
Sandy shoal of the sea 06:00-11:00 and 18:00-23:00			
Birds nesting and living on the site			
Great cormorant *Phalacrocorax carbo*			50
Kentish Plover *Charadrius alexandrinus*			30
Caspian gull *Larus cachinnans*			*20*
Common tern *Sterna hirundo*			*5*
Gull-billed tern *Gelochelidon nilotica*			*1*
Migratory birds			
Glossy ibis *Plegadis falcinellus*			*1*
Common redshank *Tringa totanus*			*15*
Spotted redshank *Tringa erythropus*			*18*
Terek Sandpiper *Xenus cinereus*			*20*
Curlew Sandpiper *Calidris ferruginea*			*7*
Gull-billed tern *Gelochelidon nilotica*			*5*
Bar-tailed Godwit *Limosa lapponica*			25
Cemetery of Kuryk village 11:00-13:00			
Birds nesting and living on the site			
Rock Pigeon *Columba livia*			*7*
Crested Lark *Galerida cristata*			*5*
Pied wheatear *Oenanthe pleschanka*			*14*
Plateau of the planned plant 17:30-22:00			
Birds nesting and living on the site			
Desert wheatear *Oenanthe deserti*			*10*
Rosy starling ***Sturnus roseus***			***3***
Date 19.07.2023 Start End: 08:00-22:40			
Weather Change:			
Day: +26	760	Cloudy	Wind from west-south-west WSW 4 m/s
Evening: +25	760	Low cloudiness	Wind from west-south-west WSW 3 m/s
Landfill of the Kuryk village 08:-10:00			
Birds nesting and living on the site			
Crested Lark *Galerida cristata*			*15*
Blue-cheeked bee-eater *Merops persicus*			*1*
Barn swallow *Hirundo rustica*			*40*
Pied wheatear *Oenanthe pleschanka*			*7*
Eurasian hoopoe ***Upupa epops***			4
Dump of construction waste in the village of Kuryk 10:30			
Birds nesting and living on the site			
Pied wheatear *Oenanthe pleschanka*			1
Abandoned farm 5 km east of the site12:00-12:40			

Birds nesting and living on the site			
Pied wheatear *Oenanthe pleschanka*			1
Edge of cliff 18:00-20:30			
Birds nesting and living on the site			
Pied wheatear *Oenanthe pleschanka*			7
Birds nesting only in neighbouring territories			
Great cormorant *Phalacrocorax carbo*			150
Cemetery of Kuryk village 20:30-22:40			
Birds nesting and living on the site			
Rock Pigeon *Columba livia*			10
Pied wheatear *Oenanthe pleschanka*			3
European Nightjar *Caprimulgus europaeus*			1
Birds nesting only in neighbouring territories			
Common Kestrel *Falco tinnunculus*			**1**
Date 20.07.2023 Start End: 08:00-22:00			
Weather Change:			
Day: +27	762	Clear	Wind from south-south-west SSW 4 m/s
Evening +25	761	Clear	Wind from the west Z2 m/s
Sea shore North of Jilandy cave 08:00-14:00			
Birds nesting and living on the site			
Great cormorant ***Phalacrocorax carbo***			150
Kentish Plover ***Charadrius alexandrinus***			40
Common Kestrel ***Falco tinnunculus***			2
Caspian gull *Larus cachinnans*			*30*
Common tern *Sterna hirundo*			*12*
Gull-billed tern *Gelochelidon nilotica*			*1*
Rock Pigeon *Columba livia*			*7*
Northern Swift *Apus apus*			*30*
Southern boundary of the site where the cliff ends, plateau 19:00-22:00			
Birds nesting and living on the site			
Rosy starling *Sturnus roseus*			3
Pied wheatear *Oenanthe pleschanka*			*3*
Date 21.07.2023 Start End: 07:30-21:30			
Weather Change:			
Day:+30	760	Low cloudiness	Wind from west-north-west WNW 4 m/s
Evening: +31	759	Low cloudiness	Wind from west-north-west WNW 2 m/s
Route along the western boundary of the site along the cliff 07:30-12:00			
Birds nesting and living on the site			
Pied wheatear *Oenanthe pleschanka*			*12*
Plateau 18:00-21:30			
Birds nesting and living on the site			
Pied wheatear *Oenanthe pleschanka*			10
Birds nesting only in neighbouring territories			
Common Kestrel ***Falco tinnunculus***			2

Blue-cheeked bee-eater *Merops persicus*			**1**
Date 22.07.2023 Start End: 06:00-20:00			
		Weather Change:	
Day +33	**761**	**Cloudy**	**Wind from the west W 4 m/s**
Evening: +34	**759**	**Cloudy**	**Wind from the north N 4 m/s**
Plateau 06:00-11:30			
Birds nesting and living on the site			
Pied wheatear *Oenanthe pleschanka*			**9**
Desert wheatear *Oenanthe deserti*			**1**
Sandbank 17:00-20:00			
Birds nesting and living on the site			
Kentish Plover *Charadrius alexandrines*			**5**
Caspian gull *Larus cachinnans*			**40**
Common tern *Sterna hirundo*			**3**
Migratory birds			
Spotted redshank *Tringa erythropus*			**2**
Common redshank *Tringa totanus*			**10**
Terek Sandpiper *Xenus cinereus*			**5**
Gull-billed tern *Gelochelidon nilotica*			**15**
Bar-tailed Godwit *Limosa lapponica*			15

3.2 VEGETATION

The vegetation in the project impact area 2-5 km from the proposed plant was surveyed on 18-22 July 2023. The main plants habitats of the territory were mapped on the satellite image and then verified on the ground (Figure 10). In accordance with the methods accepted by the scientific community[32], their floristic composition (edifiers, dominants, endemics, protected species), projective cover, soil and degree of degradation were described on 10x10 m plots (Annex 3).

[32] Braun-Blanquet, J. (1964): Pflanzensoziologie // 3. Auflage. Wien, 1964 and Kulikova G.G. Basic geobotanical methods for studying vegetation. Moscow State University, 2006, 152 p.

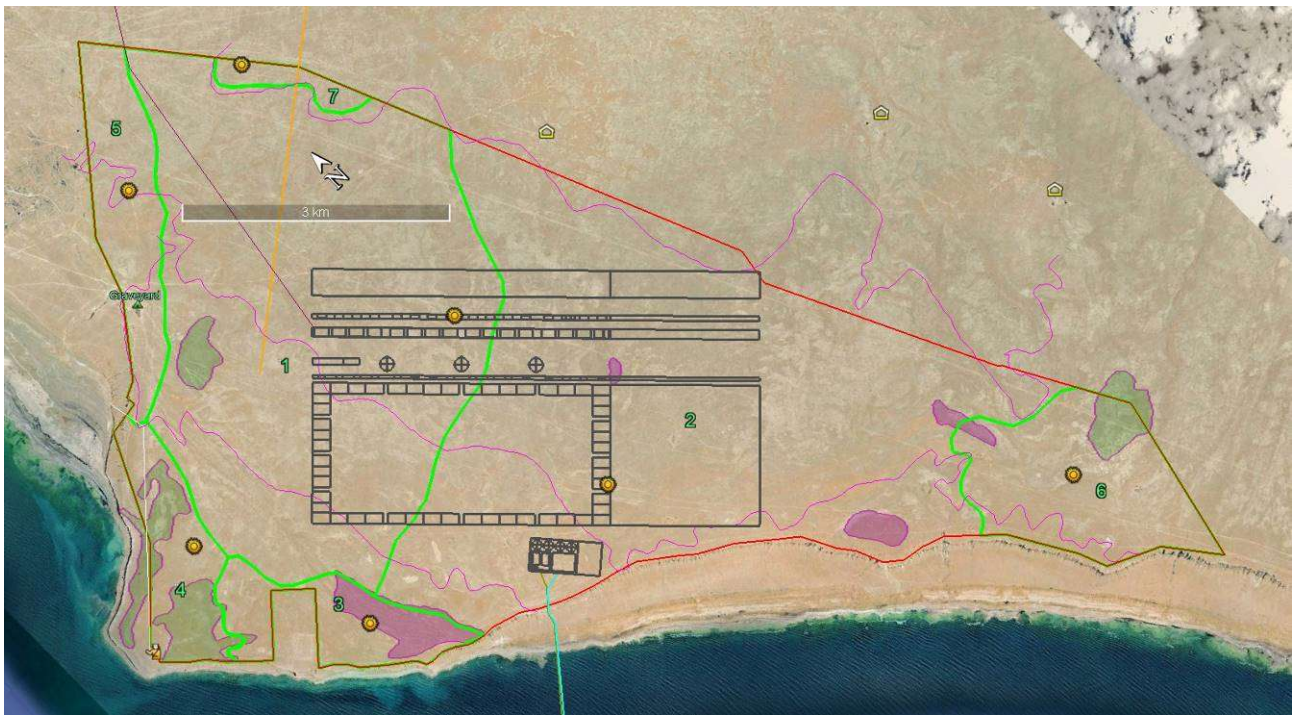


Figure 10 Kuryk area vegetation map with location of 7 plots (yellow) where typical vegetation was described (see Annex 3), relief contours 10, 15, 20 and 30 m from the cliff to the east (depressions in green, elevations in purple), and distribution of plant communities (green outline):

1 - *Artemisia kemrudica, Artemisia kemrudica - Salsola orientalis* communities
2 - *Anabasis salsa, A.brachiata, Nanophyton erinaceum, Artemisia terrae-albae* communities
3 - *Anabasis salsa* – Ephemeral plant, *Artemisia- Stipa*- Ephemeral communities
4 - *Artemisia terrae-albae - Anabasis aphylla* - Ephemeral plant communities
5 - *Nanophyton erinaceum, Anabasis salsa, Salsola orientalis- Agropyron fragile* communities
6 - *Artemisia kemrudica – Xylosalsola, Artemisia kemrudica* communities
7 - *Artemisia kemrudica - Salsola orientalis, Artemisia kemrudica - Atraphaxis replicata, Anabasis salsa* communities

The ecological value of the site vegetation and its sensitivity to the expected impacts from earthworks, vehicles tramping, dusting and soil compaction is low. No endemics or protected plant species have been identified apart from *Rhamnus sintenisii (Rech. fil.)*, which occurs only on the coastal escarpments outside the study area.

The surface of the site is flat, with a slope to the sea from 0,18° in the eastern part to 0,46° in the middle and western part, closer to the cliff. Vegetation is represented by *Salsola orientalis - Agropyron fragile* or *Salsola orientalis* formations on loamy and sandy loam soils, in some places with *Haloxylon aphyllum-Solanum* on saline soils, *perennial-Solanum* and *halophytic-Alpine* formations, mainly on desert solonets and *Artemisia and perennial-Solanum* formations on brown, in some places grey-brown or takyr-like soils and desert solonets.

Species of the genera *Artemisia, Anabasis, Halocnemum* are of landscape importance. In addition to formations dominated by *Artemisia terrae-albae* and *Anabasis aphyllum*, there is also a significant number of communities dominated by *Salsola orientalis*.

The vegetation is under extreme conditions due to the lack of water, high temperatures and strong salinity of the soil profile, which explains the low level of biodiversity, sparse projective coverage and heterogeneous spatial structure.

The dominant species are xerohalophytes belonging to the life forms of semi-shrubs, semi-shrubs, shrubs, herbaceous perennials and annuals with short (ephemerals and ephemeroids) and long growing

seasons. The largest number of species is represented by the families: *Chenopodiacea, Asteraceae, Poaceae, Cruciferae* and *Limoniaceae*.

Photo 1 *Anabasis salsa* communities with *Anabasis salsa+Sukhorukovia cana* (*Suaeda physophora*) interbeds

Photo 2 *Tamarix ramisissima* community

Flat areas of the plateau are mostly mosaically covered with formations of *Artemisia terrae-albae, Salsola orientalis* and hedgehog (*Anabasis sp.*). *Artemisia terrae-albae* has a higher percentage of aboveground phytomass than saltwort. Lowland areas are mainly covered with representatives of the marevae family. Formations composed of hedgerows (*Anabasis aphyllum* and *A. eriopoda, A. salsa*) and saltworts (*Salsola arbuscula* and *S. gemmascens ssp. nodulosa*) predominate here.

The coastal area does not fall within the survey area but, being in the neighbourhood, requires description. *Suaeda physophora* is recorded here in the community of annual saltwort on takyr and sorghum soils. Formations of hedgerow *Anabasis salsa* with a group of *Anabasis salsa+Sukhorukovia cana*

Suaeda physophora (Photo 1) stand out as separate spots on the sub-cliff plain. Further, at the coastal edge, thickets of *Tamarix gracilis Willd*, a Caspian-Turanian-Central Asian disjunctive species distributed mainly in the strip of deserted steppes or semi-deserts (Photo 2) and separate bushes of the above-mentioned, included in the Red Book of Mangystau region, *Rhamnus sintenisii (Rech. fil.)* (Photo 3) were noted.

On the plain part of the surveyed territory, where grey-brown loamy solonetz soils and solonets prevail, the following desert communities are common: *Artemisia kemrudica, Artemisia kemrudica* with *Salsola orientalis*, *Artemisia terrae-albae*, interbedded with *Salsola orientalis, Artemisia terraealbae, A. gurganica, Salsola orientalis*, *Agropyron fragile* with *Salsola arbuscular* and *Anabasis salsa*. The ratio of *Anabasis salsa* and *Artemisia terrae-albae* is not constant over the area, but in most cases *Anabasis salsa* prevails, covering at least 50 % of the area. On the sloping undulating plain with grey-brown solonetz soils and solonets grows a combination of the following communities: *Artemisia terrae-albae, A. gurganica, Eremopyrum orientale, Anabasis salsa, Artemisia terrae-albae, Anabasis aphylla* with *Peganum harmala*. This part of the territory of the proposed plant is significantly affected by grazing, so the composition of the communities is rich in *Anabasis aphylla*, *Peganum harmala*, and *Eremopyrum*.

Photo 3 *Rhamnus Sintenisii* Rech. fil

On eroded soils and shell rock outcrops, the following communities prevail*: Anabasis brachiata* and *Nanophyton erinaceum* groupings, in some places *Atraphaxis replicata*, *Convolvulus fruticosus, Rhamnus sintenisii, Tamarix ramosissima*. On plateaus with grey-brown eroded and underdeveloped soils, sparse *Anabasis salsa, A.brachiata, Nanophyton erinaceum* groupings, *Salsola arbuscula, Convol-vulus fruticosus, Atraphaxis replicata* communities develop. Occasionally, individual trees of *Haloxylon aphyllum* are found in such habitats. Takyrs occurring in the study area are either devoid of vegetation or overgrown with sparse *Anabasis aphylla*, *Anabasis brachiata, Anabasis salsa, Atraphaxis replicata* groupings, sometimes with patchy distribution of the communities.

ANNEX 1 FAUNA SURVEY DIARY

Key:
The observation location is defined by the distance from the starting point along the transects. Observations outside the Project Areas are shaded grey.
Threatened species are shown in red.

K2a	Distinctive habitat area sampling points letter 'a' stands for "animals" to distinguish them from the VPs and vegetation assessment points in the same area
ϒ	Area observations at the specific habitats points are framed
FO	Birds flew over the observer
♂	Male
♀	Female
juv.	Juvenile
BSM	Burrows of small mammals
1 15 15m	One occasion of 15 birds flew at 15m height
1s15	Same for sitting birds
TB	Tortoise burrow
TS	Tortoise shell
N,S,W,E	Animals movement direction
602	Kilometers driven (odometer last 3 digits)

SUMMER

The route through the territories, ammonia pipeline and the open storage areas was 1,020 km long.

TALAP

11.06.2024

The odometer reading in Zhanaozen is 111,471 km. The last 3 digits are indicated below.

Z16a 476

Stormy wind; cloudiness 70 %
Desert wheater ♀c40
Sunwatcher toadhead agama light coloured
Ant 2
Caracal trail
1 burrow with a diameter of 2.5-3.5 cm

Z15a 492

Termite mound – 1
Lark sp. 1FO130 < 1 m.
Calandra lark 1S10

494 Yellow ground squirrel
496 Mediterranean short-toed lark 1FO30 < 1
498 Mediterranean short-toed lark 1FO30 < 1; 1FO70 < 20
499 Mediterranean short-toed lark 1FO40 < 5; 6FO50 < 1

Z14a 501

Strong wind; cloudiness 70 %
Mediterranean short-toed lark 3FO40 < 3;
Tortoise burrow 1
Grasshoppers and locusts are scarce.

503 Mediterranean short-toed lark 1FO20 < 3; 1FO60 < 10;
507 Barn swallow 1FO30 < 5
511 Black-bellied sandgrouse 1FO150 < 10;
Mediterranean short-toed lark 1FO40 < 10; 1FO90 < 5

Z13 511

Mediterranean short-toed lark 2FO30 < 5; 1FO120 ≈ 15.
Locusts 1 individual/10 km²
Tortoise burrows
Scarab
Sunwatcher toadhead agama (f)
Black-bellied sandgrouse 1FO250 < 20;

Photo 4 Fresh burrow, diameter ~10 cm

513 Wood sandpiper 1FO40 < 20m
516 Mediterranean short-toed lark 4FO40 < 15
519 Black-bellied sandgrouse 1FO150 ~ 20-30m; 1FO90 < 15m

12.06.2024

Z12a

In the evening shepherds were herding 100-150 sheep. During the night a strong wind broke the tent. Only a few butterflies and bugs flew into the light.
05:10 Common swift 1FO120 < 10.
Wheatear sp. 1FO70 < 3
Passerines sp. 1FO150 < 1.

523 Black-bellied sandgrouse 1FO 250 ≈ 20-30m; grouse egg shells.

Z11a 524

Mediterranean short-toed lark 1FO40 < 2.

528 Mediterranean short-toed lark 1FO50 < 10; 1FO 40< 2.
Calandra lark 3FO50 < 2; 2FO40 < 5.
529 Calandra lark 1FO30 < 2
Old burrows of gerbils and tortoises (8)
530 Mediterranean short-toed lark 1S5
Passerine sp. 1FO60 < 1.
531 Calandra lark 1FO40 < 2.
532 Sunwatcher toadhead agama

Z10a 533

No animals

Z9a 537

No animals

541 Agama
Calandra lark 2FO30 < 5
544 Mediterranean short-toed lark 2FO50 < 5.
545 Lark sp. 1FO140 < 2.

Z8a 545

Mediterranean short-toed lark 1S10; 1FO15< 1.
Black-bellied sandgrouse 1FO130 ≈ 20-50 m
Black-bellied sandgrouse 12 < 20
Pallas's sandgrouse 1 < 20

547 Tortoise burrow
548 Calandra lark 1FO20< 10.
549 Mediterranean short-toed lark 1FO40 < 2.
550 Mediterranean short-toed lark 1FO30 < 1.

Z7a 551

Pallas's sandgrouse 1FO150 ≈ 15
Mediterranean short-toed lark 1FO40 < 5; 1FO20 < 3.
Red-headed bunting ♂c
Wheatear-Isabelline wheatear ♀ < 10
Mediterranean short-toed lark 1FO40 < 1.
Agama - 2
Red ratchet
Pallas's sandgrouse 1< 5.

553 Mediterranean short-toed lark 2FO40< 5.

Z6a 554

Mediterranean short-toed lark 1< 5.

555 Kestrel 1FO400 ≈ 30-50 m
556 Mediterranean short-toed lark 1FO40 < 1.

Z5a 557

Wind > 49 km/h not weakening.
Burrows of tortoises and gerbils (gerbils) - 7
Red and blue ratchets
Lark sp. 1< 10. Tortoise 1
Sunwatcher toadhead agama 1
Pallas's sandgrouse 1 ≈ 15-30

538 Black-bellied sandgrouse 1FO200< 15.
559 Pallas's sandgrouse 3FO90 < 10; 1FO120 ≈ 30 m;
562 Agama
563 Passerines sp. 1FO140< 1.

L5a 563

Calandra lark 2< 3; 1 ≈ 20-25 m.

569 Black-bellied sandgrouse 2FO180 < 10.
Mediterranean short-toed lark 2FO10 < 2.
571 Pallas's sandgrouse 2FO140 < 10.
Mediterranean short-toed lark 1FO50 < 1, 1FO30 < 2.
572 Mediterranean short-toed lark 1FO40 < 10.

Z4a 573

Well killed in 1977
Pallas's sandgrouse 1FO120 < 15. Lark sp. 1FO150 < 10. Sunwatcher toadhead agama 1
Red and blue grasshoppers

575 Mediterranean short-toed lark 1FO70 < 3.
Tortoise and pika (Ochotonidae) colony.

Z3a 577

The point is located on the edge of a drilling operation with hundreds of power poles.
Calandra lark 1 < 5.
Black-bellied sandgrouse 5 ≈ 20-50 m
Black-necked Wheatear Oenanthe finschii ♂ < 3

Z2a 581

Calandra lark 1 < 10.

583 Black-bellied sandgrouse 6FO200 ≈ 20-50 m

Z1a 587

Black-bellied sandgrouse 12 < 20
Pallas's sandgrouse 1 < 20

590 Pallas's sandgrouse 1p150 ≈ 15
592 Mediterranean short-toed lark 1p40 < 5; 1p20 < 3.
Ked-headed bunting ♂c
Isabelline wheatear ♀ < 10

L6a 617

No water in the topographic low
Calandra lark 3 < 10.
Mediterranean short-toed lark 1 < 2; 1 < 2; 1 ≈ 10-15; 1 < 10, 1 <15.
Buzzard 1 ≈ 20-50.
European bee-eater 3 < 20.
Blue-cheeked bee-eater 1<10
Barn swallow 1 < 5.
Corsac fox (molting).

Photo 5 Blue-cheeked bee-eater

ENBEK

13.06.2024

M1a 709

06:50
Dragonfly
Scarab
Mediterranean short-toed lark 1< 5, 1< 5, 1< 3.
Black-bellied sandgrouse 3 ≈ 20-30
Calandra lark 1 < 10

We went to Talap to fix the tent.
759 Mediterranean short-toed lark 1FO30<5, 3FO70<10, 1FO40< 2.
760 Calandra lark 1FO50 < 10
761 Mediterranean short-toed lark 1FO30 < 3
762 Mediterranean short-toed lark 1FO60 < 5
Calandra lark 3FO40 < 10
765 Mediterranean short-toed lark 1FO10 < 5

M2a 767

Mediterranean short-toed lark 3 < 7, 3 < 3
Agama
Sunwatcher toadhead agama
Fox
Old Corsac fox litter

769 Calandra lark 4FO30 < 10
771 Calandra lark 1FO40 < 10
774 Toad-headed agamid
776 Mediterranean short-toed lark 1FO50 < 2
777 Mediterranean short-toed lark 1FO20 < 5, 1FO40 < 10
Lark sp. 1FO120 < 10

M3a 778

Mediterranean short-toed lark 2 < 1, 1 < 1

779 Mediterranean short-toed lark 2FO30 < 3
780 Mediterranean short-toed lark 1FO60 < 5, 1FO40 < 10
781 Mediterranean short-toed lark 1FO50 < 3
782 Mediterranean short-toed lark 1FO40 < 10
783 Mediterranean short-toed lark 1FO60 < 5
784 Mediterranean short-toed lark 1FO30 < 5
786 Mediterranean short-toed lark 1S5

M4a 777

Tortoise and gerbil burrows 4
Mediterranean short-toed lark 1FO30 < 2, 1FO50 < 5
Calandra lark 1 n40< 5

785 agama
Mediterranean short-toed lark 1FO30 < 1
792 km, we ran out of petrol (so that the fuel gauge did not beep, each tank with 10 litres). Petrol consumption was 1 litre per 4.6 km. We switched to gas.
793 Mediterranean short-toed lark 1FO30 < 5
794 Mediterranean short-toed lark 1FO30 < 3; 12FO50 < 3
795 Mediterranean short-toed lark 1FO10 < 10
797 Mediterranean short-toed lark 1FO15 < 10
799 Mediterranean short-toed lark 2FO40 < 3
801 Mediterranean short-toed lark 2FO30 < 3
802 Agama
Mediterranean short-toed lark 1FO50 < 1
803 Mediterranean short-toed lark 3S5 +2S8+1S15
804 Mediterranean short-toed lark 3S10, 2FO40 < 5
805 Mediterranean short-toed lark 1S5, 1FO20 < 10, 2FO30 < 2

M5a 807

Mediterranean short-toed lark 2 < 10

808 Calandra lark 1FO30 < 10
809 Calandra lark 1S10
Mediterranean short-toed lark 1S5
813 Mediterranean short-toed lark 1FO40 < 5, 2FO10 < 1

M6a 814

Mediterranean short-toed lark ≈15, 1 mating, ≈20-25, 1 mating
14 old gerbil or gerbil burrows

821 Mediterranean short-toed lark 2FO40 <1, 1S5
822 Calandra lark 1FO30 < 10
823 Mediterranean short-toed lark 3FO50 <5,

1FO30 < 10
824 Mediterranean short-toed lark 1S5
825 Mediterranean short-toed lark 3S10, 2S15

M7a 826

Mediterranean short-toed lark 1S8, 1FO30 < 5, 2FO30 < 5
Tortoise burrow 10
Gerbil burrow 3
Agama 1
Mediterranean short-toed lark 1S10 has fledglings
Calandra lark 1FO40 < 10

827 Mediterranean short-toed lark 1FO20 < 1
828 Mediterranean short-toed lark 2S3
829 Mediterranean short-toed lark 1S5, 1S8, 1FO40 < 10
831 Mediterranean short-toed lark 3S10, 2 p30< 10, 3S5
Calandra lark 1S5
833 Mediterranean short-toed lark 1FO40 < 10, 5S5, 1S3

M8a 833

Black-bellied sandgrouse 1S30. After taking off, made a turn to an altitude of about 80-100 m.
Mediterranean short-toed lark 7p40 < 10, 2FO30 < 20
Calandra lark 6FO30 < 10
Pallas's sandgrouse 1S30, flew over less than 5m in height
Mediterranean short-toed lark; 6S10 + 3S15

834 Mediterranean short-toed lark 3S10, 1S5, 1S15
835 lizard
836 Sunwatcher toadhead agama
837 Mediterranean short-toed lark 1S4, 1FO40 < 5
838 Mediterranean short-toed lark 1S5
840 Agama
841 Lark sp. 1FO80 < 5, 1S20

M9a 843

Lizard 2
Mediterranean short-toed lark 3 < 3

846 Mediterranean short-toed lark 2FO70< 10

M17a 847

Lizard
Ruff 4 ≈ 15-30
Mediterranean short-toed lark 2 < 3

850 Mediterranean short-toed lark 2FO50 < 5
852 The old tortoise and gerbil burrows group
853 Mediterranean short-toed lark 1S10
854 Greater sand plover 1S150
Mediterranean short-toed lark 5FO40 < 5
870 overnight on the Caspian Sea shore.
Caspian gull 2.

Bat detector did not give any result. No bats were observed visually either.

14.06.2024

870 Caspian Sea
Caspian gull 2 (same as in the previous evening)
Milvus 1
Wheatear sp. 1 <5
European herring gull 2
On the edge of the cliff 1 old tortoise shell (the only one in Talap and Enbek)
881 Mediterranean short-toed lark 2FO50 < 2; agama
884 Rock dove 4FO140 < 15
Barn swallow 2FO70 < 10
Mediterranean short-toed lark 1FO40 < 5
885 Mediterranean short-toed lark 1FO30 < 5, 1FO50 < 5
888 Mediterranean short-toed lark 1FO30 < 5.

M10a 889

Butterfly 3
Mediterranean short-toed lark 2 < 2
Tortoise burrow 12
Gerbil burrow 8
Great grey shrike 6 < 5; one with lizard (Photo 6)
A 2-3 cm diameter small burrow of unknown animal.

Photo 6 Great grey shrike

891 Mediterranean short-toed lark 1FO40 < 15
892 Mediterranean short-toed lark 1FO20 < 5,
893 Mediterranean short-toed lark 1FO40 < 3
894 Calandra lark 1FO20 < 15

M16a 896

Mediterranean short-toed lark 1 < 3
Tortoise burrow 8
Gerbil burrow 3
Butterfly 1

897 Mediterranean short-toed lark 1S10, 2FO60 < 1
898 Mediterranean short-toed lark 1S5,
agama
Mediterranean short-toed lark 8FO40 < 3
Butterfly 1
899 Mediterranean short-toed lark 1FO30 < 2
Lizard
900 Mediterranean short-toed lark 1FO40 < 5
901 Mediterranean short-toed lark 1FO60 < 10, 1FO30 < 2
Lizard 2
902 Mediterranean short-toed lark 1FO10 <5, 1FO40 <5, 1FO30 <3

M11a 904

Mediterranean short-toed lark 1 < 1, 1S, 1 < 2
Yellow ground squirrel
Tortoise burrow 5
Gerbil burrow 3

906 Mediterranean short-toed lark 1FO30 < 5,
909 Mediterranean short-toed lark 1FO50 < 5, 1FO40 < 5
910 Mediterranean short-toed lark 1FO50 ≈ 15, 1S15, 1S5
Black-bellied sandgrouse 1FO200 < 20
914 Mediterranean short-toed lark 4FO30 < 3
915 Mediterranean short-toed lark 1FO30 < 5, 1S5
Lizard
916 Calandra lark 1FO40 < 10
918 Mediterranean short-toed lark 1FO30 < 5,
919 Mediterranean short-toed lark 2FO30 < 5, 1FO40 < 20

M12a 920

Agama
Mediterranean short-toed lark 1 < 5, 1 < 15,
Pieridae butterfly 3

923 Mediterranean short-toed lark 1S10, 4s15, 1FO40 < 10
924 Mediterranean short-toed lark 1 FO30 < 10

925 Mediterranean short-toed lark 1FO50 < 10
925 Mediterranean short-toed lark 1FO40 < 10
926 Barn swallow 2FO70 < 5
Mediterranean short-toed lark 3FO80 < 3
Lizard
928 Mediterranean short-toed lark 1S3, 1S10
Black-bellied sandgrouse 1S20

M13a 930

Mediterranean short-toed lark 1S, 1S
Tortoise burrow 7
Gerbil burrow 2
Butterfly 2
Lizard 1

931 Mediterranean short-toed lark 2FO30 < 1, 1FO40 < 1
932 Mediterranean short-toed lark 1FO30 < 5, 1FO30 < 5,
933 Mediterranean short-toed lark 2FO50 < 2, 1FO30 < 2
934 Mediterranean short-toed lark 1FO10 < 2
938 Mediterranean short-toed lark 1FO30 < 15

Photo 7 Mediterranean short-toed lark

M14a 939

Mediterranean short-toed lark 1 < 5, 1 < 1, 6S
Calandra lark 2 < 10, 1S
Butterfly 2

942 Mediterranean short-toed lark 1FO40 < 10

M15a 944

Butterfly 3
Calandra lark 6 < 15
Agama

948 Calandra FO20 < 15
952 water near the motorway
958 water near the motorway

15.06.2024

No observations. Bad weather.

16.06.2024

No observations. Bad weather.

17.06.2024

No observations. Bad weather.

RAHYM

18.06.2024

U9a 242

Toad-headed agamid 1
Tortoise burrow (TB) 1
Mediterranean short-toed lark 1S30
Small mammal burrows (SMB) 3
Satanas gigas 1

244 Mediterranean short-toed lark 1FO10 < 1
Agama 1
245 Crested lark 1S3 < 3
Sunwatcher toadhead agama 1
246 Lark 1FO50 < 10
247 Hare 2
247 Black-bellied sandgrouse 1FO300 < 10
Mediterranean short-toed lark 1FO20< 3, 1FO40< 3, 1S10< 3
Goitered gazelle 3
Calandra lark 1S20< 5

Photo 8 Goitered gazelles

U8a 248

TB 1
BSM 3
Mediterranean short-toed lark 1FO40 < 5
Crested lark 1S20 < 10

251 Lizard 1
BSM 4
252 Yellow ground squirrel 1 (f) Lark 1FO80 < 10
256 Crested lark 1FO15 < 20

U7a 258

Mediterranean short-toed lark 3FO30 < 10
Unconfirmed Cheetah tracks diameter about 9-10 cm
Big Gerbil
A snake ∅~1 cm
Jerboa
Goitered gazelle tracks (fresh) track length ≈ 4 cm

Photo 9 Tracks that may belong to a cheetah due to protracted claws

Photo 10 Goitered gazelle tracks

260 Hare 1
Calandra lark 1FO50 < 15
Crested lark 1S10 < 10
261 Mediterranean short-toed lark 2FO5 < 2
Hare 1
Tortoise shell "TS" 1
262 TS 1.
Mediterranean short-toed lark 3S50 < 3
263 TS 1.
264 Calandra lark 1FO40 < 10
Mediterranean short-toed lark 3FO10 < 3
265 Hare 1

Photo 11 Tolai hare

266 Mediterranean short-toed lark 1S5 < 1
Lark 4FO50 < 10
267 Hare 4
Mediterranean short-toed lark 2FO30 < 5
TS 3

U6a 268

Hare 1
Old diggings of tortoise burrows by a honey badger.
Fresh gazelle tracks
Calandra lark 3FO30 < 10

270 Mediterranean short-toed lark 1S20 < 10, 1FO30 < 10
271 Hare 1
273 Mediterranean short-toed lark 5FO20< 15
Fox Agama
274 Crested lark 1S20 < 5
Lark 1FO50 < 10
Mediterranean short-toed lark 1S20 < 5

Photo 12 Crested lark

U5a 275

BSM 1
TS 2
TB 9
Lizard 1

277 TS 1
Lark 1S30 < 5
278 TS 1.
279 Agama
280 TS 4, burrows
Calandra lark 1FO10 < 5
278 Lizard 1

U4a 282

Yellow ground squirrel 1
Crested lark 1S5 < 15
Old camel droppings
Horse tracks
BSM 22 All old
TB 14 All old
Mediterranean short-toed lark 3FO50 < 10
TB and BSM 3
The fox diggings
Orthopteroids are scarce
Lizard 1
TS 1

283 TB + BSM 2
TS 2
284 TB + BSM 1
285 TB + BSM 1
287 TS

U3a 290

TB + BSM 3
TB 7
BSM 12

282 Mediterranean short-toed lark 1FO10 < 5
282 Lesser short-toed lark 1p10 < 5

U2a 296

Smerch
TB + BSM 2
The hare's laying down
BSM 4
Old camel droppings
TB 3
Butterfly 2

298 Crested lark 1S10 < 5
299 Hare
300 Butterfly 2
301 Mediterranean short-toed lark 2FO10 < 2
TB + BSM 1
302 Butterfly 2
305 Butterfly 2
306 Mediterranean short-toed lark 2FO10 < 10
Butterfly 2
313 Shepherds hut
Caspian plover 2FO70 < 10

Photo 13 Caspian plover

Mediterranean short-toed lark 8FO50 < 10
Western black-eared wheatear 3FO 50 < 10 (tail 80% black)
Hare 5
Charadrius and hares return, despite the presence of people, to the shade under the concrete bins
315 Mediterranean short-toed lark 4FO40 < 2
318 Agama 1
320 Butterfly 8
321 Butterfly 1
330 Mediterranean short-toed lark 1S5 < 1
333 TB + BSM 1
336 TS 2.
337 TB 3, BSM 2

L4a

Mediterranean short-toed lark 1FO30 < 3
Passerines 1FO40 < 3
Calandra lark 1FO30 < 10
Greater short-toed lark 1S5 < 3
Butterfly 1
BSM 3
TB 2

340 TS 1
catfish 1FO30 < 5
342 Tulep; Calandra lark 1FO40 < 10
343 Mediterranean short-toed lark 1S20 < 3
344 Caspian plover 1S5 < 1
Lizard
347 Mediterranean short-toed lark 1S3 < 3
Caspian plover 1S10 + chick
350 Mediterranean short-toed lark 3FO40 < 10
Calandra lark 1FO50 < 10
351 Calandra lark 1FO20 < 5
Mediterranean short-toed lark 1S10 < 3
354 TS 2.
355 TS 1; Broken right leaf spring (twisted with wire)
356 Lizard 1
TB + BSM 1
BSM 2

19.06.2024

U1a

Arrival 19:00 (evening before)
Strong winds in the evening tore down the tent
Bird count 08:00

Old camel droppings
Lizard 2
BSM 21; all burrows are old

359 TS 2.
360 Red-headed bunting ♂p40 < 5
Mediterranean short-toed lark 1FO30 < 2
TS 1
361 TS 1.
363 Calandra lark 1FO70 < 10
TB + BSM 1
Mediterranean short-toed lark 1S10 < 1
365 Mediterranean short-toed lark 1S8 < 1
366 Mediterranean short-toed lark 1FO5 < 2
367 TS 2.
Mediterranean short-toed lark 2S15 < 2
369 Lark 1FO80 < 10
370 Mediterranean short-toed lark 1FO20 < 10
TS 1
372 Lark 2FO70 < 5
Agama
Mediterranean short-toed lark 1S30 < 5
Central Asian toadhead agama 1
373 BSM 1
Butterfly 1
Mediterranean short-toed lark 21S15 < 3
374 Central Asian toadhead agama 1
375 Mediterranean short-toed lark 1S3 < 3, 1S5 + chick (hatched about 1 hour ago);
2FO30 < 10
376 Mediterranean short-toed lark 1FO40 < 10
Passerines 1FO150 < 10
Mediterranean short-toed lark 1FO30 < 10; 1S5 < 3
Toad-headed agamid 1
377 Lark 1FO40 < 1
Butterfly 2
378 Mediterranean short-toed lark 1S30 < 5
379 Mediterranean short-toed lark 2FO30 < 3
380 Shrub;

11:30 - 12:00
Mediterranean short-toed lark 1S10 < 3; 2FO40 < 5, 1FO40 < 10
Calandra lark 1FO30 < 5; 2FO40 < 5
Agama 3
Red-headed bunting ♂S40
Wheater with pure-white back (Indian?) 1FO40 < 10
Rufous-tailed (southern) scrub robin with distinct white eyebrow; tail red 1FO40 < 5
Hare 3
Butterfly 2
Passerines 1S30 < 1
381 Mediterranean short-toed lark 1FO10 < 15
♀ Wheater 1FO30 < 5
♂ Spanish wheater 1FO30 < 5
383 Mediterranean short-toed lark 1S20 < 3
385 Lark 1FO40 < 10
TB + BSM 1
387 Agama
388 Mediterranean short-toed lark 1FO30 < 5; 1FO15 < 2
389 Passerines 1FO140 < 10
Calandra lark 1S10 < 3
TS 1; TB 1
391 Mediterranean short-toed lark 1FO30 < 5
392 TS 2; Agama
Mediterranean short-toed lark 1S10 < 1
394 Mediterranean short-toed lark with chick (about 1 hour)1S2 < 3
TS 1
395 Lark 1FO70 < 10; 1S5 < 1
Crested lark 1S5 < 10
396 Mediterranean short-toed lark 3S10 < 5
Wheatear 1S40 < 3
397 Mediterranean short-toed lark 1FO1 < 3
Lizard 1
BSM 3
399 TS 1.
400 TS 1
401 TS 1.
402 TS 3.
403 Mediterranean short-toed lark 1S21 < 1; leads away from chick;
7S10 < 3, 1S5 < 3
Calandra lark 8S10 < 3
TB + BSM 1
Lizard 1
404 Mediterranean short-toed lark 1S20 < 5
406 Mediterranean short-toed lark 2FO20 < 1
407 TB + BSM 2
TS 1
408 TS 1.
TB + BSM 2
409 Mediterranean short-toed lark 1S10 < 3

KANAGAT

B9a 410

Calandra lark 1FO15 < 5; 1FO40 < 10
TB + BSM 1
Mediterranean short-toed lark 1FO30 < 10
BSM 17
TB 7
TS 1

412 TS 3.
Mediterranean short-toed lark 1FO40 < 1
413 Mediterranean short-toed lark 1FO50 < 15
Butterfly 1
414 TS 1; TB + BSM 1
Butterfly 1
417 Crested lark 1FO20 < 5
Mediterranean short-toed lark 2S1 < 3
TS 3
Calandra lark 1S20 < 3
TB + BSM 1
418 Calandra lark 1FO30 < 10

B8a 419

Mediterranean short-toed lark 1FO30 < 10; 1FO15 < 5
BSM 9
TB 4
TS 1

422 Mediterranean short-toed lark 2FO40 < 10
Central Asian toadhead agama 1
423 Mediterranean short-toed lark 1FO5 < 2
TS 1
425 TS 1
427 Great Great grey shrike ♂♀c80
TS 1
428 Mediterranean short-toed lark 1FO20 < 5
429 TS 1.
Lizard 1
430 TB + BSM 1
431 TS 1
439 TS 1
440 Sidewall cut!!!
443 TS 1.

B5a 449

TS 1
Mediterranean short-toed lark 6FO30 < 5

451 Mediterranean short-toed lark 2FO10 < 1
TS 1
Central Asian toadhead agama 1
452 TS 1.
Goitered gazelle 1
Sandgrouse 1FO300 < 20
Crested lark 1FO80 < 10
Mediterranean short-toed lark 3S10 < 5
453 Mediterranean short-toed lark 1S10 < 5
454 Lizard 1
Mediterranean short-toed lark 1S5 < 1
455 Lizard 1
TS 1
456 Mediterranean short-toed lark 1FO10 < 5
TS 2
Agama 1
457 Agama 2
458 Mediterranean short-toed lark 3FO15 < 5
Lizard 1
TS 1
Crested lark 1FO10 < 5
459 Crested lark 1S10 < 3
Mediterranean short-toed lark 2S20 < 5
460 Mediterranean short-toed lark 2S10 < 1
461 TS 1.
Hedgehog pillage
462 Lark 1FO10 < 5
463 Mediterranean short-toed lark 1S5 < 3; 1FO10 < 1
TS 1

B4a 464

Abandoned mines
Calandra lark 2FO30 < 10

465 Mediterranean short-toed lark 1FO10 <10, 1FO10 <5, 2S30 <3
TS 1
466 Mediterranean short-toed lark 6S10 <3; 1S10 <2
467 Ruff 7p50 < 20
Mediterranean short-toed lark 1FO15 < 10

20.06.2024

B3a 470

7:00
TS 1
Agama 1
Mediterranean short-toed lark 12FO50 < 3
Calandra lark 2FO70 < 10, Lizard 2
TB 11
TS 1
BSM 13

471 Mediterranean short-toed lark 1FO30 < 3, 1FO50 < 5
472 Crested lark 1FO30 < 5
TB + BSM 2
473 Crested lark 2FO40 < 10
Lark 2FO140 < 5
Mediterranean short-toed lark 4FO40 < 2
474 Mediterranean short-toed lark 3S30 < 3
TB + BSM 1

B2a 475

TB + BSM 1
TS 1
Lizard 1
Calandra lark 2FO50 < 10, 1S20 < 5, 1S40 < 5
Mediterranean short-toed lark 1FO40 < 5

476 TS 1
477 Mediterranean short-toed lark 5S40 < 2

Lizard 1
Lark 1FO70 < 3
478 Lizard 1
479 Agama 1
Mediterranean short-toed lark 2S5 < 3, 1FO20 < 5
Lark 1FO80 < 10
TS 1
Crested lark 1S5 < 5
Lizard 1
481 Wheatear 1S30 < 3
Mediterranean short-toed lark 6FO30 < 5
Calandra lark 1FO20 < 5
TS 1
482 Crested lark 1S2 < 3
Agama 1
TB + BSM 1
484 Mediterranean short-toed lark 1S20 < 3
TB + BSM 2
TS 1
485 Mediterranean short-toed lark 1S20 < 3
Butterfly 3
Lizard 1
486 Mediterranean short-toed lark 1FO5 < 5

B1a 487
TB + BSM 2
TS 2
Mediterranean short-toed lark 1FO20 < 10
487 Caspian plover 4S30
488 Mediterranean short-toed lark 2S20 < 3
489 Crested lark 1FO20 < 10
491 Mediterranean short-toed lark 7p30 < 5
TS 1
8 km looking for road 499 re-departure from B1
500 TB + BSM 1
Mediterranean short-toed lark 5S30 < 3
501 Mediterranean short-toed lark 2S20 < 3, 2S2 < 3, 1S10 < 32
Crested lark 1S5 < 10
Wheatear 1S30 < 3
502 Crested lark 1FO10 < 5
Calandra lark 3S10 < 10
Mediterranean short-toed lark 1S15 < 3
503 Mediterranean short-toed lark 1S30 < 5, 2S10 < 5
Crested lark 1FO30 < 10
504 Mediterranean short-toed lark 2FO30 < 10
TS 1
Crested lark 3FO40 < 10
505 Mediterranean short-toed lark 4FO15 < 3
Caspian plover 4S10
506 Mediterranean short-toed lark 3FO10 < 3, 1S10 < 3
508 Calandra lark 1FO40 < 10
TB + BSM 1
509 BSM 3
510 Mediterranean short-toed lark 1S10 < 3
511 TS 2.
Mediterranean short-toed lark 1S3
512 TS 1
Mediterranean short-toed lark 5S15 < 3
514 Mediterranean short-toed lark 3S10 < 3, 5S10 < 3, 2S10 < 1
Before km 520 all birds are sitting in puddles. After km 520 the roads are dry
TS 1
515 TS 1 Mediterranean short-toed lark 2FO5 < 5, 1S5 < 1
516 Mediterranean short-toed lark 2S5 < 2
517 Mediterranean short-toed lark 2S10 < 2
Wheatear 1FO30 < 2
518 Mediterranean short-toed lark 2S3 < 1, 11S30 < 5
Caspian plover 1S5 < 3
519 Mediterranean short-toed lark 6S10 < 3
Calandra lark 7S10 < 5
520 Roads are dry
Butterfly 1
Mediterranean short-toed lark 1FO15 < 3
Common swift 1FO120 ≈ 15-30
521 Suspected Great bustard 3S200 ≈ 15-30 (11:40) N 42º30.173´; E 054º20.294´
Calandra lark 5FO20 < 5

L2 alt 524

Stony high bank
Mediterranean short-toed lark 7S10 < 2
Calandra lark 2S10 < 5, 22S30 < 15, 2S30 < 10, 1S10 < 10
TS 1
BSM 7

526 Calandra lark 1FO30 < 10
528 TB + BSM 2
529 Mediterranean short-toed lark 1S5 < 3
Calandra lark 5s30 < 5
530 Lark 1S10 < 5
TS 2
534 Lark 1FO50 < 10
Development (well closure)
TB + BSM no longer counted
542 Calandra lark 1FO40 < 10
Wheatear 1S40 < 10
544 Eurasian hoopoe 1FO10 < 10
546-550 Haloxylon grove
TS 1
552 Hare in the hole Lizard
553 Calandra lark 2S5 < 5
557 Lark 1FO70 < 10

L3a 558

We could not get to the planned point (L3alt) due to sands. We set up before the sands.
Green Zone; No animals

560 Great grey shrike 2S40 < 10
Agama 1
561 TS 1.
564 Hare
573 Crested lark 1S3 < 3
575 Great Great grey shrike 2S5 < 5

L2 577

14:50
Mediterranean short-toed lark 1FO40 < 5

580 MacQueen's bustard 3s200 ≈ 15-30
582 Mediterranean short-toed lark 6S10 < 5
Calandra lark 5S10 < 5
Crested lark 5S15 < 5
585 Lark 1S5 < 5
586 Calandra lark 1FO40 < 10
Mediterranean short-toed lark 7S30 < 2
591-595 Bolashak village
596 Red-headed bunting ♂S20
Mediterranean short-toed lark 1S20 < 5
597 Crested lark 1FO40 < 10

TEREN OI

602 Great grey shrike 1FO30 < 5
604 Agama 1
607 Great grey shrike 1S10 < 10
Passerines 4FO15 < 10
608 Passerines 2FO30 < 10
609 Passerines 2S40 <10 Hawfinch? 17:40
610 Red-headed bunting? ♀S15
Gerbillinae

Photo 14 Gerbillinae

612 Lark 3FO40 < 3
613 Tortoise 1

K10a 616

Triangulation sign. Evening
Two crow's nests (the upper one is unfinished). Around and under the sign there are more than 80 tortoise shells, 5-7 cm in diameter; and only some shells are split. So, they are eaten by pulling out their limbs (mostly by the head, as all of them have no heads, but some of them have their legs in place.
Hedgehog pillage 1
Horse and camel droppings.
Agama (Photo 15)
Butterfly 1
BSM 23
TB + BSM 1
Isabelline wheatear 1S20 < 2
Common swift 5FO150 < 30
Raven 5FO150 < 30. At 21:36 5 ravens landed onto the triangulation tower (it was getting dark). Screamed and flew away. Three returned and flew away again.

Photo 15 Agama

21.06.2024

Morning
Starling 3FO150 ≈ 15-30
Passerines 1FO200 ≈ 20-40, 2FO80 < 20
Lizard 1
Dragonfly 1

622 Lizard 1
623 Agama
There are puddles on the road
624 Calandra lark 8FO50 < 10
Mediterranean short-toed lark 1S10 < 2
625 Calandra lark ♂S20 < 5; 1FO10< 2
626 Calandra lark 1S40 < 10
627 Calandra lark 2FO30 < 3
Mediterranean short-toed lark 2FO30 < 3
Dragonfly 1
629 butterfly 1
630 Lizard 1
631 Agama
632 TS 1.
633 TS 1.
634 Lizard 1
635 TS 1.

K9a 636

Butterfly 2
Old camel droppings
BSM 19
TB 8
The fox diggings
The roads hold water longer than the takyrs.

637 Calandra lark 1S20 < 10
638 Common kestrel and 2 chicks in a nest on a 5-6 metre tower 3S200 ≈ 20-40
639 Agama 2
640 Lizard 1

Butterfly 1
642 Lake 700-800 m long, 150-300 m wide
Black-tailed godwit 1S140
Green sandpiper 7S130
Squirrel butterfly 3
Toad-headed agamid 1
Dragonfly 1
there are no butterflies along the shore.
Old camel droppings
Wheatear sp. 1FO40 < 3

Photo 16 Lake on takyr

643 Another place with water
Calandra lark 2S20 < 2
644 Two lakes
645 Wheatear 1FO70 < 2
646 TS 1
647 Agama 1
650 Mediterranean short-toed lark 1FO20 < 1

K8a 651

BSM 35
TS 7
TB 18
The fox diggings
Calandra lark 1FO40 < 5
TB + BSM 1
honey badger's digging
Wheatear ♀FO50 < 3
A vertical burrow ≈ 30x15-20cm. Possibly porcupine

Photo 17 Possible Porcupine burrow

Between K8 and K7 the ground is quicksand. The whole valley is muddy

Photo 18 Landscape between K8 and K7

K7a 656

No animals

662 km Lark 1S70 < 10
664 Agama 1
666.6 Yellow ground squirrel

K6a 668

Strong wind
Calandra lark 2FO20 < 10, 2S30 < 5
Old camel droppings
BSM 1

669 Lizard 1
670 TS 2
671 TS 2.
673 Calandra lark 1FO30 < 15
Mediterranean short-toed lark 3FO40 < 12
674 TS 1.
675 Wheatear 1FO80 < 5, 1S40 < 5
Calandra lark 1FO30 < 10

K5a 681

TS 2
Hare 1

683 Calandra lark 1FO70 < 10
686 TS 1
Common swift 3FO150 ≈ 20-50
688 Calandra lark 1FO10 < 5
Lizard 1

K4a 690

Mediterranean short-toed lark 1S20 < 5, 1S10 < 1
TB + BSM 8
There's a lot of BSMs
TB a lot
TS 1
The tortoise is in the burrow with its side facing the entrance.
honey badger's digging
Old camel droppings
Calandra lark 1FO40 < 20

692 Mediterranean short-toed lark 2FO40 < 3
695 Mediterranean short-toed lark 1FO30 < 5

K3a 697

BSM - a lot
Old and fresh camel dung
Fresh horse manure
TB + BSM 1
TB 14
TS 1
The fox diggings

701 Crested lark 1FO30 < 2
703 Crested lark 1FO15 < 2
Mediterranean short-toed lark 1FO15 < 2, 2FO20 < 3

K2a 705

Calandra lark 1FO20 < 10
BSM 48
TB 7
Mediterranean short-toed lark 1S30 < 1
Old camel droppings

707 Mediterranean short-toed lark 1S20 < 3
708 Calandra lark6FO50 < 15
Wheatear 1S50
Mediterranean short-toed lark 2S30 < 1, 2S30 < 1
711 Mediterranean short-toed lark 1FO40 < 3
715 Lizard 1
717 Calandra lark 1S50 < 3

K1a 718

Little rain
TB + BSM 1
BSM 7
TB 1

722 Hare.
The road stretched along the electricity poles.
730 Little owl 1S150 < 5

Photo 19 Little owl

L1a

Mediterranean short-toed lark 1FO30 < 2, 2FO20 < 1
Calandra lark 1FO40 < 5
Old camel droppings
Horse tracks
Turnip
Wheater 1S40 < 2

Ammonia Pipeline

22.06.2024

Pipeline

Cloudy, little rain, then dry and cloudy
1km stops with no birds count not shown
999 Crested larks 8
1000 Crested larks 4
1001 Caspian gulls 2 flew to the village dump from the sea to feed.
1002 Crested larks 8
1003 Common tern 1
1010 Rock pigeons 6
1011 Barn swallows 15
1013 Barn swallows 10
1014 Barn swallows 15
1015 Rosy starling 3
1022 Pied wheatear 10
1033 Desert wheatear 5
1034 Desert wheatear 5
1036 Eurasian hopoe 4

Storage Area East

1022 Caspian gull 2
1036 Gull-billed tern 2
1048 Rock pigeon 2

Storage Area West

1068 Caspian gull 4
1073 Common tern 5
1086 European Nightjar 1

AUTUMN

ZHANAOZEN-TEREN OI

24.09.2024

123,376 km – Oriental cuckoo ♀
Start from Zhanaozen 123,438 km
520 beginning of the count
Tracks of honey badger, gerbil
Harrier sp. 1s800
Long-legged buzzard juvenile h < 10
Lizard 1
521 Kestrel sp. h < 20
Tolai hare (Tracks + droppings)
Gerbillinae + tracks
Tracks of fox and hare
531 Lark sp. h < 2, E.
532 tracks of hare
535 Common Buzzard ? h ≈ 30-50, W.
543 Tracks of honey badger and hare.
Rock dove < 10, flying around.
Common kestrel ♀ h ≈ 10-40, flying around.
544 Tolai hare.
The odometer started to go off. We switched to trip measurement using Locus map, when the odometer showed 87.5km prior to stopping working.
90 km 2 booted warbler, h < 1.
93 km border post Temir-ata? We turned back. Stopped nearby for overnight stay.
K-0: N 41,988695; E 052,688343.

25.09.2024

Track returned back to zero – set «0» km.
Kestrel h < 1; 150; S.
Sylviidae sp. 1 h < 1, 70
1,6 km Harrier sp. 1<2, 400; feeding
11,1 km lark sp. 7<5, W

TEREN OI

K1a 17,5 km

10:40
BSM and TB – many.
Old droppings of camel.
Old tracks of goitered gazelle. A great many; Apparently, gazelles are migrating. There are several tracks on each meter.
Fresh droppings of hare

3,3 km Mediterranean short-toed lark 1<1, 10
5,0 km Kestrel sp. 10-80m., S. 200
6,5 km Long-legged buzzard ad 20-150; W. 400
8 km Mediterranean short-toed lark 1<3; W; 5
Due to hot weather GPS of observer 1 stopped working, therefore from here number of kilometers according to track of observer 2 (starting from 26 km) was used
27,1 km Mediterranean short-toed lark ≈20<2; 80m; N-W
28,9 km Lizard.

K2a 29,8 km

BSM + TB – few
Old droppings of camel
Fresh droppings of gerbil?
Old diggings of fox
Old droppings of goitered gazelle
Tolai hare 1
Single track of goitered gazelle

K3a 37,7 km

BSM – few;
TB – sporadic
Burrow of hare
Old droppings of camel and of young camel
Gecko
Finsch's wheatear ♂ < 2.
Droppings smaller than of adult hare, brown; spreaded on 3-4 m².
Lark sp. 20 < 2, 120. Wing bottom is light; outer rectrix are white.
Calandra lark 2 < 3, 120.
♂ possibly yellow-winged darter

40,3 km Mediterranean short-toed lark 8 < 10, 70; S.
43 km Mediterranean short-toed lark 1 < 1, 3; E.

K4a 44,7 km

Calandra lark 30 < 4, 140.
TS – 3; BSM – not many; TB – few.
Diggings of honey badger
Old droppings of hare
Burrow of ground-squirrel
Burrow of hare
White wagtail 1<10;10

45,2 km Isabelline wheatear ♀ 1<1, 40
45,7 km Mediterranean short-toed lark 7<5, 50; S-W
47,2 km TS
49,0 km Mediterranean short-toed lark 1<1, 10
51,5 km Lizard

K5a 54,0 km

Sloping hills
Kestrel ♀ 0-40m, E, 150
Ellipsoid burrow of hare
BSM – not many, TB – few, TS – 3
Old droppings of juvenile camel
Burrow of ground-squirrel 2
Diggings of fox
Diggings of honey badger
Tolai hare 2
17:35 bat with wingspread about 15-20cm flew up from the shrub to h≈2 m, flew 20-30m and landed

57,7 km hare
58,8 tracks of goitered gazelles

62,6 hare
65,3 Kestrel up to 50m; S-E.

K6a
Arrived to the camp at 18:40

26.09.2024

Started bird counting at 07:50.
Willow warbler 1 < 2, 5; S.
Red-breasted flycatcher 1 < 2, 40; S;
Barn swallow1 < 10, 70; S.
Lark sp. 5 < 2, 40, S-E.
Passeriformes sp. 1 < 1, 50.
Burrow of ground-squirrel 1
BSM few, TB sporadical
Barn swallow 1 < 5, 70; S-E.
Willow warbler 1< 1, 10; E.
White wagtail 4 < 3, 50; S-E.
Willow warbler 1 < 1, 5; S-E
Willow warbler 1 < 1, 7; S-E.

Start from K6a at 10:30; odometer reading «0» km
2,5 km Steppe eagle (3-4 years): 1 ≈ 150-250 m, 700; S-W.
4,5 km Mediterranean short-toed lark 1 < 1; 15.
Wheatears sp.1 < 2, 50; N-E.
5,1 km Tawny Pipit 1 < 1, 40.
10 km tortoise shell
12,8 km Mediterranean short-toed lark 3 < 7; 40; S-E.

K7a 13,6 km

Route on foot 2,3 km, 11:30 – 12:40
The place is hills with rock outcroppings.
TS – 10; TB – many; BSM – few.
Dragonfly
Fresh droppings of hare
Diggings of honey badger. One with depth of 0,6-0,7 m
Kestrel sp. 1 ≈ 20-40 m, 600; hunting.
Diggings of corsac (fox whelp?)
Droppings of honey badger
Lizard 1
Common redstart1 < 1; 0,5 m. Was sitting in the small burrow.
Goitered gazelle tibia
Old droppings of camel and young camel
Diggings of juvenile honey badger
Diggings of fox
Wheatears sp.1 < 3, 20; W
Wheatears sp.1 < 2, 15.

16,9 km Tortoise shell

K8a 17,8 km

Route on foot 2,2 km, 13:10 – 14:40
The tract consists of dissected hills with rock outcrops and 2 takyrs
TS – 7; TB – not many; BSM – few.
A spider with a white top
Droppings of hare
Diggings of honey badger
Droppings of possibly a pika
Daytime nest of hare 2
Beetles whose mass 'march' was observed in spring – 25
Tolai hare 1
Three regurgitate was taken
Burrow of ground-squirrel 1
Gecko 1
Northern wheatear ♀ < 1,5, 50.

20,1 km – wheatears sp.1 < 5, 70; N
21,2 km lark sp. 1 < 10, 30; S.
23 km barn swallow5 < 3, 40; E.
24 km Passeriformes sp. 1 < 4, 70; E.
28,6 km wheatears sp.1 < 1, 50.
28,8 km lark sp. 1 < 1, 40.

K9a 29,8 km

Route on foot 2,4 km, 17:25 – 19:30
Takyr, amidst a plain surrounded by hills. At 19:50 already dark.
TS – 3; TB – not many; BSM - few
Burrow of ground-squirrel 1
Colony of 6 burrows with diameter of 6-7 cm within ≈ 20 m².
Droppings smaller than hare, brown, in small heaps – 3.
Two gerbils; grey top.
Droppings in the burrow with diameter of >5-7 cm bug of Tenebrionidae (darkling beetle?)
Droppings of honey badger?
Diggings of fox
Droppings of wolf or big dog.
Near some tortoises burrows there are droppings of gerbils (jerboas?)
Old droppings of camel

27.09.2024

Route starts from «0» km
4,4 km Lark sp. 20 < 1, 15; N.
11,3 km Tolai hare

K10a 12,3 km

Route on foot 2,2 km, 09:55 – 11:45
The place is an upland near the settlement (Kanagat), a stone embankment, a tower and saxauls
TB – sporadic. Where did the raven get two hundred small tortoises for the chicks? Only a few of the shells are white in colour.
Old and fresh droppings of camel.
Fresh skin of young hedgehog, but in heap.
Burrow of ground-squirrel
Many tracks of sheeps.
Droppings of size and shape as hare's
Fresh droppings of hare
Gecko 1

22,2 km crested lark 1 < 5, 40.
22,5 km crested lark 10 < 3, 40.
Finsch's wheatear 1 < 2, 80
23,3 km crested lark 7 < 5, 40,
24,6 km crested lark 8 < 20, 70; N.
25 km crested lark 6 < 10, 50; N.
27,2 km white wagtail 2 < 5, 30.
28,5 km white wagtail 2 < 5, 20; N.
28,8 km isabelline wheatear 3s15.
29,9 km White wagtail 2s40
33,8 km Bolashak village.
White wagtail 2 + 3
Rooks ≈ 50
Rock dove 1
White Wagtail has almost black top
40 km Wheatears sp.1 < 7, 20
43,7 km Isabelline wheatear 2 < 5, 40
45,2 km Sylviidae sp. 1 < 1, 10

L2a

No animals

51 km Mediterranean short-toed lark 7 < 1, 40.
52,2 km Calandra lark 30 < 3, 50.
53,2 km Wheatears sp.1 < 2, 40
61,1 km Lark sp. 10 < 5, 120; E.
67,7 km Big dragonfly
71,2 km Hare, tortoise shell.

TEREN OI-KANAGAT

L3alt 73,8 km

Route on foot 2,2 km, 17:15 – 18:20
The tract is a plain at the foot of the chink, with groves of saxaul trees
Sun went down at 19:15
Old droppings of camel; many
Sylviidae sp. 1< 1, 10; E.
Piedmont of chink. TS 1
A grove of low saxaul
BSM few; TB – many, but 80% old.
Burrow of corsac, abandoned.
Crested lark 3 < 5, 30; S
Tracks of caracal with diameter of 6 cm.
Crested lark 1 < 3, 30; S
Huge ants crawled out during the night. The temperature is about 12 degrees Celsius.

28.09.2024

Hike to the caves in the chink, Route on foot 9,1 km, 9:50-15:45
Passeriformes sp.1s30
Passeriformes sp.1F40
Camp h = 20 m above sea level.
Solifugae sp. 1
TS 18
Droppings of hare
On the hill in front of the chink 2 old skins of hedgehog and 7 tortoise shells. Many regurgitates. Hedgehog skins brought by birds.
Owl's droppings in the crevice
Droppings of a wolf or a large dog
Diggings of fox
Above the cave in the chink is kestrel 1 ≈ 50-70, 200.
Greenish warbler 1s20 feeding in the crevice
Golden eagle 3 juvenile+1ad ≈ 200-400m S-E
In the cave there is a nest of a raptor, probably an Eurasian eagle-owl, as there are many regurgitates on the hill, and no eagle's nest was found; it is unlikely that a kestrel could have collected large tortoises. In the cave is a tortoise paw with a tibia, bones and skull of a rodent. The floor is strewn with ungulate droppings 2 times larger than gazelle - argali.
Retrix of rock dove
In the crevice is an old hedgehog skin and 2 tortoise shells.
Golden eagle 1, h ≈ 200-300, 800; S.
Shed snakeskin ≈ 50-60 cm
Diggings of wolf (a dog will not dig up a tortoise from a depth of 40cm.).
Tolai hare
Calandra lark 1 < 10, 70; E.
Diggings of wild boar.
Yellow-winged darter? 1 male, 2 females.
Calandra lark 1 < 15, 120; N-E.
Calandra lark 1 < 4, 140; N-E. Along the chink.
White wagtail 1 < 1, 20; W
Barn swallow1 < 3, 20; E.

29.09.2024

Drive from L3alt to B1 along the OHTL haul road
8,1 km tracks of fox and whelp, hare and of possibly a pika
10,7 km White wagtail 2 < 3, 30.
14,5 km Tolai hare
15,9 km Small falcon 1 < 20, 400; N.
21,5 km Tortoise shell.
55,3 km Tortoise shell
56,7 km Calandra lark 17 < 5, 40; S.
57,6 km Mediterranean short-toed lark 14 < 1, 40; S-E.
Crested lark 21 < 1, 20; S-E.
58,9 km Calandra lark 17 < 25, 30; S.
62 km Mediterranean short-toed lark 24 < 2, 10; S.
62,5 km Mediterranean short-toed lark 16 < 2, 70; W
65,1 km Mediterranean short-toed lark 16 < 2, 70; W.
66 km Mediterranean short-toed lark 4 < 3, 40; N-W.
Mediterranean short-toed lark 2 < 1, 30; S-W.
67,4 km Mediterranean short-toed lark 5 < 2, 30; S-W.
68,1 km Mediterranean short-toed lark 1 < 2, 8; W.
68,3 km Mediterranean short-toed lark 2 < 2, 20; W.
Calandra lark 1 < 32, 20; W.
Tortoise shell
69 km Tortoise shell
70,4 km Tortoise shell
70,9 km Passeriformes sp. 1 < 3, 10; N.
71,9 km Mediterranean short-toed lark 23 < 2, 30.
Mediterranean short-toed lark 2 < 2, 30; S-W.
72,6 km Mediterranean short-toed lark 2 < 10, 30; W. 8 < 4, 40; N.
73 km Mediterranean short-toed lark 30 < 5, 50; feeding.
73,5 km Barn swallow1 < 5, 20; E.
Skin of hedgehog
75,5 km TS
75,8 km TS
77,8 km Calandra lark 5 < 10; 340; feeding.
Mediterranean short-toed lark 16 < 2, 20; feeding
79,7 km Lark sp. 3 < 7, 70; S-E.
80,2 km Mediterranean short-toed lark 17 < 2, 30; S-E.
81,5 km Mediterranean short-toed lark 7 < 3, 30; N-W.
81,8 km Mediterranean short-toed lark 71 < 1, 20; feeding
82 km Mediterranean short-toed lark 1 < 3, 15; N-W.
83,7 km Mediterranean short-toed lark 3 < 21, 15; feeding
84,8 km TS
85,8 km TS
89,2 km Mediterranean short-toed lark 5 < 1, 10; E.
90,4 km tracks of hare
91,5 km Mediterranean short-toed lark 12 < 2, 40; S-E
Tracks of fox
92,6 km Lizard
92,7 km tracks of fox and and fox-cub and hare
94,2 km TS
93,5 km Mediterranean short-toed lark 2 < 12, 40; S.

KANAGAT

B1a 94,1 km

Route on foot 2,6 km, 15:45
TS – 3
BSM – not many, TB – few.
Diggings of fox
Mediterranean short-toed lark 2 < 3, 40; feeding
Calandra lark 12 < 10, 80; feeding
Calandra lark 11 < 15, 70; S-W
Burrow of fox
Mediterranean short-toed lark 1 < 5, 20; feeding
Sun went down at 19:06
There are very few butterflies flying to the light.

30.09.2024

Sunrise at 07:10 Departure from the camp at 08:15
Odometer reading «0» km
Lesser short-toed larks are flying with singing
2,4 km 4 hares
4,3 km Mediterranean short-toed lark 21 < 1, 120; E.
5,1 km tracks of fox, hare and of pika (like a squirrel's)
Mediterranean short-toed lark 2 < 10, 70; E.
5,5 km Mediterranean short-toed lark 8 < 5, 60; E.
5,7 km Mediterranean short-toed lark 8 < 30, 70; E.
Many tracks of hares
9,4 km Mediterranean short-toed lark 12 < 4, 70; E.
Crested lark 3 < 4, 40; N-E.
10,7 km Mediterranean short-toed lark 21 < 3, 70; feeding.
13,1 km TS;
Mediterranean short-toed lark 1 < 7, 60; E.
13,6 km Mediterranean short-toed lark 42 < 3, 40; E.
15,4 km Mediterranean short-toed lark 1 < 3, 20; feeding.

B10a 16,7 km;

Route on foot 2,5 km, 09:20 – 10:20
Mediterranean short-toed lark 3 < 4, 15; E.
Mediterranean short-toed lark 5 < 5, 40; E.
Skin of hedgehog, old
Burrow of fox or jackal
Mediterranean short-toed lark 6 < 3, 40; E.
Mediterranean short-toed lark 7 < 2, 50; feeding
BSM – few; TB – few
Mediterranean short-toed lark 6 < 4, 30; E.
Mediterranean short-toed lark 1 < 5, 10; E.
Old droppings of goitered gazelle
Old droppings of horse
Mediterranean short-toed lark 10 < 2, 80; E.
White wagtail 1s5

18,0 km Mediterranean short-toed lark 6 < 3, 20; S
19,5 km Mediterranean short-toed lark 46 < 2, 40; S.
20,3 km Mediterranean short-toed lark 26 < 10, 70; S-E.
TS
22,4 km Mediterranean short-toed lark 3 < 5, 60; S-E.
25,3 km Mediterranean short-toed lark 14< 8, 40; S-E.
26,3 km long-legged buzzard 1 ≈ 20-100, 400; S-E.
Calandra lark 170 < 3, 140, S-E.
27,4 km Mediterranean short-toed lark 5 < 2, 70; N-E.
28,1 km Mediterranean short-toed lark 3 < 3, 40; S-E.
TS
29,2 km Calandra lark 6 < 3, 40, feeding
30,3 km Mediterranean short-toed lark 40 < 5, 30; feeding
30,3 km Mediterranean short-toed lark 30 < 3, 40; feeding.

B2a 31,2 km;

Route on foot 1,5 km, 11:50 – 12:45
Beside takyr and within it
Droppings the size of hare's, but in heaps beside small burrow with diameter of 5-7 cm.
Mediterranean short-toed lark 1 < 3, 30; feeding
Droppings of goitered gazelle fresh
Burrow of hare, fresh
Diggings of fox
Eremias 2
TS – 2, TB – few; BSM – few.

33,3 km Mediterranean short-toed lark 21 < 3, 80; S.
TS – 2

B3a 35 km;

Route on foot 2 km, 13:25 – 14:45
Takyr is surrounded by saxaul groves.
TS – 4;
Old diggings of honey badger
Burrow of ground-squirrel – 2
Yellow-winged darter? Dragonflies cling to the blooming saxaul. – 6.
Fresh digging of fox
Eremias – 2
Mediterranean short-toed lark 1 < 5, 30; feeding.
Red-tailed shrike *Lanius phoenicuroides karelini* 1 < 3, 70; feeding
Fresh droppings of goitered gazelle
Mediterranean short-toed lark 18 < 10, 80; N.

36 km Aquila sp. 2 ≈ 100-300; 1,5 km; W. Soaring, removed at a speed of at least 60 km/hour.
37,5 km Calandra lark 4 < 2, 40; feeding
37,8 km TS
39,0 km Calandra lark 8 < 5, 30; feeding.

Karst hole beside B4a 40 km

Emperor dragonfly? - 1
Diggings of honey badger
TS - 5
Snakeskin
Jucking place of Athene sp. (consistent bird droppings at the cliff)
Common redstart 1s10

41,3 km Old droppings of goitered gazelle
Mediterranean short-toed lark 1 < 10, 40; N-W.
No bats.

Karst hole beside B4a 41,7 km

Mediterranean short-toed lark 1 < 3, 50; feeding.
Passeriformes sp.1 < 2, 70; feeding.
Diggings of honey badger
Burrow of ground-squirrel – 2
Yellow-winged darter ? and other dragonflies 14.
BSM – not many; TB – not many.

01.10.2024

Departure from karst holes area at 08:00
0,2 km - Mediterranean short-toed lark 30 < 5, 70; S
White wagtail 2s5
Calandra lark 4 < 15, 120; S.
Lark sp. 6 < 3, 150; S
Lark sp. 7 < 2, 40; E
Lark sp. 4 < 1, 30; S-E

B4a 3 km;

8:25 – 10:17
Scattering of scree debris; saxaul grove
Mediterranean short-toed lark 1 < 10, 40, E
Red-breasted flycatcher 1s40, feeding
Pied wheatear ♂♀s40, feeding
Isabelline wheatear 1 < 3, 30; chases other females out of the territory.
Calandra lark 2 < 10, 180; feeding + 4
TS – 2
Red dragonfly?
Mediterranean short-toed lark 50 < 3, 80; S
Diggings of fox
Old droppings of goitered gazelle
Common raven 2 ≈ 30, 200. Flying east then turned south.
Isabelline wheatear 2 < 3, 50; feeding
Grey skylarks are uttering mating calls, courting females.

3,3 km Mediterranean short-toed lark 10 < 2, 30; S-E + 30
8,4 km Mediterranean short-toed lark 6 < 2, 20; S.
9,8 km TS
12,5 km Calandra lark 29 < 10, 40; S-E.
Yellow-winged darter ? 10:43
16,3 km Mediterranean short-toed lark 8 < 2, 30; S.
13,7 km TS
22,3 km Calandra lark 4 < 5, 70; feeding.
23 km Calandra lark 4 < 3, 20; feeding;
TS
23,8 km TS;
23,9 km TS
24 km TS
24,3 km 2 TS
25,3 km Mediterranean short-toed lark 26 < 5, 70; feeding
27,2 km Calandra lark 4 < 54, 40; feeding
28,3 km TS

B11a 28,7 km;

Route on foot 3,1 km, 11:25 – 13:20
TS - 12
Tracks of caracal
Lizard 1
Tracks of pika? (like of squirrel)
White wagtail 1 < 3, 5; E.
Aquila sp.1 ≈ 100-200, 1500; E.
Calandra lark 8 < 3, 70; S.
Tracks of corsac fox
Mediterranean short-toed lark 1 < 5, 40; uttering a mating call.
Fresh droppings of hare
Diggings of honey badger
Scull of goitered gazelle? Part of the frontal bone.
Diggings of fox
Large dragonfly 1
Calandra lark 18 < 3, 80; N.
Yellow-winged darter ? 2
BSM – many, TB – many

29,4 km Mediterranean short-toed lark 22 < 5, 70; S.
31,1 km Mediterranean short-toed lark 4 < 2, 20; S.
31,8 km Skin of hedgehog; Mediterranean short-toed lark 1s30; feeding
33,7 km Mediterranean short-toed lark 2 < 5, 70; E.
34,1 km Tracks of wolf? About 10 cm, not circular; and hare
36,1 km Mediterranean short-toed lark 7 < 3, 5; feeding.
36,7 km Skin of hedgehog
37,4 km Mediterranean short-toed lark 6 < 5, 4; feeding.
TS – 1.

B12a 38,5 km;

Route on foot 2,6 km, 14:45 – 15:35
Takyr
Isabelline wheatear ♀ < 3, 7; feeding
Fresh droppings of hare + tracks
TS – 4
Yellow-winged darter ? – 1
Skin of hedgehog old
Spotted toadhead agama? – 1
Diggings of fox
Diggings of honey badger
Diggings of corsac fox
Droppings of small mustelids
Lizard 2
White wagtail 1 < 1, 40; S
Barn swallow 2 < 10, 80; S.

41 km Border outpost Baylaydynushsay (turned back for a detour)
42 km MacQueen's bustard 1 < 10, 700; E.
48,1 km TS
55,2 km Mediterranean short-toed lark 11 < 2, 40; S-E
TS
59,5 km Mediterranean short-toed lark 56 < 2, 80; S-W.
62,3 km Mediterranean short-toed lark 11 < 3, 130; S.
63,4 km Mediterranean short-toed lark 12 < 3, 50; S-E.
TS

B13a 64,2 km

Route on foot 3,9 km, 17:20 – 19:00
A large plot of sparsely spaced saxaul trees
Crested lark 14 < 10, 80; feeding
Calandra lark 14 < 4, 70; feeding
Barn swallow 2 < 2, 4; S-E.
Droppings of polecat or mountain weasel
Diggings of honey badger
Diggings of fox
Old droppings of goitered gazelle
Burrow of polecat
Mediterranean short-toed lark 170 < 2, 70; feeding.
White wagtail 2 < 10, 20; S.
TS – 7, BSM – many, TB – many.
Morning
07:00 - Mediterranean short-toed lark 80 < 2, 40; S.
07:11 - Mediterranean short-toed lark 20 < 2, 15; E
07:15 – White wagtail 2 < 5, 20; S. then one came back and flew north, the other east.

02.10.2024

Start from B13a
1,1 km Mediterranean short-toed lark 13 < 1, 40; E.
Mediterranean short-toed lark 200 < 2, 70; E.
2,9 km Greater spotted eagle 1 ≈ 50-200, 800; S.
Mediterranean short-toed lark 4 < 2, 30; S.
4,3 km TS
5,1 km Mediterranean short-toed lark 180 < 3, 70; S.
5,4 km TS
5,8 km Mediterranean short-toed lark 17 < 3, 20; N-E.
Mediterranean short-toed lark 20 < 3, 40; N.
7,1 km Mediterranean short-toed lark 7 < 3, 40; feeding
8,1 km Skin of hedgehog
Mediterranean short-toed lark 25 < 2, 30; E.
9,5 km Mediterranean short-toed lark 12 < 3, 30; E.

B14a 19,6 km;

Route on foot 2,6 km, 11:30 – 13:40
A lowland at the foot of the hill with a grove of low-growing sparse saxauls and deep ravines
TS – 36; TB – not many (almost all are old), BSM – few.
Lizard 5
Diggings of honey badger
Mediterranean short-toed lark 1 < 3, 40; N-E.
Mediterranean short-toed lark 20 < 3, 30; N.
Citrine wagtail ♂ < 3, 40; E.
Diggings of fox (jackal)
Fresh droppings of hare
Diggings of corsac fox
Droppings as of hare, but in heap; Old and fresh. Here it's twice as small, fresh, dark.
Gecko 1
Old tracks of camel
Burrow of ground-squirrel 2
Tolai hare 1
Suspected track of juvenile cheetah. Clawed cat track, over 6 cm in diameter; on creek bottom.
♀ red-veined darter 13:11
Common kestrel1 < 100, 200; N

12,2 km – old well with a shack
Old skin of hedgehog

Photo 20 Old skin of hedgehog and tortoise shell

Mediterranean short-toed lark 3 < 5, 30; S-E
barn swallow2 < 5, 20; S-E
20 km TS
21,2 km Mediterranean short-toed lark 3 < 5, 20; S
31,9 km tracks of caracal, fox and hares
35,5 km Mediterranean short-toed lark 1 < 2, 40; S
36,1 km TS
Mediterranean short-toed lark 5 < 3, 50; W. + 3
37,5 km TS
39 km TS

B17a 39,5 km;

15:10
Completely empty. Nothing alive.

43,5 km TS
44 km TS
44,3 km long-legged buzzard 1 < 20, 600; N-W
45,7 km tolai hare TS
46,7 km Mediterranean short-toed lark 44 < 2, 70; feeding
47 km TS
48,3 km TS 3
49 km TS 2
50,2 km Mediterranean short-toed lark 12 < 2, 50; W
50,3 km White wagtail 1 < 5, 20; feeding
50,5 km Mediterranean short-toed lark 1 < 7, 50; feeding
51,2 km TS 2

B16a 52,6 km;

16:25 – 17:20 (started to rain)
Takyr
Old diggings of honey badger
Burrow of ground-squirrel 1
Fresh droppings of goitered gazelle. Apparently there were at least 15 individuals; and they visit this place at least 4 times a year, taking into account consistent droppings.
Diggings of hare
Droppings of possibly ground-squirrel
Crested lark 2 < 2, 50; feeding
Calandra lark 1 ≈ 15-25, 120; feeding

03.10.2024

Start of attendance at first light at 07:27
08:30 white wagtail 1 < 5; 20; feeding
08:40 Mediterranean short-toed lark 1 < 2, 10; feeding

Departure from the camp at 09:18
2 km juvenile golden eagle 1 < 20, 500, hunting
A small predator is attacking him
1 < 20, 500.
Scull of goitered gazelle with horns and part of spine bone
2,6 TS tracks of fox
3,8 Mediterranean short-toed lark 40 < 2, 80; S-E.
5,2 Skin of hedgehog, old.
6,1 Mediterranean short-toed lark 4 < 2, 70; E. TS
8,5 Mediterranean short-toed lark 9 < 2, feeding
9,8 Diggings of fox The nest of a raptor or raven; old: there are no regurgitates under it. Fresh droppings of hare
TS, TB
Nest at height 1-1,2 m
10,3 TS
10,6 TS
12,4 TS
12,8 Mediterranean short-toed lark 4<1, 20; feeding
TS

B15a 13,5 km;

10:10 – 11:50
BSM – not many; TB – not many
Saxaul grove
TS – 17
Diggings of fox
Old droppings of goitered gazelle, tracks
Diggings of honey badger
Fresh droppings of hare
Mediterranean short-toed lark 4 < 2, 50; SE
Mediterranean short-toed lark 14 < 3, 40; E
Eastern black-eared wheatear
Asian Mouflon (*Ovis orientalis*) ♂ < 2, 70, feeding
Droppings of ground squirrel ? 11:08
Skin of hedgehog old
Diggings of corsac fox
Diggings as of wild boar within area around 600 m²; possible wild boar?
Passeriformes sp. 40<10, 400; E

17,3 Mediterranean short-toed lark 40 < 1, 30; feeding
TS
23,1 Mediterranean short-toed lark 4 < 1, 20; N.
25,5 TS
25,7 TS

B6a 31,7 km;

Route on foot 2,2 km, 12:50 – 14:12
Larus fuscus 1c150, feed on beetles on the takyr (which were massively observed on migration in spring; now they are also massively moving southwards; they do not sweep round the takyr).
White wagtail 1s3; feeding.
TS – 5
Diggings of fox
Diggings of honey badger
Mediterranean short-toed lark 23 < 2, 50; S-E
Lizard 2
Crested lark 7 < 10, 90; S-E
A large red-veined darter 1
Old droppings of goitered gazelle

35 TS 2

B5a 38 km;

Route on foot 2,6 km, 15:20 – 16:40
White wagtail 1s3
TS 12
BSM – few, TB – not many
Diggings of honey badger
Beetles from B6 sporadic
Calandra lark 2 < 20, 120; feeding
Diggings of hare
Diggings of corsac fox

40,3 Mediterranean short-toed lark 5 < 3; 70, feeding
45,5 TS
49,2 TS
49,7 Mediterranean short-toed lark 70 < 2; 50, N

B18a 53,2 km;

Route on foot 3,6 km, 17:20 – 18:40
Not a very old and fresh litter of goitered gazelle, about 60-70 animals.
Burrow of polecat 1
TS 4, BSM many, TB many
Diggings of honey badger
Fresh droppings of hare
Northern Goshawk ♂ < 15, 200, hunting
Calandra lark 5 < 10, 80; feeding
Ellobiuses ?
Old skin of hedgehog
Goitered gazelles moving from W to E ?
The ants haven't gone into diapause yet.

04.10.2024

2,3 km – White wagtail 1 < 2, 10; feeding
5 TS 1
5,9 TS 1
6,2 TS 1
8,1 Calandra lark 7 < 15, 70; feeding
9,4 Mediterranean short-toed lark 2 < 3, 10; feeding
11 Lesser Kestrel ♂ < 10, 500.
11,5 Juvenile eastern imperial eagle 1 < 20, 700. It flew up to an adult greater or lesser spotted eagle and they flew together.
11,7 Greater spotted eagle
12,4 Lesser Short-toed Lark 70 < 3, 80; E TS 1
13,9 TS 1 Mediterranean short-toed lark 2 < 5, 70; feeding
15,2 TS 1

B8a 16,9 km;

Route on foot 2,2 km, 10:00 – 11:40
TS – 13, BSM – many, TB - many
Mediterranean short-toed lark 17 < 3, 60; feeding
Fragment of Vanessa atalanta wing ?
Burrow of honey badger
Mediterranean short-toed lark 1s 40
Mediterranean short-toed lark 15 < 5, 70; feeding
Calandra lark uttering a mating call 1 ≈ 20-30m, 120.
Calandra lark 1 < 20, 120.
Not old droppings of goitered gazelle
The ants move away from the anthill at 47 m.
Fresh droppings of ground-squirrel
Mediterranean short-toed lark 1 < 10, 40; feeding
Droppings of polecat
Yellow-winged darter 1
Many ants
Diggings of fox

18,6 TS
19,1 TS 2
19,5 Mediterranean short-toed lark 2 < 1, 2; feeding
21,7 TS
23 Common Buzzard 1 < 10, 700; hunting
White wagtail 2 < 5, 15; feeding
Eastern imperial eagle 1 < 100, 700; hunting
26,2 Goitered gazelle 2
TS

B19a 27,6 km;

Route on foot 2,2 km, 12:45 – 15:00
TS – 13, TB – not many, BSM - few
Long-legged buzzard 1 < 50, 600; hunting.
Steppe eagle 5 ≈ 100-300m, 500; E
Greater spotted eagle 1 ≈ 100-200m, 600; E
Passeriformes sp.2 < 10, 200; feeding
Kestrel sp 1 < 50, 400; hunting
Mediterranean short-toed lark 40 < 5, 60; S-E
Diggings of honey badger
Diggings of fox
Yellow-winged darter 1
Old droppings of corsac fox beside it's burrow
hedgehog old
Nest of magpie ? Nest external diameter 9 cm, internal 6 cm; external height 7 cm, internal height 3 cm. no litter, nest old. Height above ground ≈ 1 m, in fork of saxaul.

Photo 21 Steppe eagle

28,6 – TS
32,1 – TS 2, white wagtail 1s 5

B9a 34,4 km;

Route on foot 1,1 km, 15:25 – 16:10
TS – no, BSM – few, TB – few
Diggings of honey badger
Diggings of fox
Long-legged buzzard 1 < 100, 700; hunting
Not very old and fresh droppings of goitered gazelle
There's a perennial kestrel nest on the tower, flat

35,9 Mediterranean short-toed lark 3 < 5, 40; feeding
37,7 Mediterranean short-toed lark 40 < 5, 50; feeding, TS
38 TS
40,3 Mediterranean short-toed lark 30 < 1, 20; S-E
40,5 Possible Caspian whipsnake ?
41,3 TS 2
41,8 TS
42 TS
42,5 Common kestrel 1 < 10,70; hunting + 2
42,8 TS
44 Mediterranean short-toed lark 1 < 3, 30; S-E TS
44,2 TS
44,4 TS
45,5 White wagtail 6 < 10, 40; S-E
47,8 TS
48,7 Mediterranean short-toed lark 15 <1, 40; E
49 Mediterranean short-toed lark 44 < 3, 50; S-E
50,6 White wagtail 1 < 5, 10; feeding TS
55,6 A half-destroyed eagle's nest.
59,6 TS
64 TS
65,2 White wagtail 1 < 5, 15; S-W
65,6 A medium-sized predator 1 < 10, 800; hunting
Kestrel sp. 1 < 20, 400; hunting
66 TS
66,5 TS
72,2 Mediterranean short-toed lark 2 < 1, 40; feeding
72,5 – TS

RAHYM

05.10.2024

U1a 73 km
Arrival evening before, 18:10

Route on foot 4,2 km, 07:25 – 09:50
TS – 12; TB – few; BSM – few
Aeshnidae sp. 1, when I tried to catch it, it got about 20 metres high and flew away.
Diggings of corsac fox or whelp.
Mediterranean short-toed lark 2 < 3, 10; N-W.
Diggings of honey badger
Diggings of fox
Old droppings of camel
3 horses
Daytime nest of hare
Burrow of ground-squirrel
Tolai hare
Mediterranean short-toed lark 1s

U18a

White wagtail 5 < 3, 5; E.
Common kestrel 1 < 20, 30; S-W.
Steppe eagle 3 ad. ≈ 50-150, 700; S.
Mediterranean short-toed lark 80 < 10, 70; S.
4,3 TS
9,6 Wheatears sp.1 < 5, 40; feeding
14,7 Mediterranean short-toed lark 80 < 5, 70; S.
15,9 TS
19,2 Passeriformes sp. 1 < 1, 4; feeding
23 Passeriformes sp. 75 < 5, 70; S.
23,6 Goitered gazelles 3

Photo 22 Goitered gazelles

Evacuation to the city of Janoosen for car repair

33,5 Wheatears sp.1 < 2, 30; feeding
40 Mediterranean short-toed lark 8 < 3, 30; feeding
42 Mediterranean short-toed lark 30 < 3, 40; S-E.
43 Mediterranean short-toed lark 70 < 3, 50; feeding
44 TS
47,1 Wheatears sp.1 < 1, 50; feeding
52 dead foal (no tracks of its eating by vultures or Gyps were found).
56,6 Calandra lark 1 < 3, 2; feeding
56,7 Mediterranean short-toed lark 1 < 1, 2; feeding.
58 Wheatears sp.2 < 2, 30; feeding 7 droppings of horse
61,3 Common kestrel 1 < 50, 80; hunting
63 13 droppings of horse
66 Mediterranean short-toed lark 2 < 3, 10; feeding
67,7 Crested lark 1 < 3, 5; feeding
70 Wheatears sp.3 < 2, 40; feeding
71 Mediterranean short-toed lark 2 < 3, 10; feeding
72,2 Mediterranean short-toed lark 16 < 3, 20; feeding
73,3 Mediterranean short-toed lark 4 < 2, 20; feeding
74,7 Mediterranean short-toed lark 2 < 1, 10; feeding
75,7 Crested lark 2 < 3, 5; feeding
78,5 Mediterranean short-toed lark 44 < 2, 10; E.
81,5 Mediterranean short-toed lark 60 < 3, 70; S-E
83 Mediterranean short-toed lark 30 < 2, 40; feeding
84,1 Mediterranean short-toed lark 30 < 2, 50; N
84,3 Crested lark 4 < 5, 30; feeding
90 Ground squirrel
109 Passeriformes sp.1 < 2, 5; feeding
111 Golden eagle 1 juvenile + 1 adult ≈ 100-300, 400; S. wheatears sp.1 < 2, 10; feeding
112 Golden eagle 1 juvenile + 1 adult ≈ 100, 700; sitting. white wagtail 1 < 1, 5; feeding.
120,5 Tracks of adult and juvenile hares.
128,1 Mediterranean short-toed lark 14 < 1, 20; feeding.
135 Mediterranean short-toed lark 1 < 5, 30; feeding.
137 Mediterranean short-toed lark 15 < 1, 10; N.
138 Calandra lark 12 < 3, 40; N.
142 Mediterranean short-toed lark 19 < 2, 30; N.
148 Mediterranean short-toed lark 30 < 1, 30; N.
151 Wheatears sp.1 < 2, 20; feeding.
153 km Beket-ata

07.10.2024

At Beket-ata Odometer readings were 121 km. Odometer readings are cleared to 0
6 km Small five-toed jerboa (crushed)

Photo 23 Jerboa

Calandra lark 12 < 3, 10; feeding
12,1 Mediterranean short-toed lark 32 < 2, 30; feeding
13 Mediterranean short-toed lark 60 < 2, 40; feeding
15,6 Calandra lark 6 < 5, 30; feeding
18,9 Mediterranean short-toed lark 5 < 2, 20; feeding
22,2 Mediterranean short-toed lark 2 < 3, 10; feeding
29,1 Crested lark 5 < 2, 15; feeding
33 Mediterranean short-toed lark 260 < 2, 50; feeding
34 Mediterranean short-toed lark 3 < 2, 5; feeding
35,8 Kestrel 1 < 1, 20; feeding
41 Crested lark 1 < 4, 40; feeding
43 Black kite 1 ≈ 2-200, 500; hunting
44,1 Mediterranean short-toed lark 27 < 2, 40; feeding Common raven 1 < 15, 150; hunting

45,5 Mediterranean short-toed lark 67 < 2, 40; feeding
46, 2 Cordon (white mosque)
50,6 Mediterranean short-toed lark 44 < 1, 70; feeding
52 Long-legged buzzard 1s 200 Wheatear 1 < 1, 30; feeding
52,3 Mediterranean short-toed lark 60 < 2, 40; feeding
56,6 Mediterranean short-toed lark 1 < 1, 2; feeding
58 Aquila 1 ≈ 150-200, 700; N-E
59,5 Mediterranean short-toed lark 1 < 1, 40; feeding
64 Mediterranean short-toed lark 15 < 2, 70; feeding
64,7 Mediterranean short-toed lark 150 < 2, 80; feeding
74 Calandra lark 1 < 3, 2; feeding
76 Mediterranean short-toed lark 1 < 2, 70; feeding
78,6 Mediterranean short-toed lark 40 < 2, 50; feeding
79 Northern Goshawk with prey catched
85,2 Camp down

08.10.2024

Start at 07:50
1,6 km Tracks polecat, Tracks of corsac, Tracks of hare
2 Mediterranean short-toed lark 6 < 1, 30; feeding
3 Mediterranean short-toed lark 10 < 2, 40; E
4,1 Mediterranean short-toed lark 70 < 2, 50; N-W
6,9 Long-legged buzzard 1 < 50, 500; N Passeriformes sp.15 < 10, 200; N
10,7 Common Buzzard 1 < 50, 800; feeding, falcon 1 2, 400; feeding
11,5 Crested lark 1 1, 10; feeding
13,8 Long-legged buzzard 1 < 5, 150
18,9 Tracks of corsac and ground squirrela
21,2 Tracks of hare, Tracks of cat ⦰ 5 cm
22,8 Tracks of least weasel? Distance between them just 5 cm, Tracks of hare, White wagtail 1 < 5, 10;
24,5 Pin-tailed sandgrouse1 < 3, 20, Tracks of corsac and droppings of horse, crested lark 12 < 3, 20; feeding
32,8 Juvenile ♀ of northern harrier 1 < 10, 70
42,2 Cinereous vulture 1 ≈ 50-100, 500; N, Steppe eagle 1ad < 50, 400; S
45 Common kestrel 1 < 15, 400
46,9 Lark sp 7 < 5, 70
47,1 Long-legged buzzard 1 < 40, 200

U9a 48,7 km

Route on foot 2,1 km, 10:50 – 12:50
Calandra lark 4 < 10, 40
Old droppings of camel and sheeps
Old and fresh droppings of goitered gazelle
Fresh droppings of hare and horses
Crested lark 2 < 10, 40
Diggings of corsac fox
Tracks of argali L = 7 cm
BSM and TB sporadic, old
More than 20 burrows of Ellobius ⦰ 3-4 cm
Pin-tailed sandgrouse2 < 3, 20

50,2 TS
50,9 Mediterranean short-toed lark 10 < 1, 40

U8a 54,8 km

Route on foot 3,4 km, 13:20 – 15:20
Old droppings of camel
Burrow of ground-squirrel 3
Burrow of polecat 1
Old, not old and fresh droppings of goitered gazelle
Calandra lark 37 < 3, 180; S
Calandra lark 22 < 3, 120; s – W
Yellow-winged darter 1
Diggings of fox and fox cub
Northern wheatear 1 < 1, 40
Tracks honey badger
TB – sporadic, BSM – few

57 km – Mediterranean short-toed lark 1 < 1, 5

U7a 63,8 km

Route on foot 1,9 km, 15:40 – 17:20
Passeriformes 4 < 2, 70
Diggings of fox and hare
Burrow of ground-squirrel 2
Old droppings of camel
Burrow of polecat 1
Mediterranean short-toed lark 2 < 3, 30
Hrynocephalus 1
Burrow of corsac ⦰ 15 cm
Fresh and old droppings of goitered gazelle
Fresh droppings of honey badger with speckles of black beetle elytra. ⦰ ≈ 2 мм
Droppings of argali, Fresh tracks

65 3 Goitered gazelles
65,7 Sandgrouses 40 < 3, 80
65,9 Calandra lark 1 < 10, 40
66,2 TS
72 Aquila sp 1 ≈ 50-200, 500
73,5 Calandra lark – 80 < 3, 140

09.10.2024

U6a 75 km
Arrived evening before at 18:05
Sunrise at 07:23

Route on foot 3,5 km, 07:10 – 09:06
TS 5, TB few, BSM few
Old droppings of sheeps
Old tracks droppings of horse
Old diggings of honey badger
Old Burrow of corsac
Old burrow of ground-squirrel – 3
Fresh droppings as hare's, but in heap
Calandra lark 1s70
6 < 10, 70, E.
The difference between local ants and Bashkir ants is that they hide rather than attack
Mediterranean short-toed lark 8 < 5, 70; E
Crested lark 1 < 5, 20; E
Burrow of hare fresh
White wagtail 1s 20
Old droppings of goitered gazelle
Mediterranean short-toed lark 1 < 5,20; E
Calandra lark 3 < 10, 140; E
Old diggings of fox
Mediterranean short-toed lark 1s 30
Fresh diggings of wild boar ?
Mediterranean short-toed lark 6 < 5, 40; N
White wagtail 1s 10

4,5 Yellow-winged darter, Manure of horse
6,2 Steppe eagle (2 years) 1s 150

U5a 7,3 km

Route on foot 3,3 km, 10:10 – 11:55
TS – 4, TB – few, BSM – few
Aquila sp. 1 < 100, 1,5km
Greater spotted eagle 1 < 100, 800
Calandra lark 4 < 5, 70
Calandra lark 8 < 5, 120
Fresh diggings of honey badger
Damaged anthill
Burrow of corsac, not old
Droppings of honey badger
Surface diggings of soil like a wild boar's; tracks of claws are absent
Tolai hare
Burrow of ground-squirrel 5
Old droppings of goitered gazelle

10,8 TS
13,3 Aquila sp. 1 ≈ 50-100; 1,2 km; S

U4a 13,6 km

Route on foot 2,2 km, 12:20 – 13:20
TS 3, TB few, BSM few
Old diggings of fox

18,2 calandra lark 2 < 1, 5.
21,1 fresh tracks of honey badger
22,1 Mediterranean short-toed lark 20 < 1, 40

U3a 22,5 km

Route on foot 2,1 km, 13:30 – 14:50
Rain
Old and fresh droppings of camel
Fresh droppings of honey badger and it's den
Two eagle nests on the graves, 5 metres apart. Eagle's feathers, regurgitates. In the nest, wire ⌀ 1.8 mm and more than a one metre long, rubber and debris. The diameter of the nest is about 2 metres.
TS – 3, TB – many, but old. BSM – few
Burrow of ground-squirrel 2
Diggings of fox
Water well
Old droppings of goitered gazelle

25,2 – Mediterranean short-toed lark 33 < 5, 40; N

Photo 24 Eagle nests

U2a 30,7 km

Route on foot 4 km, 15:15 – 18:00
Old droppings of camel
Burrow of ground-squirrel 6
Crested lark 1 < 10, 80
Lizard 2
Old droppings of sheeps
Calandra lark 40 < 15, 200; N-E
Droppings of and Diggings of corsac fox
Burrow of polecat (!): Burrow width - 5,5 cm, height - 11 cm, soil discharge is 1 m in length, tracks are 2-2,5 cm long, there are 4 such burrows
Mediterranean short-toed lark 1s 10
Old droppings of goitered gazelle
Pare and hare.
Droppings of a wolf or a large dog; 17:22

Morning observations 06:50 – 08:40
No birds
Burrow of European black widow with 3 cocoons. There are 2 dead beetles (migrants) in the burrow

10.10.2024

Start from U2a at 08:40; rain.
3,7 km Wheatear 1 < 1, 40
5,0 juvenile golden eagle 1 < 20, 400
Rain become downpour
32,4 lark 1 < 15, 70.
32,8 Mediterranean short-toed lark 8 < 10, 60. TS
44,6 Mediterranean short-toed lark 9 < 2, 20,
46,7 Steppe eagle 1 ad < 20, 800; S.
47,6 Mediterranean short-toed lark 3 < 1, 25; N. TS

L4a 49,4 km

10:30 – 12:50 Border outpost Tulep
Diggings of corsac fox
Burrow of polecat and its tracks.
At point No. 4 there is a hollow where melt water accumulates in spring (the last rainstorm did not leave even a puddle). Waders and small Passeriformes birds rest here during migration. Polecats are actively hunting them. The long hunting period indicates a long spring migration of birds.
Tracks of cat ⌀ 5 cm (caracal?).
Tracks of waders.
Tracks of fox
Mediterranean short-toed lark 1s30.
Droppings of hares
Water well
Burrow of ground-squirrel 4
Suspected tracks of cheetah. Juvenile 4×5 cm
In the ruined well burrow of corsac? Under the walls of the well, about 30 regurgitates of small raptor (Lesser Kestrel?) and one of Common Buzzard or long-legged buzzard
TS 2
Droppings of hare, lair
Old droppings of argali
Diggings and droppings of honey badger
TB – few, BSM – few
Kestrel 1 < 10, 400.

59,5 5 of goitered gazelles
73,8 TS
75,2 Wheatear 1 < 1, 40.
79,2 Mediterranean short-toed lark 6 < 2, 40; S

U19a 80,4 km

Route on foot 3 km, 15:20 – 17:40
Old droppings of goitered gazelle
40 heaps of dark brown fresh droppings ⌀ 5-6 mm with light longitudinal stripes. Differs from goitered gazelle by regular cylindrical oval shape. Animals moved east on both sides of the takyr
White wagtail 1 < 3, 10.
White wagtail 3 < 1, 20
Fresh droppings of hare
Not so old droppings of goitered gazelle
Burrow of ground-squirrel
Ground on the takyr, thrown out of the burrows by Ellobius, more than 100; outside the takyr have not been observed
TB – few and old. BSM – few and old; didn't find a single fresh burrow
Barn swallow 1 < 10,15.

Sunset 18:43.

11.10.2024

Departure from U19a at 08:20
2,2 km MacQueen's bustard 1 < 90, 400; S-W
13,5 Crested lark 8 < 10, 140; S.
15,4 Sylviidae sp. 1 < 1, 5. TS – 1
24,4 Greater Short-toed Lark 1 < 1, 1. Eurasian Sparrowhawk ♂ < 15, 80. A greater Short-toed Lark hid from a Eurasian Sparrowhawk under the underbody of a moving car. After the car stopped and a man got out, it did not fly out from under it, but went out looking at the sky 2 metres ahead, not paying attention to the man filming it two metres away; and, not seeing a raptor, flew above the ground.
28,7 km Eurasian teal? 4 < 30, 2;S-W.
Lark 80 < 8, 50; S.

U10a 31 km

Route on foot 4,1 km, 10:00 – 11:55
Old and not so old droppings of camel
Diggings of fox
Fresh droppings of hare
Diggings of and tracks honey badger not so old
Daytime nest of hare
Diggings of corsac fox
Damaged anthill, 1 wheatear 2 < 10, 40; S
Fresh droppings of goitered gazelle, L 11 mm; 5 animals
Droppings of a of hare, old, not so old and fresh, closely grouped, within 2m²
Lark 1s 30
Fresh and old droppings of sheep
Burrow of ground-squirrel 1
Droppings polecat
TS 1
Tolai hare 1
Mediterranean short-toed lark 1s 40
TB few and old
BSM few and old; not many fresh
Eurasian chaffinch ♂ < 3, 10
White wagtail 4 < 3, 10

34,8 km TS
35,7 wheatear 1 < 2, 40
36 Diggings of fox

U11a 38,6 km

Route on foot 3,5 km, 12:30 – 14:25
White wagtail 1 < 10, 5
Burrow of h=15cm with droppings of hare inside
Burrow of ground-squirrel 9
Fresh droppings of hare
Old droppings of camel
Old droppings of sheep
Old and fresh diggings of honey badger
Vertical burrow with inclination to sideway ⌀ 11 cm (russet ground squirrel?)
Burrow of polecat ? 5 × 10 cm, ground thrown to ≈ 1 m
Burrow of corsac
TS 2, TB – few and old, BSM – many fresh diggings
Oblongated burrow 7 × 11 cm fresh, ground thrown to 1,5 m – weasel?

U12a 44,5 km

Route on foot 3,5 km, 14:50 – 16:40
TS 7
Old, not old and fresh droppings of 7 goitered gazelle
Diggings of and old droppings of honey badger
Old droppings of camel and young camel
Old droppings of sheep
Diggings of fox
Tolai hare 2
Tortoise burrow rootled by wolf not long ago
Fresh diggings of corsac
Droppings of polecat
Lark 20 < 1, 70
Common kestrel1 < 15, 200

12.10.2024

Morning
Eurasian chaffinch ♂ 1s 30
European robin 1 < 1, 10
10:00 fog is cleared away
Eurasian Eagle-owl caught Gerbillinae
Pallid Harrier ♀ < 10, 400; S
Droppings of polecat
Lark 100 < 10, 140; S
White wagtail 1 < 5, 15; S

1,2 km Passeriformes 1 < 1, 30; S
5,9 calandra lark 30 < 3, 30; W
7,4 TS
7,7 calandra lark 10 < 3, 8; S
8,2 Mediterranean short-toed lark 16 < 1, 30
9,7 TS 2
10,7 Mediterranean short-toed lark 6 < 1, 10; W
12,7 Passeriformes 3 < 10, 140; W
13,3 greenish warbler 1s 50, Black Redstart 1s 50
14,0 Mediterranean short-toed lark 40 < 1, 50; N
15,2 about 100 burrows of Ellobius on takyr
18,3 Mediterranean short-toed lark 40 < 2, 150; W

U13a 20,5 km

Route on foot 3,5 km, 12:50 – 14:30
Eurasian chaffinch ♂ < 3, 15
White wagtail 2 < 3, 20
Passeriformes 1 < 5, 40
Mediterranean short-toed lark 3 < 10, 40
Burrow of ground-squirrel 2
Old and fresh droppings of goitered gazelle
Old droppings of sheep
Diggings of corsac fox
Diggings of fox
Fresh droppings of hare
Barn swallow1 < 5, 3; N-E
Vanessa atalanta 1
TB – few and old, BSM – few fresh

22,8 km Mediterranean short-toed lark 12 < 1, 40; W
24,3 about 300 burrows of Ellobius within takyr
27,9 TS

U15a 31,6 km

Route on foot 2,5 km, 15:04 – 16:30
TS 3
Old diggings of and Droppings of honey badger
Old droppings of goitered gazelle, including lambs
Common Quail 1 < 1, 10
Burrow of ground-squirrel 2
Droppings polecat
Fresh droppings of hare; fresh digging 16:10
Fresh skin of hedgehog with torn out piece
Burrow of marbled polecat ?

33,2 km Mediterranean short-toed lark 80 < 1, 50
35,5 A ruined building with 2 old hedgehog skins and regurgitates in it

U14a 39,8 km

Route on foot 5 km, 17:00 – 18:10
Tolai hare 1 – 4
Old and fresh droppings of goitered gazelle
TS 4
Old droppings of sheep
Old droppings of camel

13.10.2024

Morning 07:20 – 08:50
Eurasian chaffinch ♂s15
Lark 2 < 1, 50; N.
Droppings polecat
Old diggings of fox
MacQueen's bustard 3 < 50, 1,5 km; S-E
Fresh burrow of polecat – 2
Old burrow of marbled polecat?
Pallid Harrier ♂ < 50, 40; S.
Lark sp. 1 < 2, 30.

7,5 km Passeriformes sp.3 < 10, 70; W.
10 Goitered gazelle 2, Passeriformes sp.1 < 3, 10.
12,1 TS 2
15,0 Goitered gazelle 3.
16,2 TS 1
TB few; BSM few and old; some fresh diggings but zero fresh burrows

U16a 16,8 km

10:20 – 12:15
Cinereous Vulture 1 ≈ 100-300, 500; S-W.
Eurasian Griffon 2 ≈ 100-300, 500; S-W.
Fresh tracks of goitered gazelle
Burrow of polecat
Burrow of corsac
Big droppings of rodent L = 1 cm.
Fresh droppings of hare
Steppe eagle 1 < 100, 150; S-W.
Eurasian chaffinch 2 < 1, 10; W.
Wheatears sp.1 < 1, 10.
Golden eagle 1 < 100, 1 km; S.
Passeriformes sp.2 < 12, 30; W.
Passeriformes sp.12 <1, 40; W.

23,7 km Crested lark 1 < 5, 10; W.
25,3 Mediterranean short-toed lark 70 < 3, 150.
Calandra lark – 7 < 3, 40.
26,6 Merlin *Falco columbarius* ♀ < 5, 40; hunting small birds.

Photo 25 Merlin falco

Eurasian chaffinch 1s5
28,6 – Mediterranean short-toed lark 8 < 3, 20.

U17a 29,4 km

Route on foot 2,9 km, 13:10 – 14:50
Old droppings of sheeps.
TS – 2; TB – a lot of old; BSM – Fresh sporadic.
Old and fresh diggings of corsac;
Fresh droppings of honey badger.
Fresh contour feather of Short-toed snake-eagle

39,7 km Mediterranean short-toed lark 13 < 3, 50; S.
40,1 calandra lark 7 < 5, 30; N.
43,1 Mediterranean short-toed lark 70 < 5, 40; W.
48,5 MacQueen's bustard 1 < 15, 500; N.
50,7 Ellobius within takyr.
54,1 lizard
55,3 >500 discharged soil spots within takyr made by Ellobius

Photo 26 Discharged soil spots within takyr made by Ellobius

60 Mediterranean short-toed lark 20 < 1, 40.
60,7 Mediterranean short-toed lark 4 < 1, 30.
62,2 Mediterranean short-toed lark 200 < 5, 50; N.
70,4 lark sp. 2 < 5, 2100; N.
72,3 Mediterranean short-toed lark 40 < 1, 70; N.
73,5 Mediterranean short-toed lark 70 < 2, 80; W.
80,5 tracks of goitered gazelle, crested lark 8 < 10, 40.
82 tracks of hare and of horse
85,8 Mediterranean short-toed lark 150 < 5, 70; S.
92 Mediterranean short-toed lark 50 < 2, 30.
93,4 Mediterranean short-toed lark 280 < 3, 30.
94,5 Mediterranean short-toed lark 200 < 5, 70. Lesser Kestrel ♂ < 10, 350; E.
97,9 calandra lark 31 < 3, 20.
99,1 Mediterranean short-toed lark 220 < 2, 30; E.
101,2 calandra lark 1 < 3, 10; W.
103,1 calandra lark 6 < 3, 40; S-E.
103,8 Mediterranean short-toed lark 1500 < 2, 50. robin 1s30
107,7 Passeriformes sp.1s40.
113 wheatears sp.1 < 1, 20. Steppe eagle 1 <200, 800.
122,7 Passeriformes sp.1 < 3, 10. Cordon (white mosque)
140,4 kestrel sp. 1 < 50, 400.
153,7 Camp down; 19:00.

14.10.2024

Hoarfrost at 07:30 All Passeriformes birds flock to puddles.

Photo 27 Hoarfrost. All Passeriformes birds flock to puddles.

White wagtail 1s10
Common kestrel1 < 20, 200; E.
Passeriformes sp.30 < 20, 80; E.
1,2 km Mediterranean short-toed lark 49 < 1, 40; N.
4,5 Common Buzzard 1 < 10, 200. chaffinch 1s10
6,1 Eurasian Skylark 100 < 5, 140. Mediterranean short-toed lark 40 < 3, 80.
8 Mediterranean short-toed lark 43 < 2, 40.
8,8 crested lark 8 < 5, 30; N.
9,2 calandra lark 500 < 10, 70. Mediterranean short-toed lark 150 < 3, 70. Common Buzzard sp. 1 < 20, 1,2 km; E. ≈ 100 Termite mounds, common raven 1 < 15, 200.
Fresh track of fox
11,2 Mediterranean short-toed lark 9 < 1, 10.
12,4 calandra lark 38 < 3, 10.
13 harrier ♀ < 3, 200. Mediterranean short-toed lark 30 < 1, 50.
15,7 calandra lark 40 < 3, 40.
16,6 Mediterranean short-toed lark 15 < 2, 50.
Road to Beket-ata

15.10.2024

135,6 Zhanaozen; 12:50
24,5 km Crested lark 4 < 12, 10.

TALAP

16.10.2024

Z16a 27 km
Arrival evening before at 17:50
Morning 3º Sunrise at 07:55

Route on foot 3,4 km, 07:55 – 10:00
Passeriformes sp.– 1 < 10, 140.
Great Grey Shrike 1 < 2, 150.
Diggings of fox
Greenish warbler 1 < 1, 5.
Camel 9
Passeriformes sp.1 < 20, 200.
Isabelline wheatear 1 < 2, 80.
Crested lark 3 < 5, 20.
Tracks of hare Lark sp. 1 < 5, 10.
TB none; BSM few.

5,6 km crested lark 3 < 10, 15; E.
7,6 km Mediterranean short-toed lark 2 < 2, 30; E.
9,1 calandra lark 1 < 5, 40; E.
9,8 Mediterranean short-toed lark 2 < 2, 50; E.

Z15a 11,1 km

Route on foot 3,5 km, 11:10 – 13:30
Fresh and old droppings of camel
About 200 sheep
crested lark 1 < 1, 30; E.
calandra lark 12 < 10, 20; N.
Prynocephalus 3
TB sporadic; BSM not many, most of them are fresh.
Lizard 1

4,8 km calandra lark 3 < 3, 10.
5,4 crested lark 200 < 2, 70. Calandra lark 20 < 3, 50.
Lark sp. 40 < 2, 40.
6,0 mixed flock of larks 230 < 2, 50; N.
Calandra lark feed on invertebrates
8,0 36 droppings of horse.

Z14a 15 km

Route on foot 2,5 km, 14:00 – 16-30
Old diggings of honey badger
40 Camels
45 droppings of horse
TB – sporadic; BSM – not many, fresh 80%
Crested lark 7 < 10, 30; N.
Hrynocephalus 1
Calandra lark 41 < 5, 50; E
Burrow of marmot ⌀ 15 cm
Burrow of fox fresh (about 1 km shepherds camp)
Fresh droppings of hare
Old droppings of sheep
Colony of Libyan jird 7 animals.
Droppings L = 1 cm
Willow green colour fresh droppings.
Termite mound 2
Mixed flock of Lesser Short-toed Larks and Calandra Larks 550 < 2, 70; E. They do not fly in a broad front, but in a strip of 10 - 20 metres width.

16,8 km Crested lark 5 < 3, 20; N
17,6 Crested lark 40 < 3, 20
21 Mediterranean short-toed lark 50 < 1, 40; S
27,2 Mediterranean short-toed lark 110 < 1, 40; SE

17.10.2024

Z13a

Route on foot 3 km, 08:00 – 09:30
310 droppings of horse
80 Farmed Camels
Mediterranean short-toed lark 130 < 1, 120; S.
Crested lark 21 < 10, 70; W.
Calandra lark 40 < 10, 80; S.
Crested lark 1 < 15, 80; W.
Calandra lark 200 < 5, 120.
Calandra lark 4 ≈ 20-30, 80; W.
Crested lark 1 ≈ 20-30, 40; W.
Black Lark 2 < 10, 140.
TB – sporadical, BSM – sporadical.

Photo 28 Farmed camels

1,3 km – Mediterranean short-toed lark 130 < 2, 40; E.
On a further 1.2 km stretch, there are 25 Termite mounds; therefore, they are no longer counted.
3,1 calandra lark 1 < 3, 50.

Mediterranean short-toed lark 11 < 1, 40.
3,8 Mediterranean short-toed lark 500 < 1, 90.
3,9 Mediterranean short-toed lark 300 < 1, 70.
Calandra lark 6 < 5, 10.
Common raven 1 < 20, 70.
4,9 Mediterranean short-toed lark 80 < 2, 70.
7,4 Crested lark 1 < 3, 5.
8,6 Lark sp. 18 < 3, 40.
9,0 Small falcon (not kestrel) 1 < 10, 150.

Z12a 10 km

Route on foot 2,3 km, 11:20 – 12:50
241 sheep
70 droppings of horse
Old droppings of camel
50 Termite mounds
Calandra lark 28 < 10; 140; N-E
Common raven 1 < 20, 200
Tolai hare 1
Calandra lark 11 < 10, 30; N
TB – sporadic; BSM – many, 50% Fresh
Burrow of ground-squirrel 4
Old diggings of honey badger
Calandra lark 13 < 10, 50; N
Mediterranean short-toed lark 2 < 2, 60
Greater Short-toed Lark 12 < 2, 40; eating seeds of grass

11,9 km Lark sp 1 < 10, 30; N
12,3 20 droppings of horse
12,7 Mediterranean short-toed lark 100 < 1, 80; W
Camel 11
14,1 Mediterranean short-toed lark 1 < 3, 20; E

Z11a 15,0 km

Route on foot 2,3 km, 13:20 – 15:30
Mediterranean short-toed lark 60 < 1, 50
26 Camels
34 horses
Eremophila alpestris brandti 1 < 10, 40
On top of one of the hills is part of a tortoise shell. On both hills are eagle regurgitates. On the hill is the old skin of a Brandt hedgehog. Since there is no eagle nest on any of the three peaks, these are the regurgitates of migrating eagles.
Fresh diggings of fox
Burrow of ground-squirrel 2
TB – sporadic; BSM – not many, 80% of them are fresh

Photo 29 Old skin of a Brandt hedgehog.

18,2 km 24 of camel
19,3 Mediterranean short-toed lark 24 < 1, 10; E
21,3 Mediterranean short-toed lark 50 < 4, 120
21,9 Calandra lark 5 < 5, 10

18.10.2024

Z10a 23,5 km

Route on foot 2,3 km, 08:00 – 09:10
Fresh droppings of sheeps
Not old diggings of fox
Old and fresh droppings of camel
TB – sporadic, BSM – many, 90% fresh
10:05 calandra lark 20 ≈ 20-30, 80; S

3,3 km 7 droppings of horse
3,8 Lark sp 15 ≈ 15-20, 120; W
5 30 droppings of horse

Z9a 5,7 km

Route on foot 2,6 km, 10:30 – 11:40
Rain and thunderstorm
20 droppings of horse
Fresh droppings of sheeps
Old and fresh droppings of camel
Diggings of corsac fox
Calandra lark 3 < 1, 70; S
Calandra lark 1 ≈ 20-30, 140; S-E
Termite mound 1
Athene sp. 1s 200
TB – few old, BSM – not many, some are fresh
Calandra lark 1 < 1, 1

9,5 km Calandra lark 3 < 1, 70
12,2 Lark sp 30 < 10, 180

Z8a 14 km

Route on foot 3,6 km, 12:20 – 15:15
Rain
TB – sporadic, BSM – not many
Kestrel sp 1 < 20, 150
72 horses
Isabelline wheatear 1 < 1, 20
Not old diggings of honey badger
Termite mound 13
Diggings of corsac fox
Burrow of ground-squirrel 3
Calandra lark flying and chanting 1 ≈ 20, 70; S
Burrow of polecat

Z7a 19 km

15:40
Camel 2
Old and fresh Manure of horse. 6 droppings of horse
Termite mound 1

19.10.2024

Morning. Was raining all night.

Route on foot 3 km, 07:50 – 09:04
4 horses
Fresh burrow of polecat 1
Termite mound 1
Not old skin of hedgehog
Small lark 1 < 1, 40; E.
Red-footed falcon ♂ < 15, 50% S.
Camel 11

1,5 km Mediterranean short-toed lark 9 < 1, 70.

Z6a 2,5 km

Route on foot 2,5 km, 10:50 – 11:55
Burrow of ground-squirrel 1
Termite mound 2
Dead lizard
TB sporadic, one fresh.
BSM not many, 50% fresh.

Photo 30 Dead lizard

3,0 km Mediterranean short-toed lark 20 < 1, 40; S-E.

Z5a 5,3 km

Route on foot 3,3 km, 12:20 – 14:00
Spent casing of 12 calibre
Camel 17
Horse 4
Termite mound 1
Fresh digging of corsac
Lark sp 6 < 3, 150; S
TB – sporadic, 1 was inhabited;
BSM – not many, few inhabited

7,6 km Isabelline wheatear 1 < 1, 15

L5a 13 km

Route on foot 2,3 km, 14:20 – 15:40
Diggings of corsac fox
Old droppings of camel
Termite mound 2
Burrow of ground squirrel 3
TB not many, 1 fresh; BSM few, all are old
Small lark 10 < 1, 30

16,2 km Isabelline wheatear 1 < 1, 30
Crested lark 1 < 1, 5
17,7 Mediterranean short-toed lark 3 < 1, 8
18,3 Camel 6
19,5 Mediterranean short-toed lark 1 < 1, 7
19,9 Mediterranean short-toed lark 20 < 1, 70
20,5 Camel 5
22,5 Mediterranean short-toed lark 3 < 1, 15
22,7 Eurasian Skylark 1 < 1, 30.

20.10.2024

Z4a 23,2 km

Route on foot 3,3 km, 07:50 – 09:15
Was raining all night
Not old burrow of polecat
Burrow of ground-squirrel 4
Daytime nest of hare
Termite mound 1
TB – not many, old.
BSM – not many, fresh few
Wheatear sp 2 < 2, 120

2,2 km Calandra lark 200 < 5, 50
3,1 Wheatear sp 1 < 1, 40
Camera trap registered small five-toed jerboa

Z3a 4,5 km

Route on foot 3,3 km, 11:00 – 12:15
Camel 1
Crested lark 2 < 20, 150
Horses 6
Burrow of ground-squirrel 2
Calandra lark 9 < 5, 40
Burrow of ⌀ 25 cm
TB – few; BSM – few

7,5 km Hare

Z2a 8,5 km

Route on foot 2,5 km, 12:30 – 14:20
Kestrel sp 1 < 20, 800
Horse 8
Old camel droppings
Termite mound 2
Burrow of ground-squirrel 1
Burrow of fox old
Burrow of corsac
TB – few and old; BSM – many, 90 % fresh

9,3 km Crested lark 2 < 1, 10
10,4 130 droppings of horse, 6 Camels

Z1a 12,2 km

Route on foot 3,7 km, 14:40 – 16:10
Greater Short-toed Lark 2 < 3, 30
Calandra lark 2 < 10, 40
Camel 28
Horse 40
Fresh droppings of sheep
Started to rain
Burrow of ground-squirrel 2
TS – 1; TB – sporadic; BSM – not many, some are fresh

15 km Calandra lark 2 < 3, 15
19,5 Passeriformes sp.1 < 1, 20
Overnight stop 20,6 km; 16:40

21.10.2024

Sunrise at 07:50
1,3 km Crested lark 3 < 5, 10
3,6 Horse 13
5,0 Camel 5
5,2 Calandra lark 69 < 10, 20
Crested lark 12 < 5,10
6,3 Crested lark 3 < 3, 5
6,8 Mediterranean short-toed lark 60 < 2, 80
8,8 Mediterranean short-toed lark 100 < 1, 150
10,2 Calandra lark 2 < 5, 10
Horse 17
Camel 4
10,9 Crested lark 5 < 2, 15
12,4 Camel 15
13,8 Desert wheatear 1 < 1, 30
17,4 TALAP
63,2 Shepherds camp, Horse 8

L6a 64,5 km

Route on foot 2,6 km, 12:10 – 14:45
Crested lark 13 < 1, 5
Shepherds camp 3
Eurasian chaffinch 2 < 10, 150
Lizard 6
Termite mound 29
Camel 7
Horse 22
Old diggings of fox
Goats and sheeps > 40
Mediterranean short-toed lark 11s 30
Calandra lark 1s 40
Pallas's Sandgrouse 5 ≈ 20, 150
TB – sporadic; BSM – few, old

91 km Village Munaishy
103 Calandra lark 2 < 1, 5
103,8 Horse 18
104,9 Yellowhammer 3 < 3, 20
Calandra lark 3 < 5, 20
106,5 Calandra lark 2 < 3, 20
107,6 Observation finished. Termite mounds are abundant. In 7 km – 75 termite mounds.

ENBEK

22.10.2024

M1a

Route on foot 2,4 km, 08:00 – 09:20
Horse 3
Camel 3
Diggings of corsac fox
Termite mound 9
TB sporadic; BSM many, 90% fresh
Calandra lark 1 ≈ 20, 80; W
Calandra lark 4 ≈ 20, 70; 3 flying with chanting. 3 3 Calandra Lark sitting 70m from them flyover line came up on the wing and joined them.
TS 1
Calandra lark 36 ≈ 20, 80; W

18 km Calandra lark 12 < 5, 20
19,3 Horse 9, Camel 3
21,3 Sheep + goats 60
24,8 Calandra lark 50 < 10, 40

M2a 26,2 km

Route on foot 2,3 km, 12:20 – 14:20
Old and fresh manure of horse
Calandra lark 5 < 10, 50
Fresh droppings of sheeps
Termite mound 4
Fresh droppings of camel
Prynocephalus 2
Diggings of corsac fox
Common raven 1 ≈ 20-40, 1,2km; W
Libyan jird 3
TB – sporadic; BSM – not many, 80 % fresh

27,3 km Mediterranean short-toed lark 10 < 1, 40
32,5 TS 1
33,2 Calandra lark 3 < 10, 15

M3a – L7a 36,5 km

Route on foot 3,4 km, 14:45 – 16:20
Camel 19
Diggings of corsac fox
Ants carry beetle elytra out of the anthill
Yellow-winged darter (*Sympetrum flaveolum*) 1
Beside tortoises' burrows fresh droppings of Gerbillinae
Libyan jird 4; burrow ⌀ 5-6 cm
Termite mound 1

Photo 31 Libyan jird

40,5 km Mediterranean short-toed lark 7 < 1, 30
Horse 39
41 Calandra lark 43 < 3, 40
42,9 Mediterranean short-toed lark 6 < 1, 70
Horse 22
Brambling 1 < 20, 1 (on the motor hood)
45 Mediterranean short-toed lark 16 < 1, 40

23.10.2024

M4a 48 km
Arrival 17:05 (evening before)

Route on foot 5 km, 07:40 – 09:40
Horse 24
Diggings of hare
Growing bright at 08:05
Fresh diggings of corsac
Diggings of fox
Fresh droppings of pika
Old droppings of camel
Calandra lark 1s 40
Termite mound 1
Black-bellied sandgrouse 30 < 20, 800
Calandra lark 8 < 10, 200; N
Calandra lark 13 < 15, 70; S
Calandra lark 1 < 15, 60; E
Old diggings of honey badger
Calandra lark 1 < 10, 40; S
Calandra lark 1 ≈ 20, 50; S
Passeriformes sp 1 ≈ 30-50, 40; S
Mediterranean short-toed lark 100 < 2, 80
TB – many, old; BSM – not many, some are fresh

Photo 32 Black-bellied sandgrouse

2 km Mediterranean short-toed lark 40 < 5, 50; W
2,5 Camel 11
2,9 Mediterranean short-toed lark 60 < 5, 120; W
5,3 Camel 18, shepherds camp
7,7 Crested lark 6 < 10, 30; S-E
8,6 Crested lark 1 < 3, 10; N-E
9,4 Calandra lark 3 < 3, 10
10,8 Mediterranean short-toed lark 1< 1, 30
11,4 Mediterranean short-toed lark 5 < 10, 70; S-E
12 Lark sp 100 < 10, 70
15 Lark sp 10 < 5, 40
16,1 Mediterranean short-toed lark 21 < 5, 20
16,4 Tracks of hare
Camel 39
16,7 Tracks of MacQueen's bustard, of corsac and hare
17,1 Mediterranean short-toed lark 2 < 3, 10

M5a 18,6 km

Route on foot 4 km, 11:10 – 12:30
Fresh droppings of sheeps and droppings of horse, shepherds camp
Horse 10
Camel 12
Daytime nest of hare
Old Diggings of corsac fox
Lark sp 70 < 10, 140; S-E
Termite mound 1
Mediterranean short-toed lark 2 < 1, 15; S-W
TB – many, old; BSM – not many, old

23,5 km Lark sp 2 < 10, 80

M6a 25 km

Route on foot 3,7 km, 13:00 – 15:00
Harrier sp 1 < 10, 800
Fresh Manure of horse
Old and fresh camel droppings
Long-legged buzzard 1 ≈ 50-70, 500
Calandra lark 1 < 10, 40
Gerbil living in the burrows of tortoises
Mediterranean short-toed lark 26 < 10, 40
Diggings of hare
Fresh diggings of corsac
Black-bellied Sandgrouse 1 ≈ 20-30, 200; N
Lark sp 1 < 15, 120; N
Yellow-winged darter
Diggings of fox
TB few, old; BSM not many, some are fresh

27,5 km Crested lark 2 < 1, 10; W
29,7 Tracks of hare and Gerbillinae
31 Mediterranean short-toed lark 2 < 5, 30
31,5 Mediterranean short-toed lark 10 < 3, 40
32,7 Tracks of fox
37 Horse 4

24.10.2024

M7a 41 km

Route on foot 3,3 km, 07:40 – 08:40
Fresh horse droppings
Mediterranean short-toed lark 1 < 1, 40
TS – 2
Diggings of corsac fox and it's fresh droppings
Daytime nest of hare
Horse 32
Camel 9
There are no mole voles within takyrs of small circle.
Diggings of fox
Fresh burrow of honey badger
Calandra lark 3 < 10, 40
Droppings polecat
Calandra lark 70 < 15, 120; W
Lark sp 10 < 10, 120; W
Lark sp 15 < 10, 60; W
Mediterranean short-toed lark 60 < 10, 70; W
Gerbillinae
Crested lark 2 < 10, 40; W
Lark sp 100 < 3, 80
TB – not many, old; BSM – not many, fresh sporadic

2,2 km Calandra lark 2 < 10, 30; S
3,8 Tracks of fox and polecat
4,6 Tracks of hare
5,1 Mediterranean short-toed lark 10 < 1, 30; S
5,7 Lark sp 200 < 5, 70
Horse 17
6,5 Lark sp 20 < 10, 140; W
Camel 17
6,6 Calandra lark 7 < 10, 40
Butterfly

M8a 9,5 km

Route on foot 2,9 km, 10:45 – 12:30
Black-bellied Sandgrouse 10 < 10,120
Lark sp 6 < 5, 40
Camel 9
Calandra lark 3 < 20, 140
Tracks of fox
Calandra lark 1 < 3, 80
Horse 12
Lark's nest
Fresh droppings of corsac
Calandra lark 70 < 5, 50; W
Termite mound 1
Fresh droppings of polecat or marbled polecat
TB – sporadic; BSM – few, some are fresh
Droppings of MacQueen's bustard fresh, 30 droppings on 1m²
Old tracks and droppings of sheeps
Mediterranean short-toed lark 12 < 1, 40
Droppings of ground-squirrel
TS 1

11,2 km Lark sp 100 <5, 40
11,9 Lark sp 5 < 5, 40
12,3 Calandra lark 2 < 3, 5
16 Black Redstart 1 < 1, 20; SW
17,5 Lark sp 5 < 2, 30
19,3 Lark sp 3 < 5, 40
23,5 Tracks of fox and hare
Camel 11
24,6 Mediterranean short-toed lark 70 < 1, 50; S-W
24,9 Tracks of fox, polecat and suspected juvenile cheetah? (5×5 cm) with claws.
26,3 Camel 24
Horse 57
30,4 Camel 7

L1a 49,2 km

Route on foot 3,2 km, 15:10 – 16:40
Mediterranean short-toed lark 1 < 3, 40
Horse 4
Termite mound 1
Eagle's regurgitate
Fresh droppings of hare
Pallid Harrier juvenile 1 < 10, 400
Passeriformes sp.1 < 1, 150
TB and BSM – many, 50 % inhabited
Eagle's regurgitates on two elevations + droppings fox or of corsac

57,6 km Lark sp. 1 < 5, 20
62,8 Black Redstart 3s 20
69,3 Mediterranean short-toed lark 1 < 1, 1

L1 alt 74,8 km

Arrival 17:40
TS – 1
Caspian Gull 1 < 10, 800

25.10.2024

Route on foot 1,4 km, 07:40 – 10:30
Common Blackbird 1s 120
Fog closes
Common Starling 15 ≈ 20-30, 120
Passeriformes sp.40 ≈ 20-40, 150; E
Ducks sp 30 ≈ 20-40, 200; S; across gulf
Black-bellied Sandgrouse 15 < 10, 300; W
Black-bellied Sandgrouse 10 < 20, 150; going to water-plane to Caspian
Steppe Horned Lark (*Eremophila alpestris brandti*) 1 < 10, 40
Black-bellied Sandgrouse 15 ≈ 20-40, 350; flying to Caspian
Mallard ♂♀ < m30, 800; E
Horse 11
Camel 6
Mallard 7s 1 km
Calandra lark 2 ≈ 20, 70; E
European robin 1 < 10, 5
Black Redstart 2 < 10, 70
Passeriformes sp 12 < 15, 80; E
Calandra lark 1 < 20, 60; E
Common Gull 3s 900
Flying east to the coast then south through the Kazakh bay
Snakeskin; width 2,5 cm, length about 90 cm.
Allactaga (five-toed jerboas)
Passeriformes sp 28 < 20, 80; N

Photo 33 Steppe Horned Lark

2,1 km rain
2,5 Common Kestrel 1s 200
3,8 Buntings sp. 30 < 10, 40
8,3 Crested lark 1 < 10, 40

11,3 Crested lark 2 < 3, 30
Black Redstart 1 < 3, 50
13,4 Crested lark 2 < 2, 70
14, 2 Mediterranean short-toed lark 30 < 3, 40; N
15,5 Camel 6
17,0 Mediterranean short-toed lark 7 < 1, 40
Camel 9
21,0 Lark sp. 100 < 10, 70
24 Mediterranean short-toed lark 20 < 1, 30
25 Mediterranean short-toed lark 50 < 10, 120
25,4 Mediterranean short-toed lark 7 < 1, 15
Horse 7
26 MacQueen's bustard 1 < 10, 40
Horse 6
27,8 Calandra lark 50 < 10, 60

M9a 29,5 km

Route on foot 2,2 km, 14:00 – 16:00
Rain
Camel 10
Horse 13
Tracks of MacQueen's bustard and polecat
Diggings of corsac fox
Diggings of fox
Tracks of sheeps
Burrow of ground-squirrel 2
Crested lark 5 < 10, 70; N
Tracks of hare
Lark sp. 60 < 2, 150
Mediterranean short-toed lark 70 < 2, 200; S-W
Song Thrush 1 < 3, 80

32,7 km Calandra lark 13 < 5, 50
33,9 Calandra lark 30 < 3, 30
TB – sporadic; BSM - few

26.10.2024

M10a 40,5 km
Arrival 16:30 (day before)

Rainfall all day long. Observations of daily dynamics of birds were made from one point of M10 from the car
08:40 – Passeriformes sp. 40 ≈ 20, 200; N
09:50 – European robin 1s 10
11:40 – Black Redstart 2s 15; was observed in this place until 12:20
12:25 – Mediterranean short-toed lark 4 < 1, 40; N-E
12:30 – Black-bellied Sandgrouse 10 ≈ 20-40, 700; E
12:40 – Calandra lark 1 < 20, 50; N
12:50 – Rain stopped
13:10 – Black Redstart 1 < 5, 10
13:20 – Black-bellied Sandgrouse 10 < 20, 700; N
13:25 – Black Redstart ♂♀S 15, were beside the car until 15:44
16:04 – Song Thrush 5 < 10, 40; N
16:20 – Black Redstart 3s 20
16:50 – Lark sp. 20 < 2, 180
17:30 – Rock dove 25 < 20, 200

27.10.2024

08:40 dense fog
1,5 km Calandra lark 5 < 1, 40
1,6 Mediterranean short-toed lark 17 < 1, 20
2,4 Mediterranean short-toed lark 9 < 2, 30
2,9 Mediterranean short-toed lark 30 < 2, 30
3,2 Camel 8
3,6 Mediterranean short-toed lark 3 < 1, 50
4,4 Calandra lark 1 < 3, 20
Horse 5
4,9 Mediterranean short-toed lark 30 < 1, 20
5,4 Mediterranean short-toed lark 15 < 1, 40
6,5 Mediterranean short-toed lark 13 < 1, 30
7,5 Mediterranean short-toed lark 11 < 2, 10

M11a 9,3 km

Route on foot 1 km, 09:20 – 11:05
Shepherds camp
MacQueen bustard droppings.
Mediterranean short-toed lark 7 < 10, 40; W
Fresh droppings of sheeps
Horse 109
Old droppings of camel
Calandra lark 2 < 10, 40; S. courting
Calandra lark 5 < 10, 70; W
Sheeps 300
Calandra lark 5 < 20, 140
Calandra lark 30 ≈ 20-40, 150
Camel 50
Black Redstart 1 < 1, 10
Calandra lark 2 < 10, 70; W
Mediterranean short-toed lark 4 < 2, 60; W
Black-bellied Sandgrouse 13 ≈ 30-40, 200
Lark sp. 100 < 2, 80; S-W
No burrows found

Photo 34 MacQueen's bustard droppings

11,1 km Lark sp. 50 < 5, 80

Calandra lark 1 < 10, 80
12,4 Crested lark 8 < 2, 40
13,0 Lark sp. 15 < 2, 50
14,0 Calandra lark 12 < 5, 20
15,4 Eurasian chaffinch 2 < 1, 10
European robin 1 < 1, 40
16,3 Mediterranean short-toed lark 20 < 2, 40
17,7 Lark sp. 5 < 3, 30

M12a 21,4 km

Route on foot 2,4 km, 12:10 – 13:15
Lark sp. 8 < 10, 70
Calandra lark 45 < 5, 150
Mediterranean short-toed lark 42 < 5, 80
Lark sp. 14 < 5, 200
Termite mound 3
Diggings of fox
Fresh droppings of horse
Old droppings of camel
Black-bellied Sandgrouse 12 ≈ 20-40, 900
Eurasian Skylark 1 < 1, 10
Lark sp. 3 < 3, 200
Calandra lark 2 < 10, 70
Fresh Skin of hedgehog
TB and BSM - sporadic

25,6 km Mediterranean short-toed lark 3 < 1, 10
Crested lark 2 < 5, 30
26,2 Calandra lark 1 < 5, 20
27 Mediterranean short-toed lark 5 < 2, 10
Calandra lark 5 < 5, 10
28 Horse 10
Calandra lark 1 < 5, 10

M13a 30,2 km

Route on foot 2 km, 13:45 – 15:30
Burrow of ground-squirrel
Daytime nest of hare
Lark sp. 30 < 10, 80
Diggings of fox
Fresh droppings of horse
Calandra lark 13 < 20, 70; N-W
Fresh and old droppings of camel
Fresh droppings of hare
Calandra lark 150 < 10, 250
TB – not many; BSM – few
Black Redstart 1 < 2, 70

34,5 Mediterranean short-toed lark 5 < 1, 30
38,9 Long-legged buzzard ad + juvenile ≈ 100-200, 800; E
39,7 Calandra lark 1 < 10, 30
40 Calandra lark 60 ≈ 20-40, 700; E
41,5 Mediterranean short-toed lark 1 < 1, 1

28.10.2024

M14a 42,1 km
Arrival 16:10 (day before)

Route on foot 2,5 km, 08:05 – 09:50
Horse 20
Camel 50
Vanessa atalanta 2
Calandra lark 3 < 10, 140.
Daytime nest of hare
Termite mound 3
Calandra lark 45 < 10, 140; E.
Lark sp. 9 < 10, 80; E.
Black Redstart 2s70.
Common Blackbird 1 < 10, 180; E.
Passeriformes sp.40 < 10, 200; E.
Song Thrush 1 < 10, 40.
Eurasian chaffinch 2 < 10, 40.
European robin 1s10
Burrow of ground-squirrel 1
Lark sp. 30 < 20, 150; N.
Eurasian chaffinch 3 < 10, 80; S.
Mediterranean short-toed lark 50 < 10, 40; E.
Crested lark 8 < 10, 70; N-E.
Diggings of fox
Corsac came in at 01-10 on 28.10.2024 and was recorded by the camera trap
Crested lark 5 < 10, 70; N.
TB sporadic; BSM few.

2,8 km Common Blackbird 2 < 5; 400.
3,1 Mediterranean short-toed lark 1 < 3, 20.
Lark sp. 6 < 30, 70; circling.

M15a 5,1 km

Route on foot 3,5 km, 10:30 – 13:05
Lark 200 < 3, 40; W.
Camel 15
Calandra lark 50s50.
Calandra lark 50 < 3, 120; W.
Black Redstart 2s60
Isabelline wheatear 1s70
Group of honey badger's burrows ≈ 150 m². Fresh tracks beside every burrow (made in the morning?). No tracks with long claws. Size of tracks 5 × 7 cm.
Eurasian chaffinch 2 < 2, 50.
European robin 1 < 20, 30.
Mediterranean short-toed lark 15 < 2, 40.
Calandra lark 20 < 1, 70; N-W.
Lark sp. 50 < 2, 140; N-W.

Odometer set to 0 km

Photo 35 Black Redstart

L8a 23,5 km

Route on foot 5,5 km, 14:00 – 16:20
Rock dove 6 < 10, 400
Camel 6
Old droppings of sheeps and goats
Calandra lark 150 < 20, 150
Diggings of corsac fox
Tracks of fox
Fresh skin of hedgehog on hill. Droppings of big bird – common raven or long-legged buzzard
Termite mound 2
Daytime nest of hare
Crested lark 5 < 15, 60; N-W
Eastern Black-eared Wheatear 1s 50
Passeriformes sp.1 < 2, 200
TB – few; BSM – few.

M15a-L8a (see M16a, 17a at the end)

1,4 km Mediterranean short-toed lark 130 < 1, 40; N-E
3,4 Mediterranean short-toed lark 15 < 1, 50
4 Mediterranean short-toed lark 18 < 2, 10
6,6 Mediterranean short-toed lark 120 < 2, 70
Calandra lark 2 < 2, 70
7,6 Camel 14
8,1 on the puddle of water, 70 m from observer:
Eurasian chaffinch 2
Song Thrush 1
Greater Short-toed Lark 2
Lesser Short-toed Lark 2
8,2 Brambling 2 < 5, 15
Eurasian chaffinch 13 < 5, 40
8,6 Black Redstart 2 < 2, 30
10 Lark sp. 90 < 3, 70
11,5 Lark sp. 17 < 10, 80
12,4 Sheep and goats 400
13,5 Calandra lark 290 < 5, 150
16,5 Camel 17
17,8 Horse 5
20,8 Calandra lark 3 < 10, 70
21,8 Camel 18

Ammonia Pipeline

29.10.2024

Arrival at the start of the ammonium pipeline at 17:30 (day before); 43,9 km
44 km European herring gull 4 ≈ 20-50, 200; W.
Tracks of corsac
Wildlife camera trap registered Blanford's jerboa (Jaculus blanfordi turcmenicus) and corsac fox
Calandra lark 70 < 10, 40
Passeriformes sp.7 < 10, 70
Rook 13 ≈ 40-80, 400
Western jackdaw 15 ≈ 40-80, 400
Rock dove20 ≈ 20-40, 500
Kestrel 1 ≈ 20-30, 150
0,67 Lark sp 60 < 20, 150
1 Horse 25
Fresh droppings of sheep
Calandra lark 3 < 20, 140; S
BSM – fresh
2 Calandra lark
Passeriformes sp.15 < 15, 150; N
Calandra lark 40 < 15, 200
Pine Bunting 1s juvenile 20
3 Black Redstart ♂♀S 40
European herring gull 1 ≈ 30-60, 200
3,2 Brambling 6 < 3, 30
3,4 Caspian Gull 1 ≈ 20-40, 200
4 Kestrel ♂ < 20, 150
Horse 9
Black Redstart 1 < 1, 70
4,1 Common Blackbird 1 < 2, 70
5 Song Thrush 3 < 3, 70
Fresh droppings of droppings of horse and old droppings of camel.
Crested lark 4 < 15, 80
BSM 1
Black Redstart 1 < 1, 60
Calandra lark 2 < 10, 50
European herring gull 1 ≈ 30-60, 360
5,1 Calandra lark 12 < 3, 40
6 Lark sp. 60 < 10, 150; S
Calandra lark 200 < 5, 80
Mediterranean short-toed lark 2 < 10, 150; S
Termite mound 1; took some termites
Calandra lark 80 < 10, 120; S
Calandra lark 20 < 10, 80; N
6,7 Horse 9
7 Calandra lark 70 < 5, 140; E
Calandra lark 15 < 5, 200
Horse 13
Termite mound 2
Calandra lark 10 < 15, 70; S
Fresh droppings of droppings of horse and old droppings of camel.
Mazar
BSM – 1
8 Calandra lark 30 < 10, 150; N
Song Thrush 1 < 10, 40
Vanessa atalanta 1
8,5 Crested lark 4 < 15, 70
9 Crested lark 5 < 15, 70
Calandra lark 6 < 5, 70; E
BSM 3
10 Lark sp. 200 < 10, 150; N
Kestrel 1 < 20, 80
Old droppings of camel
Fresh droppings of horse
Termite mound 1
BSM – 1
Steppe Horned Lark *(Eremophila alpestris brandti)* 2 < 2, 70
11 Mediterranean short-toed lark 40 < 1, 200; W
Old and fresh droppings of horse
Old droppings of camel
BSM 2
Fresh droppings of sheep
12 Gerbillinae 3
TB 11, old
Termite mound 1
BSM 12
Crested lark 5 < 10, 70
12,5 Common Starling 4 < 15, 60
13 Lark sp. 200 < 10, 400
Common Starling 5 < 15, 50
Calandra lark 13 ≈ 20-30,120; NE
Termite mound 3
Yellowhammer 1 < 5, 60
Old droppings of camel and horses
Calandra lark 140 < 5, 80; N-E
BSM 5; TB 3
Yellow-winged darter 1 (16:35)
Fox was digging under termite mound

Photo 36 Fox was digging under termite mound

Burrows of Ellobius
14 Old droppings of camel and fresh horses
Calandra lark 40 < 5,80; N-E
Burrows of Ellobius 12
14,5 Lark sp. 13 < 5, 70

15 Arrival at 17:00, pitched camp. Railway is 1-1,5 km onward.
Old droppings of camel
BSM -1

30.10.2024

07:50, 15 km
Calandra lark 1 < 15, 80; N.
Calandra lark 60 < 5, 120; S.
Corsac (registered by camera trap)
Pallas's Sandgrouse 2 ≈ 20-40, 400; E.
Lark sp. 1 ≈ 30-50, 150; N.
Lark sp. 1 ≈ 30-50, 150; N.
Lark sp. 1 ≈ 30-50, 150; N.
16 Fresh and old manure of horse
Old droppings of camel
Crested lark 40 < 15, 80; E.
18 Crested lark 2 < 15, 80.
Kestrel 1 ≈ 20-40, 150
Crested lark 8 < 15, 120.
Long-legged buzzard 1 < 10, 360.
BSM 1, TB 9
19 BSM 1
Lark sp. 5< 5, 140; W.
20 Horse 6
Lark sp. 5< 5, 140.
BSM 3, TB 1
Crested lark 71 < 10, 120; S.
Vanessa atalanta
Track of hare
21 Railway substation.
Gerbillinae – 4
BSM – 40, TB – 1
Crested lark 1 < 15, 80; W.
Calandra lark 70 < 5, 140; W.
The voice of Gerbil reacting to Accipitridae
Yellow-winged darter 2.
22 Merlin 1 < 2, 150
BSM – 1
Lark sp. 3 < 10, 400; N-W.
Fresh and old manure of horse
Fresh droppings of camel
Fresh droppings of hare
Lark sp. 4 < 5, 200.
Horse 8
23 Fresh and old manure of horse
BSM 2
Fresh droppings of hare
Kestrel 1 < 10, 200
Mediterranean short-toed lark 1 < 5, 5.
24 Fresh manure of horse
Crested lark 5 < 10, 80.
Gerbillinae - 2.
Kestrel 1 < 20, 400
Crested lark 4 < 10, 250.
Common Starling 3 < 10, 120.
BSM + TB – 1
Crested lark 1 < 5, 150.
Calandra lark 2 < 10, 200.
Mediterranean short-toed lark 30 < 5, 140.

Open Storage Area East

13:10
Old and fresh droppings of horse
BSM – 11
Old skin of hedgehog
Fresh droppings of hare
Yellow-winged darter 1
Whoops of gerbil
TB + BSM – 2
TB 40
Feathers of crested lark plucked by bird
Great Grey Shrike 1 < 3, 200
Passeriformes sp.2 < 3, 200
Track of wolf 10 cm
Eurasian Sparrowhawk 1 < 1, 1
European herring gull 2 < 10, 30
Rook 60 < 10, 40
25 Crested lark 1 < 5, 15
Lark sp. 3 < 10, 40
26 TB + BSM – 3
Crested lark 16 < 2, 150
Old droppings of horse
Old droppings of camel
Rook 35 < 5, 200; W
TB 60
BSM 20
Burrow of ground-squirrel 1
TS 1
27 Gerbillinae 2
Wheatears sp.1s 50
28 TB – many, BSM – many
Whoops of gerbil
Gerbillinae 1 (not Libyan jird)
29 Termite mound 18
Crested lark 62 < 10, 80
30 Crested lark 70 < 10, 150; N
Termite mound 33
Crested lark 3s 20

Photo 37 Crested larks

Fresh and old manure of horse
Passeriformes sp. 200 ≈ 80-120, 400; E
BSM - 10
Hooded crow 3 ≈ 20-50, 70.
Eurasian chaffinch 1 < 2, 20.
Mediterranean short-toed lark 70 < 2, 200; E. Flying to Caspian.
Calandra lark 50 < 15, 120; W.

31.10.2024

31 km Lark sp. 40 < 2, 15; E.
Termite mound – 11
Mediterranean short-toed lark 40 < 5, 20.
Gerbillinae – 1; Whoops of Gerbillinae.
Calandra lark 4 < 5, 15; E.
Lark sp. 17 < 10, 120.
Common Starling 36 < 15, 80; N
Gerbil leaving in burrows of tortoises
32 Lark sp. 70 < 2, 200; S
Fresh droppings collected for identification
Calandra lark 7 < 10, 80; W
Whoops of Gerbillinae
Burrows of Ellobius
Eastern racer sp. 75 cm, squashed

Photo 38 Eastern racer

Open Storage Area West

10:35
Willow warbler 2 < 5, 70
Horse 6
European robin 2 < 5, 50; E
Lark sp. 40 < 10, 200
Common Blackbird 3 < 10, 120
12 km Kuryk
15 Stock Pigeon 2 < 20, 70
43 Little Bustard ♀
63,5 Little Bustard ♀
68,6 Pallas's Sandgrouse 48 < 15, 150

Chink on the Shore at Cape Sardza South of Storage Area West

Velvet Scoter 1
Slavonian Grebe juvenile 3
Great Egret 1
Caspian Gull 2
Great Cormorant 75
Common Merganser 7
Eurasian teal? 1
White wagtail 1
Black-necked Grebe juvenile. 1
Red-necked grebe ad 1
Crested lark 70 < 5, 400. Flying over the Caspian
Grey Heron 1
Great Cormorants congregate on one shallow bar (75 individuals). Within half an hour 2 flocks approached, following each other after 20 minutes. There were 20-30 individuals in each flock.
There are about 200 small birds along the Caspian shore.

Hyrasia One Plant Territory

01.11.2024

Tolai hare footprints 1
Great gerbil borrows – many
Rock Pigeon 12
Crested Lark 6
Pied wheatear 2
Great cormorant 40 on cliff
Pied wheatear 3
Common Kestrel 1
Spotted redshank 8
Terek Sandpiper 4

Points Missed in Enbek Area

M16a
Arrival at 16:20 (evening before), 94,2 km

Route on foot 2,1 km, 08:40 – 09:50
The fog doesn't go away, it thickens.
Calandra lark 50 < 10, 70; S. Flying silently
BSM – 26, TB -10, TB+BSM - 6
Some corsacs have dark longitudinal spots between the eyes and nose
Old diggings of honey badger
Diggings of fox
Camel 5
Horse 30
Calandra lark 2 < 10, 50; N-E. Flying with chirl
09:17 The fog has cleared off
Mediterranean short-toed lark 5 < 10, 40; N
Lesser Short-toed Lark doing mating rituals
Diggings of corsac fox

3,3 km Mediterranean short-toed lark 20 < 5, 40
5,2 Mediterranean short-toed lark 6 < 3, 30; S
5,9 Calandra lark 30 < 10, 50; S

6,2 Lark sp. 3 < 10, 80; S-W
7,3 Crested lark 6 < 10, 40; S-E
8,0 Calandra lark 2 < 5, 30

M17a 9,3 km

Route on foot 2,4 km, 10:20 -11:55
Mediterranean short-toed lark 5 < 3, 30
Mediterranean short-toed lark 4 < 5, 40
TB+BSM – many; TB – many, BSM – many, TS – 2, fresh
Diggings of honey badger
Crested lark 1 < 10, 80; E
Calandra lark 1s 40
Horse 18
Crested lark 5 < 10, 120; S
Crested lark 30 < 10, 70; S
Old droppings of camel
Tolai hare 1
Mediterranean short-toed lark 5 < 5, 70
Calandra lark 9 < 1, 60
Crested lark 2 < 2, 70
Old skin of hedgehog, teared apart

11,6 km Calandra lark 24 < 5, 20
12 Mediterranean short-toed lark 5 < 3, 30
14,4 Mediterranean short-toed lark 8 < 5, 30
Calandra lark 2 < 5, 20
15 Mediterranean short-toed lark 20 < 3, 40
17 Lark sp. 1 < 10, 60

ANNEX 2 GEOBOTANICAL DESCRIPTION OF SAMPLE VEGETATION PLOTS

Ninety-six examples of the project areas vegetation are described below in spring and autumn 2024. The letter in the plot name corresponds to the project areas: K-Teren oi, B-Kanagat, U-Rahym, Z-Talap, M-Enbek, P-pipeline and L-plots along the projected transmission lines.

The protected species in Kazakhstan *Xylosalsola chiwensis* found along the ammonia pipeline are shown in green.

SPRING

Sample Plot #	M5p					
Photos	Not available					
Size	10 x 10 m					
Date	18.05.2024					
Coordinates	43°13'23.78"N 52°27'4.41"E					
Position in the landscape	Gently undulating plain					
Elevation (m abs.alt.)	146					
Terrain	Plain					
Soils	Gray-brown eroded					
Water regime	Precipitations					
Community name	Anabasis					
Dominants	Anabasis brachiata					
Position in succession	Stable plant community					
Projective cover (%)	10					
Plant litter (%)	-					
Shrubs and semi-shrubs (%)	Up to 5					
Herbaceous cover (%)	Up to 5					
Shrub-semishrub layer, height (cm)	Up to 25					
Herbaceous layer, height (cm)	Up to 13					
Factors and degree of disturbance	Slightly disturbed, dirt road network, grazing					
Signs of abnormal plant development	Not observed					
Plant name	Height	Plant cover (%)	Abun-dance	Espace-ment	Phe-nophase	Zoetic condition
Dwarf shrub						
Artemisia terrae-albae	25	1-2	Sol	Df	Vegetative	Normal
Nanophyton erinaceum	5	2-3	Sol	Df	Vegetative	Normal
Herbaceous layer						
Anabasis brachiata	10	5	Sp	Df	Vegetative	Normal
Eremopyrum orientale	7	<0.5	Sol	Df	Dead	Normal
Poa bulbosa	13	<0.5	Sol	Df	Dead	Normal

Sample Plot #	M6p					
Photos	Not available					
Size	10 x 10 m					
Date	17.05.2024					
Coordinates	43°4'54.47"N 52°23'0.57"E					
Position in the landscape	Undulating plain					
Elevation (m abs.alt.)	170					
Terrain	Plain					
Soils	Solonchaks					
Water regime	Precipitations					
Community name	***Ephemerals-Halocnemum***					
Dominants	*Halocnemum strobilaceum, Eremopyrum orientale*					
Position in succession	Stable plant community					
Projective cover (%)	35-40					
Plant litter (%)	-					
Shrubs and semi-shrubs (%)	Up to 15					
Herbaceous cover (%)	Up to 20					
Shrub-semishrub layer, height (cm)	10-20					
Herbaceous layer, height (cm)	12					
Factors and degree of disturbance	Slightly disturbed, dirt road network, grazing					
Signs of abnormal plant development	Not observed					
Additions						
Plant name	Height	Plant cover (%)	Abun-dance	Espace-ment	Phe-nophase	Zoetic condition
Dwarf shrub						
Halocnemum strobilaceum	10-15	10	Sp	Df	Vegetative	Normal
Dwarf shrub						
Artemisia kemrudica	20	3-5	Sol-Sp	Df-gr	Vegetative	Normal
Herbaceous layer						
Asparagus breslerianus	30	<0.5	Sol	Df	Fruition	Normal
Eremopyrum orientale	12	20	Sp	Df	Dead	Normal
Lepidium perfoliatum	12	<1	Sol	Df	Dead	Normal
Lappula spinocarpos subsp. ceratophora	11	<0.5	Sol	Df	Fruition	Normal

Sample Plot #	M7p					
Photo	Not available					
Size	10 x 10 m					
Date	17.05.2024					
Coordinates	42°51'16.56"N 52°17'32.44"E					
Position in the landscape	Gently undulating plain					
Elevation (m abs.alt.)	146					
Terrain	Plain					
Soils	Solonchaks					
Water regime	Precipitations					
Community name	***Ephemerals-Halocnemum***					
Dominants	*Halocnemum strobilaceum, Eremopyrum orientale*					
Position in succession	Stable plant community					
Projective cover (%)	25-30					
Plant litter (%)	-					
Shrubs and semi-shrubs (%)	Up to 17					
Herbaceous cover (%)	10					
Shrub-semishrub layer, height (cm)	Up to 20					
Herbaceous layer, height (cm)	Up to 15					
Factors and degree of disturbance	Slightly disturbed, dirt road network, grazing					
Signs of abnormal plant development	Not observed					
Additions						
Plant name	Height	Plant cover (%)	Abun-dance	Espace-ment	Phe-nophase	Zoetic condition
Dwarf shrub						
Halocnemum strobilaceum	10-15	15	Sp	Df	Vegetative	Normal
Dwarf shrub						
Artemisia kemrudica	20	1	Sol	Df	Vegetative	Normal
Nanophyton erinaceum	5	1	Sol	Df	Vegetative	Normal
Herbaceous layer						
Anabasis brachiata	10	1	Sol	Df	Vegetative	Normal
Eremopyrum orientale	12	10	Sp	Df	Dead	Normal
Lepidium perfoliatum	10	<0.5	Sol	Df	Dead	Normal
Centaurea spp.	15	<1	Sol	Df	Flowering	Normal

Sample Plot #	K2p					
Photos K2p, K2p.1 and K2p.2						
Size	10 x 10 m					
Date	18.05.2024					
Coordinates	42°05’03.12’’N 52°42’58.97’’E					
Position in the landscape	Undulating plain					
Height (m vertical coordinate)	160					
Terrain	Plain					
Soils	Gray-brown alkaline					
Water regime	Precipitations					
Community name	***Caroxylon orientale***					
Dominants	*Caroxylon orientale*					
Position in succession	Stable plant community					
Projective cover (%)	2530					
Plant litter (%)	-					
Shrubs and semi-shrubs (%)	30					
Herbaceous cover (%)	<1					
Shrub-semishrub layer, height (cm)	Up to 40					
Herbaceous layer, height (cm)	Up to 10					
Factors and degree of disturbance	Slightly disturbed, burrowing animals colonies, dirt road network					
Signs of abnormal plant development	Not observed					
Additions	20% Caroxylon orientale – Dead					
Scientific name of plant species	Height	Plant cover (%)	Abun-dance	Espace-ment	Phe-nophase	Zoetic condition
Semi-shrub						
Caroxylon orientale	40	2530	SpCop1	Df	Vegetative	De-pressed
Dwarf shrub						
Artemisia kemrudica	25	<1	Sol	Df	Vegetative	Good
Anabasis salsa	10	23	Sol	Df	Vegetative	Good
Herbaceous layer						
Eremopyrum orientale	10	<1	Sol	Df	Dying	Normal
Koelpinia linearis	5	<0,5	Sol	Df	Flower	Good
Lichens						
Xanthoparmelia camtschadalis	<1	<0,5	Sol	Df		

Sample Plot #	K5p					
Photos K5p, K5p.1, K5p.2 and K5p.3						
Size	10 x 10 m					
Date	18.05.2024					
Coordinates	42° 7'37.21"N 52°52'57.16"E					
Position in the landscape	Undulating plain					
Height (m vertical coordinate)	157					
Terrain	Plain					
Soils	Gray-brown alkaline					
Water regime	Precipitations					
Community name	**Perennial *anabasis-salsa***					
Dominants	Nanophyton erinaceum, Anabasis brachiata					
Position in succession	Digressed plant formation					
Projective cover (%)	5-10					
Plant litter (%)	-					
Shrubs and semi-shrubs (%)	Up to 6					
Herbaceous cover (%)	Up to 2					
Shrub-semishrub layer, height (cm)	Up to 30					
Herbaceous layer, height (cm)	Up to 7					
Factors and degree of disturbance	Severe degree of disturbance: numerous burrowing animals colonies, dirt road network					
Signs of abnormal plant development	Not observed					
Additions	Burrowing animals' colonies, presumably abandoned 90% Caroxylon orientale – in dry condition					
Scientific name of plant species	Height	Plant cover (%)	Abun-dance	Espace-ment	Phe-nophase	Zoetic condition
Shrub						
Oreosalsola arbusculiformis	30	1	Un-Sol	Df	Vegetative	Normal
Semishrub						
Caroxylon orientale	20	2	Sol	Df	Vegetativ., dry	De-pressed
Dwarf semishrub						
Nanophyton erinaceum	3	3	Sol	Df	Vegetative	Normal
Herbaceous layer						
Anabasis brachiata	7	2	Sol	Df	Vegetative	Normal
Lichens						
Evernia esorediosa f. terrestris	<1	<1	Sol	Df		

Sample Plot #	K7p
Photos K7p, K7p.1 and K7p2	

Size	10 x 10 m					
Date	18.05.2024					
Coordinates	42°20'8.42"N 52°48'10.82"E					
Position in the landscape	Undulating plain					
Height (m vertical coordinate)	187					
Terrain	Plain					
Soils	Gray-brown alkaline					
Water regime	Precipitations					
Community name	***Xylosalsola-wormwood* with *Caroxylon orientale***					
Dominants	*Caroxylon orientale, Artemisia kemrudica*					
Position in succession	Stable plant community					
Projective cover (%)	30-35					
Plant litter (%)	-					
Shrub-dwarf semishrubs (%)	Up to 31					
Herbaceous cover (%)	<1					
Shrub-semishrub layer, height (cm)	Up to 45					
Herbaceous layer, height (cm)	5					
Factors and degree of disturbance	Slightly disturbed, grazing, dirt road network					
Signs of abnormal plant development	Not observed					
Additions	5% Artemisia kemrudica Dead					
Scientific name of plant species	Height	Plant cover (%)	Abun-dance	Espace-ment	Phe-nophase	Zoetic condition
Shrub						
Oreosalsola arbusculiformis	45	<1	SolUn	Df	Vegetative	Good
Semi-shrub						
Caroxylon orientale	35	20	Sp	Df	Dead	De-pressed
Dwarf shrub						
Artemisia kemrudica	25	10	Sp	Df	Dead	De-pressed
Anabasis salsa	8	1	Sol	Df	Vegetative	Good
Herbaceous layer						
Lappula spp.	5	<0,1	Sol	Df	Fruition	Good

Sample Plot #	K13p					
Photos K13p and K13p.1						
Size	10 x 10 m					
Date	18.05.2024					
Coordinates	42°04’48.99’’N 52°48’25.10’’E					
Position in the landscape	Undulating plain					
Height (m vertical coordinate)	167					
Terrain	Plain					
Soils	Gray-brown alkaline					
Water regime	Precipitations					
Community name	***Caroxylon orientale***					
Dominants	*Caroxylon orientale*					
Position in succession	Stable plant community					
Projective cover (%)	25-30					
Plant litter (%)	-					
Shrubs and semi-shrubs (%)	Up to 30					
Herbaceous cover (%)	<1					
Shrub-semishrub layer, height (cm)	Up to 30					
Herbaceous layer, height (cm)	10					
Factors and degree of disturbance	Mild to moderate disturbance, earth burrowing animals’ colonies, dirt road network.					
Signs of abnormal plant development	Not observed					
Additions	*Caroxylon orientale* – 50% Dead					
Scientific name of plant species	Height	Plant cover (%)	Abun-dance	Espace-ment	Phe-nophase	Zoetic condition
Semi-shrub						
Caroxylon orientale	30	25	Sp	Df	Dead	De-pressed
Dwarf shrub						
Artemisia kemrudica	25	23	Sol	Df	Vegetative	Good
Anabasis salsa	8	12	Sol	Df	Vegetative	Good
Herbaceous layer						
Anabasis brachiata	10	<1	Sol	Df	Vegetative	Good
Eremopyrum orientale	10	<1	Sol	Df	Dying	Normal

Sample Plot #	K15p					
Photo	Not available					
Size	10 x 10 m					
Date	18.05.2024					
Coordinates	42°05'0.22''N 52°45'01.25''E					
Position in the landscape	Undulating plain					
Height (m vertical coordinate)	157					
Terrain	Plain					
Soils	Gray-brown alkaline					
Water regime	Precipitations					
Community name	**Perennial-halophytic**					
Dominants	*Nanophyton erinaceum, Anabasis brachiata*					
Position in succession	Degressive plant community					
Projective cover (%)	510					
Plant litter (%)	-					
Shrub-dwarf semishrubs (%)	Up to 6					
Herbaceous cover (%)	Up to 2					
Shrub-dwarf semishrubs layer, hight (cm)	Up to 30					
Herbaceous layer, height (cm)	Up to 7					
Factors and degree of disturbance	Severe degree of disturbance: numerous burrowing animals colonies, dirt road network					
Signs of abnormal plant development	Not observed					
Additions	Burrowing animals' colonies, presumably abandoned 90% Caroxylon orientale – Dead					
Scientific name of plant species	Height	Plant cover (%)	Abun-dance	Espace-ment	Phe-nophase	Zoetic condition
Shrub						
Oreosalsola arbusculiformis	30	1	UnSol	Df	Vegetative	Good
Semi-shrub						
Caroxylon orientale	20	2	Sol	Df	Dead	De-pressed
Dwarf shrub						
Nanophyton erinaceum	3	3	Sol	Df	Vegetative	Good
Herbaceous layer						
Anabasis brachiata	7	2	Sol	Df	Vegetative	Good
Lichen						
Xanthoparmelia camtschadalis	<1	<1	Sol	Df		

Sample Plot #	K16p					
Photo	Not available					
Size	10 x 10 m					
Date	18.05.2024					
Coordinates	42°04’51.44’’N 52°45’49.80’’E					
Position in the landscape	Undulating plain					
Height (m vertical coordinate)	161					
Terrain	Plain					
Soils	Gray-brown alkaline					
Water regime	Precipitations					
Community name	***Caroxylon orientale***					
Dominants	*Caroxylon orientale*					
Position in succession	Stable plant community					
Projective cover (%)	2025					
Plant litter (%)	-					
Shrub-dwarf semishrubs (%)	Up to 22					
Herbaceous cover (%)	<1					
Shrubополукустарниковый ярус, высота (см)	Up to 30					
Herbaceous layer, height (cm)	Up to 10					
Factors and degree of disturbance	Medium disturbance: numerous burrowing animals’ colonies, dirt road network					
Signs of abnormal plant development	Not observed					
Additions	Burrowing animals’ colonies, presumably abandoned 80% Caroxylon orientale – Dead					
Scientific name of plant species	Height	Plant cover (%)	Abun-dance	Espace-ment	Phe-nophase	Zoetic condition
Semi-shrub						
Caroxylon orientale	30	20	Sp	Df	Dead	De-pressed
Dwarf shrub						
Artemisia kemrudica	20	12	Sol	Df	Vegetative	Good
Herbaceous layer						
Anabasis brachiata	10	<1	Sol	Df	Vegetative	Good

Sample Plot #	K17p
Photos K17p, K17p.1, K17p.2 and K17p.3	
Size	10 x 10 m
Date	18.05.2024
Coordinates	42°04’39.86’’N 52°46’48.87’’E
Position in the landscape	Undulating plain with sloping hills
Height (m vertical coordinate)	188
Terrain	The flat top of the low ridge
Soils	Gray-brown alkaline, badly eroded
Water regime	Precipitations
Community name	Single plants and oligodominant groupings
Dominants	-
Position in succession	Degressive plant community
Projective cover (%)	35
Plant litter (%)	-
Shrub-dwarf semishrubs (%)	Up to 3
Herbaceous cover (%)	Up to 2
Shrub-dwarf semishrubs layer, hight (cm)	Up to 40
Herbaceous layer, height (cm)	Up to 45
Factors and degree of disturbance	Severe degree of disturbance: road degression
Signs of abnormal plant development	Not observed

Scientific name of plant species	Height	Plant cover (%)	Abun-dance	Espace-ment	Phe-nophase	Zoetic condition
Shrub						
Atraphaxis replicata	40	<0,5	Un	Df	Flower	Good
Ephedra aurantiaca	15	<1	Sol	Df	Vegetative	Good
Semi-shrub						
Caroxylon orientale	30	1	Sol	Df	Vegetative	Good
Dwarf shrub						
Artemisia kemrudica	25	<1	Sol	Df	Vegetative	Good
Herbaceous layer						
Anabasis brachiata	10	1	Sol	Df	Vegetative	Good
Euphorbias spp.	45	<1	Sol	Df	Flower	Good

Sample Plot #	K18p
Photos K18p, K18p.1 and K18p.2	

Size	10 x 10 m					
Date	18.05.2024					
Coordinates	42°04’47.30’’N 52°47’42.37’’E					
Position in the landscape	Undulating plain					
Height (m vertical coordinate)	171					
Terrain	Plain					
Soils	Gray-brown alkaline					
Water regime	Precipitations					
Community name	***Xylosalsola-wormwood***					
Dominants	*Artemisia kemrudica*					
Position in succession	Stable plant community					
Projective cover (%)	30-35					
Plant litter (%)	-					
Shrubs and semi-shrubs (%)	Up to 32					
Herbaceous cover (%)	<1					
Shrub-semishrub layer, height (cm)	Up to 40					
Herbaceous layer, height (cm)	Up to 7					
Factors and degree of disturbance	Mild to moderate disturbance, earth burrowing animals’ orm colonies, dirt road network.					
Signs of abnormal plant development	Not observed					
Additions	*Artemisia kemrudica* up to 70% dead					
Scientific name of plant species	Height	Plant cover (%)	Abun-dance	Espace-ment	Phe-nophase	Zoetic condition
Semi-shrub						
Ephedra aurantiaca	40	12	Sol	Df	Vegetative	Good
Dwarf shrub						
Artemisia kemrudica	25	30	Cop1	Df	Dead	De-pressed
Herbaceous layer						
Eremopyrum orientale	7	<1	Sol	Df	Dying	Normal
Bromus tectorum	7	<0,5	Sol	Df	Dying	Normal

Sample Plot #	K19p
Photos K19p and K19p.1	

Size	10 x 10 m					
Date	18.05.2024					
Coordinates	42°05’12.86’’N 52°50’04.73’’E					
Position in the landscape	Undulating plain					
Height (m vertical coordinate)	165					
Terrain	Plain					
Soils	Takyr					
Water regime	Precipitations					
Community name	Single perennial saltwart					
Dominants	-					
Position in succession	Stable plant community					
Projective cover (%)	0					
Plant litter (%)	-					
Shrubs and semi-shrubs (%)	<1					
Herbaceous cover (%)	0					
Shrub-semishrub layer, height (cm)	Up to 10					
Factors and degree of disturbance	Slightly disturbed, dirt road network					
Signs of abnormal plant development	Not observed					
Scientific name of plant species	Height	Plant cover (%)	Abun-dance	Espace-ment	Phe-nophase	Zoetic condition
Dwarf shrub						
Caroxylon gemmascens	10	<0,5	Sol	Df	Vegetative	Normal
Anabasis salsa	7	<0,5	Sol	Df	Vegetative	Normal

Sample Plot #	K20p					
Photos K20p, K20p.1 and K20p.2						
Size	10 x 10 m					
Date	18.05.2024					
Coordinates	42°06’28.71’’N 52°51’26.41’’E					
Position in the landscape	Undulating plain					
Height (m vertical coordinate)	176					
Terrain	Plain					
Soils	Gray-brown alkaline along with takyrs					
Water regime	Precipitations					
Community name	**Xylosalsola-wormwood**					
Dominants	*Artemisia kemrudica*					
Position in succession	Stable plant community					
Projective cover (%)	30-35					
Plant litter (%)	-					
Shrubs and semi-shrubs (%)	Up to 35					
Herbaceous cover (%)	<1					
Shrub-semishrub layer, height (cm)	35					
Herbaceous layer, height (cm)	5					
Factors and degree of disturbance	Slightly disturbed, burrowing animals colonies, dirt road network					
Signs of abnormal plant development	Not observed					
Additions	*Artemisia kemrudica* up to 50% dead					
Scientific name of plant species	Height	Plant cover (%)	Abun-dance	Espace-ment	Phe-nophase	Zoetic condition
Dwarf shrub						
Artemisia kemrudica	35	30-35	Cop1	Df	Dead	De-pressed
Herbaceous layer						
Ceratocarpus arenarius	5	<1	Sol	Df	Fruition	Good

Sample Plot #	K21p					
Photos K21p, K21p.1 and K21p.2						
Size	10 x 10 m					
Date	18.05.2024					
Coordinates	42°08’30.18’’N 52°53’27.85’’E					
Position in the landscape	Plain					
Height (m vertical coordinate)	217					
Terrain	Plain					
Soils	Gray-brown alkaline					
Water regime	Precipitations					
Community name	***Salsola gemmascens Pall.***					
Dominants	*Caroxylon gemmascens*					
Position in succession	Stable plant community					
Projective cover (%)	2530					
Plant litter (%)	-					
Shrub-dwarf semishrubs (%)	Up to 30					
Herbaceous cover (%)	1					
Shrub-semishrub layer, height (cm)	Up to 35					
Herbaceous layer, height (cm)	10					
Factors and degree of disturbance	Slightly disturbed, grazing, dirt road network					
Signs of abnormal plant development	Not observed					
Additions	Caroxylon gemmascens – up to 5% Dead					
Scientific name of plant species	Height	Plant cover (%)	Abun-dance	Espace-ment	Phe-nophase	Zoetic condition
Dwarf shrub						
Caroxylon gemmascens	35	25	Sp	Df	Dead	De-pressed
Artemisia kemrudica	30	12	Sol	Df	Vegetative	Good
Anabasis salsa	10	23	Sol	Df	Vegetative	Good
Herbaceous layer						
Anabasis brachiata	10	1	Sol	Df	Vegetative	Good
Koelpinia linearis	7	<0,5	Sol	Df	Flower	Good

Sample Plot #	K22p
Photos K22p and K22p.1	

Size	10 x 10 m
Date	18.05.2024
Coordinates	42°11’25.77’’N 52°56’43.34’’E
Position in the landscape	Plain
Height (m vertical coordinate)	219
Terrain	Plain
Soils	Gray-brown alkaline
Water regime	Precipitations
Community name	***Salsola gemmascens Pall.* with *Anabasis salsa***
Dominants	*Anabasis salsa, Caroxylon gemmascens*
Position in succession	Stable plant community
Projective cover (%)	20-25
Plant litter (%)	0
Shrub-dwarf semishrubs (%)	Up to 25
Herbaceous cover (%)	<1
Shrub-semishrub layer, height (cm)	Up to 50
Herbaceous layer, height (cm)	Up to 10
Factors and degree of disturbance	Slightly disturbed, grazing, dirt road network
Signs of abnormal plant development	Not observed

Scientific name of plant species	Height	Plant cover (%)	Abun-dance	Espace-ment	Phe-nophase	Zoetic condition
Shrub						
Oreosalsola arbusculiformis	50	<1	Sol	Df	Vegetative	Good
Dwarf shrub						
Anabasis salsa	10	15	Sp	Df	Vegetative	Good
Caroxylon gemmascens	40	10	Sp	Df	Vegetative	Good
Herbaceous layer						
Eremopyrum orientale	10	<0,5	Sol	Df	Dying	Normal
Koelpinia linearis	7	<0,5	Sol	Df	Flower	Good
Lappula spp.	5	<0,1	Sol	Df	Fruition	Good

Sample Plot #	K23p
Photos K23p and K23p.1	

Size	10 x 10 m					
Date	18.05.2024					
Coordinates	42°13’15.34’’N 52°58’53.44’’E					
Position in the landscape	Undulating plain					
Height (m vertical coordinate)	218					
Terrain	Plain					
Soils	Gray-brown alkaline					
Water regime	Precipitations					
Community name	**Xylosalsola-wormwood**					
Dominants	*Artemisia kemrudica*					
Position in succession	Stable plant community					
Projective cover (%)	35-40					
Plant litter (%)	-					
Shrub-dwarf semishrubs (%)	Up to 40					
Herbaceous cover (%)	<1					
Shrub-semishrub layer, height (cm)	Up to 45					
Herbaceous layer, height (cm)	10					
Factors and degree of disturbance	Slightly disturbed, burrowing animals colonies, dirt road network					
Signs of abnormal plant development	Not observed					
Additions	15–20% of total projective cover are Dead, 70% of *Artemisia kemrudica* Dead					
Scientific name of plant species	Height	Plant cover (%)	Abun-dance	Espace-ment	Phe-nophase	Zoetic condition
Shrub						
Ephedra aurantiaca	45	<1	Sol	Df	Vegetative	Good
Dwarf shrub						
Artemisia kemrudica	25	30-35	Cop1	Df	Dead	De-pressed
Caroxylon gemmascens	40	35	SolSp	Df	Dead	De-pressed
Anabasis salsa	8	12	Sol	Df	Vegetative	Good
Herbaceous layer						
Anabasis brachiata	10	<1	Sol	Df	Vegetative	Good
Eremopyrum orientale	7	<0,5	Sol	Df	Dying	Normal

Sample Plot #	K24p
Photos K24p and K24p.1	

Size	10 x 10 m
Date	18.05.2024
Coordinates	42°15’43.55’’N 52°55’35.22’’E
Position in the landscape	Undulating plain
Height (m vertical coordinate)	213
Terrain	Plain
Soils	Gray-brown alkaline
Water regime	Precipitations
Community name	***Salsola gemmascens Pall.*** **with Xylosalsola-wormwood**
Dominants	*Artemisia kemrudica, Caroxylon gemmascens*
Position in succession	Stable plant community
Projective cover (%)	30-35
Plant litter (%)	-
Shrub-dwarf semishrubs (%)	Up to 32
Herbaceous cover (%)	<1
Shrub-semishrub layer, height (cm)	Up to 45
Herbaceous layer, height (cm)	Up to 30
Factors and degree of disturbance	Slightly disturbed, burrowing animals colonies, dirt road network
Signs of abnormal plant development	Not observed
Additions	5% *Artemisia kemrudica* Dead

Scientific name of plant species	Height	Plant cover (%)	Abun-dance	Espace-ment	Phe-nophase	Zoetic condition
Shrub						
Oreosalsola arbusculiformis	45	<1	SolUn	Df	Vegetative	Good
Dwarf shrub						
Artemisia kemrudica	25	20	Sp	Df	Dead	De-pressed
rooCaroxylon gemmascens	35	10	Sp	Df	Dead	De-pressed
Anabasis salsa	10	12	Sol	Df	Vegetative	Good
Herbaceous layer						
Salsola spp.	30	<1	Sol	Df	Vegetative	Good
Eremopyrum orientale	7	<0,5	Sol	Df	Dying	Normal

Sample Plot #	B3p					
Photo	Not available					
Size	10 x 10 m					
Date	20.05.2024					
Coordinates	42°10'33.15"N 54°53'56.39''E					
Position in the landscape	Gently undulating plain					
Elevation (m abs.alt.)	188					
Terrain	Plain					
Soils	Takyr					
Water regime	Precipitations					
Community name	**Sporadically Ferula assafoetida**					
Dominants	-					
Position in succession	Stable plant community					
Projective cover (%)	<1					
Plant litter (%)	-					
Shrubs and semi-shrubs (%)	<1					
Herbaceous cover (%)	-					
Shrub-semishrub layer, height (cm)	Up to 15					
Herbaceous layer, height (cm)	-					
Factors and degree of disturbance	Slightly disturbed, dirt road network					
Signs of abnormal plant development	Not observed					
Plant name	Height	Plant cover (%)	Abun-dance	Espace-ment	Phe-nophase	Zoetic condition
Semi-shrub						
Caroxylon orientale	30	<1	Un-Sol	Df-gr	Vegitative	Normal

Sample Plot #	B4p					
Photo	Not available					
Size	10 x 10 m					
Date	20.05.2024					
Coordinates	42° 6'29.32"N 55° 9'59.33"E					
Position in the landscape	Gently undulating plain					
Elevation (m abs.alt.)	197					
Terrain	Plain					
Soils	Grey-brown alkaline					
Water regime	Precipitations					
Community name	**Anabasis salsa-Ferula assafoetida**					
Dominants	Anabasis salsa, Caroxylon orientale					
Position in succession	Stable plant community					
Projective cover (%)	25-30					
Shrubs-dwarf semi-shrubs (%)	Up to 27					
Herbaceous cover (%)	1					
Shrub-semishrub layer, height (cm)	Up to 40					
Herbaceous layer, height (cm)	Up to 15					
Factors and degree of disturbance	Slightly disturbed, burrowing animals colonies, dirt road network					
Signs of abnormal plant development	Not observed					
Additions	40% Caroxylon orientale in dry condition					
Plant name	Height	Plant cover (%)	Abun-dance	Espace-ment	Phe-nophase	Zoetic condition
Semi-shrub						
Caroxylon orientale	40	20	Sp	Df	Vegitative, dry	Su-pressed
Dwarf shrub						
Anabasis salsa	8	7	Sp	Df	Vegitative	Normal
Herbaceous layer						
Eremopyrum orientale	7	<0.5	Sol	Df	Dead	Normal
Plantago minuta	4	<0.1	Sol	Df	Fruition	Normal
Arnebia decumbens	12	<0.5	Sol	Df	Fruition	Normal
Senecio glaucus subsp. coronopifolius	7	<0.1	Sol	Df	Fruition	Normal
Euphorbia inderiensis	10	<0.1	Sol	Df	Fruition	Normal
Arenaria leptoclados	7	<0.5	Sol	Df	Fruition	Normal
Nonea caspica	3	<0.1	Sol	Df	Flowering	Normal
Hypecoum pendulum var. pendulum	15	<0.1	Sol	Df	Fruition	Normal
Koelpinia linearis	10	<0.1	Sol	Df	Fruition	Normal
Astragalus bakaliensis	8	<0.5	Sol	Df	Fruition	Normal

Sample Plot #	B5p					
Photo	Not available					
Size	10 x 10 m					
Date	19.05.2024					
Coordinates	42°19'4.60"N 54°52'25.63"E					
Position in the landscape	Undulating plain					
Elevation (m abs.alt.)	176					
Terrain	Plain					
Soils	Gray-brown alkaline					
Water regime	Precipitations					
Community name	**Ferula assafoetida-Anabasis with Haloxylon**					
Dominants	Anabasis salsa					
Position in succession	Stable plant community					
Projective cover (%)	20-25					
Plant litter (%)	-					
Shrubs and semi-shrubs (%)	24					
Herbaceous cover (%)	<1					
Shrub-semishrub layer, height (cm)	Up to 160					
Herbaceous layer, height (cm)	Up to 10					
Factors and degree of disturbance	Slightly disturbed, dirt road network, burrowing animals colonies					
Signs of abnormal plant development	Not observed					
Plant name	Height	Plant cover (%)	Abun-dance	Espace-ment	Phe-nophase	Zoetic condition
Tree						
Haloxylon ammodendron	160	<1	Sol	Gr	Fruition	Normal
Semi-shrub						
Caroxylon orientale	30	2-3	Sol	Gr	Fruition	Normal
Capparis spinosa var. herbacea	--	<0.5	Sol	Df	End of vegetation	Normal
Dwarf shrub						
Artemisia kemrudica	25	1	Sol	Gr	Budding, dry	Supressed
Anabasis salsa	15	20	Sp	Df	Fruition	Normal
Nanophyton erinaceum	5	<1	Sol	Df	Fruition	Normal
Herbaceous layer						
Girgensohnia oppositiflora	10	<0.5	Sol	Df	Fruition	Normal
Eremopyrum orientale	5	<0.5	Sol	Df	Dead	Normal
Climacoptera spp.	3	<0.5	Sol	Df	Dead	Normal

Sample Plot #	B6p					
Photo	Not available					
Size	10 x 10 m					
Date	19.05.2024					
Coordinates	42°29'14.36"N 54°53'0.84»E					
Position in the landscape	Undulating plain with takyr depressions					
Elevation (m abs.alt.)	176					
Terrain	Plain					
Soils	Gray-brown alkaline					
Water regime	Precipitations					
Community name	**Ferula assafoetida-Anabasis with Haloxylon in complex with sporadic plants on takyr**					
Dominants	Anabasis salsa, Caroxylon orientale					
Position in succession	Stable plant community					
Projective cover (%)	15–25 and 1-2					
Plant litter (%)	-					
Shrubs and semi-shrubs (%)	17 and 1–2					
Herbaceous cover (%)	2–3 and <1					
Shrub-semishrub layer, height (cm)	Up to 160 and 30					
Herbaceous layer, height (cm)	Up to 25 and 30					
Factors and degree of disturbance	Slightly disturbed, dirt road network					
Signs of abnormal plant development	Not observed					
Additions	Artemisia kemrudica – 60% in dry condition.					
Plant name	Height	Plant cover (%)	Abun-dance	Espace-ment	Phe-nophase	Zoetic condition
Tree						
Haloxylon ammodendron	160	<1	Sol	Df	Fruition	Normal
Semi-shrub						
Caroxylon orientale	45	5	Sp	Df	Fruition	Normal
Dwarf shrub						
Artemisia kemrudica	30	1-2	Sol	Df	Budding, dry	Supressed
Anabasis salsa	15	10	Sp	Df	Fruition	Normal
Herbaceous layer						
Girgensohnia oppositiflora	25	<0.5	Sol	Df	Fruition	Normal
Eremopyrum orientale	10	<0.5	Sol	Df	Dead	Normal
Tetracme spp.	10	2-3	Sol	Df	Dead	Normal
Sporadic plants on takyr						
Semi-shrub						
Capparis spinosa var. herbacea	--	<1	Sol	Df	End of vegetation	Normal
Dwarf shrub						
Artemisia kemrudica	30	1-2	Sol	Gr	Budding	Normal
Anabasis salsa	25	<1	Sol	Df	Fruition	Normal
Herbaceous layer						
Anabasis brachiata	10	<1	Sol	Df	Fruition	Normal
Anabasis eriopoda	15	<1	Sol	Df	Fruition	Normal
Soda foliosa	20	<0.5	Sol	Df	Fruition	Normal
Girgensohnia oppositiflora	30	<0.5	Sol	Df	Fruition	Normal

Sample Plot #	B7p					
Photo B7p						
Size	10 x 10 m					
Date	19.05.2024					
Coordinates	42°32'15.75"N 55° 5'52.00"E					
Position in the landscape	Gently undulating plain					
Elevation (m abs.alt.)	170					
Terrain	Plain					
Soils	Gray-brown alkaline					
Water regime	Precipitations					
Soil cover	-					
Community name	**Ferula assafoetida-Artemisia kemrudica-wormwood-perennial-Salsola with Haloxylon**					
Dominants	Artemisia kemrudica, Caroxylon orientale					
Position in succession	Stable plant community					
Projective cover (%)	30-40					
Plant litter (%)	-					
Shrubs and semi-shrubs (%)	35					
Herbaceous cover (%)	5–10					
Shrub-semishrub layer, height (cm)	Up to 160					
Herbaceous layer, height (cm)	Up to 50					
Factors and degree of disturbance	Slightly disturbed, dirt road network					
Signs of abnormal plant development	Not observed					
Additions						
Plant name	Height	Plant cover (%)	Abun-dance	Espace-ment	Phe-nophase	Zoetic condition
Tree of shrub						
Haloxylon ammodendron	160	<1	Sol	Gr	Vegitative	Normal
Semi-shrub						
Caroxylon orientale	30	7	Sp	Df	Vegitative	Normal
Dwarf shrub						
Artemisia terrae-albae	25	2	Sol	Grr	Vegitative	Normal
Artemisia kemrudica	25	20	Sp	Gr	Vegitative	Normal
Caroxylon gemmascens	40	3	Sol	Df	Vegitative	Normal
Anabasis salsa	7	3	Sol	Df	Vegitative	Normal
Herbaceous layer						
Xylosalsola arbuscula	45	3	Sol	Gr	Vegitative	Normal
Anabasis brachiata	15	2	Sol	Df	Vegitative	Normal
Arnebia decumbens	5	<1	Sol	Df	Flowering	Normal
Astragalus flexus	4	<1	Un-Sol	Df	Fruition	Normal
Eremopyrum orientale	10	<1	Sol	Df	Dead	Normal
Descurainia sophia	40	<0.5	Sol	Df	Dead	Normal

Sample Plot #	B7p					
Euphorbia sclerocyathiu	45	3	Sol	Df	Flowering	Normal
Lepidium perfoliatum	10	<1	Sol	Df	Dead	Normal
Gypsophila diffusa	50	<1	Un-Sol	Df	Flowering	Normal
Malacocarpus crithmifolius	-	5	Sp	Gr	Flowering	Normal
Senecio glaucus subsp. coronopifolius	8	<1	Sol	Df	Flowering	Normal
Zygophyllum ovigerum	10	<1	Sol	Df	Fruition	Normal

Sample Plot #	B8p
Photos B8p.1, B8p.2 and B8p.3	
Size	10 x 10 m
Date	20.05.2024
Coordinates	42°25'50.35"N 54°12'52.28"E
Position in the landscape	Undulating plain
Height (m vertical coordinate)	106
Terrain	Plain
Soils	Gray-brown alkaline
Water regime	Precipitations
Community name	***Anabasis salsa-Salsola gemmascens Pall.***
Dominants	*Anabasis salsa*
Position in succession	Stable plant community
Projective cover (%)	35-40
Plant litter (%)	-
Shrub-dwarf semishrubs (%)	Up to 35
Herbaceous cover (%)	Up to 2
Shrub-semishrub layer, height (cm)	Up to 45
Herbaceous layer, height (cm)	Up to 10
Factors and degree of disturbance	Slightly disturbed, dirt road network
Signs of abnormal plant development	Not observed
Additions	80% *Caroxylon gemmascens* Dead

Scientific name of plant species	Height	Plant cover (%)	Abun-dance	Espace-ment	Phe-nophase	Zoetic condition
Dwarf shrub						
Caroxylon gemmascens	45	30	Cop1	Df	Dead	De-pressed
Anabasis salsa	8	5	Sol	Df	Vegetative	Good
Artemisia kemrudica	25	<1	Sol	Df	Vegetative	Good
Herbaceous layer						
Anabasis brachiata	10	12	Sol	Df	Vegetative	Good
Eremopyrum orientale	8	<0,5	Sol	Df	Dying	Normal
Plantago minuta	3	<0,1	Sol	Df	Fruition	Good
Arnebia decumbens	5	<0,1	Sol	Df	Fruition	Good
Senecio glaucus subsp. coronopifolius	7	<0,5	Sol	Df	Flower/Fru-ition	Good
Euphorbia inderiensis	10	<0,1	Sol	Df	Fruition	Good

Sample Plot #	B9p					
Photos B9p.1, B9p.2, B9p.3 and B9p.4						
Size	10 x 10 m					
Date	20.05.2024					
Coordinates	42°25'57.09"N 54°26'37.16"E					
Position in the landscape	Undulating plain					
Height (m vertical coordinate)	192					
Terrain	Plain					
Soils	Takyr soil					
Water regime	Precipitations					
Community name	**Perennial-halophytic**					
Dominants	*Anabasis salsa, Caroxylon orientale*					
Position in succession	Stable plant community					
Projective cover (%)	510					
Plant litter (%)	-					
Shrub-dwarf semishrubs (%)	Up to 7					
Herbaceous cover (%)	<1					
Shrub-semishrub layer, height (cm)	Up to 200					
Herbaceous layer, height (cm)	Up to 10					
Factors and degree of disturbance	Slightly disturbed, burrowing animals colonies, dirt road network					
Signs of abnormal plant development	Not observed					
Additions	Burrowing animals' colonies, presumably abandoned					
Scientific name of plant species	Height	Plant cover (%)	Abun-dance	Espace-ment	Phe-nophase	Zoetic condition
Shrub						
Haloxylon ammodendron	200	2	Sol	Df	Vegetative	Good
Semi-shrub						
Caroxylon orientale	35	23	Sol	Df	Vegetative	Good
Dwarf shrub						
Artemisia kemrudica	25	<0,5	UnSol	Df	Vegetative	Good
Anabasis salsa	8	3	Sol	Df	Vegetative	Good
Herbaceous layer						
Anabasis brachiata	10	<1	Sol	Df	Vegetative	Good
Eremopyrum orientale	7	<0,5	Sol	Df	Dying	Normal
Plantago minuta	4	<0,1	Sol	Df	Fruition	Good
Arnebia decumbens	8	<0,5	Sol	Df	Flower/Fru-ition	Good
Ranunculus testiculatus	4	<0,1	Sol	Df	Fruition	Good
Astragalus spp.	5	<0,1	Sol	Df	Fruition	Good
Senecio glaucus subsp. coronopifolius	7	<0,5	Sol	Df	Flower/Fru-ition	Good

Sample Plot #	B10p					
Photos B10p.1, B10p.2 and B10p.3						
Size	10 x 10 m					
Date	20.05.2024					
Coordinates	42°26'1.03"N 54°29'38.98"E					
Position in the landscape	Undulating plain					
Height (m vertical coordinate)	185					
Terrain	Plain					
Soils	Gray-brown argillaceous					
Water regime	Precipitations					
Community name	***Caroxylon orientale-Anabasis salsa* with *Haloxylon***					
Dominants	*Anabasis salsa, Caroxylon orientale*					
Position in succession	Stable plant community					
Projective cover (%)	2025					
Plant litter (%)	-					
Shrub-dwarf semishrubs (%)	Up to 2022					
Herbaceous cover (%)	<1					
Shrub-semishrub layer, height (cm)	Up to 220					
Herbaceous layer, height (cm)	Up to 15					
Factors and degree of disturbance	Slightly disturbed, burrowing animals colonies, dirt road network					
Signs of abnormal plant development	Not observed					
Scientific name of plant species	Height	Plant cover (%)	Abun-dance	Espace-ment	Phe-nophase	Zoetic condition
Shrub						
Haloxylon ammodendron	220	23	Sol	Df	Vegetative	Good
Shrub						
Oreosalsola arbusculiformis	45	<1	Sol	Df	Vegetative	Good
Semi-shrub						
Caroxylon orientale	35	5	Sp	Df	Vegetative	Good
Dwarf shrub						
Anabasis salsa	8	1015	Sp	Df	Vegetative	Good
Herbaceous layer						
Eremopyrum orientale	8	<0,5	Sol	Df	Dying	Normal
Plantago minuta	4	<0,5	Sol	Df	Fruition	Good
Arnebia decumbens	5	<0,5	Sol	Df	Flower/Fru-ition	Good
Senecio glaucus subsp. coronopifolius	7	<0,1	Sol	Df	Flower/Fru-ition	Good
Euphorbia inderiensis	15	<0,1	Sol	Df	Fruition	Good

Sample Plot #	B11p					
Photos B11p, and B11p.1						
Size	10 x 10 m					
Date	20.05.2024					
Coordinates	42°25’27.66’’N 54°33’25.82’’E					
Position in the landscape	Undulating plain					
Height (m vertical coordinate)	188					
Terrain	Plain					
Soils	Takyr					
Water regime	Precipitations					
Community name	**Sporadical *Caroxylon orientale***					
Dominants	-					
Position in succession	Stable plant community					
Projective cover (%)	<1					
Plant litter (%)	-					
Shrubs and semi-shrubs (%)	<1					
Herbaceous cover (%)	0					
Shrub-semishrub layer, height (cm)	Up to 15					
Factors and degree of disturbance	Slightly disturbed, dirt road network					
Signs of abnormal plant development	Not observed					
Scientific name of plant species	Height	Plant cover (%)	Abun-dance	Espace-ment	Phe-nophase	Zoetic condition
Semi-shrub						
Caroxylon orientale	30	<1	UnSol	Dfgr	Vegetative	Normal

Sample Plot #	B12p
Photos B12p, B12p.1 and B12p.2	
Size	10 x 10 m
Date	20.05.2024
Coordinates	42°24’20.88’’N 54°40’45.16’’E
Position in the landscape	Undulating plain
Height (m vertical coordinate)	197
Terrain	Plain
Soils	Gray-brown alkaline
Water regime	Precipitations
Community name	***Anabasis salsa-Caroxylon orientale***
Dominants	*Anabasis salsa, Caroxylon orientale*
Position in succession	Stable plant community
Projective cover (%)	25-30
Plant litter (%)	-
Shrub-dwarf semishrubs (%)	Up to 27
Herbaceous cover (%)	1
Shrub-semishrub layer, height (cm)	Up to 40
Herbaceous layer, height (cm)	Up to 15
Factors and degree of disturbance	Slightly disturbed, burrowing animals colonies, dirt road network
Signs of abnormal plant development	Not observed
Additions	40% *Caroxylon orientale* dead

Scientific name of plant species	Height	Plant cover (%)	Abun-dance	Espace-ment	Phe-nophase	Zoetic condition
Semi-shrub						
Caroxylon orientale	40	20	Sp	Df	Dead	De-pressed
Dwarf shrub						
Anabasis salsa	8	7	Sp	Df	Vegetative	Good
Herbaceous layer						
Eremopyrum orientale	7	<0,5	Sol	Df	Dying	Normal
Plantago minuta	4	<0,1	Sol	Df	Fruition	Good
Arnebia decumbens	12	<0,5	Sol	Df	Fruition	Good
Senecio glaucus subsp. coronopifolius	7	<0,1	Sol	Df	Flower/Fru-ition	Good
Euphorbia inderiensis	10	<0,1	Sol	Df	Fruition	Good
Arenaria leptoclados	7	<0,5	Sol	Df	Fruition	Good
Nonea caspica	3	<0,1	Sol	Df	Flower	Good
Hypecoum pendulum var. pendulum	15	<0,1	Sol	Df	Fruition	Good
Koelpinia linearis	10	<0,1	Sol	Df	Fruition	Good
Zygophyllum lehmannianum	5	<0,5	Sol	Df	Fruition	Good

Sample Plot #	U8p
Photo U8p	

Size	10 x 10 m
Date	19.05.2024
Coordinates	43°29'32.46"N 55°33'4.09"E
Position in the landscape	Gently undulating plain
Elevation (m abs.alt.)	250
Terrain	Plain
Soils	Gray-brown alkaline
Water regime	Precipitations
Community name	**Ferula assafoetida-Anabasis**
Dominants	Caroxylon orientale, Anabasis salsa
Position in succession	Stable plant community
Projective cover (%)	25-30
Plant litter (%)	-
Shrubs and semi-shrubs (%)	25-30
Herbaceous cover (%)	2
Shrub-semishrub layer, height (cm)	Up to 30
Herbaceous layer, height (cm)	Up to 15
Factors and degree of disturbance	Slightly disturbed, dirt road network
Signs of abnormal plant development	Not observed

Plant name	Height	Plant cover (%)	Abun-dance	Espace-ment	Phe-nophase	Zoetic condition
Semi-shrub						
Caroxylon orientale	30	10	Sp	Df	Vegitative	Normal
Dwarf shrub						
Artemisia terrae-albae	25	1	Sol	Grr	Vegitative	Normal
Nanophyton erinaceum	3-5	2	Sol	Df	Vegitative	Normal
Anabasis salsa	7	15-20	Sp	Df	Vegitative	Normal
Herbaceous layer						
Astragalus ustiurtensis	15	<1	Sol	Gr	Fruition	Normal
Anabasis brachiata	15	2	Sol	Df	Vegitative	Normal
Arnebia decumbens	7	<0.5	Sol	Df	Flowering	Normal
Eremopyrum orientale	10	<1	Sol	Df	Dead	Normal
Lepidium perfoliatum	10	<1	Sol	Df	Dead	Normal
Senecio glaucus subsp. Coronopifolius	8	<1	Sol	Df	Flowering	Normal
Zygophyllum ovigerum	10	<1	Sol	Df	Fruition	Normal

Sample Plot #	U9p
Photo U9p	
Size	10 x 10 m
Date	19.05.2024
Coordinates	43°16'33.93"N 55°33'2.23"E
Position in the landscape	Gently undulating plain
Elevation (m abs.alt.)	270
Terrain	Plain
Soils	Gray-brown alkaline
Water regime	Precipitations
Community name	***White-ground with* wormwood *with Anabasis salsa***
Dominants	*Artemisia terrae-albae, Anabasis salsa*
Position in succession	Stable plant community
Projective cover (%)	30-35
Plant litter (%)	-
Shrubs and semi-shrubs (%)	30-35
Herbaceous cover (%)	1–2
Shrub-semishrub layer, height (cm)	Up to 45
Herbaceous layer, height (cm)	Up to 30
Factors and degree of disturbance	Slightly disturbed, dirt road network
Signs of abnormal plant development	Not observed
Additions	

Scientific name of plant species	Height	Plant cover (%)	Abun-dance	Espace-ment	Phe-nophase	Zoetic condition
Semi-shrub						
Caroxylon orientale	30	1	Sol	Df	Vegetative	Normal
Anabasis aphylla	45	<1	Sol	Df	Vegetative	Normal
Dwarf shrub						
Artemisia terrae-albae	25	25-30	Sp-Cop1	Df	Vegetative	Normal
Anabasis salsa	7	3	Sol	Df	Vegetative	Normal
Herbaceous layer						
Rheum tataricum	5	1-2	Sol	Df	Dead	Normal
Ferula tatarica	30	<0.5	Sol	Df	Flowering	Normal
Fritillaria karelinii	10	-	Un	-	Fruition	Normal

Sample Plot #	U10p
Photo U10p	
Size	10 x 10 m
Date	19.05.2024
Coordinates	42°52’46.31’’N 55°22’9.29’’E
Position in the landscape	Gently undulating plain
Elevation (m abs.alt.)	250
Terrain	Plain
Soils	Gray-brown alkaline
Water regime	Precipitations
Community name	***Caroxylon orientale-Anabasis***
Dominants	*Caroxylon orientale, Anabasis salsa*
Position in succession	Stable plant community
Projective cover (%)	25-30
Plant litter (%)	-
Shrubs and semi-shrubs (%)	25-30
Herbaceous cover (%)	2
Shrub-semishrub layer, height (cm)	Up to 30
Herbaceous layer, height (cm)	Up to 15
Factors and degree of disturbance	Slightly disturbed, dirt road network
Signs of abnormal plant development	Not observed
Additions	

Scientific name of plant species	Height	Plant cover (%)	Abun-dance	Espace-ment	Phe-nophase	Zoetic condition
Semi-shrub						
Caroxylon orientale	30	10	Sp	Df	Vegetative	Normal
Dwarf shrub						
Artemisia terrae-albae	25	1	Sol	Grr	Vegetative	Normal
Nanophyton erinaceum	3-5	2	Sol	Df	Vegetative	Normal
Anabasis salsa	7	15-20	Sp	Df	Vegetative	Normal
Herbaceous layer						
Astragalus ustiurtensis	15	<1	Sol	Gr	Fruition	Normal
Anabasis brachiata	15	2	Sol	Df	Vegetative	Normal
Arnebia decumbens	7	<0.5	Sol	Df	Flowering	Normal
Eremopyrum orientale	10	<1	Sol	Df	Dead	Normal
Lepidium perfoliatum	10	<1	Sol	Df	Dead	Normal
Senecio glaucus subsp. Coronopifolius	8	<1	Sol	Df	Flowering	Normal
Zygophyllum ovigerum	10	<1	Sol	Df	Fruition	Normal

Sample Plot #	Z10p					
Photo	Not available					
Size	10 x 10 m					
Date	17.05.2024					
Coordinates	43°33'3.32"N 53°3'8.13"E					
Position in the landscape	Undulating plain					
Height (m vertical coordinate)	222					
Terrain	Plain					
Soils	Grey-brown sabulous					
Water regime	Precipitations					
Community name	**White-ground sagebrush**					
Dominants	*Artemisia terraealbae*					
Position in succession	Stable plant community					
Projective cover (%)	35-40					
Plant litter (%)	-					
Shrubs and semi-shrubs (%)	Up to 30					
Herbaceous cover (%)	Up to 710					
Shrub-semishrub layer, height (cm)	Up to 25					
Herbaceous layer, height (cm)	Up to 50					
Factors and degree of disturbance	Slightly disturbed, dirt road network, grazing					
Signs of abnormal plant development	Not observed					
Scientific name of plant species	Height	Plant cover (%)	Abun-dance	Espace-ment	Phenophase	Zoetic condition
Semi-shrub						
Caroxylon orientale	15	5	Sp	Df	Vegetative	Good
Dwarf shrub						
Artemisia terraealbae	25	25	Sp	Df	Vegetative	Good
Herbaceous layer						
Stipa spp.	15	1	Sol	Df	Vegetative	Good
Iris songarica	50	<1	Sol	Df	Flower	Good
Carex physodes	10	1	Sol	Df	Dying	Normal
Eremopyrum orientale	7	<0,5	Sol	Df	Dying	Normal
Meniocus linifolius	18	<0,5	Sol	Df	Fruition	Good
Koelpinia linearis	13	<0,5	Sol	Df	Fruition	Good
Ceratocarpus arenarius	6	35	SolSp	Df	Fruition	Good
Allium caspium	15	<0,1	UnSol	Df	Flower	Good
Arnebia decumbens	5	<0,1	Sol	Df	Fruition	Good

Sample Plot #	Z15p					
Photo	Not available					
Size	10 x 10 m					
Date	16.05.2024					
Coordinates	43°39'38.40"N 52°24'56.86"E					
Position in the landscape	Undulating plain					
Elevation (m abs.alt.)	200					
Terrain	Plain					
Soils	Gray-brown alkaline					
Water regime	Precipitations					
Community name	***Caroxylon orientale***					
Dominants	*Caroxylon orientale*					
Position in succession	Stable plant community					
Projective cover (%)	15-20					
Plant litter (%)	-					
Shrubs and semi-shrubs (%)	Up to 17					
Herbaceous cover (%)	Up to 3					
Shrub-semishrub layer, height (cm)	Up to 25					
Herbaceous layer, height (cm)	Up to 20					
Factors and degree of disturbance	Mild to moderate disturbance: dirt road network, grazing					
Signs of abnormal plant development	Not observed					
Scientific name of plant species	Height	Plant cover (%)	Abundance	Espace-ment	Phenophase	Zoetic condition
Semi-shrub						
Caroxylon orientale	20	15	Sp	Df	Vegetative	Good
Anabasis aphylla	30	<0,5	Sol	Df	Vegetative	Good
Dwarf shrub						
Artemisia terraealbae	25	12	Sol	Df	Vegetative	Good
Anabasis salsa	7	12	Sol	Df	Vegetative	Good
Herbaceous layer						
Eremopyrum orientale	10	34	Sol	Df	Dying	Normal
Ranunculus testiculatus	5	<0,5	Sol	Df	Fruition	Good
Asparagus breslerianus	20	<0,5	Sol	Df	Fruition	Good
Rheum tataricum	3	<0,5	Sol	Df	Dying	Normal
Tragopogon marginifolius	20	<0,1	UnSol	Df	Flower	Good

Sample Plot #	M3p
Photos M3p, M3p.1, M3p.2 and M3p.3	

Size	10 x 10 m					
Date	21.05.2024					
Coordinates	43°17’19.14"N 52°19’12.68”E					
Position in the landscape	Undulating plain					
Height (m vertical coordinate)	210					
Terrain	Plain					
Soils	Gray-brown alkaline					
Water regime	Precipitations					
Community name	**White-ground sagebrush with *Anabasis salsa***					
Dominants	*Artemisia terrae albae, Anabasis salsa*					
Position in succession	Stable plant community					
Projective cover (%)	25-30 // 10-15					
Plant litter (%)	-					
Shrubs and semi-shrubs (%)	Up to 30 // до 10					
Herbaceous cover (%)	<1					
Shrub-semishrub layer, height (cm)	Up to 25 см					
Herbaceous layer, height (cm)	Up to 10 см					
Factors and degree of disturbance	Slightly disturbed, grazing, dirt road network					
Signs of abnormal plant development	Not observed					
Scientific name of plant species	Height	Plant cover (%)	Abun-dance	Espace-ment	Phe-nophase	Zoetic condition
1. White-ground sagebrush						
Dwarf shrub						
Artemisia terraealbae	25	25	Sp	Df	Vegetative	Good
Anabasis salsa	10	23	Sol	Df	Vegetative	Good
Herbaceous layer						
Eremopyrum orientale	10	<0,5	Sol	Df	Dying	Normal
Lepidium perfoliatum	8	<0,1	Sol	Df	Dying	Normal
2. *Anabasis salsa*						
Dwarf shrub						
Anabasis salsa	10	10	Sp	Df	Vegetative	Good
Artemisia terraealbae	25	1	Sol	Df	Vegetative	Good
Herbaceous layer						
Fritillaria karelinii	12		Un		Fruition	Good
Eremopyrum orientale	10	<0,1	Sol	Df	Dying	Normal
Lepidium perfoliatum	8	<0,1	Sol	Df	Dying	Normal

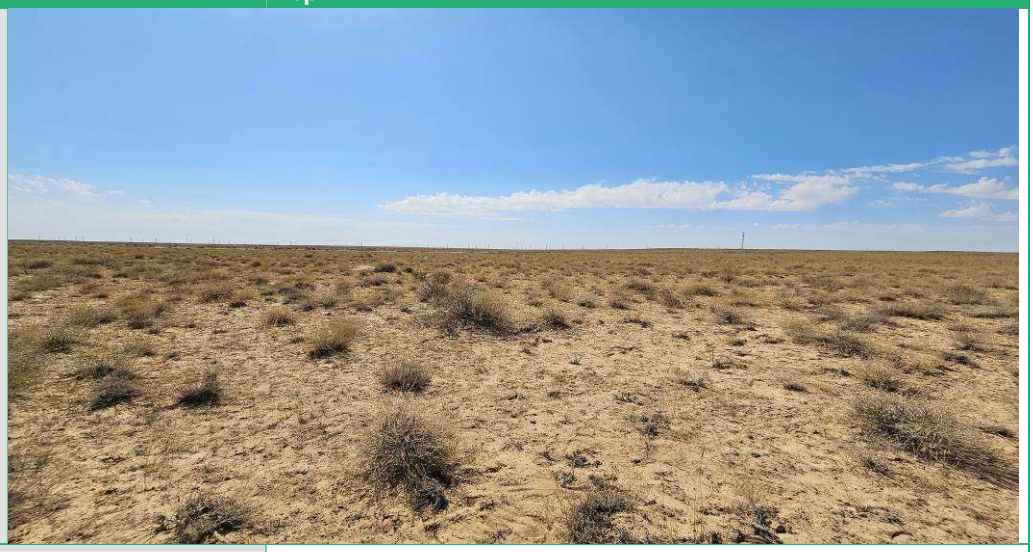
Sample Plot #	M11p					
Photo	Not available					
Size	10 x 10 m					
Date	17.05.2024					
Coordinates	42°53'17.82"N 52°38'54.16"E					
Position in the landscape	Uhdulating plain					
Height (m vertical coordinate)	170					
Terrain	Plain					
Soils	Solonchaks					
Water regime	Precipitations					
Community name	**Ephemeral-Halocnemum strobilaceum**					
Dominants	*Halocnemum strobilaceum, Eremopyrum orientale*					
Position in succession	Stable plant community					
Projective cover (%)	35-40					
Plant litter (%)	-					
Shrubs and semi-shrubs (%)	Up to 15					
Herbaceous cover (%)	Up to 20					
Shrub-semishrub layer, height (cm)	1020					
Herbaceous layer, height (cm)	12					
Factors and degree of disturbance	Low degree of disturbance, dirt road network, grazing					
Signs of abnormal plant development	Not observed					
Scientific name of plant species	Height	Plant cover (%)	Abun-dance	Espace-ment	Phe-nophase	Zoetic condition
Semi-shrub						
Halocnemum strobilaceum	1015	10	Sp	Df	Vegetative	Good
Dwarf shrub						
Artemisia kemrudica	20	35	SolSp	Dfgr	Vegetative	Good
Herbaceous layer						
Asparagus breslerianus	30	<0,5	Sol	Df	Fruition	Good
Eremopyrum orientale	12	20	Sp	Df	Dying	Normal
Lepidium perfoliatum	12	<1	Sol	Df	Dying	Normal
Lappula spinocarpos subsp. ceratophora	11	<0,5	Sol	Df	Fruition	Good

Sample Plot #	M12p
Photos M12p and M12p.1	

Size	10 x 10 m
Date	17.05.2024
Coordinates	42°48’30.00’’N 52°40’41.72’’E
Position in the landscape	Undulating plain
Height (m vertical coordinate)	146
Terrain	Plain
Soils	Solonchaks
Water regime	Precipitations
Community name	***Ephemeral-Halocnemum strobilaceum***
Dominants	*Halocnemum strobilaceum, Eremopyrum orientale*
Position in succession	Stable plant community
Projective cover (%)	25-30
Plant litter (%)	-
Shrubs and semi-shrubs (%)	Up to 17
Herbaceous cover (%)	10
Shrub-semishrub layer, height (cm)	Up to 20
Herbaceous layer, height (cm)	Up to 15
Factors and degree of disturbance	Low degree of disturbance, dirt road network, grazing
Signs of abnormal plant development	Not observed

Scientific name of plant species	Height	Plant cover (%)	Abun-dance	Espace-ment	Phe-nophase	Zoetic condition
Semi-shrub						
Halocnemum strobilaceum	1015	15	Sp	Df	Vegetative	Good
Dwarf shrub						
Artemisia kemrudica	20	1	Sol	Df	Vegetative	Good
Nanophyton erinaceum	5	1	Sol	Df	Vegetative	Good
Herbaceous layer						
Anabasis brachiata	10	1	Sol	Df	Vegetative	Good
Eremopyrum orientale	12	10	Sp	Df	Dying	Normal
Lepidium perfoliatum	10	<0,5	Sol	Df	Dying	Normal
Centaurea spp.	15	<1	Sol	Df	Flower	Good

Sample Plot #	L3p					
Photo	Not available					
Size	10 x 10 m					
Date	20.05.2024					
Coordinates	42°29'31.83"N 54°15'51.22"E					
Position in the landscape	Undulating plain					
Height (m vertical coordinate)	134					
Terrain	Plain					
Soils	Takyr					
Water regime	Precipitations					
Community name	**Sporadical *Salsola gemmascens Pall.***					
Dominants	*Caroxylon gemmascens*					
Position in succession	Stable plant community					
Projective cover (%)	<1					
Plant litter (%)	-					
Shrubs and semi-shrubs (%)	<1					
Herbaceous cover (%)	0					
Shrub-semishrub layer, height (cm)	Up to 35					
Herbaceous layer, height (cm)	-					
Factors and degree of disturbance	Slightly disturbed, dirt road network					
Signs of abnormal plant development	Not observed					
Scientific name of plant species	Height	Plant cover (%)	Abun-dance	Espace-ment	Phe-nophase	Zoetic condition
Dwarf shrub						
Caroxylon gemmascens	35	<1	UnSol	Df	Vegetative	Normal
Shrub						
Atraphaxis spinosa	90	<1	Sol	Df	Veg. ends	Normal.
Semi-shrub						
Caroxylon orientale	25	<1	Sol	Df	Veg./Fruit.	Normal
Capparis spinosa var. herbacea	--	<0.5	Sol	Df	Veg. ends	Normal
Alhagi pseudalhagi	10	<1	Sol	Df	Dying	Normal
Herbaceous layer						
Anabasis eriopoda	8	<0.5	Sol	Df	Fruition	Normal
Zygophyllum ovigerum	45	<0.5	Sol	Df	Veg. ends	Normal
Soda foliosa	3	--	Un	--	Fruition.	Normal

Sample Plot #	L6p					
Photos L6p, L6p.1, L6p.2, L6p.3, L6p.4, L6p.5, L6p.6 and L6p.7						
Size	10 x 10 m					
Date	17.05.2024					
Coordinates	43°27'5.84"N 52°19'29.45"E					
Position in the landscape	Undulating plain					
Height (m vertical coordinate)	220					
Terrain	Plain					
Soils	Grey-brown sabulous					
Water regime	Precipitations					
Community name	**Caroxylon orientale-White-ground sagebrush with Siberian wheatgrass**					
Dominants	*Artemisia terraealbae, Caroxylon orientale*					
Position in succession	Stable plant community					
Projective cover (%)	30-35					
Plant litter (%)	-					
Shrubs and semi-shrubs (%)	Up to 30					
Herbaceous cover (%)	Up to 5					
Shrub-semishrub layer, height (cm)	Up to 25					
Herbaceous layer, height (cm)	Up to 15					
Factors and degree of disturbance	Slightly disturbed, dirt road network, grazing					
Signs of abnormal plant development	Not observed					
Scientific name of plant species	Height	Plant cover (%)	Abun-dance	Espace-ment	Phe-nophase	Zoetic condition
Semi-shrub						
Caroxylon orientale	25	5	Sp	Df	Vegetative	Good
Dwarf shrub						
Artemisia terraealbae	25	25	Sp	Df	Vegetative	Good
Herbaceous layer						
Agropyron fragile	15	3	Sol	Df	Vegetative	Good
Iris songarica	50	<1	Sol	Df	Flower	Good
Carex physodes	10	1	Sol	Df	Dying	Normal
Eremopyrum orientale	7	<0,5	Sol	Df	Dying	Normal
Poa bulbosa	13	<0,5	Sol	Df	Dying	Normal

Sample Plot #	L7p					
Photo	Not available					
Size	10 x 10 m					
Date	18.05.2024					
Coordinates	43°17'46.81"N 52°10'15.15"E					
Position in the landscape	Undulating plain					
Height (m vertical coordinate)	146					
Terrain	Plain					
Soils	Gray-brown alkaline					
Water regime	Precipitations					
Community name	***Anabasis***					
Dominants	*Anabasis brachiata*					
Position in succession	Stable plant community					
Projective cover (%)	10					
Plant litter (%)	-					
Shrubs and semi-shrubs (%)	Up to 5					
Herbaceous cover (%)	Up to 5					
Shrub-semishrub layer, height (cm)	Up to 25					
Herbaceous layer, height (cm)	Up to 13					
Factors and degree of disturbance	Slightly disturbed, dirt road network, grazing					
Signs of abnormal plant development	Not observed					
Scientific name of plant species	Height	Plant cover (%)	Abun-dance	Espace-ment	Phe-nophase	Zoetic condition
Dwarf shrub						
Artemisia terraealbae	25	12	Sol	Df	Vegetative	Good
Nanophyton erinaceum	5	23	Sol	Df	Vegetative	Good
Herbaceous layer						
Anabasis brachiata	10	5	Sp	Df	Vegetative	Good
Eremopyrum orientale	7	<0,5	Sol	Df	Dying	Normal
Poa bulbosa	13	<0,5	Sol	Df	Dying	Normal

Sample Plot #	L8p					
Photo	Not available					
Size	10 x 10 m					
Date	17.05.2024					
Coordinates	43°12'11.87"N 51°57'14.76"E					
Position in the landscape	Gently undulating plain					
Height (m vertical coordinate)	107					
Terrain	Plain					
Soils	Grey-brown salty					
Water regime	Precipitations					
Community name	Caroxylon orientale					
Dominants	Caroxylon orientale					
Position in succession	Stable plant community					
Projective cover (%)	20-25					
Plant litter (%)	-					
Semishrub-dwarf semishrub (%)	22					
Herbaceous cover (%)	1-2					
Shrub-semishrub layer, height (cm)	Up to 50					
Herbaceous layer, height (cm)	Up to 30					
Factors and degree of disturbance	Slightly disturbed, grasing, sporadically digged soil					
Signs of abnormal plant development	Not observed					
Scientific name of plant species	Height	Plant cover (%)	Abudance	Espace-ment	Phe-nophase	Zoetic condition
Shrub						
Atraphaxis spinosa	50	<1	Sol	Df	End of veg-etation	Normal
Semi-shrub						
Caroxylon orientale	30	15	Sp	Df	Fruition	Normal
Dwarf shrub						
Artemisia gurganica	40	2-3	Sol	Df	Bud-for-mation	Normal
Artemisia terrae-albae	30	1	Sol	Df	Bud-for-mation	Normal
Anabasis salsa	20	3-5	Sol- Sp	Df	Fruition	Normal
Herbaceous layer						
Anabasis eriopoda	10	<1	Sol	Gr	Fruition	Normal
Lepidium perfoliatum	10	<0.5	Sol	Df	Dying	Normal
Eremopyrum orientale	10	1	Sol	Df	Dying	Normal
Girgensohnia oppositiflora	30	<1	Sol	Df	Fruition	Normal
Ceratocarpus arenarius	15	<1	Sol	Df	Fruition	Normal
Pyankovia brachiata	25	<1	Sol	Df	Fruition	Normal
Alyssum desertorum	5	<0.5	Sol	Df	Dying	Normal

Sample Plot #	L10p					
Photo	Not available					
Size	10 x 10 m					
Date	20.05.2024					
Coordinates	42°28'9.26"N 54°13'35.93"E					
Position in the landscape	Gently undulating plain					
Height (m vertical coordinate)	106					
Terrain	Plain					
Soils	Grey-brown alkaline					
Water regime	Precipitations					
Community name	**Anabasis salsa-Salsola gemmascens**					
Dominants	Anabasis salsa					
Position in succession	Stable plant community					
Projective cover (%)	35-40					
Plant litter (%)	-					
Shrubs and semi-shrubs (%)	Up to 35					
Herbaceous cover (%)	Up to 2					
Shrub-semishrub layer, height (cm)	Up to 45					
Herbaceous layer, height (cm)	Up to 10					
Factors and degree of disturbance	Slightly disturbed, dirt road network					
Signs of abnormal plant development	Not observed					
Additions	80% Caroxylon gemmascens in dry condition					
Scientific name of plant species	Height	Plant cover (%)	Abudance	Espace-ment	Phe-nophase	Zoetic condition
Dwarf shrub						
Caroxylon gemmascens	45	30	Cop1	Df	Vegetative, dry	De-pressed
Anabasis salsa	8	5	Sol	Df	Vegetative	Normal
Artemisia kemrudica	25	<1	Sol	Df	Vegetative	Normal
Herbaceous layer						
Anabasis brachiata	10	1-2	Sol	Df	Vegetative	Normal
Eremopyrum orientale	8	<0.5	Sol	Df	Dying	Normal
Plantago minuta	3	<0.1	Sol	Df	Fruition	Normal
Arnebia decumbens	5	<0.1	Sol	Df	Fruition	Normal
Senecio glaucus subsp. coronopifolius	7	<0.5	Sol	Df	Flower/Fru-ition	Normal
Euphorbia inderiensis	10	<0.1	Sol	Df	Fruition	Normal

Sample Plot #	L11p					
Photo	Not available					
Size	10 x 10 m					
Date	20.05.2024					
Coordinates	42°26'14.71"N 54°21'45.28"E					
Position in the landscape	Gently undulating plain					
Height (m vertical coordinate)	192					
Terrain	Plain					
Soils	Takyr					
Water regime	Precipitations					
Community name	**Perennial halophytic**					
Dominants	Anabasis salsa, Caroxylon orientale					
Position in succession	Stable plant community					
Projective cover (%)	5-10					
Plant litter (%)	-					
Shrubs and semi-shrubs (%)	Up to 7					
Herbaceous cover (%)	<1					
Shrub-semishrub layer, height (cm)	Up to 200					
Herbaceous layer, height (cm)	Up to 10					
Factors and degree of disturbance	Slightly disturbed, burrowing animals colonies, dirt road network					
Signs of abnormal plant development	Not observed					
Additions	Burrowing animals colonies, probably abandoned					
Scientific name of plant species	Height	Plant cover (%)	Abudance	Espace-ment	Phe-nophase	Zoetic condition
Tree or shrub						
Haloxylon ammodendron	200	2	Sol	Df	Vegetative	Normal
Semi-shrub						
Caroxylon orientale	35	2-3	Sol	Df	Vegetative	Normal
Dwarf shrub						
Artemisia kemrudica	25	<0.5	Un-Sol	Df	Vegetative	Normal
Anabasis salsa	8	3	Sol	Df	Vegetative	Normal
Herbaceous layer						
Anabasis brachiata	10	<1	Sol	Df	Vegetative	Normal
Eremopyrum orientale	7	<0.5	Sol	Df	Dying	Normal
Plantago minuta	4	<0.1	Sol	Df	Fruition	Normal
Arnebia decumbens	8	<0.5	Sol	Df	Flower/Fru-ition	Normal
Ranunculus testiculatus	4	<0.1	Sol	Df	Fruition	Normal
Astragalus spp.	5	<0.1	Sol	Df	Fruition	Normal
Senecio glaucus subsp. coronopifolius	7	<0.5	Sol	Df	Flower/Fru-ition	Normal

Sample Plot #	L12p					
Photo	Not available					
Size	10 x 10 m					
Date	20.05.2024					
Coordinates	42°24'54.44"N 54°27'30.59"E					
Position in the landscape	Gently undulating plain					
Height (m vertical coordinate)	185					
Terrain	Plain					
Soils	Grey-brown loamy					
Water regime	Precipitations					
Community name	**Caroxylon orientale-Anabasis salsa with Halóxylon**					
Dominants	Anabasis salsa, Caroxylon orientale					
Position in succession	Stable plant community					
Projective cover (%)	20-25					
Plant litter (%)	-					
Shrubs and semi-shrubs (%)	Up to 20-22					
Herbaceous cover (%)	<1					
Shrub-semishrub layer, height (cm)	Up to 220					
Herbaceous layer, height (cm)	Up to 15					
Factors and degree of disturbance	Slightly disturbed, burrowing animals colonies, dirt road network					
Signs of abnormal plant development	Not observed					
Scientific name of plant species	Height	Plant cover (%)	Abudance	Espace-ment	Phe-nophase	Zoetic condition
Tree or shrub						
Haloxylon ammodendron	220	2-3	Sol	Df	Vegetative	Normal
Shrub						
Oreosalsola arbusculiformis	45	<1	Sol	Df	Vegetative	Normal
Semi-shrub						
Caroxylon orientale	35	5	Sp	Df	Vegetative	Normal
Dwarf shrub						
Anabasis salsa	8	10-15	Sp	Df	Vegetative	Normal
Herbaceous layer						
Eremopyrum orientale	8	<0.5	Sol	Df	Dying	Normal
Plantago minuta	4	<0.5	Sol	Df	Fruition	Normal
Arnebia decumbens	5	<0.5	Sol	Df	Flower/Fru-ition	Normal
Senecio glaucus subsp. coronopifolius	7	<0.1	Sol	Df	Flower/Fru-ition	Normal
Euphorbia inderiensis	15	<0.1	Sol	Df	Fruition	Normal

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Sample Plot #	L1p
Photos L1p, L1p.1 and L1p.2	
Size	10 x 10 m
Date	6.09.2024
Coordinates	42°48'12.69"N 52°44'27.10"E
Position in the landscape	Undulating plain
Height (m vertical coordinate)	88
Terrain	Plain
Soils	Grey-brown salty
Water regime	Precipitations
Community name	**Perennial halophytic with Artemisia**
Dominants	Caroxylon gemmascens, Anabasis salsa
Position in succession	Stable plant community
Projective cover (%)	20-25
Plant litter (%)	-
Semishrub-dwarf semishrub (%)	19
Herbaceous cover (%)	6
Shrub-semishrub layer, height (cm)	Up to 30
Herbaceous layer, height (cm)	Up to 17
Factors and degree of disturbance	Slightly disturbed, dirt road network, beside OHTL and gas pipeline
Signs of abnormal plant development	Not observed

Scientific name of plant species	Height	Plant cover (%)	Abudance	Espace-ment	Phe-nophase	Zoetic condition
Semi-shrub						
Caroxylon gemmascens	25	7-10	Sp	Df	Flowering	Normal
Dwarf shrub						
Artemisia kemrudica	30	1-2	Sol	Df	Bud-formation	Normal
Artemisia terrae-albae	27	1-2	Sol	Df	Bud-formation	Normal
Anabasis salsa	15	5	Sp	Df	Flower-ing/Fruition	Normal
Nanophyton erinaceum	10	<1	Sol	Df	Fruition	Normal
Herbaceous layer						
Anabasis brachiata	10	2-3	Sol	Gr	Fruition	Normal
Lepidium perfoliatum	17	<0.5	Sol	Df	Dying	Normal
Eremopyrum triticeum	15	3-5	Sol-Sp	Df	Dying	Normal
Girgensohnia oppositiflora	6	<0.5	Sol	Df	Fruition	Normal
Fritillaria karelinii	10	--	Un-Sol	Df	Dying	Normal
Halimocnemis sclerosperma	6	<0.5	Un-Sol	Df	Fruition	Normal
Tetracme spp.	12	<0.5	Sol	Df	Dying	Normal

Sample Plot #	L2p					
Photo	Not available					
Size	10 x 10 m					
Date	9.09.2024					
Coordinates	42°25'4.27"N 53°46'2.23"E					
Position in the landscape	Ridge-cellular sands					
Height (m vertical coordinate)	26					
Terrain	Low ridges					
Soils	Sandy					
Water regime	Precipitations					
Community name	**Sparse Haloxylon**					
Dominants	Haloxylon ammodendron, Artemisia kemrudica					
Position in succession	Stable plant community					
Projective cover (%)	15–25 (together with – up to 35%)					
Plant litter (%)	-					
Semishrub-dwarf semishrub (%)	25					
Herbaceous cover (%)	<1					
Shrub-semishrub layer, height (cm)	170					
Herbaceous layer, height (cm)	Up to 150					
Factors and degree of disturbance	Slightly disturbed, dirt road network					
Signs of abnormal plant development	Not observed					
Additions	Abundant moss Syntrichia caninervis – 5–10% + to TPC					
Scientific name of plant species	Height	Plant cover (%)	Abudance	Espace-ment	Phe-nophase	Zoetic condition
Tree						
Haloxylon ammodendron	170	15-20	Sp	Df	Fruition	Normal
Shrub						
Calligonum caput-medusae	90	1-2	Sol	Df	Fruition	Normal
Ammodendron eichwaldii	80	<1	Sol	Df	End of vegetation	Normal
Ephedra strobilacea	35	<1	Sol	Df	Vegetative	Normal
Atraphaxis replicata	75	<1	Sol	Df	End of vegetation	Normal
Semi-shrub						
Caroxylon orientale	50	<1	Sol	Df	Fruition	Normal
Dwarf shrub						
Xylosalsola arbuscula	80	1	Sol	Df	Fruition	Normal
Dwarf shrub						
Artemisia kemrudica	28	3-5	Sol-Sp	Df	Bud-for-mation	Normal
Herbaceous layer						
Ferula foetida	150	<0.5	Sol	Df	Dying	Normal
Bassia laniflora	28	<0.5	Sol	Df	Fruition	Normal
Salsola tragus	10	<0.5	Sol	Df	Dying	Normal
Climacoptera obtusifolia	23	<0.5	Sol	Df	Fruition	Normal
Carex physodes	10	<0.5	Sol	Df	Dying	Normal
Eremopyrum orientale	5	<0.5	Sol	Df	Dying	Normal
Ceratocarpus arenarius	5	<0.5	Sol	Df	Dying	Normal
Stipagrostis pennata	50	<1	Sol	Df	Dying	Normal
Haplophyllum versicolor	60	<0.5	Un-Sol	Df	Dying	Normal
Heliotropium spp.	5	--	Un	--	Vegetative	Normal

Sample Plot #	L3p
Photos L3p, L3p.1 and L3p.2	

Size	10 x 10 m
Date	9.09.2024
Coordinates	42°29'31.83"N 54°15'51.22"E
Position in the landscape	Undulating plain with hillocks and takyrs in depressions
Height (m vertical coordinate)	110
Terrain	Plain
Soils	Grey-brown salty
Water regime	Precipitations
Community name	Perennial halophytic-Artemisia
Dominants	Artemisia kemrudica, Caroxylon gemmascens
Position in succession	Digressed plant formation
Projective cover (%)	20-25
Plant litter (%)	-
Semishrub-dwarf semishrub (%)	20
Herbaceous cover (%)	<1
Shrub-semishrub layer, height (cm)	Up to 90
Herbaceous layer, height (cm)	Up to 25
Factors and degree of disturbance	Slightly disturbed, draught, dirt road network,
Signs of abnormal plant development	Not observed
Additions	Almost all Artemisia is in dry condition, probably to drought-ridden years. Amount of live plants is <1%.

Scientific name of plant species	Height	Plant cover (%)	Abudance	Espacement	Phenophase	Zoetic condition
Shrub						
Atraphaxis replicata	75	<1	Sol	Df	End of vegetation	Normal
Semi-shrub						
Caroxylon orientale	40	3	Sol	Df	Fruition	Normal
Dwarf shrub						
Xylosalsola arbuscula	90	<1	Sol	Df	Fruition	Normal
Dwarf shrub						
Caroxylon gemmascens	35	3-5	Sol-Sp	Df	Fruition	Normal
Anabasis salsa	25	1-2	Sol	Df	Fruition	Normal
Artemisia kemrudica	30	10	Sp	Df	Dying	Heavily depressed
Herbaceous layer						
Anabasis brachiata	10	<1	Sol	Df	Fruition	Normal
Girgensohnia oppositiflora	25	<0.5	Sol	Df	Fruition	Normal
Eremopyrum orientale	12	<0.5	Sol	Df	Dying	Normal
Ceratocarpus arenarius	10	<0.5	Sol	Df	Fruition	Normal
Carex physodes	15	<1	Sol	Df	Dying	Normal

Sample Plot #	L4p
Photos L4p, L4p.1, L4p.2, L4p.3 and L4p.4	

Size	10 x 10 m
Date	10.09.2024
Coordinates	42°54'13.84"N 55°28'40.80"E
Position in the landscape	Undulating plain
Height (m vertical coordinate)	239
Terrain	Plain
Soils	Grey-brown salty
Water regime	Precipitations
Community name	**Anabasis salsa**
Dominants	Anabasis salsa
Position in succession	Stable plant community
Projective cover (%)	15-20
Plant litter (%)	-
Semishrub-dwarf semishrub (%)	20
Herbaceous cover (%)	<0.5
Shrub-semishrub layer, height (cm)	Up to 40
Herbaceous layer, height (cm)	Up to 20
Factors and degree of disturbance	Slightly disturbed, dirt road network, grazing
Signs of abnormal plant development	Not observed
Additions	Locally heavily depressed on the numerous dirt roads crossings. Some areas are plantless

Scientific name of plant species	Height	Plant cover (%)	Abudance	Espace-ment	Phe-nophase	Zoetic condition
Semi-shrub						
Caroxylon orientale	40	1-2	Sol	Df	Fruition	Normal
Dwarf shrub						
Anabasis salsa	15	18	Sp	Df	Fruition	Normal
Artemisia kemrudica	27	<1	Sol	Gr	Bud-for-mation	Normal
Nanophyton erinaceum	6	<0.5	Sol	Df	Fruition	Normal
Herbaceous layer						
Medicago medicaginoides	10	<0.5	Sol	Df	Dying	Normal
Girgensohnia oppositiflora	8	<0.5	Sol	Df	Dying	Normal
Eremopyrum orientale	3	<0.5	Sol	Df	Dying	Normal
Peganum harmala	20	<0.5	Un-Sol	Df	Dying	Normal
Ceratocarpus arenarius	7	<0.5	Sol	Df	Dying	Normal
Tetracme spp.	10	<0.5	Sol	Df	Dying	Normal

Sample Plot #	L5p					
Photos L5p, L5p.1, L5p.2, L5p.3 and L5p.4						
Size	10 x 10 m					
Date	5.09.2024					
Coordinates	43°32'19.27"N 52°29'54.09"E					
Position in the landscape	Undulating plain beside with place Karamandybas					
Height (m vertical coordinate)	290					
Terrain	Plain					
Soils	Grey-brown salty					
Water regime	Precipitations					
Community name	**Anabasis salsa**					
Dominants	Anabasis salsa					
Position in succession	Stable plant community					
Projective cover (%)	10-20					
Plant litter (%)	-					
Semishrub-dwarf semishrub (%)	15					
Herbaceous cover (%)	<1					
Shrub-semishrub layer, height (cm)	Up to 23					
Herbaceous layer, height (cm)	Up to 30					
Factors and degree of disturbance	Slightly disturbed, grasing, dirt road network					
Signs of abnormal plant development	Not observed					
Additions	Some areas are plantless.					
Scientific name of plant species	Height	Plant cover (%)	Abudance	Espace-ment	Phe-nophase	Zoetic condition
Dwarf shrub						
Anabasis salsa	15	10-15	Sp	Df	Fruition	Normal
Artemisia terrae-albae	23	1	Sol	Df	Bud-for-mation	Normal
Nanophyton erinaceum	5	<1	Sol	Df	Fruition	Normal
Herbaceous layer						
Halimocnemis sclerosperma	10	<0.5	Sol	Df	Fruition	Normal
Anabasis eriopoda	10	<0.5	Sol	Df	Fruition	Normal
Eremopyrum orientale	5	<0.5	Sol	Df	Dying	Normal
Peganum harmala	30	<1	Sol	Df	Dying	Normal
Ceratocarpus arenarius	5	<0.5	Sol	Df	Dying	Normal

Sample Plot #	L6p					
Photos L6p, L6p.1, L6p.2, L6p.3, L6p.4, L6p.5, L6p.6 and L6p.7						
Size	10 x 10 m					
Date	4.09.2024					
Coordinates	43°27'5.84"N 52°19'29.45"E					
Position in the landscape	Gently undulating plain					
Height (m vertical coordinate)	227					
Terrain	Plain					
Soils	Sandy					
Water regime	Precipitations					
Community name	Artemisia-Caroxylon orientale					
Dominants	Krascheninnikovia ceratoides, Artemisia lercheana					
Position in succession	Stable plant community					
Projective cover (%)	30-35					
Plant litter (%)	-					
Semishrub-dwarf semishrub (%)	27					
Herbaceous cover (%)	6					
Shrub-semishrub layer, height (cm)	Up to 85					
Herbaceous layer, height (cm)	Up to 80					
Factors and degree of disturbance	Slightly disturbed, beside the plot – pipelines, dirt roads, OHTL					
Signs of abnormal plant development	Not observed					
Scientific name of plant species	Height	Plant cover (%)	Abudance	Espace-ment	Phe-nophase	Zoetic condition
Shrub						
Atraphaxis spinosa	60	<1	Sol	Df	End of vegeta-tion	Normal
Ammodendron eichwaldii	85	<1	Sol	Df	End of vegeta-tion	Normal
Dwarf shrub						
Xylosalsola arbuscula	30	<1	Un-Sol	Df	Fruition	Normal
Semi-shrub						
Krascheninnikovia ceratoides	80	15	Sp	Df	Fruition	Normal
Dwarf shrub						
Artemisia lercheana	45	10	Sp	Df	Bud-formation	Normal
Herbaceous layer						
Agropyron fragile	70	4	Sol	Df	Fruition	Normal
Stipa arabica	80	1-2	Sol	Df	Dying	Normal
Eremopyrum orientale	7	<0.5	Sol	Df	Dying	Normal
Salsola tragus	15	<0.5	Sol	Df	Fruition	Normal
Ranunculus testiculatus	5	<0.5	Sol	Df	Dying	Normal
Asparagus spp.	30	--	Un	--	Dying	Normal
Iris songarica	12	<0.5	Sol	Df	Dying	Normal

Sample Plot #	L7p					
Photos L7p, L7p.1, L7p.2, L7p.3, L7p.4 and L7p.5						
Size	10 x 10 m					
Date	4.09.2024					
Coordinates	43°17'46.81"N 52°10'15.15"E					
Position in the landscape	Gently undulating plain					
Height (m vertical coordinate)	194					
Terrain	Plain					
Soils	Grey-brown salty					
Water regime	Precipitations					
Community name	**Artemisia- Anabasis salsa-Caroxylon orientale in complex with Lichen-Anabasis on bozyngens**					
Dominants	Caroxylon orientale, Anabasis salsa and Anabasis brachiata					
Position in succession	Stable plant community					
Projective cover (%)	25–30 and 17-19					
Plant litter (%)	-					
Semishrub-dwarf semishrub (%)	27 and 3					
Herbaceous cover (%)	1–2 and 11 (+ 3–5% lichens)					
Shrub-semishrub layer, height (cm)	Up to 40 and 30					
Herbaceous layer, height (cm)	Up to 15 and 40					
Factors and degree of disturbance	Slightly disturbed, grasing, dirt road network, disturbed during geological surveys plots					
Signs of abnormal plant development	Not observed					
Scientific name of plant species	Height	Plant cover (%)	Abudance	Espacement	Phenophase	Zoetic condition
Artemisia-Anabasis salsa-Caroxylon orientale						
Shrub						
Ephedra aurantiaca	10	<0.5	Sol	Df	Vegetative	Normal
Semi-shrub						
Caroxylon orientale	40	20	Sp	Df	Fruition	Normal
Dwarf shrub						
Artemisia terrae-albae	40	2-3	Sol	Df	Bud-formation	Normal
Anabasis salsa	20	5	Sp	Df	Flowering/Fruition	Normal
Herbaceous layer						
Anabasis brachiata	15	<1	Sol	Gr	Fruition	Normal
Lepidium perfoliatum	10	<0.5	Sol	Df	Dying	Normal
Eremopyrum orientale	5	<0.5	Sol	Df	Dying	Normal
Ranunculus testiculatus	3	<1	Sol	Df	Dying	Normal
Halimocnemis sclerosperma	15	<0.5	Sol	Df	Fruition	Normal

Sample Plot #	L7p					
Scientific name of plant species	Height	Plant cover (%)	Abudance	Espace-ment	Phe-nophase	Zoetic condition
Tetracme spp.	10	<0.5	Sol	Df	Dying	Normal
Medicago medicaginoides	10	<0.5	Sol	Df	Dying	Normal
Lichen-Anabasis on bozyngens						
Semi-shrub						
Caroxylon orientale	30	1-2	Sol	Df	Fruition	Normal
Dwarf shrub						
Artemisia terrae-albae	30	1	Sol	Df	Bud-for-mation	Normal
Herbaceous layer						
Anabasis brachiata	15	10	Sol	Gr	Fruition	Normal
Eremopyrum orientale	5	<0.5	Sol	Df	Dying	Normal
Bassia laniflora	40	1	Sol	Df	Fruition	Normal
Tetracme spp.	10	<0.5	Sol	Df	Dying	Normal
Lichen						
Evernia esorediosa f. terrestris	---	3–5	Sol- Sp	Df		

Sample Plot #	L8p
Photos L8p, L8p.1, L8p.2, L8p.3 and L8p.4	

Size	10 x 10 m					
Date	3.09.2024					
Coordinates	43°12'11.87"N 51°57'14.76"E					
Position in the landscape	Gently undulating plain					
Height (m vertical coordinate)	107					
Terrain	Plain					
Soils	Grey-brown salty					
Water regime	Precipitations					
Community name	Caroxylon orientale					
Dominants	Caroxylon orientale					
Position in succession	Stable plant community					
Projective cover (%)	20-25					
Plant litter (%)	-					
Semishrub-dwarf semishrub (%)	22					
Herbaceous cover (%)	1-2					
Shrub-semishrub layer, height (cm)	Up to 50					
Herbaceous layer, height (cm)	Up to 30					
Factors and degree of disturbance	Slightly disturbed, grasing, sporadically digged soil					
Signs of abnormal plant development	Not observed					
Scientific name of plant species	Height	Plant cover (%)	Abudance	Espace-ment	Phe-nophase	Zoetic condition
Shrub						
Atraphaxis spinosa	50	<1	Sol	Df	End of veg-etation	Normal
Semi-shrub						
Caroxylon orientale	30	15	Sp	Df	Fruition	Normal
Dwarf shrub						
Artemisia gurganica	40	2-3	Sol	Df	Bud-for-mation	Normal
Artemisia terrae-albae	30	1	Sol	Df	Bud-for-mation	Normal
Anabasis salsa	20	3-5	Sol- Sp	Df	Fruition	Normal
Herbaceous layer						
Anabasis eriopoda	10	<1	Sol	Gr	Fruition	Normal
Lepidium perfoliatum	10	<0.5	Sol	Df	Dying	Normal
Eremopyrum orientale	10	1	Sol	Df	Dying	Normal
Girgensohnia oppositiflora	30	<1	Sol	Df	Fruition	Normal
Ceratocarpus arenarius	15	<1	Sol	Df	Fruition	Normal
Pyankovia brachiata	25	<1	Sol	Df	Fruition	Normal
Alyssum desertorum	5	<0.5	Sol	Df	Dying	Normal

Sample Plot #	L9p					
Photos L9p, L9p.1 and L9p.2						
Size	10 x 10 m					
Date	9.09.2024					
Coordinates	42°33’35.99’’N 53°55’00.91’’E					
Position in the landscape	Plain between cliff and sand low ridges					
Height (m vertical coordinate)	29					
Terrain	Plain					
Soils	Solonchaks					
Water regime	Precipitations					
Community name	**Salsola**					
Dominants	Kalidium caspicum					
Position in succession	Stable plant community					
Projective cover (%)	3-5					
Plant litter (%)	-					
Semishrub-dwarf semishrub (%)	3-5					
Herbaceous cover (%)	--					
Shrub-semishrub layer, height (cm)	Up to 150					
Herbaceous layer, height (cm)	--					
Factors and degree of disturbance	Slightly disturbed, dirt road network					
Signs of abnormal plant development	Not observed					
Additions						
Scientific name of plant species	Height	Plant cover (%)	Abudance	Espace-ment	Phe-nophase	Zoetic condition
Tree						
Haloxylon ammodendron	150	<1	Sol	Df	Fruition	Normal
Dwarf shrub						
Kalidium caspicum	60	3-5	Sol-Sp	Df	Flowering	Normal
Dwarf shrub						
Anabasis salsa	7	<0.5	Sol	Df	Fruition	Normal

Sample Plot #	L10p					
Photo	Not available					
Size	10 x 10 m					
Date	09.09.2024					
Coordinates	42°28'9.26"N 54°13'35.93"E					
Position in the landscape	Gently undulating plain					
Height (m vertical coordinate)	106					
Terrain	Plain					
Soils	Grey-brown alkaline					
Water regime	Precipitations					
Community name	**Anabasis salsa-Salsola gemmascens**					
Dominants	Anabasis salsa					
Position in succession	Stable plant community					
Projective cover (%)	35-40					
Plant litter (%)	-					
Shrubs and semi-shrubs (%)	Up to 35					
Herbaceous cover (%)	Up to 2					
Shrub-semishrub layer, height (cm)	Up to 45					
Herbaceous layer, height (cm)	Up to 10					
Factors and degree of disturbance	Slightly disturbed, dirt road network					
Signs of abnormal plant development	Not observed					
Additions	80% Caroxylon gemmascens in dry condition					
Scientific name of plant species	Height	Plant cover (%)	Abudance	Espace-ment	Phe-nophase	Zoetic condition
Dwarf shrub						
Caroxylon gemmascens	45	30	Cop1	Df	Vegetative, dry	De-pressed
Anabasis salsa	8	5	Sol	Df	Vegetative	Normal
Artemisia kemrudica	25	<1	Sol	Df	Vegetative	Normal
Herbaceous layer						
Anabasis brachiata	10	1-2	Sol	Df	Vegetative	Normal
Eremopyrum orientale	8	<0.5	Sol	Df	Dying	Normal
Plantago minuta	3	<0.1	Sol	Df	Fruition	Normal
Arnebia decumbens	5	<0.1	Sol	Df	Fruition	Normal
Senecio glaucus subsp. coronopifolius	7	<0.5	Sol	Df	Flower/Fru-ition	Normal
Euphorbia inderiensis	10	<0.1	Sol	Df	Fruition	Normal

Sample Plot #	L11p					
Photo	Not available					
Size	10 x 10 m					
Date	09.09.2024					
Coordinates	42°26'14.71"N 54°21'45.28"E					
Position in the landscape	Gently undulating plain					
Height (m vertical coordinate)	192					
Terrain	Plain					
Soils	Takyr					
Water regime	Precipitations					
Community name	**Perennial halophytic**					
Dominants	Anabasis salsa, Caroxylon orientale					
Position in succession	Stable plant community					
Projective cover (%)	5-10					
Plant litter (%)	-					
Shrubs and semi-shrubs (%)	Up to 7					
Herbaceous cover (%)	<1					
Shrub-semishrub layer, height (cm)	Up to 200					
Herbaceous layer, height (cm)	Up to 10					
Factors and degree of disturbance	Slightly disturbed, burrowing animals colonies, dirt road network					
Signs of abnormal plant development	Not observed					
Additions	Burrowing animals colonies, probably abandoned					
Scientific name of plant species	Height	Plant cover (%)	Abudance	Espace-ment	Phe-nophase	Zoetic condition
Tree or shrub						
Haloxylon ammodendron	200	2	Sol	Df	Vegetative	Normal
Semi-shrub						
Caroxylon orientale	35	2-3	Sol	Df	Vegetative	Normal
Dwarf shrub						
Artemisia kemrudica	25	<0.5	Un-Sol	Df	Vegetative	Normal
Anabasis salsa	8	3	Sol	Df	Vegetative	Normal
Herbaceous layer						
Anabasis brachiata	10	<1	Sol	Df	Vegetative	Normal
Eremopyrum orientale	7	<0.5	Sol	Df	Dying	Normal
Plantago minuta	4	<0.1	Sol	Df	Fruition	Normal
Arnebia decumbens	8	<0.5	Sol	Df	Flower/Fru-ition	Normal
Ranunculus testiculatus	4	<0.1	Sol	Df	Fruition	Normal
Astragalus spp.	5	<0.1	Sol	Df	Fruition	Normal
Senecio glaucus subsp. coronopifolius	7	<0.5	Sol	Df	Flower/Fru-ition	Normal

Sample Plot #	L12p					
Photo	Not available					
Size	10 x 10 m					
Date	09.09.2024					
Coordinates	42°24'54.44"N 54°27'30.59"E					
Position in the landscape	Gently undulating plain					
Height (m vertical coordinate)	185					
Terrain	Plain					
Soils	Grey-brown loamy					
Water regime	Precipitations					
Community name	**Caroxylon orientale-Anabasis salsa with Halóxylon**					
Dominants	Anabasis salsa, Caroxylon orientale					
Position in succession	Stable plant community					
Projective cover (%)	20-25					
Plant litter (%)	-					
Shrubs and semi-shrubs (%)	Up to 20-22					
Herbaceous cover (%)	<1					
Shrub-semishrub layer, height (cm)	Up to 220					
Herbaceous layer, height (cm)	Up to 15					
Factors and degree of disturbance	Slightly disturbed, burrowing animals colonies, dirt road network					
Signs of abnormal plant development	Not observed					
Scientific name of plant species	Height	Plant cover (%)	Abudance	Espace-ment	Phe-nophase	Zoetic condition
Tree or shrub						
Haloxylon ammodendron	220	2-3	Sol	Df	Vegetative	Normal
Shrub						
Oreosalsola arbusculiformis	45	<1	Sol	Df	Vegetative	Normal
Semi-shrub						
Caroxylon orientale	35	5	Sp	Df	Vegetative	Normal
Dwarf shrub						
Anabasis salsa	8	10-15	Sp	Df	Vegetative	Normal
Herbaceous layer						
Eremopyrum orientale	8	<0.5	Sol	Df	Dying	Normal
Plantago minuta	4	<0.5	Sol	Df	Fruition	Normal
Arnebia decumbens	5	<0.5	Sol	Df	Flower/Fru-ition	Normal
Senecio glaucus subsp. coronopifolius	7	<0.1	Sol	Df	Flower/Fru-ition	Normal
Euphorbia inderiensis	15	<0.1	Sol	Df	Fruition	Normal

Sample Plot #	K1p					
Photos K1p, K1p.1 and K1p.2						
Size	10 x 10 m					
Date	7.09.2024					
Coordinates	42°13'23.05"N 52°46'2.48"E					
Position in the landscape	Gently undulating plain					
Elevation (m abs.alt.)	143					
Terrain	Plain					
Soils	Gray-brown alkaline					
Water regime	Precipitations					
Community name	**Perennial halophytic with wormwood in complex with Anabasis-lichenaceous groups on bosyngens (dry crust of gypsified clays)**					
Dominants	Caroxylon orientale, Artemisia kemrudica and Evernia esorediosa f. terrestris, Anabasis brachiata					
Position in succession	Stable plant community					
Projective cover (%)	25–30 and 5–15%					
Plant litter (%)	-					
Shrubs and semi-shrubs (%)	23 and 1-2					
Herbaceous cover (%)	2–3 (+lichen up to 5%) and 5 (+lichen up to 10%)					
Shrub-semishrub layer, height (cm)	Up to 40					
Herbaceous layer, height (cm)	Up to 20					
Factors and degree of disturbance	Slightly disturbed, dirt road network, burrowing animals colonies					
Signs of abnormal plant development	Not observed					
Plant name	Height	Plant cover (%)	Abun-dance	Espace-ment	Phe-nophase	Zoetic condition
Shrub						
Ephedra aurantiaca	10	1	Sol	Df	Vegitative	Normal
Semi-shrub						
Caroxylon orientale	40	10	Sp	Df	Fruition	Normal
Dwarf shrub						
Caroxylon gemmascens	25	1	Sol	Df	Fruition	Normal
Anabasis salsa	30	3	Sol	Df	Fruition	Normal
Artemisia kemrudica	27	3-5	Sol-Sp	Df	Budding	Normal
Nanophyton erinaceum	17	2-3	Sol	Df	Fruition	Normal
Herbaceous layer						
Anabasis brachiata	10	2-3	Sol	Gr	Fruition	Normal
Girgensohnia oppositiflora	20	<0.5	Sol	Df	Fruition	Normal
Lichen						
Evernia esorediosa f. terrestris	--	2-5	Sol-Sp	Df		
Anabasis-lichens aggregations on bosyngens (dry crust of gypsified clays)						
Semi-shrub						

Sample Plot #	K1p					
Scientific name of plant species	Height	Plant cover (%)	Abudance	Espace-ment	Phe-nophase	Zoetic condition
Caroxylon orientale	40	1-2	Sol	Df	Fruition	Normal
Herbaceous layer						
Anabasis brachiata	12	5	Sp	Gr	Fruition	Normal
Girgensohnia oppositiflora	30	<0.5	Sol	Df	Fruition	Normal
Lichen						
Evernia esorediosa f. terrestris	--	10	Sp	Df		

Sample Plot #	K2p					
Photo	Not available					
Size	10 x 10 m					
Date	07.09.2024					
Coordinates	42°05'03.12''N 52°42'58.97''E					
Position in the landscape	Undulating plain					
Height (m vertical coordinate)	160					
Terrain	Plain					
Soils	Gray-brown alkaline					
Water regime	Precipitations					
Community name	***Caroxylon orientale***					
Dominants	*Caroxylon orientale*					
Position in succession	Stable plant community					
Projective cover (%)	2530					
Plant litter (%)	-					
Shrubs and semi-shrubs (%)	30					
Herbaceous cover (%)	<1					
Shrub-semishrub layer, height (cm)	Up to 40					
Herbaceous layer, height (cm)	Up to 10					
Factors and degree of disturbance	Slightly disturbed, burrowing animals colonies, dirt road network					
Signs of abnormal plant development	Not observed					
Additions	20% Caroxylon orientale – Dead					
Scientific name of plant species	Height	Plant cover (%)	Abun-dance	Espace-ment	Phe-nophase	Zoetic condition
Semi-shrub						
Caroxylon orientale	40	2530	SpCop1	Df	Vegetative	De-pressed
Dwarf shrub						
Artemisia kemrudica	25	<1	Sol	Df	Vegetative	Good
Anabasis salsa	10	23	Sol	Df	Vegetative	Good
Herbaceous layer						
Eremopyrum orientale	10	<1	Sol	Df	Dying	Normal
Koelpinia linearis	5	<0,5	Sol	Df	Flower	Good
Lichens						
Xanthoparmelia camtschadalis	<1	<0,5	Sol	Df		

Sample plot #	K3p
Photos K3p, K3p.1, K3p.2, K3p.3 and K3p.4	

Size	10 x 10 m					
Date	7.09.2024					
Coordinates	42° 7'3.61"N 52°46'43.22"E					
Position in the landscape	Undulating plain					
Elevation (m abs.alt.)	142					
Terrain	Plain					
Soils	Gray-brown alkaline					
Water regime	Precipitations					
Community name	**Perennial halophytic**					
Dominants	Caroxylon gemmascens, Anabasis salsa					
Position in succession	Stable plant community					
Projective cover (%)	20-25					
Plant litter (%)	-					
Shrubs and semi-shrubs (%)	20					
Herbaceous cover (%)	1					
Shrub-semishrub layer, height (cm)	Up to 40					
Herbaceous layer, height (cm)	Up to 10					
Factors and degree of disturbance	Slightly disturbed, dirt road network, burrowing animals colonies					
Signs of abnormal plant development	Not observed					
Additions	Perennial Salsola – 2%, in dry condition					
Plant name	Height	Plant cover (%)	Abun-dance	Espace-ment	Phe-nophase	Zoetic condition
Semi-shrub						
Caroxylon orientale	40	3-4	Sol	Df	Fruition	Normal
Dwarf shrub						
Caroxylon gemmascens	30	10	Sp	Df	Fruition	Normal
Anabasis salsa	27	3-5	Sol-Sp	Df	Fruition	Normal
Artemisia kemrudica	25	<1	Sol	Df	Budding	Normal
Herbaceous layer						
Anabasis brachiata	10	1	Sol	Df	Fruition	Normal

Sample Plot #	K4p					
Photos K4p, K4p.1, K4p.2, K4p.3 and K4p.4						
Size	10 x 10 m					
Date	7.09.2024					
Coordinates	42°10'34.51"N 52°51'12.05"E					
Position in the landscape	Undulating plain					
Elevation (m abs.alt.)	164					
Terrain	Takyr depression					
Soils	Takyr					
Water regime	Precipitations					
Community name	**Sporadic plants**					
Dominants	---					
Position in succession	Stable plant community					
Projective cover (%)	2-3					
Plant litter (%)	-					
Shrubs and semi-shrubs (%)	1-2					
Herbaceous cover (%)	1-2					
Shrub-semishrub layer, height (cm)	Up to 27					
Herbaceous layer, height (cm)	Up to 20					
Factors and degree of disturbance	Slightly disturbed, dirt road network, abandoned burrowing animals colonies					
Signs of abnormal plant development	Not observed					
Additions						
Plant name	Height	Plant cover (%)	Abundance	Espacement	Phenophase	Zoetic condition
Dwarf shrub						
Artemisia kemrudica	27	1-2	Sol	Df	Budding	Normal
Herbaceous layer						
Ceratocarpus arenarius	20	1-2	Sol	Df	Fruition	Normal

Sample Plot #	K5p					
Photos	Not available					
Size	10 x 10 m					
Date	07.09.2024					
Coordinates	42° 7'37.21"N 52°52'57.16"E					
Position in the landscape	Undulating plain					
Height (m vertical coordinate)	157					
Terrain	Plain					
Soils	Gray-brown alkaline					
Water regime	Precipitations					
Community name	**Perennial *anabasis-salsa***					
Dominants	Nanophyton erinaceum, Anabasis brachiata					
Position in succession	Digressed plant formation					
Projective cover (%)	5-10					
Plant litter (%)	-					
Shrubs and semi-shrubs (%)	Up to 6					
Herbaceous cover (%)	Up to 2					
Shrub-semishrub layer, height (cm)	Up to 30					
Herbaceous layer, height (cm)	Up to 7					
Factors and degree of disturbance	Severe degree of disturbance: numerous burrowing animals colonies, dirt road network					
Signs of abnormal plant development	Не обнаружены					
Additions	Burrowing animals' colonies, presumably abandoned 90% Caroxylon orientale – in dry condition					
Scientific name of plant species	Height	Plant cover (%)	Abun-dance	Espace-ment	Phe-nophase	Zoetic condition
Shrub						
Oreosalsola arbusculiformis	30	1	Un-Sol	Df	Vegetative	Normal
Semishrub						
Caroxylon orientale	20	2	Sol	Df	Vegetativ., dry	De-pressed
Dwarf semishrub						
Nanophyton erinaceum	3	3	Sol	Df	Vegetative	Normal
Herbaceous layer						
Anabasis brachiata	7	2	Sol	Df	Vegetative	Normal
Lichens						
Evernia esorediosa f. terrestris	<1	<1	Sol	Df		

Sample Plot #	K6p					
Photos K6p, K6p.1, K6p.2, K6p.3, K6p.4 and K6p.5						
Size	10 x 10 m					
Date	8.09.2024					
Coordinates	42°13'48.99"N 52°55'42.49"E					
Position in the landscape	Gently undulating plain					
Elevation (m abs.alt.)	167					
Terrain	Plain					
Soils	Gray-brown alkaline					
Water regime	Precipitations					
Community name	**Ferula assafoetida-Artemisia kemrudica and wormwood in complex with perennial Salsola groups on eroded sites**					
Dominants	Artemisia kemrudica, Caroxylon orientale					
Position in succession	Stable plant community					
Projective cover (%)	30–35 and 2–5% on eroded sites					
Plant litter (%)	-					
Shrubs and semi-shrubs (%)	30 and 4					
Herbaceous cover (%)	1					
Shrub-semishrub layer, height (cm)	Up to 60 and 65					
Herbaceous layer, height (cm)	Up to 35 and 12					
Factors and degree of disturbance	Slightly disturbed, grazing, dirt road network					
Signs of abnormal plant development	Not observed					
Additions	Artemisia kemrudica – 2–3% in dry condition					
Plant name	Height	Plant cover (%)	Abundance	Espacement	Phenophase	Zoetic condition
Shrub						
Ephedra aurantiaca	20	1	Sol	Gr	Vegitative	Normal
Oreosalsola arbusculiformis	60	<0.5	Un-Sol	Df	Fruition	Normal
Semi-shrub						
Caroxylon orientale	40	7	Sp	Df	Fruition	Normal
Capparis spinosa	--	<1	Sol	Df	Dead	Normal
Dwarf shrub						
Artemisia kemrudica	27	20	Sp	Df	Budding	Normal
Anabasis salsa	15	1	Sol	Df	Fruition	Normal
Herbaceous layer						
Ceratocarpus arenarius	7	<0.5	Sol	Df	Dead	Normal
Girgensohnia oppositiflora	35	<0.5	Sol	Df	Fruition	Normal
Eremopyrum orientale	10	<0.5	Sol	Df	Dead	Normal
Pereterrenial Sálsola aggregations						
Shrub						

Sample Plot #	K6p					
Scientific name of plant species	Height	Plant cover (%)	Abudance	Espace-ment	Phe-nophase	Zoetic condition
Atraphaxis replicata	65	<1	Sol	Df	End of veg-etation	Normal
Semi-shrub						
Caroxylon orientale	25	1	Sol	Df	Fruition	Normal
Dwarf shrub						
Anabasis salsa	10	2	Sol	Df	Fruition	Normal
Artemisia kemrudica	25	1	Sol	Df	Budding	Normal
Herbaceous layer						
Anabasis brachiata	12	<1	Sol	Df	Fruition	Normal
Anabasis eriopoda	8	<0.5	Un-Sol	Df	Fruition	Normal

Sample Plot #	K7p					
Photo	Not available					
Size	10 x 10 m					
Date	07.09.2024					
Coordinates	42°20'8.42"N 52°48'10.82"E					
Position in the landscape	Undulating plain					
Height (m vertical coordinate)	187					
Terrain	Plain					
Soils	Gray-brown alkaline					
Water regime	Precipitations					
Community name	***Xylosalsola-wormwood* with *Caroxylon orientale***					
Dominants	*Caroxylon orientale, Artemisia kemrudica*					
Position in succession	Stable plant community					
Projective cover (%)	30-35					
Plant litter (%)	-					
Shrub-dwarf semishrubs (%)	Up to 31					
Herbaceous cover (%)	<1					
Shrub-semishrub layer, height (cm)	Up to 45					
Herbaceous layer, height (cm)	5					
Factors and degree of disturbance	Slightly disturbed, grazing, dirt road network					
Signs of abnormal plant development	Not observed					
Additions	5% Artemisia kemrudica Dead					
Scientific name of plant species	Height	Plant cover (%)	Abun-dance	Espace-ment	Phe-nophase	Zoetic condition
Shrub						
Oreosalsola arbusculiformis	45	<1	SolUn	Df	Vegetative	Good
Semi-shrub						
Caroxylon orientale	35	20	Sp	Df	Dead	De-pressed
Dwarf shrub						
Artemisia kemrudica	25	10	Sp	Df	Dead	De-pressed
Anabasis salsa	8	1	Sol	Df	Vegetative	Good
Herbaceous layer						
Lappula spp.	5	<0,1	Sol	Df	Fruition	Good

Sample Plot #	K8p
Photos K8p, K8p.1, K8p.2, K8p.3, K8p.4 and K8p.5	
Size	10 x 10 m
Date	8.09.2024
Coordinates	42°15'26.32"N 53° 1'39.33"E
Position in the landscape	Gently undulating plain
Elevation (m abs.alt.)	171
Terrain	Plain
Soils	Gray-brown alkaline
Water regime	Precipitations
Community name	**Perennial Salsola with wormwood on the spot of Férula assa-fóetida-Artemisia kemrudica**
Dominants	--
Position in succession	Digressive plant formation
Projective cover (%)	5-10
Plant litter (%)	-
Shrubs and semi-shrubs (%)	5
Herbaceous cover (%)	1
Shrub-semishrub layer, height (cm)	Up to 27
Herbaceous layer, height (cm)	Up to 30
Factors and degree of disturbance	Severely disturbed, hayland, dirt road network
Signs of abnormal plant development	Not observed
Additions	Stacks of vegetation, cut probably more than 3 years ago

Plant name	Height	Plant cover (%)	Abun-dance	Espace-ment	Phe-nophase	Zoetic condition
Semi-shrub						
Caroxylon orientale	25	2	Sol	Df	Fruition	Normal
Dwarf shrub						
Artemisia kemrudica	27	<1	Sol	Df	Budding	Normal
Anabasis salsa	15	2-3	Sol	Df	Fruition	Normal
Caroxylon gemmascens	20	<0.5	Sol	Df	Fruition	Normal
Herbaceous layer						
Anabasis brachiata	10	<1	Un-Sol	Df	Fruition	Normal
Girgensohnia oppositiflora	30	1	Sol	Df	Fruition	Normal
Eremopyrum orientale	10	<0.5	Sol	Df	Dead	Normal

Sample Plot #	K9p					
Photos K9p, K9p.1 and K9p.2						
Size	10 x 10 m					
Date	8.09.2024					
Coordinates	42°16'54.75"N 53° 7'34.44"E					
Position in the landscape	Undulating plain					
Elevation (m abs.alt.)	173					
Terrain	Plain					
Soils	Gray-brown alkaline					
Water regime	Precipitations					
Community name	**Artemisia kemrudica and wormwood with perennial saltworts**					
Dominants	Artemisia kemrudica					
Position in succession	Stable plant community					
Projective cover (%)	25-30					
Plant litter (%)	-					
Shrubs and semi-shrubs (%)	27					
Herbaceous cover (%)	-					
Shrub-semishrub layer, height (cm)	Up to 60					
Herbaceous layer, height (cm)	-					
Factors and degree of disturbance	Slightly disturbed, dirt road network, burrowing animals colonies					
Signs of abnormal plant development	Not observed					
Additions	Artemisia kemrudica – 15% in dry condition					
Plant name	Height	Plant cover (%)	Abun-dance	Espace-ment	Phe-nophase	Zoetic condition
Shrub						
Oreosalsola arbusculiformis	60	<0.1	Un	Df	Fruition	Normal
Semi-shrub						
Caroxylon orientale	50	1-2	Sol	Df	Fruition	Normal
Dwarf shrub						
Artemisia kemrudica	40	25	Sp	Df	Budding	Supressed
Anabasis salsa	15	1-2	Sol	Df	Fruition	Normal

Sample Plot #	K10p					
Photos K10p, K10p.1, K10p.2, K10p.3 and K10p.4						
Size	10 x 10 m2					
Date	8.09.2024					
Coordinates	42°20'38.95"N 53° 2'26.89"E					
Position in the landscape	Undulating plain					
Elevation (m abs.alt.)	148					
Terrain	Plain					
Soils	Gray-brown alkaline					
Water regime	Precipitations					
Community name	**Ferula assafoetida-Artemisia kemrudica and wormwood**					
Dominants	--					
Position in succession	Stable plant community					
Projective cover (%)	30-35					
Plant litter (%)	-					
Shrubs and semi-shrubs (%)	30-35					
Herbaceous cover (%)	<0.5					
Shrub-semishrub layer, height (cm)	Up to 40					
Herbaceous layer, height (cm)	Up to 10					
Factors and degree of disturbance	Slightly disturbed, grazing, dirt road network					
Signs of abnormal plant development	Not observed					
Additions	Artemisia kemrudica – 2–3% in dry condition					
Plant name	Height	Plant cover (%)	Abun-dance	Espace-ment	Phe-nophase	Zoetic condition
Semi-shrub						
Caroxylon orientale	40	5	Sp	Df	Fruition	Normal
Dwarf shrub						
Artemisia kemrudica	30	25-30	Sp-Cop1	Df	Budding	Normal
Anabasis salsa	15	<1	Sol	Df	Fruition	Normal
Caroxylon gemmascens	35	1	Sol	Df	Fruition	Normal
Herbaceous layer						
Girgensohnia oppositiflora	10	<0.5	Sol	Df	Fruition	Normal

Sample Plot #	K11p
Photos K11p, K11p.1, K11p.2 and K11p.3	
Size	10 x 10 m
Date	8.09.2024
Coordinates	42°16'8.48"N 53°18'14.24"E
Position in the landscape	Undulating pimple plain
Elevation (m abs.alt.)	148
Terrain	Gently sloping plain
Soils	Gray-brown alkaline
Water regime	Precipitations
Community name	**Artemisia kemrudica-wormwood-perennial-Salsola**
Dominants	Artemisia kemrudica, Anabasis salsa, Caroxylon orientale
Position in succession	Digressive plant formation
Projective cover (%)	25-30
Plant litter (%)	-
Shrubs and semi-shrubs (%)	25-30
Herbaceous cover (%)	<0.5
Shrub-semishrub layer, height (cm)	Up to 50
Herbaceous layer, height (cm)	10
Factors and degree of disturbance	Slightly disturbed, dirt road network
Signs of abnormal plant development	Not observed
Additions	Artemisia kemrudica – 80% in dry condition. Near is trigger point (geodesical), and takyr in the topographic low

Plant name	Height	Plant cover (%)	Abun-dance	Espace-ment	Phe-nophase	Zoetic condition
Semi-shrub						
Caroxylon orientale	50	4-5	Sol-Sp	Df	Fruition	Normal
Dwarf shrub						
Artemisia kemrudica	40	10-15	Sp	Df	Budding, dry	Supressed
Anabasis salsa	15	5	Sp	Df	Fruition	Normal
Caroxylon gemmascens	40	3-4	Sp	Df	Fruition	Normal
Herbaceous layer						
Eremopyrum triticeum	10	<0.5	Sol	Df	Dead	Normal

Sample Plot #	K12p					
Photos K12p, K12p.1, K12p.2, K12p.3 and K12p.4						
Size	10 x 10 m2					
Date	8.09.2024					
Coordinates	42°18'25.89"N 53°20'10.51"E					
Position in the landscape	Undulating pimple plain					
Elevation (m abs.alt.)	151					
Terrain	Gently sloping plain					
Soils	Gray-brown alkaline					
Water regime	Precipitations					
Community name	**Anabasis in complex with Férula assa-fóetida-Atraphaxis-wormwood grouping**					
Dominants	Anabasis salsa					
Position in succession	Stable plant community					
Projective cover (%)	15–20 and 50%					
Plant litter (%)	-					
Shrubs and semi-shrubs (%)	18 and 50					
Herbaceous cover (%)	<1					
Shrub-semishrub layer, height (cm)	Up to 25 and 80					
Herbaceous layer, height (cm)	Up to 10					
Factors and degree of disturbance	Slightly disturbed, grazing, dirt road network					
Signs of abnormal plant development	Not observed					
Plant name	Height	Plant cover (%)	Abun-dance	Espace-ment	Phe-nophase	Zoetic condition
Semi-shrub						
Caroxylon orientale	25	1-2	Sol	Df	Fruition	Normal
Dwarf shrub						
Anabasis salsa	20	15	Sp	Df	Fruition	Normal
Herbaceous layer						
Anabasis brachiata	8	<1	Sol	Df	Fruition	Normal
Anabasis eriopoda	10	<0.1	Un- Sol	Df	Fruition	Normal
Halimocnemis sclerosperma	10	--	Un	--	Fruition	Normal
Ferula assafoetida-Atraphaxis-wormwood grouping						
Shrub						
Atraphaxis replicata	80	10	Sp	Gr	End of veg-etation	Normal
Semi-shrub						
Caroxylon orientale	50	10	Sp	Gr	Fruition	Normal
Dwarf shrub						
Artemisia gurganica	60	30	Cop1	Gr	Budding	Normal

Sample Plot #	K13p					
Photo	Not available					
Size	10 x 10 m					
Date	07.09.2024					
Coordinates	42°04’48.99’’N 52°48’25.10’’E					
Position in the landscape	Undulating plain					
Height (m vertical coordinate)	167					
Terrain	Plain					
Soils	Gray-brown alkaline					
Water regime	Precipitations					
Community name	***Caroxylon orientale***					
Dominants	*Caroxylon orientale*					
Position in succession	Stable plant community					
Projective cover (%)	2530					
Plant litter (%)	-					
Shrubs and semi-shrubs (%)	Up to 30					
Herbaceous cover (%)	<1					
Shrub-semishrub layer, height (cm)	Up to 30					
Herbaceous layer, height (cm)	10					
Factors and degree of disturbance	Mild to moderate disturbance, earth burrowing animals’ orm colonies, dirt road network.					
Signs of abnormal plant development	Not observed					
Additions	*Caroxylon orientale* – 50% Dead					
Scientific name of plant species	Height	Plant cover (%)	Abun-dance	Espace-ment	Phe-nophase	Zoetic condition
Semi-shrub						
Caroxylon orientale	30	25	Sp	Df	Dead	De-pressed
Dwarf shrub						
Artemisia kemrudica	25	23	Sol	Df	Vegetative	Good
Anabasis salsa	8	12	Sol	Df	Vegetative	Good
Herbaceous layer						
Anabasis brachiata	10	<1	Sol	Df	Vegetative	Good
Eremopyrum orientale	10	<1	Sol	Df	Dying	Normal

Sample Plot #	K14p					
Photos K14p, K14p.1, K14p.2, K14p.3, K14p.4 and K14p.5						
Size	10 x 10 m					
Date	8.09.2024					
Coordinates	42°20'20.42"N 53°26'57.11"E					
Position in the landscape	Gently undulating plain					
Elevation (m abs.alt.)	168					
Terrain	Plain					
Soils	Gray-brown alkaline					
Water regime	Precipitations					
Community name	**Perennial halophytic-Artemisia kemrudica-wormwood-perennial-Salsola**					
Dominants	*Artemisia kemrudica, Caroxylon gemmascens*					
Position in succession	Digressive plant formation					
Projective cover (%)	20-25					
Plant litter (%)	-					
Shrubs and semi-shrubs (%)	22					
Herbaceous cover (%)	<1					
Shrub-semishrub layer, height (cm)	Up to 70					
Herbaceous layer, height (cm)	Up to 40					
Factors and degree of disturbance	Slightly disturbed, dirt road network					
Signs of abnormal plant development	Not observed					
Additions	Artemisia kemrudica – 80% in dry condition. Locally, areas devoid of vegetation occur at intersections.					
Plant name	Height	Plant cover (%)	Abun-dance	Espace-ment	Phe-nophase	Zoetic condition
Shrub						
Oreosalsola arbusculiformis	70	<1	Sol	Df	Fruition	Normal
Semi-shrub						
Caroxylon orientale	60	1-2	Sol	Df	Fruition	Normal
Capparis spinosa var. herbacea	--	<1	Sol	Df	End of vegetation	Normal
Dwarf shrub						
Artemisia kemrudica	38	10-12	Sp	Df	Budding, dry	Supressed
Anabasis salsa	15	3	Sol	Df	Fruition	Normal
Caroxylon gemmascens	30	3-5	Sol-Sp	Df	Fruition	Normal
Herbaceous layer						
Eremopyrum orientale	6	<0.5	Sol	Df	Dead	Normal
Halimocnemis sclerosperma	15	<0.1	Un-Sol	Df	Fruition	Normal
Girgensohnia oppositiflora	30	<0.5	Sol	Df	Fruition	Normal
Climacoptera spp.	40	<0.5	Sol	Df	Dead	Normal

Sample plot #	K15p					
Photo	Not available					
Size	10 x 10 m					
Date	8.09.2024					
Coordinates	42° 5'0.39"N 52°45'1.27"E					
Position in the landscape	Undulating plain					
Elevation (m abs.alt.)	186					
Terrain	Plain					
Soils	Gray-brown alkaline					
Water regime	Precipitations					
Community name	**Artemisia kemrudica-wormwood-perennial-Salsola**					
Dominants	*Artemisia kemrudica*					
Position in succession	Digressive plant formation					
Projective cover (%)	15-25					
Plant litter (%)	-					
Shrubs and semi-shrubs (%)	23					
Herbaceous cover (%)	<1					
Shrub-semishrub layer, height (cm)	Up to 40					
Herbaceous layer, height (cm)	10					
Factors and degree of disturbance	Slightly disturbed, dirt road network, material excavated during geological investigation					
Signs of abnormal plant development	Not observed					
Additions	Artemisia kemrudica – 80% in dry condition					
Plant name	Height	Plant cover (%)	Abun-dance	Espace-ment	Phe-nophase	Zoetic condition
Semi-shrub						
Caroxylon orientale	40	3-5	Sol-Sp	Df	Fruition	Normal
Dwarf shrub						
Artemisia kemrudica	25-45	10	Sp	Df	Budding, dry.	Supressed
Caroxylon gemmascens	35	3	Sol	Df	Fruition	Normal
Anabasis salsa	22	5	Sp	Df	Fruition	Normal
Herbaceous layer						
Anabasis brachiata	10	<1	Sol	Df	Fruition	Normal
Lichen						
Evernia esorediosa f. terrestris	--	1	Sol	Df		

Sample Plot #	K16p					
Photo	Not available					
Size	10 x 10 m					
Date	07.09..2024					
Coordinates	42°04’51.44’’N 52°45’49.80’’E					
Position in the landscape	Undulating plain					
Height (m vertical coordinate)	161					
Terrain	Plain					
Soils	Gray-brown alkaline					
Water regime	Precipitations					
Community name	***Caroxylon orientale***					
Dominants	*Caroxylon orientale*					
Position in succession	Stable plant community					
Projective cover (%)	2025					
Plant litter (%)	-					
Shrub-dwarf semishrubs (%)	Up to 22					
Herbaceous cover (%)	<1					
Shrubополукустарниковый ярус, высота (см)	Up to 30					
Herbaceous layer, height (cm)	Up to 10					
Factors and degree of disturbance	Medium disturbance: numerous burrowing animals’ colonies, dirt road network					
Signs of abnormal plant development	Not observed					
Additions	Burrowing animals’ colonies, presumably abandoned 80% Caroxylon orientale – Dead					
Scientific name of plant species	Height	Plant cover (%)	Abun-dance	Espace-ment	Phe-nophase	Zoetic condition
Semi-shrub						
Caroxylon orientale	30	20	Sp	Df	Dead	De-pressed
Dwarf shrub						
Artemisia kemrudica	20	12	Sol	Df	Vegetative	Good
Herbaceous layer						
Anabasis brachiata	10	<1	Sol	Df	Vegetative	Good

Sample Plot #	K17p					
Photo	Not available					
Size	10 x 10 m					
Date	07.09.2024					
Coordinates	42°04’39.86’’N 52°46’48.87’’E					
Position in the landscape	Undulating plain with sloping hills					
Height (m vertical coordinate)	188					
Terrain	The flat top of the low ridge					
Soils	Gray-brown alkaline, badly eroded					
Water regime	Precipitations					
Community name	Single plants and oligodominant groupings					
Dominants	-					
Position in succession	Degressive plant community					
Projective cover (%)	35					
Plant litter (%)	-					
Shrub-dwarf semishrubs (%)	Up to 3					
Herbaceous cover (%)	Up to 2					
Shrub-dwarf semishrubs layer, hight (cm)	Up to 40					
Herbaceous layer, height (cm)	Up to 45					
Factors and degree of disturbance	Severe degree of disturbance: road degression					
Signs of abnormal plant development	Not observed					
Scientific name of plant species	Height	Plant cover (%)	Abun-dance	Espace-ment	Phe-nophase	Zoetic condition
Shrub						
Atraphaxis replicata	40	<0,5	Un	Df	Flower	Good
Ephedra aurantiaca	15	<1	Sol	Df	Vegetative	Good
Semi-shrub						
Caroxylon orientale	30	1	Sol	Df	Vegetative	Good
Dwarf shrub						
Artemisia kemrudica	25	<1	Sol	Df	Vegetative	Good
Herbaceous layer						
Anabasis brachiata	10	1	Sol	Df	Vegetative	Good
Euphorbias spp.	45	<1	Sol	Df	Flower	Good

Sample Plot #	K18p					
Photo	Not available					
Size	10 x 10 m					
Date	07.09.2024					
Coordinates	42°04’47.30’’N 52°47’42.37’’E					
Position in the landscape	Undulating plain					
Height (m vertical coordinate)	171					
Terrain	Plain					
Soils	Gray-brown alkaline					
Water regime	Precipitations					
Community name	***Xylosalsola-wormwood***					
Dominants	*Artemisia kemrudica*					
Position in succession	Stable plant community					
Projective cover (%)	30-35					
Plant litter (%)	-					
Shrubs and semi-shrubs (%)	Up to 32					
Herbaceous cover (%)	<1					
Shrub-semishrub layer, height (cm)	Up to 40					
Herbaceous layer, height (cm)	Up to 7					
Factors and degree of disturbance	Mild to moderate disturbance, earth burrowing animals’ orm colonies, dirt road network.					
Signs of abnormal plant development	Not observed					
Additions	*Artemisia kemrudica* up to 70% dead					
Scientific name of plant species	Height	Plant cover (%)	Abun-dance	Espace-ment	Phe-nophase	Zoetic condition
Semi-shrub						
Ephedra aurantiaca	40	12	Sol	Df	Vegetative	Good
Dwarf shrub						
Artemisia kemrudica	25	30	Cop1	Df	Dead	De-pressed
Herbaceous layer						
Eremopyrum orientale	7	<1	Sol	Df	Dying	Normal
Bromus tectorum	7	<0,5	Sol	Df	Dying	Normal

Sample Plot #	K19p					
Photo	Not available					
Size	10 x 10 m					
Date	07.09.2024					
Coordinates	42°05’12.86’’N 52°50’04.73’’E					
Position in the landscape	Undulating plain					
Height (m vertical coordinate)	165					
Terrain	Plain					
Soils	Takyr					
Water regime	Precipitations					
Community name	Single perennial saltwart					
Dominants	-					
Position in succession	Stable plant community					
Projective cover (%)	0					
Plant litter (%)	-					
Shrubs and semi-shrubs (%)	<1					
Herbaceous cover (%)	0					
Shrub-semishrub layer, height (cm)	Up to 10					
Factors and degree of disturbance	Slightly disturbed, dirt road network					
Signs of abnormal plant development	Not observed					
Scientific name of plant species	Height	Plant cover (%)	Abun-dance	Espace-ment	Phe-nophase	Zoetic condition
Dwarf shrub						
Caroxylon gemmascens	10	<0,5	Sol	Df	Vegetative	Normal
Anabasis salsa	7	<0,5	Sol	Df	Vegetative	Normal

Sample Plot #	K20p					
Photo	Not available					
Size	10 x 10 m					
Date	07.09.2024					
Coordinates	42°06’28.71’’N 52°51’26.41’’E					
Position in the landscape	Undulating plain					
Height (m vertical coordinate)	176					
Terrain	Plain					
Soils	Gray-brown alkaline along with takyrs					
Water regime	Precipitations					
Community name	**Xylosalsola-wormwood**					
Dominants	*Artemisia kemrudica*					
Position in succession	Stable plant community					
Projective cover (%)	30-35					
Plant litter (%)	-					
Shrubs and semi-shrubs (%)	Up to 35					
Herbaceous cover (%)	<1					
Shrub-semishrub layer, height (cm)	35					
Herbaceous layer, height (cm)	5					
Factors and degree of disturbance	Slightly disturbed, burrowing animals colonies, dirt road network					
Signs of abnormal plant development	Not observed					
Additions	*Artemisia kemrudica* up to 50% dead					
Scientific name of plant species	Height	Plant cover (%)	Abun-dance	Espace-ment	Phe-nophase	Zoetic condition
Dwarf shrub						
Artemisia kemrudica	35	30-35	Cop1	Df	Dead	De-pressed
Herbaceous layer						
Ceratocarpus arenarius	5	<1	Sol	Df	Fruition	Good

Sample Plot #	K21p					
Photo	Not available					
Size	10 x 10 m					
Date	07.09.2024					
Coordinates	42°08’30.18’’N 52°53’27.85’’E					
Position in the landscape	Plain					
Height (m vertical coordinate)	217					
Terrain	Plain					
Soils	Gray-brown alkaline					
Water regime	Precipitations					
Community name	***Salsola gemmascens Pall.***					
Dominants	*Caroxylon gemmascens*					
Position in succession	Stable plant community					
Projective cover (%)	25-30					
Plant litter (%)	-					
Shrub-dwarf semishrubs (%)	Up to 30					
Herbaceous cover (%)	1					
Shrub-semishrub layer, height (cm)	Up to 35					
Herbaceous layer, height (cm)	10					
Factors and degree of disturbance	Slightly disturbed, grazing, dirt road network					
Signs of abnormal plant development	Not observed					
Additions	Caroxylon gemmascens – up to 5% Dead					
Scientific name of plant species	Height	Plant cover (%)	Abundance	Espace-ment	Phe-nophase	Zoetic condition
Dwarf shrub						
Caroxylon gemmascens	35	25	Sp	Df	Dead	De-pressed
Artemisia kemrudica	30	12	Sol	Df	Vegetative	Good
Anabasis salsa	10	23	Sol	Df	Vegetative	Good
Herbaceous layer						
Anabasis brachiata	10	1	Sol	Df	Vegetative	Good
Koelpinia linearis	7	<0,5	Sol	Df	Flower	Good

Sample Plot #	**K22p**					
Photo	Not available					
Size	10 x 10 m					
Date	07.09.2024					
Coordinates	42°11’25.77’’N 52°56’43.34’’E					
Position in the landscape	Plain					
Height (m vertical coordinate)	219					
Terrain	Plain					
Soils	Gray-brown alkaline					
Water regime	Precipitations					
Community name	***SSalsola gemmascens Pall.* with *Anabasis salsa***					
Dominants	*Anabasis salsa, Caroxylon gemmascens*					
Position in succession	Stable plant community					
Projective cover (%)	2025					
Plant litter (%)	0					
Shrub-dwarf semishrubs (%)	Up to 25					
Herbaceous cover (%)	<1					
Shrub-semishrub layer, height (cm)	Up to 50					
Herbaceous layer, height (cm)	Up to 10					
Factors and degree of disturbance	Slightly disturbed, grazing, dirt road network					
Signs of abnormal plant development	Not observed					
Scientific name of plant species	Height	Plant cover (%)	Abun-dance	Espace-ment	Phe-nophase	Zoetic condition
Shrub						
Oreosalsola arbusculiformis	50	<1	Sol	Df	Vegetative	Good
Dwarf shrub						
Anabasis salsa	10	15	Sp	Df	Vegetative	Good
Caroxylon gemmascens	40	10	Sp	Df	Vegetative	Good
Herbaceous layer						
Eremopyrum orientale	10	<0,5	Sol	Df	Dying	Normal
Koelpinia linearis	7	<0,5	Sol	Df	Flower	Good
Lappula spp.	5	<0,1	Sol	Df	Fruition	Good

Sample Plot #	K23p					
Photo	Not available					
Size	10 x 10 m					
Date	07.09.2024					
Coordinates	42°13’15.34’’N 52°58’53.44’’E					
Position in the landscape	Undulating plain					
Height (m vertical coordinate)	218					
Terrain	Plain					
Soils	Gray-brown alkaline					
Water regime	Precipitations					
Community name	**Xylosalsola-wormwood**					
Dominants	*Artemisia kemrudica*					
Position in succession	Stable plant community					
Projective cover (%)	35-40					
Plant litter (%)	-					
Shrub-dwarf semishrubs (%)	Up to 40					
Herbaceous cover (%)	<1					
Shrub-semishrub layer, height (cm)	Up to 45					
Herbaceous layer, height (cm)	10					
Factors and degree of disturbance	Slightly disturbed, burrowing animals colonies, dirt road network					
Signs of abnormal plant development	Not observed					
Additions	15–20% of total projective cover are Dead, 70% of *Artemisia kemrudica* Dead					
Scientific name of plant species	Height	Plant cover (%)	Abun-dance	Espace-ment	Phe-nophase	Zoetic condition
Shrub						
Ephedra aurantiaca	45	<1	Sol	Df	Vegetative	Good
Dwarf shrub						
Artemisia kemrudica	25	30-35	Cop1	Df	Dead	De-pressed
Caroxylon gemmascens	40	35	SolSp	Df	Dead	De-pressed
Anabasis salsa	8	12	Sol	Df	Vegetative	Good
Herbaceous layer						
Anabasis brachiata	10	<1	Sol	Df	Vegetative	Good
Eremopyrum orientale	7	<0,5	Sol	Df	Dying	Normal

Sample Plot #	K24p					
Photo	Not available					
Size	10 x 10 m					
Date	07.09.2024					
Coordinates	42°15’43.55’’N 52°55’35.22’’E					
Position in the landscape	Undulating plain					
Height (m vertical coordinate)	213					
Terrain	Plain					
Soils	Gray-brown alkaline					
Water regime	Precipitations					
Community name	***Salsola gemmascens Pall.* with Xylosalsola-wormwood**					
Dominants	*Artemisia kemrudica, Caroxylon gemmascens*					
Position in succession	Stable plant community					
Projective cover (%)	30-35					
Plant litter (%)	-					
Shrub-dwarf semishrubs (%)	Up to 32					
Herbaceous cover (%)	<1					
Shrub-semishrub layer, height (cm)	Up to 45					
Herbaceous layer, height (cm)	Up to 30					
Factors and degree of disturbance	Slightly disturbed, burrowing animals colonies, dirt road network					
Signs of abnormal plant development	Not observed					
Additions	5% *Artemisia kemrudica* Dead					
Scientific name of plant species	Height	Plant cover (%)	Abun-dance	Espace-ment	Phe-nophase	Zoetic condition
Shrub						
Oreosalsola arbusculiformis	45	<1	SolUn	Df	Vegetative	Good
Dwarf shrub						
Artemisia kemrudica	25	20	Sp	Df	Dead	De-pressed
rooCaroxylon gemmascens	35	10	Sp	Df	Dead	De-pressed
Anabasis salsa	10	12	Sol	Df	Vegetative	Good
Herbaceous layer						
Salsola spp.	30	<1	Sol	Df	Vegetative	Good
Eremopyrum orientale	7	<0,5	Sol	Df	Dying	Normal

Sample Plot #	B1p
Photos B1p, B1p.1, B1p.2, B1p.3, B1p.4 and B1p.5	

Size	10 x 10 m					
Date	9.09.2024					
Coordinates	42°18'21.84"N 54°29'32.43"E					
Position in the landscape	Undulating pimple plain					
Elevation (m abs.alt.)	166					
Terrain	Plain with bosyngens (dry crust of gypsified clays)					
Soils	Gray-brown eroded salty					
Water regime	Precipitations					
Community name	**Perennial halophytic-wormwood in complex with lichens on bosyngens (dry crust of gypsified clays)**					
Dominants	*Artemisia kemrudica, Caroxylon orientale* and *Evernia esorediosa f. terrestris*					
Position in succession	Digressive plant formation					
Projective cover (%)	30–35 and 15–20					
Plant litter (%)	-					
Shrubs and semi-shrubs (%)	30 and 5 (+ 10–15% lichen)					
Herbaceous cover (%)	<1					
Shrub-semishrub layer, height (cm)	Up to 160 and 30					
Herbaceous layer, height (cm)	Up to 15 and 10					
Factors and degree of disturb-ance	Slightly disturbed, dirt road network					
Signs of abnormal plant devel-opment	Not observed					
Additions	Artemisia kemrudica and Caroxylon orientale – 90% in dry condition.					
Plant name	Height	Plant cover (%)	Abundance	Espace-ment	Phe-nophase	Zoetic condition
Tree						
Haloxylon ammodendron	160	1	Sol	Gr	Fruition	Normal
Shrub						
Oreosalsola arbusculiformis	75	<1	Sol	Df	Fruition	Normal
Atraphaxis replicata	60	<1	Sol	Df	End of vegetation	Normal
Semi-shrub						
Caroxylon orientale	45	3-5	Sol-Sp	Df	Fruition	Supressed
Dwarf shrub						
Artemisia kemrudica	30	15-20	Sp	Df	Budding, dry	Supressed
Anabasis salsa	27	1-2	Sol	Df	Fruition	Normal
Herbaceous layer						
Girgensohnia oppositiflora	15	<0.5	Sol	Df	Fruition	Normal
Eremopyrum orientale	10	<0.5	Sol	Df	Dead	Normal

Sample Plot #	B1p					
Plant name	Height	Plant cover (%)	Abundance	Espace-ment	Phe-nophase	Zoetic condition
Amberboa nana	3	<0.5	Sol	Df	Dead	Normal
Tetracme spp.	15	<1	Sol	Df	Dead	Normal
Lichens aggregations on bosyngens (dry crust of gypsified clays)						
Dwarf shrub						
Artemisia kemrudica	30	3-5	Sol-Sp	Df	Budding, dry.	Supressed
Herbaceous layer						
Anabasis brachiata	10	<1	Sol	Gr	Fruition	Normal
Eremopyrum orientale	5	<0.5	Sol	Df	Dead	Normal
Lichen						
Evernia esorediosa f. terrestris	--	10-15	Sol	Df		

Sample Plot #	B2p
Photos B2p, B2p.1 and B2p.2	

Size	10 x 10 m
Date	9.09.2024
Coordinates	42°11'23.56"N 54°41'40.41"E
Position in the landscape	Undulating plain with takyr depressions
Elevation (m abs.alt.)	166
Terrain	Plain
Soils	Gray-brown alkaline
Water regime	Precipitations
Community name	**Anabasis**
Dominants	Anabasis salsa
Position in succession	Stable plant community
Projective cover (%)	15-20
Plant litter (%)	-
Shrubs and semi-shrubs (%)	15-20
Herbaceous cover (%)	<1
Shrub-semishrub layer, height (cm)	20
Herbaceous layer, height (cm)	Up to 20
Factors and degree of disturbance	Slightly disturbed, dirt road network, burrowing animals colonies
Signs of abnormal plant development	Not observed
Additions	Anabasis salsa – 1–2 % in dry condition.

Plant name	Height	Plant cover (%)	Abun-dance	Espace-ment	Phe-nophase	Zoetic condition
Dwarf shrub						
Anabasis salsa	20	15-20	Sp	Df	Fruition	Normal
Herbaceous layer						
Girgensohnia oppositiflora	20	<0.5	Un-Sol	Df	Fruition	Normal
Amberboa nana	2	<0.5	Un-Sol	Df	Dead	Normal
Tetracme spp.	7	<0.5	Sol	Df	Dead	Normal

Sample Plot #	B3p					
Photo	Not available					
Size	10 x 10 m					
Date	09.09.2024					
Coordinates	42°10'33.15"N 54°53'56.39''E					
Position in the landscape	Gently undulating plain					
Elevation (m abs.alt.)	188					
Terrain	Plain					
Soils	Takyr					
Water regime	Precipitations					
Community name	**Sporadically Ferula assafoetida**					
Dominants	-					
Position in succession	Stable plant community					
Projective cover (%)	<1					
Plant litter (%)	-					
Shrubs and semi-shrubs (%)	<1					
Herbaceous cover (%)	-					
Shrub-semishrub layer, height (cm)	Up to 15					
Herbaceous layer, height (cm)	-					
Factors and degree of disturbance	Slightly disturbed, dirt road network					
Signs of abnormal plant development	Not observed					
Plant name	Height	Plant cover (%)	Abun-dance	Espace-ment	Phe-nophase	Zoetic condition
Semi-shrub						
Caroxylon orientale	30	<1	Un-Sol	Df-gr	Vegitative	Normal

Sample Plot #	B4p					
Photo	Not available					
Size	10 x 10 m					
Date	09.09.2024					
Coordinates	42° 6'29.32"N 55° 9'59.33"E					
Position in the landscape	Gently undulating plain					
Elevation (m abs.alt.)	197					
Terrain	Plain					
Soils	Grey-brown alkaline					
Water regime	Precipitations					
Community name	**Anabasis salsa-Ferula assafoetida**					
Dominants	*Anabasis salsa, Caroxylon orientale*					
Position in succession	Stable plant community					
Projective cover (%)	25-30					
Shrubs-dwarf semi-shrubs (%)	Up to 27					
Herbaceous cover (%)	1					
Shrub-semishrub layer, height (cm)	Up to 40					
Herbaceous layer, height (cm)	Up to 15					
Factors and degree of disturbance	Slightly disturbed, burrowing animals colonies, dirt road network					
Signs of abnormal plant development	Not observed					
Additions	40% Caroxylon orientale in dry condition					
Plant name	Height	Plant cover (%)	Abun-dance	Espace-ment	Phe-nophase	Zoetic condition
Semi-shrub						
Caroxylon orientale	40	20	Sp	Df	Vegitative, dry	Su-pressed
Dwarf shrub						
Anabasis salsa	8	7	Sp	Df	Vegitative	Normal
Herbaceous layer						
Eremopyrum orientale	7	<0.5	Sol	Df	Dead	Normal
Plantago minuta	4	<0.1	Sol	Df	Fruition	Normal
Arnebia decumbens	12	<0.5	Sol	Df	Fruition	Normal
Senecio glaucus subsp. coronopifolius	7	<0.1	Sol	Df	Fruition	Normal
Euphorbia inderiensis	10	<0.1	Sol	Df	Fruition	Normal
Arenaria leptoclados	7	<0.5	Sol	Df	Fruition	Normal
Nonea caspica	3	<0.1	Sol	Df	Flowering	Normal
Hypecoum pendulum var. pendulum	15	<0.1	Sol	Df	Fruition	Normal
Koelpinia linearis	10	<0.1	Sol	Df	Fruition	Normal
Astragalus bakaliensis	8	<0.5	Sol	Df	Fruition	Normal

Sample Plot #	B5p					
Photo	Not available					
Size	10 x 10 m					
Date	09.09.2024					
Coordinates	42°19'4.60"N 54°52'25.63"E					
Position in the landscape	Undulating plain					
Elevation (m abs.alt.)	176					
Terrain	Plain					
Soils	Gray-brown alkaline					
Water regime	Precipitations					
Community name	**Ferula assafoetida-Anabasis with Haloxylon**					
Dominants	*Anabasis salsa*					
Position in succession	Stable plant community					
Projective cover (%)	20-25					
Plant litter (%)	-					
Shrubs and semi-shrubs (%)	24					
Herbaceous cover (%)	<1					
Shrub-semishrub layer, height (cm)	Up to 160					
Herbaceous layer, height (cm)	Up to 10					
Factors and degree of disturbance	Slightly disturbed, dirt road network, burrowing animals colonies					
Signs of abnormal plant development	Not observed					
Plant name	Height	Plant cover (%)	Abundance	Espace-ment	Phe-nophase	Zoetic condition
Tree						
Haloxylon ammodendron	160	<1	Sol	Gr	Fruition	Normal
Semi-shrub						
Caroxylon orientale	30	2-3	Sol	Gr	Fruition	Normal
Capparis spinosa var. herbacea	--	<0.5	Sol	Df	End of vegetation	Normal
Dwarf shrub						
Artemisia kemrudica	25	1	Sol	Gr	Budding, dry	Supressed
Anabasis salsa	15	20	Sp	Df	Fruition	Normal
Nanophyton erinaceum	5	<1	Sol	Df	Fruition	Normal
Herbaceous layer						
Girgensohnia oppositiflora	10	<0.5	Sol	Df	Fruition	Normal
Eremopyrum orientale	5	<0.5	Sol	Df	Dead	Normal
Climacoptera spp.	3	<0.5	Sol	Df	Dead	Normal

Sample Plot #	B6p					
Photo	Not available					
Size	10 x 10 m					
Date	09.09.2024					
Coordinates	42°29'14.36"N 54°53'0.84»E					
Position in the landscape	Undulating plain with takyr depressions					
Elevation (m abs.alt.)	176					
Terrain	Plain					
Soils	Gray-brown alkaline					
Water regime	Precipitations					
Community name	**Ferula assafoetida-Anabasis with Haloxylon in complex with sporadic plants on takyr**					
Dominants	*Anabasis salsa, Caroxylon orientale*					
Position in succession	Stable plant community					
Projective cover (%)	15–25 and 1-2					
Plant litter (%)	-					
Shrubs and semi-shrubs (%)	17 and 1–2					
Herbaceous cover (%)	2–3 and <1					
Shrub-semishrub layer, height (cm)	Up to 160 and 30					
Herbaceous layer, height (cm)	Up to 25 and 30					
Factors and degree of disturbance	Slightly disturbed, dirt road network					
Signs of abnormal plant development	Not observed					
Additions	Artemisia kemrudica – 60% in dry condition.					
Plant name	Height	Plant cover (%)	Abun-dance	Espace-ment	Phe-nophase	Zoetic condition
Tree						
Haloxylon ammodendron	160	<1	Sol	Df	Fruition	Normal
Semi-shrub						
Caroxylon orientale	45	5	Sp	Df	Fruition	Normal
Dwarf shrub						
Artemisia kemrudica	30	1-2	Sol	Df	Budding, dry	Supressed
Anabasis salsa	15	10	Sp	Df	Fruition	Normal
Herbaceous layer						
Girgensohnia oppositiflora	25	<0.5	Sol	Df	Fruition	Normal
Eremopyrum orientale	10	<0.5	Sol	Df	Dead	Normal
Tetracme spp.	10	2-3	Sol	Df	Dead	Normal
Sporadic plants on takyr						
Semi-shrub						
Capparis spinosa var. herbacea	--	<1	Sol	Df	End of vegetation	Normal
Dwarf shrub						
Artemisia kemrudica	30	1-2	Sol	Gr	Budding	Normal
Scientific name of plant species	Height	Plant cover (%)	Abudance	Espace-ment	Phe-nophase	Zoetic condition
Anabasis salsa	25	<1	Sol	Df	Fruition	Normal
Herbaceous layer						
Anabasis brachiata	10	<1	Sol	Df	Fruition	Normal
Anabasis eriopoda	15	<1	Sol	Df	Fruition	Normal
Soda foliosa	20	<0.5	Sol	Df	Fruition	Normal
Girgensohnia oppositiflora	30	<0.5	Sol	Df	Fruition	Normal

Sample Plot #	B7p					
Photo	Not available					
Size	10 x 10 m					
Date	09.09.2024					
Coordinates	42°32'15.75"N 55° 5'52.00"E					
Position in the landscape	Gently undulating plain					
Elevation (m abs.alt.)	170					
Terrain	Plain					
Soils	Gray-brown alkaline					
Water regime	Precipitations					
Soil cover	-					
Community name	**Ferula assafoetida-Artemisia kemrudica-wormwood-perennial-Salsola with Haloxylon**					
Dominants	*Artemisia kemrudica, Caroxylon orientale*					
Position in succession	Stable plant community					
Projective cover (%)	30-40					
Plant litter (%)	-					
Shrubs and semi-shrubs (%)	35					
Herbaceous cover (%)	5–10					
Shrub-semishrub layer, height (cm)	Up to 160					
Herbaceous layer, height (cm)	Up to 50					
Factors and degree of disturbance	Slightly disturbed, dirt road network					
Signs of abnormal plant development	Not observed					
Additions						
Plant name	Height	Plant cover (%)	Abun-dance	Espace-ment	Phe-nophase	Zoetic condition
Tree of shrub						
Haloxylon ammodendron	160	<1	Sol	Gr	Vegitative	Normal
Semi-shrub						
Caroxylon orientale	30	7	Sp	Df	Vegitative	Normal
Dwarf shrub						
Artemisia terrae-albae	25	2	Sol	Grr	Vegitative	Normal
Artemisia kemrudica	25	20	Sp	Gr	Vegitative	Normal
Caroxylon gemmascens	40	3	Sol	Df	Vegitative	Normal
Anabasis salsa	7	3	Sol	Df	Vegitative	Normal
Herbaceous layer						
Xylosalsola arbuscula	45	3	Sol	Gr	Vegitative	Normal
Anabasis brachiata	15	2	Sol	Df	Vegitative	Normal
Arnebia decumbens	5	<1	Sol	Df	Flowering	Normal
Astragalus flexus	4	<1	Un-Sol	Df	Fruition	Normal
Eremopyrum orientale	10	<1	Sol	Df	Dead	Normal
Descurainia sophia	40	<0.5	Sol	Df	Dead	Normal
Euphorbia sclerocyathiu	45	3	Sol	Df	Flowering	Normal
Lepidium perfoliatum	10	<1	Sol	Df	Dead	Normal
Gypsophila diffusa	50	<1	Un-Sol	Df	Flowering	Normal
Malacocarpus crithmifolius	-	5	Sp	Gr	Flowering	Normal
Senecio glaucus subsp. coronopifolius	8	<1	Sol	Df	Flowering	Normal
Zygophyllum ovigerum	10	<1	Sol	Df	Fruition	Normal

Sample Plot #	B8p					
Photo	Not available					
Size	10 x 10 m					
Date	09.09.2024					
Coordinates	42°25'50.35''N 54°12'52.28"E					
Position in the landscape	Undulating plain					
Height (m vertical coordinate)	106					
Terrain	Plain					
Soils	Gray-brown alkaline					
Water regime	Precipitations					
Community name	***Anabasis salsa-Salsola gemmascens Pall.***					
Dominants	*Anabasis salsa*					
Position in succession	Stable plant community					
Projective cover (%)	35-40					
Plant litter (%)	-					
Shrub-dwarf semishrubs (%)	Up to 35					
Herbaceous cover (%)	Up to 2					
Shrub-semishrub layer, height (cm)	Up to 45					
Herbaceous layer, height (cm)	Up to 10					
Factors and degree of disturbance	Slightly disturbed, dirt road network					
Signs of abnormal plant development	Not observed					
Additions	80% *Caroxylon gemmascens* Dead					
Scientific name of plant species	Height	Plant cover (%)	Abun-dance	Espace-ment	Phe-nophase	Zoetic condition
Dwarf shrub						
Caroxylon gemmascens	45	30	Cop1	Df	Dead	De-pressed
Anabasis salsa	8	5	Sol	Df	Vegetative	Good
Artemisia kemrudica	25	<1	Sol	Df	Vegetative	Good
Herbaceous layer						
Anabasis brachiata	10	12	Sol	Df	Vegetative	Good
Eremopyrum orientale	8	<0,5	Sol	Df	Dying	Normal
Plantago minuta	3	<0,1	Sol	Df	Fruition	Good
Arnebia decumbens	5	<0,1	Sol	Df	Fruition	Good
Senecio glaucus subsp. coronopifolius	7	<0,5	Sol	Df	Flower/Fru-ition	Good
Euphorbia inderiensis	10	<0,1	Sol	Df	Fruition	Good

Sample Plot #	B9p					
Photo	Not available					
Size	10 x 10 m					
Date	20.09.2024					
Coordinates	42°25'57.09"N 54°26'37.16"E					
Position in the landscape	Undulating plain					
Height (m vertical coordinate)	192					
Terrain	Plain					
Soils	Takyr soil					
Water regime	Precipitations					
Community name	**Perennial-halophytic**					
Dominants	*Anabasis salsa, Caroxylon orientale*					
Position in succession	Stable plant community					
Projective cover (%)	510					
Plant litter (%)	-					
Shrub-dwarf semishrubs (%)	Up to 7					
Herbaceous cover (%)	<1					
Shrub-semishrub layer, height (cm)	Up to 200					
Herbaceous layer, height (cm)	Up to 10					
Factors and degree of disturbance	Slightly disturbed, burrowing animals colonies, dirt road network					
Signs of abnormal plant development	Not observed					
Additions	Burrowing animals' colonies, presumably abandoned					
Scientific name of plant species	Height	Plant cover (%)	Abun-dance	Espace-ment	Phe-nophase	Zoetic condition
Shrub						
Haloxylon ammodendron	200	2	Sol	Df	Vegetative	Good
Semi-shrub						
Caroxylon orientale	35	23	Sol	Df	Vegetative	Good
Dwarf shrub						
Artemisia kemrudica	25	<0,5	UnSol	Df	Vegetative	Good
Anabasis salsa	8	3	Sol	Df	Vegetative	Good
Herbaceous layer						
Anabasis brachiata	10	<1	Sol	Df	Vegetative	Good
Eremopyrum orientale	7	<0,5	Sol	Df	Dying	Normal
Plantago minuta	4	<0,1	Sol	Df	Fruition	Good
Arnebia decumbens	8	<0,5	Sol	Df	Flower/Fru-ition	Good
Ranunculus testiculatus	4	<0,1	Sol	Df	Fruition	Good
Astragalus spp.	5	<0,1	Sol	Df	Fruition	Good
Senecio glaucus subsp. coronopifolius	7	<0,5	Sol	Df	Flower/Fru-ition	Good

Sample Plot #	B10p					
Photo	Not available					
Size	10 x 10 m					
Date	09.09.2024					
Coordinates	42°26'1.03"N 54°29'38.98"E					
Position in the landscape	Undulating plain					
Height (m vertical coordinate)	185					
Terrain	Plain					
Soils	Gray-brown argillaceous					
Water regime	Precipitations					
Community name	***Caroxylon orientale-Anabasis salsa* with *Haloxylon***					
Dominants	*Anabasis salsa, Caroxylon orientale*					
Position in succession	Stable plant community					
Projective cover (%)	2025					
Plant litter (%)	-					
Shrub-dwarf semishrubs (%)	Up to 2022					
Herbaceous cover (%)	<1					
Shrub-semishrub layer, height (cm)	Up to 220					
Herbaceous layer, height (cm)	Up to 15					
Factors and degree of disturbance	Slightly disturbed, burrowing animals colonies, dirt road network					
Signs of abnormal plant development	Not observed					
Scientific name of plant species	Height	Plant cover (%)	Abun-dance	Espace-ment	Phe-nophase	Zoetic condition
Shrub						
Haloxylon ammodendron	220	23	Sol	Df	Vegetative	Good
Shrub						
Oreosalsola arbusculiformis	45	<1	Sol	Df	Vegetative	Good
Semi-shrub						
Caroxylon orientale	35	5	Sp	Df	Vegetative	Good
Dwarf shrub						
Anabasis salsa	8	1015	Sp	Df	Vegetative	Good
Herbaceous layer						
Eremopyrum orientale	8	<0,5	Sol	Df	Dying	Normal
Plantago minuta	4	<0,5	Sol	Df	Fruition	Good
Arnebia decumbens	5	<0,5	Sol	Df	Flower/Fru-ition	Good
Senecio glaucus subsp. coronopifolius	7	<0,1	Sol	Df	Flower/Fru-ition	Good
Euphorbia inderiensis	15	<0,1	Sol	Df	Fruition	Good

Sample Plot #	B11p					
Photo	Not available					
Size	10 x 10 m					
Date	09.09.2024					
Coordinates	42°25’27.66’’N 54°33’25.82’’E					
Position in the landscape	Undulating plain					
Height (m vertical coordinate)	188					
Terrain	Plain					
Soils	Takyr					
Water regime	Precipitations					
Community name	**Sporadical *Caroxylon orientale***					
Dominants	-					
Position in succession	Stable plant community					
Projective cover (%)	<1					
Plant litter (%)	-					
Shrubs and semi-shrubs (%)	<1					
Herbaceous cover (%)	0					
Shrub-semishrub layer, height (cm)	Up to 15					
Factors and degree of disturbance	Slightly disturbed, dirt road network					
Signs of abnormal plant development	Not observed					
Scientific name of plant species	Height	Plant cover (%)	Abun-dance	Espace-ment	Phe-nophase	Zoetic condition
Semi-shrub						
Caroxylon orientale	30	<1	UnSol	Dfgr	Vegetative	Normal

Sample Plot #	B12p					
Photo	Not available					
Size	10 x 10 m					
Date	09.09.2024					
Coordinates	42°24’20.88’’N 54°40’45.16’’E					
Position in the landscape	Undulating plain					
Height (m vertical coordinate)	197					
Terrain	Plain					
Soils	Gray-brown alkaline					
Water regime	Precipitations					
Community name	***Anabasis salsa-Caroxylon orientale***					
Dominants	*Anabasis salsa, Caroxylon orientale*					
Position in succession	Stable plant community					
Projective cover (%)	2530					
Plant litter (%)	-					
Shrub-dwarf semishrubs (%)	Up to 27					
Herbaceous cover (%)	1					
Shrub-semishrub layer, height (cm)	Up to 40					
Herbaceous layer, height (cm)	Up to 15					
Factors and degree of disturbance	Slightly disturbed, burrowing animals colonies, dirt road network					
Signs of abnormal plant development	Not observed					
Additions	40% *Caroxylon orientale* dead					
Scientific name of plant species	Height	Plant cover (%)	Abun-dance	Espace-ment	Phe-nophase	Zoetic condition
Semi-shrub						
Caroxylon orientale	40	20	Sp	Df	Dead	De-pressed
Dwarf shrub						
Anabasis salsa	8	7	Sp	Df	Vegetative	Good
Herbaceous layer						
Eremopyrum orientale	7	<0,5	Sol	Df	Dying	Normal
Plantago minuta	4	<0,1	Sol	Df	Fruition	Good
Arnebia decumbens	12	<0,5	Sol	Df	Fruition	Good
Senecio glaucus subsp. coronopifolius	7	<0,1	Sol	Df	Flower/Fru-ition	Good
Euphorbia inderiensis	10	<0,1	Sol	Df	Fruition	Good
Arenaria leptoclados	7	<0,5	Sol	Df	Fruition	Good
Nonea caspica	3	<0,1	Sol	Df	Flower	Good
Hypecoum pendulum var. pendulum	15	<0,1	Sol	Df	Fruition	Good
Koelpinia linearis	10	<0,1	Sol	Df	Fruition	Good
Zygophyllum lehmannianum	5	<0,5	Sol	Df	Fruition	Good

Sample Plot #	Z1p
Photos Z1p, Z1p.1 and Z1p.2	
Size	10 x 10 m
Date	5.09.2024
Coordinates	43°39'15.53"N 52°27'8.32"E
Position in the landscape	Undulating plain
Elevation (m abs.alt.)	300
Terrain	Plain
Soils	Gray-brown alkaline
Water regime	Precipitations
Community name	***Anabasis***
Dominants	*Anabasis salsa*
Position in succession	Stable plant community
Projective cover (%)	20-25
Plant litter (%)	-
Shrubs and semi-shrubs (%)	21
Herbaceous cover (%)	1-2
Shrub-semishrub layer, height (cm)	Up to 17
Herbaceous layer, height (cm)	Up to 10
Factors and degree of disturbance	Slightly disturbed, grazing, dirt road network
Signs of abnormal plant development	Not observed
Additions	

Scientific name of plant species	Height	Plant cover (%)	Abun-dance	Espace-ment	Phe-nophase	Zoetic condition
Semi-shrub						
Caroxylon orientale	15	1	Sol	Df	Fruition	Normal
Dwarf shrub						
Anabasis salsa	17	20	Sp	Df	Fruition	Normal
Herbaceous layer						
Eremopyrum orientale	7	<1	Sol	Df	Dead	Normal
Ceratocarpus arenarius	3	<0.5	Sol	Df	Dead	Normal
Allium caspium	--	--	Un	Df	Dead	Normal
Pyankovia brachiata	10	<0.5	Sol	Df	Fruition	Normal

Sample Plot #	Z2p
Photos Z2p, Z2p.1, Z2p.2 and Z2p.3	
Size	10 x 10 m
Date	5.09.2024
Coordinates	43°37'42.17"N 52°33'27.22"E
Position in the landscape	Undulating plain
Elevation (m abs.alt.)	343
Terrain	Plain
Soils	Gray-brown alkaline
Water regime	Precipitations
Community name	**Perennial halophytic-wormwood**
Dominants	*Artemisia terrae-albae, Anabasis salsa*
Position in succession	Stable plant community
Projective cover (%)	25-30
Plant litter (%)	-
Shrubs and semi-shrubs (%)	30
Herbaceous cover (%)	<1
Shrub-semishrub layer, height (cm)	Up to 27
Herbaceous layer, height (cm)	Up to 7
Factors and degree of disturbance	Slightly disturbed, grazing, dirt road network
Signs of abnormal plant development	Not observed
Additions	

Scientific name of plant species	Height	Plant cover (%)	Abun-dance	Espace-ment	Phe-nophase	Zoetic condition
Semi-shrub						
Caroxylon orientale	20	3	Sol	Df	Fruition	Su-pressed
Dwarf shrub						
Artemisia terrae-albae	27	20	Sp	Df	Budding	Normal
Anabasis salsa	15	7	Sp	Df	Fruition	Normal
Herbaceous layer						
Eremopyrum orientale	7	<1	Sol	Df	Dead	Normal
Girgensohnia oppositiflora	7	<0.5	Sol	Df	Fruition	Normal
Ranunculus testiculatus	3	<0.5	Sol	Df	Dead	Normal

Sample Plot #	Z3p
Photos Z3p, Z3p.1 and Z3p.2	

Size	10 x 10 m					
Date	5.09.2024					
Coordinates	43°34'11.87"N 52°32'1.14"E					
Position in the landscape	Gently undulating plain					
Elevation (m abs.alt.)	304					
Terrain	Plain					
Soils	Gray-brown alkaline					
Water regime	Precipitations					
Community name	***Anabasis***					
Dominants	*Anabasis salsa*					
Position in succession	Stable plant community					
Projective cover (%)	15-20					
Plant litter (%)	-					
Shrubs and semi-shrubs (%)	20					
Herbaceous cover (%)	<1					
Shrub-semishrub layer, height (cm)	Up to 25					
Herbaceous layer, height (cm)	Up to 10					
Factors and degree of disturbance	Slightly-averagely disturbed, grazing, dirt road network					
Signs of abnormal plant development	Not observed					
Additions						
Scientific name of plant species	Height	Plant cover (%)	Abun-dance	Espace-ment	Phe-nophase	Zoetic condition
Semi-shrub						
Caroxylon orientale	20	1	Sol	Df	Fruition	Normal
Dwarf shrub						
Anabasis salsa	15	17	Sp	Df	Fruition	Normal
Nanophyton erinaceum	3	1-2	Sol	Df	Fruition	Normal
Artemisia terrae-albae	25	1-2	Sol	Df	Budding	Normal
Herbaceous layer						
Eremopyrum orientale	4	<0.5	Sol	Df	Dead	Normal
Girgensohnia oppositiflora	10	<0.5	Sol	Df	Fruition	Normal
Pyankovia brachiata	8	<0.5	Sol	Df	Fruition	Normal
Orobanche cumana	7	<0.5	Sol	Df	Dead	Normal

Sample plot #	Z4p
Photos Z4p, Z4p.1, Z4p.2 and Z4p.3	

Size	10 x 10 m
Date	5.09.2024
Coordinates	43°35'4.21"N 52°35'43.58"E
Position in the landscape	Undulating plain
Elevation (m abs.alt.)	317
Terrain	Plain
Soils	Gray-brown alkaline
Water regime	Precipitations
Community name	**Wormwood with perennial saltworts**
Dominants	*Artemisia terrae-albae, Caroxylon orientale*
Position in succession	Stable plant community
Projective cover (%)	20-25
Plant litter (%)	-
Shrubs and semi-shrubs (%)	20-22
Herbaceous cover (%)	<1
Shrub-semishrub layer, height (cm)	Up to 23
Herbaceous layer, height (cm)	Up to 15
Factors and degree of disturbance	Slightly-averagely disturbed, grazing, dirt road network
Signs of abnormal plant development	Not observed
Additions	

Scientific name of plant species	Height	Plant cover (%)	Abun-dance	Espace-ment	Phe-nophase	Zoetic condition
Semi-shrub						
Caroxylon orientale	15	3-5	Sol-Sp	Df	Fruition	Normal
Dwarf shrub						
Ephedra distachya	10	<1	Sol	Df	Vegetative	Normal
Dwarf shrub						
Artemisia terrae-albae	23	15	Sp	Df	Budding	Su-pressed
Anabasis salsa	15	2	Sol	Df	Fruition	Normal
Herbaceous layer						
Eremopyrum orientale	6	<0.5	Sol	Df	Dead	Normal
Girgensohnia oppositiflora	7	<0.5	Sol	Df	Fruition	Normal
Ranunculus testiculatus	3	<0.5	Sol	Df	Dead	Normal
Ceratocarpus arenarius	5	<0.5	Sol	Df	Dead	Normal
Pyankovia brachiata	15	<0.5	Sol	Df	Fruition	Normal

Sample Plot #	Z5p
Photos Z5p, Z5p.1 and Z5p.2	

Size	10 x 10 m					
Date	5.09.2024					
Coordinates	43°37'42.32"N 52°38'7.51"E					
Position in the landscape	Undulating plain					
Elevation (m abs.alt.)	354					
Terrain	Plain					
Soils	Gray-brown alkaline					
Water regime	Precipitations					
Community name	***Anabasis***					
Dominants	*Anabasis salsa*					
Position in succession	Stable plant community					
Projective cover (%)	20-25					
Plant litter (%)	-					
Shrubs and semi-shrubs (%)	22					
Herbaceous cover (%)	1-2					
Shrub-semishrub layer, height (cm)	Up to 25					
Herbaceous layer, height (cm)	Up to 15					
Factors and degree of disturbance	Slightly disturbed, grazing, dirt road network					
Signs of abnormal plant development	Not observed					
Additions						
Scientific name of plant species	Height	Plant cover (%)	Abundance	Espace-ment	Phe-nophase	Zoetic condition
Semi-shrub						
Caroxylon orientale	20	3	Sol	Df	Fruition	Normal
Dwarf shrub						
Artemisia terrae-albae	25	2-3	Sol	Gr	Budding	Su-pressed
Anabasis salsa	10	15	Sp	Df	Fruition	Normal
Nanophyton erinaceum	5	<1	Sol	Df	Fruition	Normal
Herbaceous layer						
Anabasis brachiata	15	<1	Sol	Gr	Fruition	Normal
Anabasis eriopoda	10	<0.5	Sol	Df	Fruition	Normal
Eremopyrum triticeum	10	<0.5	Sol	Df	Dead	Normal
Fritillaria karelinii	7	<0.5	Sol	Df	Dead	Normal
Lepidium perfoliatum	15	<0.5	Sol	Df	Dead	Normal
Pyankovia brachiata	10	<0.5	Sol	Df	Fruition	Normal
Orobanche cumana	3	<0.5	Sol	Df	Dead	Normal

Sample Plot #	Z6p					
Photos Z6p, Z6p.1, Z6p.2 and Z6p.3						
Size	10 x 10 m					
Date	5.09.2024					
Coordinates	43°37'41.37"N 52°42'54.21"E					
Position in the landscape	Undulating plain near hillock Kyzymshek					
Elevation (m abs.alt.)	353					
Terrain	Plain					
Soils	Gray-brown alkaline					
Water regime	Precipitations					
Community name	***Anabasis* in complex with wormwood in microdepressions**					
Dominants	*Anabasis salsa; Artemisia terrae-albae*					
Position in succession	Stable plant community					
Projective cover (%)	20–25 and 25-30					
Plant litter (%)	-					
Shrubs and semi-shrubs (%)	25 and 28					
Herbaceous cover (%)	<0.5					
Shrub-semishrub layer, height (cm)	Up to 40					
Herbaceous layer, height (cm)	Up to 20					
Factors and degree of disturbance	Slightly disturbed, grazing, dirt road network					
Signs of abnormal plant development	Not observed					
Additions						
Scientific name of plant species	Height	Plant cover (%)	Abun-dance	Espace-ment	Phe-nophase	Zoetic condition
Anabasis						
Semi-shrub						
Caroxylon orientale	40	2-3	Sol	Df	Fruition	Normal
Dwarf shrub						
Artemisia terrae-albae	23	<1	Sol	Df	Budding	Normal
Anabasis salsa	15	20	Sp	Df	Fruition	Normal
Nanophyton erinaceum	7	2-3	Sol	Df	Fruition	Normal
Herbaceous layer						
Eremopyrum orientale	5	<0.5	Sol	Df	Dead	Normal
Lepidium perfoliatum	10	<0.5	Sol	Df	Dead	Normal
Pyankovia brachiata	20	<0.5	Sol	Df	Fruition	Normal
Ceratocarpus arenarius	7	<0.5	Sol	Df	Dead	Su-pressed
Girgensohnia oppositiflora	10	<0.5	Sol	Df	Fruition	Normal
Rheum tataricum	--	--	Un	--	Dead	Normal
Wormwood						
Shrub						

Sample Plot #	Z6p					
Scientific name of plant species	Height	Plant cover (%)	Abun-dance	Espace-ment	Phe-nophase	Zoetic condition
Atraphaxis replicata	25	<1	Sol	Df	Senes-cence	Normal
Semi-shrub						
Caroxylon orientale	40	2-3	Sol	Df	Fruition	Normal
Dwarf shrub						
Ephedra distachya	10	<1	Sol	Df	Senes-cence	Normal
Convolvulus fruticosus	40	<1	Sol	Df	Senes-cence	Normal
Dwarf shrub						
Artemisia terrae-albae	23	25	Sp	Df	Budding	Normal
Bassia prostrata	40	1	Sol	Df	Fruition	Normal
Nanophyton erinaceum	7	<1	Sol	Df	Fruition	Normal
Herbaceous layer						
Anabasis brachiata	10	<0.5	Sol	Df	Fruition	Normal
Eremopyrum orientale	7	<0.5	Sol	Df	Dead	Normal
Girgensohnia oppositiflora	10	<0.5	Sol	Df	Fruition	Normal
Rheum tataricum	--	<0.5	Sol	Df	Dead	Normal

Sample Plot #	Z7p
Photos Z7p, Z7p.1, Z7p.2 and Z7p.3	
Size	10 x 10 m
Date	5.09.2024
Coordinates	43°38'20.66"N 52°47'51.62"E
Position in the landscape	Undulating plain
Elevation (m abs.alt.)	360
Terrain	Plain
Soils	Gray-brown alkaline
Water regime	Precipitations
Community name	***Caroxylon orientale-Anabasis* in complex with *Caroxylon orientale-wormwood* on microhills**
Dominants	*Anabasis salsa, Caroxylon orientale; C. orientale, Artemisia terrae-albae*
Position in succession	Stable plant community
Projective cover (%)	25–30 and 30-35
Plant litter (%)	-
Shrubs and semi-shrubs (%)	30
Herbaceous cover (%)	<0.5
Shrub-semishrub layer, height (cm)	Up to 30
Herbaceous layer, height (cm)	Up to 20
Factors and degree of disturbance	Slightly disturbed, grazing, dirt road network
Signs of abnormal plant development	Not observed
Additions	

Sample Plot #	Z8p
Photos Z8p, Z8p.1, Z8p.2 and Z8p.3	

Size	10 x 10 m
Date	5.09.2024
Coordinates	43°40'39.41"N 52°49'27.40"E
Position in the landscape	Undulating plain
Elevation (m abs.alt.)	310
Terrain	Plain
Soils	Gray-brown alkaline
Water regime	Precipitations
Community name	***Anabasis***
Dominants	*Anabasis salsa*
Position in succession	Stable plant community
Projective cover (%)	20-25
Plant litter (%)	-
Shrubs and semi-shrubs (%)	25
Herbaceous cover (%)	<0.5
Shrub-semishrub layer, height (cm)	Up to 45
Herbaceous layer, height (cm)	Up to 15
Factors and degree of disturbance	Slightly disturbed, grazing, dirt road network
Signs of abnormal plant development	Not observed
Additions	

Plant name	Height	Plant cover (%)	Abun-dance	Espace-ment	Phe-nophase	Zoetic condition
Semi-shrub						
Caroxylon orientale	25	1	Sol	Df	Fruition	Su-pressed
Anabasis aphylla	45	1	Sol	Df	Fruition	Normal
Dwarf shrub						
Artemisia terrae-albae	27	<1	Sol	Df	Budding	Su-pressed
Anabasis salsa	10	20-25	Sp	Df	Fruition	Normal
Herbaceous layer						
Eremopyrum orientale	7	<0.5	Sol	Df	Dead	Normal
Eremopyrum triticeum	5	<0.5	Sol	Df	Dead	Normal
Alyssum desertorum	10	<0.5	Sol	Df	Dead	Normal
Ceratocarpus arenarius	5	<0.5	Sol	Df	Dead	Su-pressed
Pyankovia brachiata	15	<0.5	Sol	Df	Fruition	Normal
Ranunculus testiculatus	3	<0.5	Sol	Df	Dead	Normal

Sample Plot #	Z9p
Photos Z9p, Z9p.1, Z9p.2, Z9p.3, Z9p.4 and Z9p.5	
Size	10 x 10 m
Date	4.09.2024
Coordinates	43°34'19.70"N 52°55'13.96"E
Position in the landscape	Flat top of hillock Bessik
Elevation (m abs.alt.)	359
Terrain	Plain
Soils	Gray-brown alkaline
Water regime	Precipitations
Community name	**Sporadic plants and aggregations**
Dominants	---
Position in succession	Digressive plant formation
Projective cover (%)	3
Plant litter (%)	-
Shrubs and semi-shrubs (%)	2-3
Herbaceous cover (%)	1
Shrub-semishrub layer, height (cm)	Up to 40
Herbaceous layer, height (cm)	Up to 30
Factors and degree of disturbance	Severely disturbed (tramped-down), motor vehicle traffic
Signs of abnormal plant development	Not observed
Additions	Ruinated trigger point (geodesic)

Plant name	Height	Plant cover (%)	Abun-dance	Espace-ment	Phe-nophase	Zoetic condition
Shrub						
Oreosalsola arbusculiformis	10	<1	Sol	Df	Fruition	Normal
Semi-shrub						
Caroxylon orientale	10	<1	Sol	Df	Fruition	Normal
Dwarf shrub						
Convolvulus fruticosus	40	<1	Sol	Df	Senescence	Normal
Dwarf shrub						
Artemisia terrae-albae	25	1	Sol	Df	Budding	Normal
Bassia prostrata	20	1	Sol	Df	Fruition	Normal
Herbaceous layer						
Anabasis brachiata	10	<1	Sol	Df	Fruition	Normal
Peganum harmala	30	<1	Sol	Df	Dead	Normal
Poa bulbosa	20	<0.5	Sol	Df	Dead	Normal
Girgensohnia oppositiflora	15	<0.5	Sol	Df	Fruition	Normal

Sample plot #	Z10p
Photos Z10p, Z10p.1, Z10p.2 and Z10p.3	

Size	10 x 10 m
Date	4.09.2024
Coordinates	43°33'3.32"N 53°03'8.13"E
Position in the landscape	Undulating plain
Elevation (m abs.alt.)	337
Terrain	Plain
Soils	Gray-brown alkaline
Water regime	Precipitations
Community name	***Caroxylon orientale-Anabasis* with *wormwood***
Dominants	*Anabasis salsa, Caroxylon orientale*
Position in succession	Digressive plant formation
Projective cover (%)	15-20
Plant litter (%)	-
Shrubs and semi-shrubs (%)	18
Herbaceous cover (%)	1–2
Shrub-semishrub layer, height (cm)	Up to 20
Herbaceous layer, height (cm)	Up to 30
Factors and degree of disturbance	Severely disturbed, grazing
Signs of abnormal plant development	Not observed
Additions	

Plant name	Height	Plant cover (%)	Abun-dance	Espace-ment	Phe-nophase	Zoetic condition
Semi-shrub						
Caroxylon orientale	10	5	Sp	Df	Fruition	Su-pressed
Dwarf shrub						
Artemisia terrae-albae	20	3	Sol	Df	Budding	Normal
Anabasis salsa	10	10	Sp	Df	Flowering\ Fruition	Su-pressed
Herbaceous layer						
Eremopyrum orientale	10	<1	Sol	Df	Dead	Normal
Medicago medicaginoides	7	<0.5	Sol	Df	Dead	Normal
Peganum harmala	30	<1	Sol	Df	Dead	Normal
Ceratocarpus arenarius	10	<1	Sol	Df	Fruition	Normal
Girgensohnia oppositiflora	15	<0.5	Sol	Df	Fruition	Normal

Sample Plot #	Z11p
Photos Z11p, Z11p.1, Z11p.2 and Z11p.3	

Size	10 x 10 m
Date	5.09.2024
Coordinates	43°42'2.58"N 52°33'10.98"E
Position in the landscape	Pimple plain
Elevation (m abs.alt.)	354
Terrain	Hillocks slopes in combination with depressions
Soils	Gray-brown alkaline
Water regime	Precipitations
Community name	**Perennial *anabasis-salsa* along with annual *anabasis-salsa* with wormwood**
Dominants	*Anabasis salsa* and *Artemisia lercheana*
Position in succession	Stable plant community
Projective cover (%)	15–20 and 25-30
Plant litter (%)	-
Shrubs and semi-shrubs (%)	12 and 21
Herbaceous cover (%)	5 and 4-5
Shrub-semishrub layer, height (cm)	Up to 30
Herbaceous layer, height (cm)	Up to 65 and up to 30
Factors and degree of disturbance	Slightly disturbed, grazing, dirt road network
Signs of abnormal plant development	Not observed
Additions	

Plant name	Height	Plant cover (%)	Abun-dance	Espace-ment	Phe-nophase	Zoetic condition
Perennial halophytic						
Shrub						
Atraphaxis replicata	10	<1	Sol	Df	Senes-cence	Normal
Semi-shrub						
Caroxylon orientale	25	2-3	Sol	Df	Fruition	Normal
Limonium suffruticosum	20	1	Sol	Df	Fruition	Normal
Dwarf shrub						
Artemisia terrae-albae	25	1-2	Sol	Df	Budding	Normal
Artemisia lercheana	30	<1	Sol	Df	Budding	Normal
Anabasis salsa	15	7	Sp	Df	Fruition	Normal
Herbaceous layer						
Stipa arabica	65	<1	Sol	Df	Dead	Normal
Halimocnemis karelinii	10	5	Sp	Df	Fruition	Normal
Pyankovia brachiata	15	<1	Sol	Df	Fruition	Normal

Sample Plot #	Z11p					
Plant name	Height	Plant cover (%)	Abun-dance	Espace-ment	Phe-nophase	Zoetic condition
Eremopyrum triticeum	5	<0.5	Sol	Df	Dead	Normal
Climacoptera obtusifolia	40	<0.5	Sol	Df	Fruition	Normal
Poa bulbosa	20	<0.5	Sol	Df	Dead	Normal
Annual anabasis-salsa with wormwood						
Dwarf shrub						
Artemisia lercheana	30	20	Sp	Df	Budding	Normal
Artemisia terrae-albae	25	1	Sol	Df	Budding	Normal
Herbaceous layer						
Tanacetum achilleifolium	30	<1	Sol	Df	Dead	Normal
Agropyron fragile	20	<1	Sol	Df	Dead	Normal
Aeluropus littoralis	10	<1	Sol	Df	Dead	Normal
Pyankovia brachiata	25	2-3	Sol	Df	Fruition	Normal
Poa bulbosa	25	<0.5	Sol	Df	Dead	Normal
Eremopyrum orientale	10	<0.5	Sol	Df	Dead	Normal

Sample Plot #	Z12p
Photos Z12p, Z12p.1, Z12p.2, Z12p.3, Z12p.4, Z12p.5, Z12p.6, Z12p.7 and Z12p.8	
Size	10 x 10 m
Date	5.09.2024
Coordinates	43°41'13.68"N 52°35'59.59"E
Position in the landscape	Pimple plain
Elevation (m abs.alt.)	334
Terrain	Hillocks with concretions
Soils	Grey-brown sandy-loam
Water regime	Precipitations
Community name	***Teresken (Kraschenninnikovia)***
Dominants	*Kraschenninnikovia ceratoides*
Position in succession	Stable, locally digressive plant formation
Projective cover (%)	15-20
Plant litter (%)	-
Shrubs and semi-shrubs (%)	17-18
Herbaceous cover (%)	2-3
Shrub-semishrub layer, height (cm)	Up to 70
Herbaceous layer, height (cm)	Up to 45
Factors and degree of disturbance	Slightly-averagely disturbed, grazing, dirt road network
Signs of abnormal plant development	Not observed
Additions	Small pen with weeds aggregation

Sample plot #	Z12p					
Plant name	Height	Plant cover (%)	Abun-dance	Espace-ment	Phe-nophase	Zoetic condition
Semi-shrub						
Krascheninnikovia ceratoides	60	15	Sp	Df	Flowering\ Fruition	Su-pressed
Alhagi pseudalhagi	25	<0.5	Sol	Df	Senes-cence	Normal
Dwarf shrub						
Ephedra distachya	15	<0.5	Sol	Df	Senes-cence	Normal
Dwarf shrub						
Artemisia terrae-albae	30	1	Sol	Df	Budding	Normal
Bassia prostrata	70	1-2	Sol	Df	Fruition	Normal
Herbaceous layer						
Eremopyrum orientale	10	2-3	Sol	Df	Dead	Normal
Euphorbia sclerocyathium	45	<1	Sol	Df	Senes-cence	Normal
Girgensohnia oppositiflora	15	<0.5	Sol	Df	Fruition	Normal
Agropyron fragile	35	<0.5	Sol	Df	Dead	Normal
Alyssum desertorum	7	<0.5	Sol	Df	Dead	Normal
Ceratocarpus arenarius	3	<0.5	Sol	Df	Fruition	Normal
Salsola tragus	10	<0.5	Sol	Df	Fruition	Normal
Poa bulbosa	25	<0.5	Sol	Df	Dead	Normal
Within small abandoned pen and beside itv(1-2m) – weed plants aggregations						
Caroxylon nitrarium	30	<1	Sol	Gr	Flowering	Normal
Suaeda acuminata	15	<1	Sol	Gr	Fruition	Normal
Descurainia sophia	70	<1	Sol	Gr	Dead	Normal
Peganum harmala	40	<1	Sol	Gr	Dead	Normal
Eremopyrum triticeum	10	<1	Sol	Gr	Dead	Normal
Alhagi pseudalhagi	30	<1	Sol	Gr	Senes-cence	Normal

Sample Plot #	Z13p
Photos Z13p, Z13p.1, Z13p.2, Z13p.3, Z13p.4, Z13p.5, Z13p.6 and Z13p.7	
Size	10 x 10 m
Date	5.09.2024
Coordinates	43°33'52.48"N 52°55'54.87"E
Position in the landscape	Undulating plain in the foothill of hillock Bessik
Elevation (m abs.alt.)	323
Terrain	Plain
Soils	Gray-brown alkaline, takyr
Water regime	Precipitations
Community name	**Combination: 1 *Anabasis salsa* on smooth slopes with 2 *Anabasis aphylla* in takyr and 3 *wormwood-Anabasis salsa* on elevated sites**
Dominants	*Anabasis salsa; Anabasis aphylla; A. salsa, Artemisia terrae-albae*
Position in succession	Stable plant community
Projective cover (%)	1. 20–25; 2. 5–10; 3. 25-30
Plant litter (%)	-
Shrubs and semi-shrubs (%)	1. 23; 2. 5-10; 3. 15
Herbaceous cover (%)	1. <1; 2. <0.5; 3. <0.5
Shrub-semishrub layer, height (cm)	1. up to 27; 2. up to 25; 3. up to 27
Herbaceous layer, height (cm)	1. up to 30; 2. up to 25; 3. up to 13
Factors and degree of disturbance	Slightly disturbed, grazing, dirt road network
Signs of abnormal plant development	Not observed
Additions	

Sample Plot #	Z13p					
Plant name	Height	Plant cover (%)	Abun-dance	Espace-ment	Phe-nophase	Zoetic condition
1. Anabasis						
Semi-shrub						
Caroxylon orientale	25	2	Sol	Df	Fruition	Normal
Dwarf shrub						
Anabasis salsa	18	20	Sp	Df	Flowering\ Fruition	Normal
Artemisia terrae-albae	27	1	Sol	Df	Budding	Normal
Herbaceous layer						
Pyankovia brachiata	30	<1	Sol	Df	Fruition	Normal
Eremopyrum orientale	5	<0.5	Sol	Df	Dead	Normal
Girgensohnia oppositiflora	15	<0.5	Sol	Df	Fruition	Normal
2. Anabasis aphylla on takyr-like soils						
Semi-shrub						
Anabasis aphylla	25	5-10	Sp	Df	Fruition	Normal
Dwarf shrub						
Anabasis salsa	5	<0.5	Un-Sol	Df	Fruition	Normal
Herbaceous layer						
Pyankovia brachiata	25	<0.5	Un-Sol	Df	Fruition	Normal
Soda foliosa	10	<0.5	Sol	Df	Flowering	Normal
3. Wormwood-Anabasis						
Semi-shrub						
Caroxylon orientale	25	<1	Sol	Df	Fruition	Normal
Dwarf shrub						
Artemisia terrae-albae	27	10	Sp	Df	Budding	Normal
Anabasis salsa	15	15	Sp	Df	Fruition	Normal
Herbaceous layer						
Pyankovia brachiata	13	<0.5	Sol	Df	Fruition	Normal
Ceratocarpus arenarius	7	<0.5	Sol	Df	Dead	Normal
Lepidium perfoliatum	8	<0.5	Sol	Df	Dead	Normal
Eremopyrum orientale	7	<0.5	Sol	Df	Dead	Normal
Ranunculus testiculatus	3	<0.5	Sol	Df	Dead	Normal

Sample Plot #	Z14p
Photos Z14p and Z14p.1	

Size	10 x 10 m
Date	5.09.2024
Coordinates	43°37’13.77’’N 52°42’24.28’’E
Position in the landscape	Flat top of hillock Kyzymshek
Elevation (m abs.alt.)	357
Terrain	Plain
Soils	Gray-brown alkaline
Water regime	Precipitations
Community name	Sporadic plants on the hillock edge
Dominants	---
Position in succession	Digressive plant formation
Projective cover (%)	1-2
Plant litter (%)	-
Shrubs and semi-shrubs (%)	1
Herbaceous cover (%)	<1
Shrub-semishrub layer, height (cm)	Up to 50
Herbaceous layer, height (cm)	Up to 25
Factors and degree of disturbance	Severely disturbed (tramped-down), motor vehicle traffic, grazing
Signs of abnormal plant development	Not observed
Additions	

Plant name	Height	Plant cover (%)	Abun-dance	Espace-ment	Phe-nophase	Zoetic condition
Shrub						
Oreosalsola arbusculiformis	50	<1	Sol	Df	Fruition	Normal
Semi-shrub						
Caroxylon orientale	30	<1	Sol	Df	Fruition	Normal
Dwarf shrub						
Artemisia terrae-albae	25	<1	Sol	Df	Budding	Normal
Herbaceous layer						
Anabasis brachiata	25	<1	Sol	Df	Fruition	Normal
Anabasis truncata	10	<1	Sol	Df	Fruition	Normal

Sample Plot #	Z15p					
Photo	Not available					
Size	10 x 10 m					
Date	5.09.2024					
Coordinates	43°39'38.40"N 52°24'56.86"E					
Position in the landscape	Undulating plain					
Elevation (m abs.alt.)	200					
Terrain	Plain					
Soils	Gray-brown alkaline					
Water regime	Precipitations					
Community name	***Caroxylon orientale***					
Dominants	*Caroxylon orientale*					
Position in succession	Stable plant community					
Projective cover (%)	15-20					
Plant litter (%)	-					
Shrubs and semi-shrubs (%)	Up to 17					
Herbaceous cover (%)	Up to 3					
Shrub-semishrub layer, height (cm)	Up to 25					
Herbaceous layer, height (cm)	Up to 20					
Factors and degree of disturbance	Mild to moderate disturbance: dirt road network, grazing					
Signs of abnormal plant development	Not observed					
Scientific name of plant species	Height	Plant cover (%)	Abundance	Espace-ment	Phenophase	Zoetic condition
Semi-shrub						
Caroxylon orientale	20	15	Sp	Df	Vegetative	Good
Anabasis aphylla	30	<0,5	Sol	Df	Vegetative	Good
Dwarf shrub						
Artemisia terraealbae	25	12	Sol	Df	Vegetative	Good
Anabasis salsa	7	12	Sol	Df	Vegetative	Good
Herbaceous layer						
Eremopyrum orientale	10	34	Sol	Df	Dying	Normal
Ranunculus testiculatus	5	<0,5	Sol	Df	Fruition	Good
Asparagus breslerianus	20	<0,5	Sol	Df	Fruition	Good
Rheum tataricum	3	<0,5	Sol	Df	Dying	Normal
Tragopogon marginifolius	20	<0,1	UnSol	Df	Flower	Good

Sample plot #	M1p					
Photos M1p, M1p.1, M1p.2, M1p.3, M1p.4, M1p.5 and M1p.6						
Size	10 x 10 m					
Date	4.09.2024					
Coordinates	43°23'12.20"N 52°06'5.05"E					
Position in the landscape	Gently undulating plain					
Elevation (m abs.alt.)	203					
Terrain	Plain					
Soils	Gray-brown alkaline					
Water regime	Precipitations					
Community name	**Wormwood with *Anabasis aphylla***					
Dominants	*Artemisia terrae-albae, Anabasis aphylla*					
Position in succession	Stable plant community					
Projective cover (%)	30-35					
Plant litter (%)	-					
Shrubs and semi-shrubs (%)	30-35					
Herbaceous cover (%)	2					
Shrub-semishrub layer, height (cm)	Up to 50					
Herbaceous layer, height (cm)	Up to 15					
Factors and degree of disturbance	Averagely disturbed, grazing, dirt road network					
Signs of abnormal plant development	Not observed					
Additions	Anabasis aphylla with galls (cecidiums)					
Plant name	Height	Plant cover (%)	Abun-dance	Espace-ment	Phe-nophase	Zoetic condition
Semi-shrub						
Anabasis aphylla	50	3-5	Sol-Sp	Df	Fruition	Supressed
Dwarf shrub						
Artemisia terrae-albae	30	25-30	Sp-Cop1	Df	Budding	Normal
Herbaceous layer						
Eremopyrum orientale	10	<0.5	Sol	Df	Dead	Normal
Ranunculus testiculatus	5	<0.5	Sol	Df	Dead	Normal
Ceratocarpus arenarius	15	2	Sol	Df	Fruition	Normal
Alyssum desertorum	7	<0.5	Sol	Df	Dead	Normal
Pyankovia brachiata	15	<0.5	Sol	Df	Fruition	Normal
Orobanche cumana	7	<0.5	Sol	Df	Dead	Normal

Sample plot #	M2p
Photos M2p, M2p.1 and M 2p.2	

Size	10 x 10 m
Date	4.09.2024
Coordinates	43°19'34.93"N 52°14'30.70"E
Position in the landscape	Gently undulating plain
Elevation (m abs.alt.)	206
Terrain	Plain
Soils	Gray-brown alkaline
Water regime	Precipitations
Community name	***Caroxylon orientale***
Dominants	*Caroxylon orientale*
Position in succession	Stable plant community
Projective cover (%)	25-30
Plant litter (%)	-
Shrubs and semi-shrubs (%)	28
Herbaceous cover (%)	1-2
Shrub-semishrub layer, height (cm)	Up to 45
Herbaceous layer, height (cm)	Up to 15
Factors and degree of disturbance	Slightly disturbed, grazing, dirt road network
Signs of abnormal plant development	Not observed
Additions	

Plant name	Height	Plant cover (%)	Abun-dance	Espace-ment	Phe-nophase	Zoetic condition
Semi-shrub						
Caroxylon orientale	45	25	Sp	Df	Fruition	Normal
Dwarf shrub						
Artemisia terrae-albae	40	1-2	Sol	Df	Budding	Normal
Anabasis salsa	10	1-2	Sol	Df	Flower-ing/Fruition	Normal
Herbaceous layer						
Anabasis brachiata	15	<1	Sol	Gr	Fruition	Normal
Lepidium perfoliatum	15	<0.5	Sol	Df	Dead	Normal
Eremopyrum orientale	7	<0.5	Sol	Df	Dead	Normal
Ranunculus testiculatus	5	<1	Sol	Df	Dead	Normal
Ceratocarpus arenarius	10	<0.5	Sol	Df	Fruition	Normal
Tetracme spp.	10	<0.5	Sol	Df	Dead	Normal
Orobanche cumana	5	--	Un	--	Dead	Normal

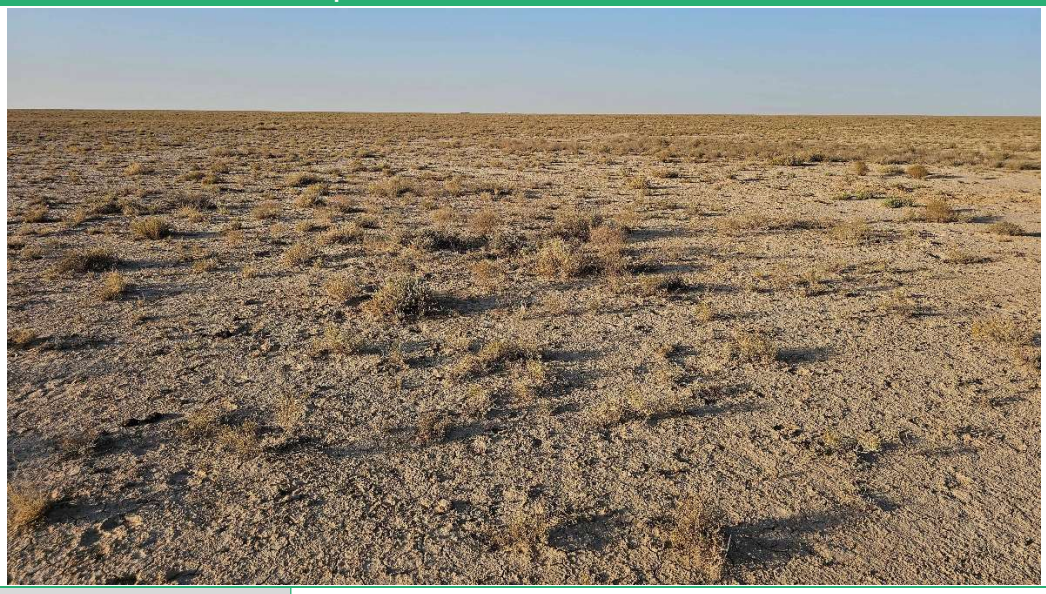
Sample plot #	M3p
Photo M3p	

Size	10 x 10 m					
Date	4.09.2024					
Coordinates	43°17'19.14"N 52°19'12.68"E					
Position in the landscape	Gently undulating plain					
Elevation (m abs.alt.)	210					
Terrain	Plain					
Soils	Gray-brown alkaline					
Water regime	Precipitations					
Community name	**White-ground with wormwood with perennial saltworts**					
Dominants	*Artemisia terrae-albae, Caroxylon orientale*					
Position in succession	Stable plant community					
Projective cover (%)	30-35					
Plant litter (%)	-					
Shrubs and semi-shrubs (%)	30					
Herbaceous cover (%)	5					
Shrub-semishrub layer, height (cm)	Up to 40					
Herbaceous layer, height (cm)	Up to 17					
Factors and degree of disturbance	Slightly disturbed, grazing, burrowing animals colonies, dirt road network					
Signs of abnormal plant development	Not observed					
Additions	Lichen <0.5%					
Plant name	Height	Plant cover (%)	Abundance	Espacement	Phenophase	Zoetic condition
Shrub						
Ephedra aurantiaca	10	<1	Sol	Df	Vegetative	Normal
Semi-shrub						
Caroxylon orientale	35	3	Sol	Df	Fruition	Normal
Dwarf shrub						
Artemisia terrae-albae	40	25-30	Sp-Cop1	Df	Budding	Normal
Anabasis salsa	20	<1	Sol	Df	Flowering/Fruition	Normal
Nanophyton erinaceum	7	<1	Sol	Df	Fruition	Normal
Herbaceous layer						
Anabasis brachiata	15	2-5	Sol-Sp	Df-Gr	Fruition	Normal
Anabasis eriopoda	15	<0.5	Sol	Df	Fruition	Normal
Lepidium perfoliatum	15	<0.5	Sol	Df	Dead	Normal
Medicago medicaginoides	15	<0.5	Sol	Df	Dead	Normal
Halimocnemis sclerosperma	17	<0.5	Sol	Df	Fruition	Normal
Girgensohnia oppositiflora	10	<0.5	Sol	Df	Fruition	Normal
Eremopyrum orientale	10	<0.5	Sol	Df	Dead	Normal
Ranunculus testiculatus	5	<0.5	Sol	Df	Dead	Normal
Tetracme spp.	15	1	Sol	Df	Dead	Normal

Sample plot #	M4p
Photos M4p, M4p.1 and M4p.2	

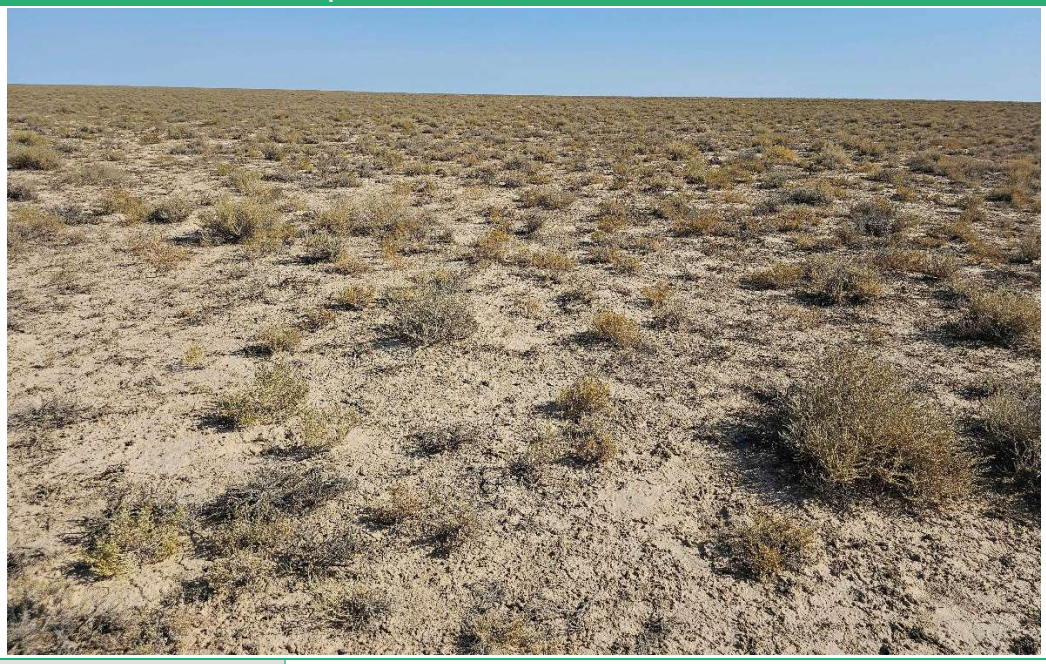
Size	10 x 10 m
Date	4.09.2024
Coordinates	43°15'41.48"N 52°22'13.44"E
Position in the landscape	Gently undulating plain
Elevation (m abs.alt.)	196
Terrain	Plain
Soils	Gray-brown alkaline
Water regime	Precipitations
Community name	***Caroxylon orientale*-white-ground-wormwood**
Dominants	*Artemisia terrae-albae, Caroxylon orientale*
Position in succession	Stable plant community
Projective cover (%)	30-35
Plant litter (%)	-
Shrubs and semi-shrubs (%)	30
Herbaceous cover (%)	1-2
Shrub-semishrub layer, height (cm)	Up to 45
Herbaceous layer, height (cm)	Up to 15
Factors and degree of disturbance	Slightly disturbed, grazing, dirt road network
Signs of abnormal plant development	Not observed
Additions	

Plant name	Height	Plant cover (%)	Abun-dance	Espace-ment	Phe-nophase	Zoetic condition
Semi-shrub						
Caroxylon orientale	30	5	Sp	Df	Fruition	Normal
Dwarf shrub						
Artemisia terrae-albae	25	25	Sp	Df	Budding	Normal
Anabasis salsa	5	<1	Sol	Df	Fruition	Normal
Nanophyton erinaceum	10	<1	Sol	Df	Fruition	Normal
Bassia prostrata	45	<1	Sol	Df	Fruition	Normal
Herbaceous layer						
Anabasis brachiata	15	<1	Sol	Gr	Fruition	Normal
Lepidium perfoliatum	15	<0.5	Sol	Df	Dead	Normal
Ceratocarpus arenarius	5	<1	Sol	Df	Fruition	Normal
Meniocus linifolius	15	<0.5	Sol	Df	Fruition	Normal
Girgensohnia oppositiflora	10	<0.5	Sol	Df	Fruition	Normal
Eremopyrum orientale	10	<0.5	Sol	Df	Dead	Normal
Ranunculus testiculatus	5	<0.5	Sol	Df	Dead	Normal

Sample Plot #	M5p
Photos M5p, M5p.1, M5p.2 and M5p.3	

Size	10 x 10 m					
Date	03.09.2024					
Coordinates	43°13'23.78"N 52°27'4.41"E					
Position in the landscape	Gently undulating plain					
Elevation (m abs.alt.)	146					
Terrain	Plain					
Soils	Gray-brown eroded					
Water regime	Precipitations					
Community name	**Anabasis**					
Dominants	*Anabasis brachiata*					
Position in succession	Stable plant community					
Projective cover (%)	10					
Plant litter (%)	-					
Shrubs and semi-shrubs (%)	Up to 5					
Herbaceous cover (%)	Up to 5					
Shrub-semishrub layer, height (cm)	Up to 25					
Herbaceous layer, height (cm)	Up to 13					
Factors and degree of disturbance	Slightly disturbed, dirt road network, grazing					
Signs of abnormal plant development	Not observed					
Plant name	Height	Plant cover (%)	Abun-dance	Espace-ment	Phe-nophase	Zoetic condition
Dwarf shrub						
Artemisia terrae-albae	25	1-2	Sol	Df	Vegetative	Normal
Nanophyton erinaceum	5	2-3	Sol	Df	Vegetative	Normal
Herbaceous layer						
Anabasis brachiata	10	5	Sp	Df	Vegetative	Normal
Eremopyrum orientale	7	<0.5	Sol	Df	Dead	Normal
Poa bulbosa	13	<0.5	Sol	Df	Dead	Normal

Sample Plot #	M6p					
Photo	Not available					
Size	10 x 10 m^2					
Date	03.09.2024					
Coordinates	43°4'54.47"N 52°23'0.57"E					
Position in the landscape	Undulating plain					
Elevation (m abs.alt.)	170					
Terrain	Plain					
Soils	Solonchaks					
Water regime	Precipitations					
Community name	***Ephemerals-Halocnemum***					
Dominants	*Halocnemum strobilaceum, Eremopyrum orientale*					
Position in succession	Stable plant community					
Projective cover (%)	35-40					
Plant litter (%)	-					
Shrubs and semi-shrubs (%)	Up to 15					
Herbaceous cover (%)	Up to 20					
Shrub-semishrub layer, height (cm)	10-20					
Herbaceous layer, height (cm)	12					
Factors and degree of disturbance	Slightly disturbed, dirt road network, grazing					
Signs of abnormal plant development	Not observed					
Additions						
Plant name	Height	Plant cover (%)	Abun-dance	Espace-ment	Phe-nophase	Zoetic condition
Dwarf shrub						
Halocnemum strobilaceum	10-15	10	Sp	Df	Vegetative	Normal
Dwarf shrub						
Artemisia kemrudica	20	3-5	Sol-Sp	Df-gr	Vegetative	Normal
Herbaceous layer						
Asparagus breslerianus	30	<0.5	Sol	Df	Fruition	Normal
Eremopyrum orientale	12	20	Sp	Df	Dead	Normal
Lepidium perfoliatum	12	<1	Sol	Df	Dead	Normal
Lappula spinocarpos subsp. ceratophora	11	<0.5	Sol	Df	Fruition	Normal

Sample Plot #	M7p
Photos M7p, M7p.1, M7p.2 and M7p.3	

Size	10 x 10 m
Date	03.09.2024
Coordinates	42°51'23.18"N 52°17'37.68"E
Position in the landscape	Gently undulating plain
Elevation (m abs.alt.)	146
Terrain	Plain
Soils	Solonchaks
Water regime	Precipitations
Community name	***Ephemerals-Halocnemum***
Dominants	*Halocnemum strobilaceum, Eremopyrum orientale*
Position in succession	Stable plant community
Projective cover (%)	25-30
Plant litter (%)	-
Shrubs and semi-shrubs (%)	Up to 17
Herbaceous cover (%)	10
Shrub-semishrub layer, height (cm)	Up to 20
Herbaceous layer, height (cm)	Up to 15
Factors and degree of disturbance	Slightly disturbed, dirt road network, grazing
Signs of abnormal plant development	Not observed
Additions	

Plant name	Height	Plant cover (%)	Abundance	Espace-ment	Phe-nophase	Zoetic condition
Dwarf shrub						
Halocnemum strobilaceum	10-15	15	Sp	Df	Vegetative	Normal
Dwarf shrub						
Artemisia kemrudica	20	1	Sol	Df	Vegetative	Normal
Nanophyton erinaceum	5	1	Sol	Df	Vegetative	Normal
Herbaceous layer						
Anabasis brachiata	10	1	Sol	Df	Vegetative	Normal
Eremopyrum orientale	12	10	Sp	Df	Dead	Normal
Lepidium perfoliatum	10	<0.5	Sol	Df	Dead	Normal
Centaurea spp.	15	<1	Sol	Df	Flowering	Normal

Sample Plot #	M8p
Photos M8p, M8p.1, M8p.2 and M8p.3	
Size	10 x 10 m
Date	6.09.2024
Coordinates	42°51'50.36"N 52°36'28.70"E
Position in the landscape	Undulating plain
Elevation (m abs.alt.)	97
Terrain	Plain
Soils	Gray-brown alkaline
Water regime	Precipitations
Community name	***Salsola gemmascens* with *ephemerons***
Dominants	*Caroxylon gemmascens*
Position in succession	Stable plant community
Projective cover (%)	25-30
Plant litter (%)	-
Shrubs and semi-shrubs (%)	26
Herbaceous cover (%)	5
Shrub-semishrub layer, height (cm)	Up to 50
Herbaceous layer, height (cm)	Up to 15
Factors and degree of disturbance	Averagely disturbed, plants covered with dust, grazing, dirt road network
Signs of abnormal plant development	Not observed
Additions	Near the point of description there is a road laying - mounds of soil, stones.

Plant name	Height	Plant cover (%)	Abundance	Espacement	Phenophase	Zoetic condition
Dwarf shrub						
Caroxylon gemmascens	10	25	Sp	Df	Flowering	Normal
Artemisia kemrudica	20	<1	Sol	Df	Budding	Normal
Artemisia terrae-albae	22	<1	Sol	Df	Budding	Normal
Anabasis salsa	20	<1	Sol	Df	Budding	Normal
Nanophyton erinaceum	5	1-2	Sol	Df	Fruition	Normal
Herbaceous layer						
Eremopyrum orientale	10	5	Sp	Df	Dead	Normal
Lepidium perfoliatum	20	<0.5	Sol	Df	Dead	Normal
Medicago medicaginoides	10	<0.5	Sol	Df	Dead	Normal

Sample Plot #	M9p					
Photos M9p, M9p.1, M9p.2, M9p.3, M9p.4 and M9p.5						
Size	10 x 10 m					
Date	3.09.2024					
Coordinates	42°55'34.26"N 52°11'42.38"E					
Position in the landscape	Gently undulating plain					
Elevation (m abs.alt.)	113					
Terrain	Plain					
Soils	Gray-brown alkaline					
Water regime	Precipitations					
Community name	**Perennial halophytic**					
Dominants	*Caroxylon orientale, Anabasis truncata*					
Position in succession	Stable plant community					
Projective cover (%)	20-25					
Plant litter (%)	-					
Shrubs and semi-shrubs (%)	16					
Herbaceous cover (%)	5					
Shrub-semishrub layer, height (cm)	Up to 30					
Herbaceous layer, height (cm)	Up to 25					
Factors and degree of disturbance	Slightly disturbed, grazing, dirt road network					
Signs of abnormal plant development	Not observed					
Additions	Place Zhaman Kyzyladyr					
Plant name	Height	Plant cover (%)	Abun-dance	Espace-ment	Phe-nophase	Zoetic condition
Semi-shrub						
Caroxylon orientale	30	10	Sp	Df	Fruition	Normal
Dwarf shrub						
Ephedra spp.	10	<0.5	Sol	Df	Senes-cence	Normal
Dwarf shrub						
Nanophyton erinaceum	7	3	Sol	Df	Fruition	Normal
Artemisia terrae-albae	25	<1	Sol	Df	Budding	Normal
Anabasis salsa	10	3	Sol	Df	Fruition	Normal
Herbaceous layer						
Anabasis truncata	10	3-5	Sol-Sp	Df	Fruition	Normal
Eremopyrum triticeum	5	<0.5	Sol	Df	Dead	Normal
Lepidium perfoliatum	20	<0.5	Sol	Df	Dead	Normal
Halimocnemis sclerosperma	10	<0.5	Sol	Df	Fruition	Normal
Ceratocarpus arenarius	5	<0.5	Sol	Df	Fruition	Normal
Tetracme spp.	10	<0.5	Sol	Df	Dead	Normal
Ranunculus testiculatus	5	<0.5	Sol	Df	Dead	Normal
Girgensohnia oppositiflora	25	<0.5	Sol	Df	Fruition	Normal

Sample Plot #	M9p					
Plant name	Height	Plant cover (%)	Abun-dance	Espace-ment	Phe-nophase	Zoetic condition
Fritillaria karelinii	--	--	Un	--	Dead	Normal
Astragalus spp.	--	<0.5	Sol	Df	Dead	Normal

Sample Plot #	M10p
Photos M10p, M10p.1, M10p.2, M10p.3 and M10p.4	

Size	10 x 10 m
Date	3.09.2024
Coordinates	43° 2'42.90"N 52° 0'41.31"E
Position in the landscape	Gently undulating plain
Elevation (m abs.alt.)	100
Terrain	Plain
Soils	Gray-brown alkaline
Water regime	Precipitations
Community name	***Caroxylon orientale-Anabasis* in complex with wormwood**
Dominants	*Nanophyton erinaceum, Caroxylon orientale* and *Artemisia terrae-albae*
Position in succession	Stable plant community
Projective cover (%)	15–20 and 35-40
Shrubs and semi-shrubs (%)	18 and 35
Herbaceous cover (%)	<1 and 1-2
Shrub-semishrub layer, height (cm)	Up to 40 and 25
Herbaceous layer, height (cm)	Up to 15 and 20
Factors and degree of disturbance	Slightly disturbed, grazing, dirt road network
Signs of abnormal plant development	Not observed
Additions	The area occupied by plant communities is similar

Plant name	Height	Plant cover (%)	Abun-dance	Espace-ment	Phe-nophase	Zoetic condition
Caroxylon orientale-Anabasis						
Semi-shrub						
Caroxylon orientale	30	5	Sp	Df	Fruition	Normal
Dwarf shrub						
Nanophyton erinaceum	7	10	Sp	Df	Fruition	Normal
Artemisia terrae-albae	25	1-2	Sol	Df	Budding	Normal
Artemisia lercheana	40	1	Sol	Df	Budding	Normal
Anabasis salsa	20	1	Sol	Df	Fruition	Normal
Herbaceous layer						
Eremopyrum triticeum	5	<0.5	Sol	Df	Dead	Normal
Lepidium perfoliatum	10	<0.5	Sol	Df	Dead	Normal
Halimocnemis sclerosperma	10	--	Un	--	Fruition	Normal
Ceratocarpus arenarius	5	<0.5	Sol	Df	Fruition	Normal
Tetracme spp.	15	<1	Sol	Df	Dead	Normal
Wormwood						
Semi-shrub						
Caroxylon orientale	15	<1	Sol	Df	Fruition	Normal
Dwarf shrub						
Artemisia terrae-albae	25	35	Cop1	Df	Budding	Normal
Nanophyton erinaceum	10	<0.5	Sol	Df	Fruition	Normal
Anabasis salsa	15	<0.5	Sol	Df	Fruition	Normal

Sample Plot #	M10p					
Plant name	Height	Plant cover (%)	Abun-dance	Espace-ment	Phe-nophase	Zoetic condition
Herbaceous layer						
Ranunculus testiculatus	5	1-2	Sol	Df	Dead	Normal
Lepidium perfoliatum	20	<0.5	Sol	Df	Dead	Normal

Sample Plot #	M11p					
Photo	Not available					
Size	10 x 10 m					
Date	4.09.2024					
Coordinates	42°53'17.82"N 52°38'54.16"E					
Position in the landscape	Undulating plain					
Elevation (m abs.alt.)	194					
Terrain	Takyr depression					
Soils	Takyr					
Water regime	Precipitations					
Community name	**Sporadic plants**					
Dominants	---					
Position in succession	Stable plant community					
Projective cover (%)	2-5					
Plant litter (%)	-					
Shrubs and semi-shrubs (%)	3					
Herbaceous cover (%)	<1					
Shrub-semishrub layer, height (cm)	Up to 50					
Herbaceous layer, height (cm)	Up to 15					
Factors and degree of disturbance	Averagely disturbed, grazing, part of takyr digged for watering place					
Signs of abnormal plant development	Not observed					
Additions						
Plant name	Height	Plant cover (%)	Abun-dance	Espace-ment	Phe-nophase	Zoetic condition
Shrub						
Atraphaxis spinosa	40	2	Sol	Df	Dead	Normal
Semi-shrub						
Alhagi pseudalhagi	10	<1	Sol	Df	Dead	Normal
Capparis spinosa var. herbacea	3	<1	Sol	Df	Senescence	Normal
Dwarf shrub						
Artemisia gurganica	50	1	Sol	Df	Budding	Normal
Herbaceous layer						
Polygonum spp.	15	<0.5	Un-Sol	Df	Flowering	Normal

Sample Plot #	M12p					
Photo	Not available					
Size	10 x 10 m					
Date	06.09.2024					
Coordinates	42°48’30.00’’N 52°40’41.72’’E					
Position in the landscape	Undulating plain					
Height (m vertical coordinate)	146					
Terrain	Plain					
Soils	Solonchaks					
Water regime	Precipitations					
Community name	Ephemeral-Halocnemum strobilaceum					
Dominants	Halocnemum strobilaceum, Eremopyrum orientale					
Position in succession	Stable plant community					
Projective cover (%)	25-30					
Plant litter (%)	-					
Shrubs and semi-shrubs (%)	Up to 17					
Herbaceous cover (%)	10					
Shrub-semishrub layer, height (cm)	Up to 20					
Herbaceous layer, height (cm)	Up to 15					
Factors and degree of disturbance	Low degree of disturbance, dirt road network, grazing					
Signs of abnormal plant development	Not observed					
Scientific name of plant species	Height	Plant cover (%)	Abun-dance	Espace-ment	Phe-nophase	Zoetic condition
Semi-shrub						
Halocnemum strobilaceum	1015	15	Sp	Df	Vegetative	Good
Dwarf shrub						
Artemisia kemrudica	20	1	Sol	Df	Vegetative	Good
Nanophyton erinaceum	5	1	Sol	Df	Vegetative	Good
Herbaceous layer						
Anabasis brachiata	10	1	Sol	Df	Vegetative	Good
Eremopyrum orientale	12	10	Sp	Df	Dying	Normal
Lepidium perfoliatum	10	<0,5	Sol	Df	Dying	Normal
Centaurea spp.	15	<1	Sol	Df	Flower	Good

Sample Plot #	M13p					
Photo	Not available					
Size	10 x 10 m					
Date	3.09.2024					
Coordinates	42°52'40.83"N 52°17'33.07"E					
Position in the landscape	Gently undulating plain					
Elevation (m abs.alt.)	141					
Terrain	Plain					
Soils	Gray-brown alkaline					
Water regime	Precipitations					
Community name	***Anabasis salsa-Caroxylon orientale***					
Dominants	*Caroxylon orientale, Anabasis salsa*					
Position in succession	Stable plant community					
Projective cover (%)	20-25					
Plant litter (%)	-					
Shrubs and semi-shrubs (%)	20					
Herbaceous cover (%)	1-2					
Shrub-semishrub layer, height (cm)	Up to 45					
Herbaceous layer, height (cm)	Up to 15					
Factors and degree of disturbance	Slightly disturbed, grazing, dirt road network					
Signs of abnormal plant development	Not observed					
Additions	Near Tokmak cape. Lichen <1%					
Plant name	Height	Plant cover (%)	Abun-dance	Espace-ment	Phe-nophase	Zoetic condition
Semi-shrub						
Caroxylon orientale	45	10	Sp	Df	Fruition	Normal
Dwarf shrub						
Artemisia terrae-albae	30	1	Sol	Df	Budding	Normal
Anabasis salsa	20	7	Sp	Df	Flower-ing/Fruition	Normal
Nanophyton erinaceum	7	1-2	Sol	Df	Fruition	Normal
Herbaceous layer						
Anabasis brachiata	10	<1	Sol	Df	Fruition	Normal
Eremopyrum triticeum	3	<0.5	Sol	Df	Dead	Normal
Climacoptera spp.	10	<0.5	Sol	Df	Dead	Normal
Ceratocarpus arenarius	7	<0.5	Sol	Df	Dead	Normal
Lepidium perfoliatum	15	<0.5	Sol	Df	Dead	Normal
Ranunculus testiculatus	5	<0.5	Sol	Df	Dead	Normal
Zygophyllum ovigerum	5	--	Un	--	Senes-cence	Normal
Tetracme spp.	10	<1	Sol	Df	Dead	Normal

Sample plot #	M14p
Photos M14p, M14p.1, M14p.2, M14p.3 and M14p.4	

Size	10 x 10 m
Date	3.09.2024
Coordinates	43°6'58.53"N 52°23'42.32"E
Position in the landscape	Gently undulating plain
Elevation (m abs.alt.)	169
Terrain	Plain
Soils	Gray-brown alkaline
Water regime	Precipitations
Community name	**White-ground with wormwood with perennial saltworts**
Dominants	*Artemisia terrae-albae, Caroxylon orientale*
Position in succession	Stable plant community
Projective cover (%)	30-35
Plant litter (%)	-
Shrubs and semi-shrubs (%)	35
Herbaceous cover (%)	<1
Shrub-semishrub layer, height (cm)	Up to 25
Herbaceous layer, height (cm)	Up to 15
Factors and degree of disturbance	Slightly disturbed, grazing, dirt road network
Signs of abnormal plant development	Not observed
Additions	

Plant name	Height	Plant cover (%)	Abun-dance	Espace-ment	Phe-nophase	Zoetic condition
Shrub						
Ephedra aurantiaca	10	<1	Sol	Df	Vegetative	Normal
Semi-shrub						
Caroxylon orientale	20	3-4	Sol	Df	Fruition	Normal
Dwarf shrub						
Artemisia terrae-albae	25	30	Cop1	Df	Budding	Normal
Anabasis salsa	15	<1	Sol	Df	Fruition	Normal
Nanophyton erinaceum	10	<1	Sol	Df	Fruition	Normal
Herbaceous layer						
Anabasis truncata	10	<1	Sol	Gr	Fruition	Normal
Climacoptera obtusifolia	10	<0.5	Sol	Df	Dead	Normal
Lepidium perfoliatum	15	<0.5	Sol	Df	Dead	Normal
Halimocnemis sclerosperma	10	<0.5	Un-Sol	Df	Fruition	Normal
Tetracme spp.	10	<0.5	Sol	Df	Dead	Normal

Sample Plot #	M15p					
Photo	Not available					
Size	10 x 10 m					
Date	3.09.2024					
Coordinates	43°10'35.71"N 52°26'3.56"E					
Position in the landscape	Gently undulating plain					
Elevation (m abs.alt.)	195					
Terrain	Plain					
Soils	Gray-brown alkaline					
Water regime	Precipitations					
Community name	**White-ground-wormwood-perennial-Salsola**					
Dominants	*Caroxylon orientale, Artemisia terrae-albae*					
Position in succession	Stable plant community					
Projective cover (%)	15-20					
Plant litter (%)	-					
Shrubs and semi-shrubs (%)	16					
Herbaceous cover (%)	1-2					
Shrub-semishrub layer, height (cm)	Up to 40					
Herbaceous layer, height (cm)	Up to 15					
Factors and degree of disturbance	Averagely disturbed, grazing, dirt road network					
Signs of abnormal plant development	Not observed					
Additions						
Plant name	Height	Plant cover (%)	Abun-dance	Espace-ment	Phe-nophase	Zoetic condition
Semi-shrub						
Caroxylon orientale	40	7	Sp	Df	Fruition	Normal
Dwarf shrub						
Artemisia terrae-albae	30	5	Sp	Df	Budding	Normal
Anabasis salsa	15	3-5	Sol-Sp	Gr	Fruition	Normal
Nanophyton erinaceum	5	1	Sol	Df	Fruition	Normal
Herbaceous layer						
Anabasis eriopoda	15	<1	Un-Sol	Df	Fruition	Normal
Lepidium perfoliatum	15	<0.5	Sol	Df	Dead	Normal
Halimocnemis sclerosperma	10	1	Sol	Df	Fruition	Normal
Ceratocarpus arenarius	7	<1	Sol	Df	Fruition	Normal

Sample Plot #	U1p
Photos U1p.1 and U1p.2	

Size	10 x 10 m					
Date	9.09.2024					
Coordinates	42°49'15.80"N 55°23'30.21"E					
Position in the landscape	Undulating plain					
Elevation (m abs.alt.)	240					
Terrain	Plain					
Soils	Gray-brown alkaline					
Water regime	Precipitations					
Community name	***Caroxylon orientale-Anabasis***					
Dominants	*Anabasis salsa, Caroxylon orientale*					
Position in succession	Stable plant community					
Projective cover (%)	25-30					
Plant litter (%)	-					
Shrubs and semi-shrubs (%)	30					
Herbaceous cover (%)	<0.5					
Shrub-semishrub layer, height (cm)	Up to 30					
Herbaceous layer, height (cm)	5					
Factors and degree of disturbance	Slightly disturbed, dirt road network					
Signs of abnormal plant development	Not observed					
Scientific name of plant species	Height	Plant cover (%)	Abun-dance	Espace-ment	Phe-nophase	Zoetic condition
Semi-shrub						
Caroxylon orientale	30	5	Sp	Df	Fruition	Normal
Dwarf shrub						
Anabasis salsa	15	25	Sp	Df	Fruition	Normal
Artemisia terrae-albae	26	<1	Sol	Gr	Flower-ing/Fruition	Normal
Nanophyton erinaceum	8	<1	Sol	Gr	Fruition	Normal
Herbaceous layer						
Eremopyrum orientale	5	<0.5	Sol	Df	Dead	Normal

Sample Plot #	U2p					
Photo	Not available					
Size	10 x 10 m					
Date	9.09.2024					
Coordinates	43°17'50.58"N 55°35'24.16"E					
Position in the landscape	Gently undulating plain					
Elevation (m abs.alt.)	214					
Terrain	Plain					
Soils	Gray-brown alkaline					
Water regime	Precipitations					
Community name	***Anabasis***					
Dominants	*Anabasis salsa*					
Position in succession	Stable plant community					
Projective cover (%)	20-25					
Plant litter (%)	-					
Shrubs and semi-shrubs (%)	20–25					
Herbaceous cover (%)	<0.5					
Shrub-semishrub layer, height (cm)	Up to 40					
Herbaceous layer, height (cm)	3					
Factors and degree of disturbance	Slightly disturbed, dirt road network					
Signs of abnormal plant development	Not observed					
Additions						
Scientific name of plant species	Height	Plant cover (%)	Abun-dance	Espace-ment	Phe-nophase	Zoetic condition
Semi-shrub						
Caroxylon orientale	40	1	Sol	Df	Fruition	Normal
Dwarf shrub						
Anabasis salsa	18	20-25	Sp	Df	Fruition	Normal
Herbaceous layer						
Eremopyrum orientale	3	<0.5	Sol	Df	Dead	Normal

Sample Plot #	U3p					
Photo	Not available					
Size	10 x 10 m					
Date	10.09.2024					
Coordinates	43°12'12.66"N 55°44'15.28"E					
Position in the landscape	Undulating plain					
Elevation (m abs.alt.)	271					
Terrain	Plain					
Soils	Gray-brown alkaline					
Water regime	Precipitations					
Community name	***Anabasis salsa-Caroxylon orientale***					
Dominants	*Caroxylon orientale, Anabasis salsa*					
Position in succession	Stable plant community					
Projective cover (%)	25-30					
Plant litter (%)	-					
Shrubs and semi-shrubs (%)	25-30					
Herbaceous cover (%)	<0.5					
Shrub-semishrub layer, height (cm)	Up to 50					
Herbaceous layer, height (cm)	8					
Factors and degree of disturbance	Slightly disturbed, dirt road network, grazing, near OHTL					
Signs of abnormal plant development	Not observed					
Scientific name of plant species	Height	Plant cover (%)	Abun-dance	Espace-ment	Phe-nophase	Zoetic condition
Semi-shrub						
Caroxylon orientale	50	15-18	Sp	Df	Fruition	Normal
Dwarf shrub						
Anabasis salsa	32	7-10	Sp	Df	Fruition	Normal
Herbaceous layer						
Eremopyrum orientale	3	<0.5	Sol	Df	Dead	Normal
Tetracme spp	8	<0.5	Sol	Df	Dead	Normal

Sample Plot #	U4p					
Photo	Not available					
Size	10 x 10 m					
Date	10.09.2024					
Coordinates	43°17'33.49"N 55°41'4.20"E					
Position in the landscape	Undulating plain					
Elevation (m abs.alt.)	265					
Terrain	Plain					
Soils	Gray-brown alkaline					
Water regime	Precipitations					
Community name	***Caroxylon orientale***					
Dominants	*Caroxylon orientale*					
Position in succession	Stable plant community					
Projective cover (%)	25-30					
Plant litter (%)	-					
Shrubs and semi-shrubs (%)	26					
Herbaceous cover (%)	2-3					
Shrub-semishrub layer, height (cm)	Up to 70					
Herbaceous layer, height (cm)	Up to 15					
Factors and degree of disturbance	Slightly disturbed, dirt road network, near OHTL					
Signs of abnormal plant development	Not observed					
Scientific name of plant species	Height	Plant cover (%)	Abun-dance	Espace-ment	Phe-nophase	Zoetic condition
Shrub						
Ephedra aurantiaca	20	<1	Sol	Df	Vegetative	Normal
Oreosalsola arbusculiformis	70	1	Sol	Df	Fruition	Normal
Semi-shrub						
Caroxylon orientale	40	25	Sp	Df	Fruition	Normal
Dwarf shrub						
Nanophyton erinaceum	5	<1	Sol	Df	Fruition	Normal
Anabasis salsa	15	<0.5	Sol	Df	Fruition	Normal
Herbaceous layer						
Anabasis brachiata	15	2-3	Sol	Gr	Fruition	Normal
Eremopyrum orientale	3	<0.5	Sol	Df	Dead	Normal

Sample Plot #	U5p					
Photo	Not available					
Size	10 x 10 m					
Date	10.09.2024					
Coordinates	43°22'20.47"N 55°43'27.97"E					
Position in the landscape	Gently undulating plain					
Elevation (m abs.alt.)	270					
Terrain	Plain					
Soils	Gray-brown alkaline					
Water regime	Precipitations					
Community name	***Anabasis***					
Dominants	*Anabasis salsa*					
Position in succession	Stable plant community					
Projective cover (%)	20-25					
Plant litter (%)	-					
Shrubs and semi-shrubs (%)	25					
Herbaceous cover (%)	2-3					
Shrub-semishrub layer, height (cm)	Up to 40					
Herbaceous layer, height (cm)	Up to 15					
Factors and degree of disturbance	Slightly disturbed, dirt road network					
Signs of abnormal plant development	Not observed					
Additions						
Scientific name of plant species	Height	Plant cover (%)	Abun-dance	Espace-ment	Phe-nophase	Zoetic condition
Semi-shrub						
Caroxylon orientale	40	<1	Sol	Df	Fruition	Normal
Dwarf shrub						
Artemisia terrae-albae	30	<1	Sol	Df	Budding	Normal
Anabasis salsa	20	25	Sp	Df	Fruition	Normal
Herbaceous layer						
Anabasis brachiata	15	2-3	Sol	Gr	Fruition	Normal
Eremopyrum orientale	3	<0.5	Sol	Df	Dead	Normal

Sample Plot #	U6p					
Photo	Not available					
Size	10 x 10 m					
Date	10.09.2024					
Coordinates	43°25'24.87"N 55°45'20.00"E					
Position in the landscape	Gently undulating plain					
Elevation (m abs.alt.)	275					
Terrain	Plain					
Soils	Gray-brown alkaline					
Water regime	Precipitations					
Community name	***Anabasis salsa-Caroxylon orientale***					
Dominants	*Caroxylon orientale, Anabasis salsa*					
Position in succession	Stable plant community					
Projective cover (%)	25-30					
Plant litter (%)	-					
Shrubs and semi-shrubs (%)	26					
Herbaceous cover (%)	1					
Shrub-semishrub layer, height (cm)	Up to 40					
Herbaceous layer, height (cm)	Up to 15					
Factors and degree of disturbance	Slightly disturbed, dirt road network					
Signs of abnormal plant development	Not observed					
Additions						
Scientific name of plant species	Height	Plant cover (%)	Abun-dance	Espace-ment	Phe-nophase	Zoetic condition
Semi-shrub						
Caroxylon orientale	40	15	Sp	Df	Fruition	Normal
Dwarf shrub						
Artemisia terrae-albae	30	1-2	Sol	Df	Budding	Normal
Anabasis salsa	20	10	Sp	Df	Fruition	Normal
Herbaceous layer						
Anabasis brachiata	15	1	Sol	Gr	Fruition	Normal
Eremopyrum orientale	6	<1	Sol	Df	Dead	Normal

Sample plot #	U7p					
Photo	Not available					
Size	10 x 10 m					
Date	04.09.2024					
Coordinates	43°28'57.33"N 55°55'28.98"E					
Position in the landscape	Sloping hill Karabaul					
Elevation (m abs.alt.)	290					
Terrain	Elevated plain					
Soils	Gray-brown eroded salty					
Water regime	Precipitations					
Community name	***Anabasis***					
Dominants	*Anabasis brachiata*					
Position in succession	Stable plant community					
Projective cover (%)	10-15					
Plant litter (%)	-					
Shrubs and semi-shrubs (%)	2-3					
Herbaceous cover (%)	10					
Shrub-semishrub layer, height (cm)	Up to 30					
Herbaceous layer, height (cm)	Up to 15					
Factors and degree of disturbance	Slightly disturbed, dirt road network					
Signs of abnormal plant development	Not observed					
Additions						
Scientific name of plant species	Height	Plant cover (%)	Abun-dance	Espace-ment	Phe-nophase	Zoetic condition
Semi-shrub						
Caroxylon orientale	30	1-2	Sp	Df	Fruition	Normal
Dwarf shrub						
Artemisia terrae-albae	30	<1	Sol	Gr	Budding	Normal
Anabasis salsa	20	1	Sp	Df	Fruition	Normal
Herbaceous layer						
Anabasis brachiata	15	10	Sol	Gr	Fruition	Normal

Sample Plot #	U8p					
Photo	Not available					
Size	10 x 10 m					
Date	09.09.2024					
Coordinates	43°29'32.46"N 55°33'4.09"E					
Position in the landscape	Gently undulating plain					
Elevation (m abs.alt.)	250					
Terrain	Plain					
Soils	Gray-brown alkaline					
Water regime	Precipitations					
Community name	**Ferula assafoetida-Anabasis**					
Dominants	Caroxylon orientale, Anabasis salsa					
Position in succession	Stable plant community					
Projective cover (%)	25-30					
Plant litter (%)	-					
Shrubs and semi-shrubs (%)	25-30					
Herbaceous cover (%)	2					
Shrub-semishrub layer, height (cm)	Up to 30					
Herbaceous layer, height (cm)	Up to 15					
Factors and degree of disturbance	Slightly disturbed, dirt road network					
Signs of abnormal plant development	Not observed					
Plant name	Height	Plant cover (%)	Abun-dance	Espace-ment	Phe-nophase	Zoetic condition
Semi-shrub						
Caroxylon orientale	30	10	Sp	Df	Vegitative	Normal
Dwarf shrub						
Artemisia terrae-albae	25	1	Sol	Grr	Vegitative	Normal
Nanophyton erinaceum	3-5	2	Sol	Df	Vegitative	Normal
Anabasis salsa	7	15-20	Sp	Df	Vegitative	Normal
Herbaceous layer						
Astragalus ustiurtensis	15	<1	Sol	Gr	Fruition	Normal
Anabasis brachiata	15	2	Sol	Df	Vegitative	Normal
Arnebia decumbens	7	<0.5	Sol	Df	Flowering	Normal
Eremopyrum orientale	10	<1	Sol	Df	Dead	Normal
Lepidium perfoliatum	10	<1	Sol	Df	Dead	Normal
Senecio glaucus subsp. Coronopifolius	8	<1	Sol	Df	Flowering	Normal
Zygophyllum ovigerum	10	<1	Sol	Df	Fruition	Normal

Sample Plot #	U9p					
Photo	Not available					
Size	10 x 10 m					
Date	09.09.2024					
Coordinates	43°16'33.93"N 55°33'2.23"E					
Position in the landscape	Gently undulating plain					
Elevation (m abs.alt.)	270					
Terrain	Plain					
Soils	Gray-brown alkaline					
Water regime	Precipitations					
Community name	***White-ground with* wormwood *with Anabasis salsa***					
Dominants	*Artemisia terrae-albae, Anabasis salsa*					
Position in succession	Stable plant community					
Projective cover (%)	30-35					
Plant litter (%)	-					
Shrubs and semi-shrubs (%)	30-35					
Herbaceous cover (%)	1–2					
Shrub-semishrub layer, height (cm)	Up to 45					
Herbaceous layer, height (cm)	Up to 30					
Factors and degree of disturbance	Slightly disturbed, dirt road network					
Signs of abnormal plant development	Not observed					
Additions						
Scientific name of plant species	Height	Plant cover (%)	Abun-dance	Espace-ment	Phe-nophase	Zoetic condition
Semi-shrub						
Caroxylon orientale	30	1	Sol	Df	Vegetative	Normal
Anabasis aphylla	45	<1	Sol	Df	Vegetative	Normal
Dwarf shrub						
Artemisia terrae-albae	25	25-30	Sp-Cop1	Df	Vegetative	Normal
Anabasis salsa	7	3	Sol	Df	Vegetative	Normal
Herbaceous layer						
Rheum tataricum	5	1-2	Sol	Df	Dead	Normal
Ferula tatarica	30	<0.5	Sol	Df	Flowering	Normal
Fritillaria karelinii	10	-	Un	-	Fruition	Normal

Sample Plot #	U10p					
Photo	Not available					
Size	10 x 10 m					
Date	09.09.2024					
Coordinates	42°52'46.31''N 55°22'9.29''E					
Position in the landscape	Gently undulating plain					
Elevation (m abs.alt.)	250					
Terrain	Plain					
Soils	Gray-brown alkaline					
Water regime	Precipitations					
Community name	***Caroxylon orientale-Anabasis***					
Dominants	*Caroxylon orientale, Anabasis salsa*					
Position in succession	Stable plant community					
Projective cover (%)	25-30					
Plant litter (%)	-					
Shrubs and semi-shrubs (%)	25-30					
Herbaceous cover (%)	2					
Shrub-semishrub layer, height (cm)	Up to 30					
Herbaceous layer, height (cm)	Up to 15					
Factors and degree of disturbance	Slightly disturbed, dirt road network					
Signs of abnormal plant development	Not observed					
Additions						
Scientific name of plant species	Height	Plant cover (%)	Abun-dance	Espace-ment	Phe-nophase	Zoetic condition
Semi-shrub						
Caroxylon orientale	30	10	Sp	Df	Vegetative	Normal
Dwarf shrub						
Artemisia terrae-albae	25	1	Sol	Grr	Vegetative	Normal
Nanophyton erinaceum	3-5	2	Sol	Df	Vegetative	Normal
Anabasis salsa	7	15-20	Sp	Df	Vegetative	Normal
Herbaceous layer						
Astragalus ustiurtensis	15	<1	Sol	Gr	Fruition	Normal
Anabasis brachiata	15	2	Sol	Df	Vegetative	Normal
Arnebia decumbens	7	<0.5	Sol	Df	Flowering	Normal
Eremopyrum orientale	10	<1	Sol	Df	Dead	Normal
Lepidium perfoliatum	10	<1	Sol	Df	Dead	Normal
Senecio glaucus subsp. Coronopifolius	8	<1	Sol	Df	Flowering	Normal
Zygophyllum ovigerum	10	<1	Sol	Df	Fruition	Normal

Sample plot #	P1p (Pipeline)
Photos P1p, P1p.1, P1p.2 and P1p.3	

Size	10 x 10 m
Date	2.09.2024
Coordinates	43°10'1.61"N 51°29'8.12"E
Position in the landscape	Undulating sandy coastal plain
Elevation (m abs.alt.)	16
Terrain	Plain
Soils	Sandy salty
Water regime	Precipitations
Community name	**Wormwood**
Dominants	*Artemisia lercheana*
Position in succession	Stable plant community
Projective cover (%)	25-30
Plant litter (%)	---
Shrubs and semi-shrubs (%)	27
Herbaceous cover (%)	2
Shrub-semishrub layer, height (cm)	Up to 90
Herbaceous layer, height (cm)	Up to 80
Factors and degree of disturbance	Slightly disturbed, grazing
Signs of abnormal plant development	Not observed
Additions	Near houses

Plant name	Height	Plant cover (%)	Abun-dance	Espace-ment	Phe-nophase	Zoetic condition
Shrub						
Atraphaxis replicata	80	2-3	Sol	Df	Fruition	Normal
Semi-shrub						
Frankenia hirsuta	10	<0.5	Sol	Df	Fruition	Normal
Dwarf shrub						
Artemisia arenaria	90	15	Sp	Df	Budding	Normal
Artemisia lercheana	70	10	Sp	Df	Budding	Normal
Herbaceous layer						
Euphorbia seguieriana	80	1-2	Sol	Df	Dead	Normal
Aeluropus littoralis	10	<0.5	Sol	Df	Fruitious/Dead	Normal
Salsola tragus	40	<0.5	Sol	Df	Fruition	Normal
Echinops ritro	40	<1	Sol	Df	Dead	Normal
Erysimum leucanthemum	60	<1	Sol	Df	Flowering/ Fruition	Normal
Bromus tectorum	20	<0.5	Sol	Df	Dead	Normal
Peganum harmala	30	<0.5	Sol	Df	Dead	Normal

Sample plot #	P2p (Pipeline)					
Photos P2p, P2p.1, P2p.2 and P2p.3						
Size	10 x 10 m					
Date	2.09.2024					
Coordinates	43°10'23.35"N 51°29'28.48"E					
Position in the landscape	Lowered undulating plain					
Elevation (m abs.alt.)	16					
Terrain	Plain					
Soils	Grey-brown sandy-loam salty					
Water regime	Precipitations					
Community name	**Coastal-convolvulaceous-wormwood with Tamarix**					
Dominants	*Artemisia lercheana, Convolvulus erinaceus, Aeluropus littoralis*					
Position in succession	Stable plant community					
Projective cover (%)	30-35					
Plant litter (%)	---					
Shrubs and semi-shrubs (%)	27-30					
Herbaceous cover (%)	5					
Shrub-semishrub layer, height (cm)	Up to 90					
Herbaceous layer, height (cm)	Up to 85					
Factors and degree of disturbance	Averagely disturbed, grazing, solid domestic waste					
Signs of abnormal plant development	Not observed					
Plant name	Height	Plant cover (%)	Abun-dance	Espace-ment	Phe-nophase	Zoetic condition
Shrub						
Tamarix ramosissima	90	3	Sol	Df	Flowering	Normal
Atraphaxis replicata	50	1-2	Sol	Df	Fruition	Normal
Semi-shrub						
Alhagi pseudalhagi	60	1-2	Sol	Gr	Fruition	Normal
Convolvulus erinaceus	90	5	Sp	Df	Flowering	Normal
Dwarf shrub						
Ephedra distachya	10	<1	Sol	Df	Senescence	Normal
Dwarf shrub						
Artemisia lercheana	60	15	Sp	Df	Budding	Normal
Herbaceous layer						
Aeluropus littoralis	15	5	Sp	Df	Fruitious/Dead	Normal
Agropyron fragile	60	<1	Sol	Df	Senescence	Normal
Salsola tragus	50	<1	Sol	Df	Fruition	Normal
Caroxylon nitrarium	60	<1	Sol	Df	Fruition	Normal
Bassia laniflora	70	<0.5	Sol	Df	Flowering	Normal
Euphorbia seguieriana	85	<1	Sol	Df	Dead	Normal

Sample plot #	P2p (Pipeline)					
Plant name	Height	Plant cover (%)	Abun-dance	Espace-ment	Phe-nophase	Zoetic condition
Zygophyllum turcomanicum	40	<1	Sol	Df	Fruitious/Dead	Normal
Echinops ritro	25	<0.5	Sol	Df	Dead	Normal

Sample Plot #	P3p (Pipeline)
Photos P3p, P3p.1 and P3p.2	

Size	10 x 10 m
Date	2.09.2024
Coordinates	43°10'42.38"N 51°29'45.36"E
Position in the landscape	Lowered undulating plain
Elevation (m abs.alt.)	17
Terrain	Plain
Soils	Grey-brown sandy-loam salty
Water regime	Precipitations
Community name	**Coastal-convolvulaceous-wormwood**
Dominants	*Artemisia lercheana, Convolvulus erinaceus, Aeluropus littoralis*
Position in succession	Stable plant community
Projective cover (%)	30-35
Shrubs and semi-shrubs (%)	30
Herbaceous cover (%)	5
Shrub-semishrub layer, height (cm)	Up to 90
Herbaceous layer, height (cm)	Up to 85
Factors and degree of disturbance	Averagely disturbed, grazing
Signs of abnormal plant development	Not observed
Additions	

Plant name	Height	Plant cover (%)	Abun-dance	Espace-ment	Phe-nophase	Zoetic condition
Shrub						
Tamarix ramosissima	60	--	Sol	Df	Senescence	Normal
Semi-shrub						
Alhagi pseudalhagi	60	1-2	Sol	Gr	Fruition	Normal
Convolvulus erinaceus	90	7	Sp	Df	Flowering	Normal
Dwarf shrub						
Ephedra distachya	10	<1	Sol	Df	Senescence	Normal
Dwarf shrub						
Artemisia lercheana	60	20	Sp	Df	Budding	Normal
Herbaceous layer						
Aeluropus littoralis	15	5	Sp	Df	Fruitious/Dead	Normal
Agropyron fragile	60	<1	Sol	Df	Senescence	Normal
Salsola tragus	50	<1	Sol	Df	Fruition	Normal
Caroxylon nitrarium	60	<1	Sol	Df	Fruition	Normal
Bassia laniflora	70	<0.5	Sol	Df	Flowering	Normal
Euphorbia seguieriana	85	<1	Sol	Df	Dead	Normal

Sample Plot # P3p (Pipeline)						
Plant name	Height	Plant cover (%)	Abun-dance	Espace-ment	Phe-nophase	Zoetic condition
Zygophyllum turcomanicum	40	<1	Sol	Df	Fruitious/Dead	Normal
Echinops ritro	25	<0.5	Sol	Df	Dead	Normal

Sample Plot #	P4p (Pipeline)
Photos P4p, P4p.1, P4p.2 and P4p.3	

Size	10 x 10 m
Date	2.09.2024
Coordinates	43°11'19.50"N 51°30'16.96"E
Position in the landscape	Undulating coastal plain
Elevation (m abs.alt.)	15
Terrain	Plain
Soils	Weakly consolidated saline sands
Water regime	Precipitations
Community name	**Wormwood with Kochia**
Dominants	Artemisia lercheana
Position in succession	Stable plant community
Projective cover (%)	35-40
Plant litter (%)	---
Shrubs and semi-shrubs (%)	36
Herbaceous cover (%)	1-2
Shrub-semishrub layer, height (cm)	Up to 90
Herbaceous layer, height (cm)	Up to 90
Factors and degree of disturbance	Slightly disturbed, grazing
Signs of abnormal plant development	Not observed
Additions	

Plant name	Height	Plant cover (%)	Abun-dance	Espace-ment	Phenophase	Zoetic condition
Shrub						
Tamarix ramosissima	60	--	Un	--	Senescence	Normal
Semi-shrub						
Limonium suffruticosum	60	--	Un	--	Fruition	Normal
Alhagi pseudalhagi	70	1-2	Sol	Gr	Senescence	Normal
Anabasis aphylla	30	<1	Sol	Gr	Fruition	Normal
Dwarf shrub						
Ephedra distachya	5	1	Sol	Df	Vegetative	Normal
Convolvulus fruticosus	80	--	Un	--	Fruition	Normal
Dwarf shrub						
Artemisia lercheana	25	30	Cop1	Df	Budding	Normal
Bassia prostrata	90	3	Sol	Df	Flowering	Normal
Herbaceous layer						
Stipa arabica	75	<1	Sol	Df	Dead	Normal
Agropyron fragile	60	--	Un	--	Senescence	Normal
Salsola tragus	25	<1	Sol	Df	Fruition	Normal
Poa bulbosa	15	<1	Sol	Df	Dead	Normal
Aeluropus littoralis	10	<1	Sol	Df	Fruitious/Dead	Normal

Sample Plot # P4p (Pipeline)						
Plant name	Height	Plant cover (%)	Abun-dance	Espace-ment	Phenophase	Zoetic condition
Euphorbia seguieriana	90	<0.5	Sol	Df	Dead	Normal
Zygophyllum turcomanicum	30	--	Un	--	Senescence	Normal
Gagea reticulata	5	<0.5	Sol	Df	Dead	Normal

Sample plot #	P5p (Pipeline)
Photos P5p, P5p.1, P5p.2, P5p.3, P5p.4 and P5p.5	

Size	10 x 10 m
Date	2.09.2024
Coordinates	43°11'31.50"N 51°32'34.02"E
Position in the landscape	Coastal sand pimple plain
Elevation (m abs.alt.)	11
Terrain	Pimple plain
Soils	Weakly consolidated saline sands
Water regime	Precipitations
Community name	**Sand-wormwood with Tamarix**
Dominants	*Artemisia arenaria*
Position in succession	Stable plant community
Projective cover (%)	25-30
Plant litter (%)	---
Shrubs and semi-shrubs (%)	25
Herbaceous cover (%)	5
Shrub-semishrub layer, height (cm)	Up to 100
Herbaceous layer, height (cm)	Up to 80
Factors and degree of disturbance	Averagely disturbed, grazing, tracks of an old fire
Signs of abnormal plant development	Not observed
Additions	Tamarix on the hillocks tops

Plant name	Height	Plant cover (%)	Abun-dance	Espace-ment	Phenophase	Zoetic condition
Shrub						
Tamarix ramosissima	100	3	Sol	Df	Flowering	Normal
Semi-shrub						
Alhagi pseudalhagi	70	<1	Sol	Df	Senescence	Normal
Dwarf shrub						
Ephedra distachya	7	1-2	Sol	Gr	Vegetative	Normal
Dwarf shrub						
Artemisia arenaria	80	20	Sp	Df	Budding	Normal
Artemisia lercheana	50	1-2	Sol	Df	Budding	Normal
Herbaceous layer						
Agropyron fragile	80	<1	Sol	Df	Dead	Normal
Stipagrostis pennata	40	<1	Sol	Df	Dead	Normal
Euphorbia seguieriana	80	3-5	Sol-Sp	Df	Dead	Normal
Salsola tragus	30	<0.5	Sol	Df	Fruition	Normal
Echinops ritro	70	<0.5	Un-Sol	Df	Dead	Normal
Zygophyllum turcomanicum	30	<1	Sol	Df	Senescence	Normal
Bromus tectorum	10	<0.5	Sol	Df	Dead	Normal

Sample plot #	P5p (Pipeline)					
Plant name	Height	Plant cover (%)	Abun-dance	Espace-ment	Phenophase	Zoetic condition
Climacoptera lanata	60	<1	Sol	Df	Fruition	Normal
Bassia laniflora	23	<0.5	Sol	Df	Fruition	Normal
Horaninovia ulicina	10	<1	Sol	Df	Flowering	Normal

Sample plot #	P6p (Pipeline)
Photos P6p, P6p.1 and P6p.2	
Size	10 x 10 m
Date	2.09.2024
Coordinates	43°12'32.86"N 51°34'23.70"E
Position in the landscape	Coastal sand flat
Elevation (m abs.alt.)	13
Terrain	Plain
Soils	Weakly consolidated sands
Water regime	Precipitations
Community name	**Euphorbia-wormwood**
Dominants	*Artemisia lercheana, Euphorbia seguieriana*
Position in succession	Stable plant community
Projective cover (%)	30-40
Plant litter (%)	---
Shrubs and semi-shrubs (%)	25-30
Herbaceous cover (%)	10
Shrub-semishrub layer, height (cm)	Up to 45
Herbaceous layer, height (cm)	Up to 80
Factors and degree of disturbance	Averagely disturbed, grazing
Signs of abnormal plant development	Not observed
Additions	

Plant name	Height	Plant cover (%)	Abundance	Espace-ment	Phe-nophase	Zoetic condition
Dwarf shrub						
Artemisia lercheana	45	25-30	Sp-Cop1	Df	Budding	Normal
Herbaceous layer						
Stipa arabica	80	<1	Sol	Df	Dead	Normal
Agropyron fragile	80	<1	Sol	Df	Dead	Normal
Salsola tragus	40	3	Sol	Df	Fruition	Normal
Euphorbia seguieriana	60	5	Sp	Df	Dead	Normal
Carex physodes	7	<1	Sol	Df	Dead	Normal
Iris tenuifolia	50	<1	Sol	Df	Dead	Normal
Bromus tectorum	20	<0.5	Sol	Df	Dead	Normal
Astragalus spp	2	<1	Sol	Df	Dead	Normal

Sample Plot #	P7p (Pipeline)
Photos P7p, P7p.1, P7p.2 and P7p.3	

Size	10 x 10 m
Date	2.09.2024
Coordinates	43°15'7.06"N 51°36'19.60"E
Position in the landscape	Coastal sand flat
Elevation (m abs.alt.)	- 3
Terrain	Plain
Soils	Weakly consolidated saline sands
Water regime	Precipitations
Community name	**Alhagi-sand-wormwood**
Dominants	*Artemisia arenaria, Alhagi pseudalhagi*
Position in succession	Stable plant community
Projective cover (%)	30-35
Plant litter (%)	---
Shrubs and semi-shrubs (%)	30-32
Herbaceous cover (%)	1
Shrub-semishrub layer, height (cm)	Up to 100
Herbaceous layer, height (cm)	Up to 90
Factors and degree of disturbance	Slightly-averagely disturbed, grazing
Signs of abnormal plant development	Not observed
Additions	OHTL beside, underground pipeline, railway Xylosalsola chiwensis – red-listed species

Plant name	Height	Plant cover (%)	Abun-dance	Espace-ment	Phenophase	Zoetic condition
Shrub						
Atraphaxis replicata	40	--	Un	Df	Senescence	Normal
Semi-shrub						
Xylosalsola chiwensis	40	1	Sol	Df	Fruition	Normal
Limonium suffruticosum	30	<1	Sol	Df	Fruition	Normal
Alhagi pseudalhagi	50	10	Sp	Df	Senescence	Normal
Dwarf shrub						
Ephedra distachya	40	<1	Sol	Df	Vegetative	Normal
Dwarf shrub						
Artemisia arenaria	90-100	15-20	Sp	Df	Budding	Normal
Artemisia lercheana	80	1-2	Sol	Df	Budding	Normal
Herbaceous layer						
Stipa arabica	90	<1	Sol	Df	Dead	Normal
Salsola tragus	30	<1	Sol	Df	Fruition	Normal
Descurainia sophia	70	<0.5	Sol	Df	Dead	Normal
Echinops albicaulis	80	<0.5	Sol	Df	Dead	Normal

Sample Plot #	P7p (Pipeline)					
Plant name	Height	Plant cover (%)	Abun-dance	Espace-ment	Phenophase	Zoetic condition
Zygophyllum turcomanicum	10	--	Un	Df	Senescence	Normal

Sample Plot #	P8p (Pipeline)
Photos P8p, P8p.1, P8p.2, P8p.3, P8p.4 and P8p.5	

Size	10 x 10 m
Date	2.09.2024
Coordinates	43°15'0.36"N 51°40'14.51"E
Position in the landscape	Undulating hilly plain
Elevation (m abs.alt.)	621
Terrain	Plain
Soils	Gray-brown alkaline
Water regime	Precipitations
Community name	**Perennial halophytic-wormwood with ephemerons**
Dominants	*Artemisia terrae-albae, Oreosalsola arbusculiformis*
Position in succession	Stable plant community
Projective cover (%)	20-25
Shrubs and semi-shrubs (%)	17-20
Herbaceous cover (%)	5
Shrub-semishrub layer, height (cm)	Up to 60
Herbaceous layer, height (cm)	Up to 60
Factors and degree of disturbance	Slightly disturbed, grazing
Signs of abnormal plant development	Not observed
Additions	Bedrock exposure 20%. *Xylosalsola chiwensis* – red-listed species

Plant name	Height	Plant cover (%)	Abundance	Espacement	Phenophase	Zoetic condition
Shrub						
Oreosalsola arbusculiformis	60	3-5	Sol-Sp	Df	Fruition	Normal
Atraphaxis spinosa	30	1	Sol	Df	Senescence	Normal
Semi-shrub						
Xylosalsola chiwensis	25	1	Sol	Df	Fruition	Normal
Limonium suffruticosum	27	<1	Sol	Df	Fruition	Normal
Dwarf shrub						
Convolvulus fruticosus	40	1	Sol	Df	Senescence	Normal
Ephedra distachya	15	<1	Sol	Df	Vegetative	Normal
Dwarf shrub						
Artemisia terrae-albae	23	10-15	Sp	Df	Budding	Normal
Artemisia lercheana	27	1-2	Sol	Df	Budding	Normal
Anabasis salsa	5	<1	Sol	Df	Flowering\ Fruition	Normal
Nanophyton erinaceum	3	<1	Sol	Df	Fruition	Normal
Herbaceous layer						
Anabasis brachiata	10	3	Sol	Df	Fruition	Normal
Stipa arabica	60	<1	Sol	Df	Dead	Normal
Poa bulbosa	20	1-2	Sol	Df	Dead	Normal
Ranunculus testiculatus	4	<1	Sol	Df	Dead	Normal

Sample Plot # P8p (Pipeline)						
Plant name	Height	Plant cover (%)	Abun-dance	Espace-ment	Phenophase	Zoetic condition
Alyssum desertorum	10	<0.5	Sol	Df	Dead	Normal
Eremopyrum bonaepartis	10	<0.5	Sol	Df	Dead	Normal
Tulipa spp.	5	<0.5	Sol	Df	Dead	Normal

ANNEX 3 DESCRIPTION OF PLANT COMMUNITIES IN THE KURYK AREA

1. *Artemisia kemrudica*, *Artemisia kemrudica* - *Salsola orientalis* communities (43.108453° 51.721768°; 17.6 km^2, 36 % of the study area)

The communities are hemipetrophytic and hemihalophytic community complexes. *Artemisia kemrudica*, *Artemisia kemrudica* - *Salsola orientalis* communities, in some places with *Xylosalsola* or *Haloxylon* are located on a slightly undulating plain (Photo 39). Soils are grey-brown solonetz soils with porous crust broken into polygonal cracks on the surface, significant compaction of the middle part of the profile with clumpy or lumpy-clumpy structure, low thickness of humus horizon (less than 30 cm). Weakly expressed phytogenic hillocks and burrows of marmosets are observed on the surface. The projective coverage of vegetation is 45 %. Disturbance of vegetation cover is from medium to weak, there are ruts from transport, signs of grazing, rubbish. Floristic composition - 14 species: *Artemisia kemrudica* – 20 %, *Salsola arbusculiformis* – 10 %, *Salsola orientalis* -5-7 %, *Haloxylon aphyllum* -1 %, *Anabasis eriopoda* - 0,5 %, *A. salsa* – 10 %, *Nanophyton erinaceum* <1 %, *Climacoptera brachiata* - 0,5 %, *Ceratocarpus utriculosus* - 0,5 %, *Ceratocephala testiculata* 1 %, *Roemeria hybrida* 0,5 %, *Leptaleum filifolium* <1 %, *Sasola nitraria* <1 %, *Suaeda acuminata* <1 %.

Artemisia kemrudica Krasch. - Artemisia kemrudica (kemrud jusans). On sandy, sandy loam, loamy, fine-grained soils, gypsum clays, clay solonchaks, stony and fine-grained slopes.

Photo 39 *Artemisia kemrudica - Caroxylon gemmascens* communities

2. *Anabasis salsa*, *A.brachiata, Nanophyton erinaceum*, *Artemisia terrae-albae* communities (43.085556° 51.720520; 21.38 km^2, 43 % of the study area).

This plants community occupies the largest part of the site. *Anabasis salsa*, *A.brachiata, Nanophyton erinaceum*, *Artemisia terrae-albae* communities, in some places with *Salsola orientalis* on grey-brown solonetz soils and desert solonets. These communities (Photo 40) have a weak to medium degree of disturbance. Traces of disturbance as a result of grazing, livestock tramping – 30 %. Projective coverage of vegetation – 26 %. Floristic composition - 18 species: *Artemisia terrae-albae* – 20 %, *Anabasis eriop-oda* - 0,5 %, *A. salsa* – 10 %, *Nanophyton erinaceum* <1 %, *Salsola orientalis* - 0,5 %, *Climacoptera brachiata* - 0,5 %, *Gyrgen-sohnia oppositiflora* - 0,5 %, *Ceratocarpus utriculosus* - 0,5 %, *Eremopyrum orientale* <1 %, *Strigosella africana* <1 %, *S.circinata* <1 %, *Lepidium perfoliatum* <1 %, *Ceratocephala testiculata* 1 %, *Roemeria hybrida* 0,5 %, *Leptaleum filifolium* <1 %, *Sasola nitraria* - <1 %, *Halimocnemis karelinii* - <1 %, *Suaeda acuminata* - <1 %. Native species account for 100 %.

Photo 40 Communities from *Artemisia terrae-albae*

3. *Anabasis salsa – Ephemeral plant*, *Artemisia- Stipa- Ephemeral* communities (43.092283° 51.683794°; 1.77 km^2, 4 % of the study area)

Anabasis salsa – Ephemeral plant communities are widespread on desert solonetz, *Artemisia sagebrush-ephemeral* on brown, less often grey-brown loamy or light loamy soils. These communities include 15 species: *Anabasis salsa* – 10 %, *A. eriopoda* – 0,5 %, *Artemisia terrae-albae* – 5-7 %, *Stipa caspia* – 5 %, *Nanophyton erinaceum* – 2 %, *Salsola oriantalis* – 0,5 %, *Ceratocepahla testiculata* – 1 %, *Strigosella Africana* - 1-2 %, *S.circinnata* – 0,5 %, *Eremopyrum orientale* – 0,5 %, *Tetracme quad-ricornis* – 0,5 %, *Lepidium perfoliatum* – 0,5 %, *Leptaleum filifolium* – 0,5 %, *Climacoptera brachiata* – 0,5 %, *Rhinopetalum karelinii* - <1 %. Native species account for 80 % of the total. Ephemerals account for 20 % of the projective cover of all community species. The projective cover of vegetation is 25 %.

4. *Artemisia terrae-albae - Anabasis aphylla - Ephemeral plant* communities (43.110189° 51.673940°; 1.88 km^2, 4 % of the study area)

Artemisia terrae-albae - Anabasis aphylla - Ephemeral plant communities, in some places with Kochia, *Artemisia terrae-albae - Ephemeral plant, Ceratocarpus arenarius* communities are spread on brown, much less often on grey-brown loamy soils with the participation *Anabasis salsa* or *Atriplex cana, Artemisia pauciflora* communities on desert solonets. These communities have medium disturbance and projective vegetative cover of 25 %. Floristic composition - 19 species: *Anabasis salsa* – 10 %, *Ceratocarpus arenarius* – 5 %, *Atriplex cana* – 5 %, *A. eriopoda* – 0,5 %, *Anabasis aphylla* – 0,5 %, *Artemisia terrae-albae* – 5-7 %, *Artemisia pauciflora* – 5-7 %, *Nanophyton erinaceum* – 2 %, *Salsola oriantalis* – 0,5 %, *Ceratocepahla testiculata* – 1 %, *Strigosella africana*- 1-2 %, *S.circinnata* – 0,5 %, *Eremopyrum orientale* – 0,5 %, *Tetracme quadricornis* – 0,5 %, *Lepidium perfoliatum* – 0,5 %, *Leptaleum filifolium* – 0,5 %, *Kochia prostrata* – 0,5 %, *Climacoptera brachiata* – 0,5 %, *Rhinopetalum karelinii* <1 %. Native species account for 80 % of the total.

5. *Nanophyton erinaceum, Anabasis salsa, Salsola orientalis - Agropyron fragile* communities (43.140320°; 51.701839°; 2.40 km^2, 5 % of the study area)

Nanophyton erinaceum, Anabasis salsa, Salsola orientalis - Agropyron fragile communities, in some places with Kochia or *Atraphaxis replicata* on grey-brown solonetz, in some places rubbly soils are widespread in the northern and north-western part of the territory. Background state of vegetation. Floristic composition - 20 species: *Anabasis salsa* - 17-20 % (Photo 41), *Anabasis eriopoda* – 5 %, *Salsola orientalis* – 3 %, *Veronica amoena* -1 %, *Eremopyrum orientale* – 2 %, *Lappula spinocarpos* - 0,5 %, *Strigosella circinata* - 0,5 % *Goldbachia laevigata* - 0,5 %, *Leptaleum filifolium* - 0,5 %, *Allium caspium* - 0,5 %, *Ceratocepahala testiculata* - 0,5 %, *Girgensohnia oppositiflora* - 0,5 %, *Nonnea caspica* - 0,5 %, *Scorzonera pusilla* - 0,5 %, *Chaenorhinum calycinum* - 0,5 %, *Arnebia decumbens* - 0,5 %, *Pachypterigium multicaule* - 0,5 %, *Roemeria hybrida* - 0,5 %, *Koelpinia linearis* <1 %, *Polygonum* sp. <1 %. Native perennial species account for 70 % of the community projective cover, while ephemerals and ephemeroids account for the remaining 30 %.

Salsola orientalis is a typical semi-shrub, haloxerophyte 20-40 (50) cm tall with pubescent valvate leaves with stems that are woody and lower. On rubbly micro-highs, groupings of *Nanophyton erinaceum* are found among this community, which stand out noticeably among *Artemisia* and *Salsola orientalis*. *Artemisia* and *Salsola orientalis* form the first tier-25-30 cm high, the second tier is occupied by ephemerals, which are mainly concentrated near *Artemisia* and *Salsola orientalis* bushes, *Nanophyton erinaceum* occupies micro-highs of the relief, the soil is compacted, the surface is covered with rubble. The projective coverage is 15-20 %.

Photo 41 *Anabasis salsa* (C.A. Mey.) Benth. ex Volkens

6. *Artemisia kemrudica – Xylosalsola, Artemisia kemrudica* communities (43.053539° 51.767098°; 3.74 km^2, 8 % of the study area)

Artemisia kemrudica – Xylosalsola, Artemisia kemrudica communities, in some places with participation of *Nanophyton erinaceum* communities on grey-brown sometimes rubbly soils. Phytogenic hillocks are formed near bushes. Disturbance is average. Projective coverage – 20 %. Floristic composition - 9 species: *Artemisia kemrudica* – 10 %, *Salsola arbusculiformis* – 5 %, *Anabasis eriopoda* – 5 %, *Anabasis salsa* – 3 %, *Artemisia terrae-albae* <1 %, *Sasola nitraria* <1 %, *Euphorbia seguieriana* <1 % (Photo 42), *Halimocnemis karelinii* <1 %, *Suaeda acuminata* <1 %. Native species account for 100 %.

These communities are very vulnerable, it is necessary to protect them from intensive grazing. With increasing pressure on pastures the regenerative capacity of plants is suppressed (*Xylosalsola*, *Artemisia*, *Salsola orientalis*), the number of ephemeroids decreases, weedy species such as *Pergamum garmala*, *Ceratocephalis falkata* are introduced.

Photo 42 *Euphorbia seguieriana*

7. *Artemisia kemrudica - Salsola orientalis, Artemisia kemrudica - Atraphaxis replicata, Anabasis salsa* communities (43.141436° 51.725080°; 0.44 km^2, 1 % of the study area)

Artemisia kemrudica - Salsola orientalis, Artemisia kemrudica - Atraphaxis replicata, Anabasis salsa on grey-brown solonetz soils are distributed in the north-eastern part of the territory. Evidence of vegetation disturbance due to grazing. Slight to moderate disturbance with livestock tramping 20-30 %. Projective coverage – 35 %. Floristic composition - 16 species: *Artemisia kemrudica* – 10 %, *Salsola orientalis* - 7-10 %, *Anabasis salsa* - 5-7 %, *Tetracme quadri-cornis* - 5-7 %, *Centaurea adpressa* - 0,5 %, *Consolida camptocarpa* - 0,5 %, *Eremopyrum orientale* - 0,5 %, *Ceratocephala testiculata* - 0,5 %, *Veronica amoena* <1 %, *Lappula spinocarpos* <1 %, *Polygonum aviculare* <1 %, *Strigosella africana* <1 %, *Astragalus s*p. <1 %, *Goldbachia laevigata* <1 %, *Allium caspium* <1 %, *Gyrgensohnia oppositiflora* <1 %. Native species account for 78 % of the community projective cover, ephemerals and ephemeroids for 22 %.