Dzhankeldy 500 MW Wind Farm
Republic of Uzbekistan

Critical Habitat Assessment–
Stage 2

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LIST OF ABBREVIATIONS

ABBREVIATION	MEANING
ADB	Asian Development Bank
AoI	Area of Influence
AZE	Alliance for Zero Extinction
CHA	Critical Habitat Assessment
CO	Collapsed, IUCN Red List of Ecosystems Category
CR	Critically Endangered, IUCN Red List of Threatened Species Category
DD	Data Deficient, IUCN Red List of Threatened Species Category
EAAA	Ecologically Appropriate Area of Analysis
EBRD	European Bank for Reconstruction and Development
EOO	Extent of Occurrence
EN	Endangered, IUCN Red List of Threatened Species Category
IBA	Important Bird Areas
IFC	International Finance Corporation
IUCN	International Union for Conservation of Nature
KBA	Key Biodiversity Areas
LC	Least Concern, IUCN Red List of Threatened Species Category
NT	Near Threatened, IUCN Red List of Threatened Species Category
OHTL	Overhead Transmission Line
SAC	Special Areas of Conservation
SPA	Special Protection Areas
VP	Vantage Point
VU	Vulnerable, IUCN Red List of Threatened Species Category

1 INTRODUCTION

1.1 Background

As part of the Uzbekistan 2030 Energy Strategy, ACWA Power has signed an implementation agreement with the Ministry of Energy in Uzbekistan for developing, building and operating 500MW wind farm in Dzhankeldy. ACWA Power has since established a Project Company ' FE ACWA Power Dzhankeldy Wind LLC' registered in the Republic of Uzbekistan with registration number 839862. ACWA Power Bash Wind LLC has entered into a 25-year Power Purchase Agreement (PPA) with JSC 'National Electric Grids of Uzbekistan', which is based on the ultimate operations of the Project.

The Project includes the development, financing, construction, operation and maintenance of the Wind Farm including the Wind Farm electrical substation. In addition, it will also include development, financing, construction and transfer of Purchase Electrical Facilities (OHTL and common electrical facilities shared with Bash 500MW Wind Farm), switchyard (with transformers) or 500/220kV pooling station.

This Report constitutes the CHA Stage 2 Report which has been prepared in support of the Environmental and Social Impact Assessment (ESIA). Further information is provided in the following subsections.

1.2 Critical Habitat Assessment

'Critical Habitat' is a concept applicable to several international financial lending institutions, designed to enable the identification of areas of high biodiversity value in which development would be particularly sensitive and require special attention. The concept has been developed in consultation with numerous international conservation organisations and thus takes into account many pre-existing conservation approaches, such as Key Biodiversity Areas, Important Bird Areas, and Alliance for Zero Extinction Sites. This comprehensive approach has meant that it has seen high levels of interest and uptake.

The concept is further defined in the following documents:

- European Bank for Reconstruction and Development (EBRD) Performance Requirement 6 (PR6) Biodiversity Conservation and Sustainable Management of Living Natural Resources

- International Finance Corporation (IFC) IFC Performance Standard 6 (PS6) on Biodiversity Conservation and Sustainable Management of Living Resources.
- A number of multilateral banks have policies closely aligned with PS6, and more than 75 private banks signed up to the Equator Principles have an implicit commitment to PS6.
- Asian Development Bank (ADB) Safeguard Policy Statement (SPS) 2009, ADB Environment Safeguards A Good Practice Sourcebook Draft Working Document

The objective of undertaking a Critical Habitat Assessment (CHA) is to arrive at definitive conclusions regarding whether or not the area where a development has been proposed meets the definitions of a Critical Habitat, per the classifications set out in EBRD PR6, IFC PS6, and the ADB Safeguards following the criteria and processes for CHA described therein.

1.3 Overview of CHA Process

The CHA process includes a three-stage approach:

- Stage 1 – Desktop Assessment and Stakeholder Engagement
- Stage 2 – Field Surveys and Data Collection
- Stage 3 – Assessment of Findings against Critical Habitat criteria

The full CHA Methodology is available in the CHA Methodology Report.

The findings of the CHA process will feed into and further inform the overall project ESIA and subsequent environmental management and monitoring programmes.

1.4 Determining Study Area Boundaries (based on AoI/ EAAA)

An integral part of the CHA is the appropriate delineation of study area boundaries. As the project in question is for a wind farm, it was deemed prudent to acknowledge a large area of influence (AoI) for birds and bats, with consideration of Important Bird Areas within 20km during initial screening, as well as the known migratory flyways of the region.

For all other biodiversity aspects, it was considered adequate to consider the physical project boundaries as well as up to a 1km buffer zone. Thus, the Ecologically Appropriate Area of Analysis (EAAA) has been developed by assuming the AoI is no further than the 1km boundary for all WF and OHTL corridor aspects except for birds and bats.

1.5 Purpose/Scope of Report

The outcomes of the field surveys and data collection will culminate in the provision of a CHA Stage 2 Report. This Stage 2 Report includes:

- Detailed methodology followed for all surveys;
- Results of surveys and findings, presented in a series of summary statistics and tables;
- Narrative on the conclusions that can be drawn on the basis of the survey findings, especially on the condition of the overall biodiversity features and relative sensitivity of the study area ecosystem.

2 THREATENED SPECIES

2.1 Sociable Lapwing

The Sociable Lapwing (*Vanellus gregarius*) is listed as Critically Endangered on the IUCN Red List, due to rapid population decline thought to be driven by hunting pressures.

It is a passage migrant through Uzbekistan, crossing southbound in the autumn months and returning northbound in the spring months to breed in Northern Kazakhstan and Russian in the summer months.

Preferred habitat during migration is typically sandy plains with short grass, dry meadows, fallow land and cultivated fields. The primary threat is presumed to be illegal hunting during migration and on wintering grounds, resulting in low adult survival.

Current estimations calculate a possible total population size of 5,600 breeding pairs, i.e., 11,200 mature individuals, roughly equivalent to 16,000-17,000 individuals in total.

Research indicates that the species generally follows one of two migratory pathways, the eastern pathway which upon initial inspection may pass near the project site.

Figure 2-1 Distribution of the Social Lapwing

2.1.1 Baseline Survey

2.1.1.1 Methods

2.1.1.1.1 Dzhankeldy Wind Farm

The Dzhankeldy WF site was comprehensively surveyed over one year (16 May 2020-20 May 2021) during all four seasons following the guidance of the Scottish Natural Heritage (SNH) guidelines (2017), which are currently the internationally accepted best-practice for onshore wind farm surveying and assessment.

A total of 10 Vantage Points (VPs) were surveyed to collect data on species, numbers, physical characteristics, and flight behaviour. The points are located so as to cover the project area as completely as possible (Figure 2-2).

The duration of survey at each vantage point was approximately 3 hours. During observations weather conditions such as wind speed and direction, and air temperature were recorded. Wind speed and air temperature were measured using an anemometer. Whenever possible, approximate flight altitude, speed, and flight direction of the birds were recorded every 15 seconds.

During the observations, photographing and short video shooting of the birds were carried out, which were used to confirm the correct species identification and obtain additional data on the number of individuals.

During the summer 2020, autumn 2020 and spring 2021 surveys Cliffs and ledges on the Northern sides of the Western Kuldzhuktau mountain range were examined for nests of large birds of prey to identify nesting species and collect data on their nesting ecology and behaviour.

Nest locations were recorded and mapped. During the survey optical devices such as binoculars and telescopes were used. Local residents and shepherds were interviewed for information on the presence of bird predator nests in the area. Due to the lack of large trees and shrubs, nesting birds in trees was excluded. Surveys were conducted both in the project area and in the surrounding area.

Figure 2-2 Vantage Points at Dzhankeldy Wind Farm Site

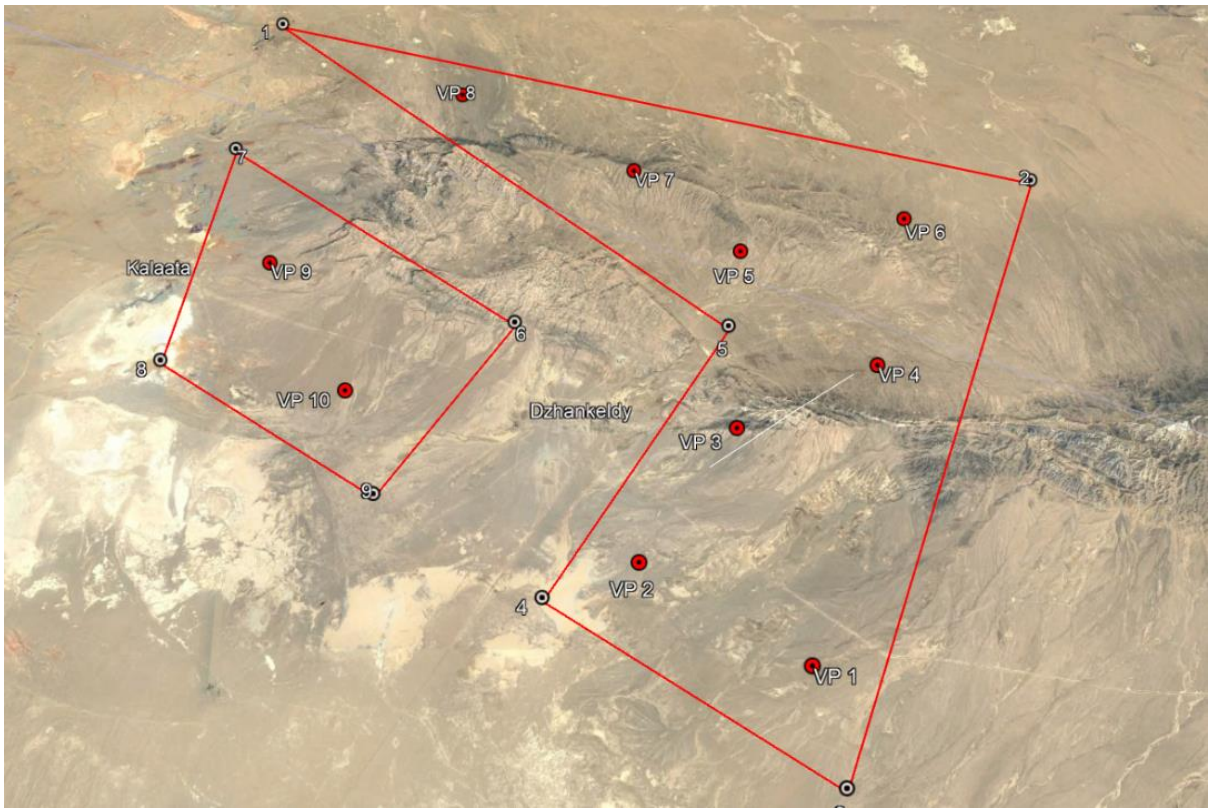


Figure 2-3 Nest Survey Routes during Summer

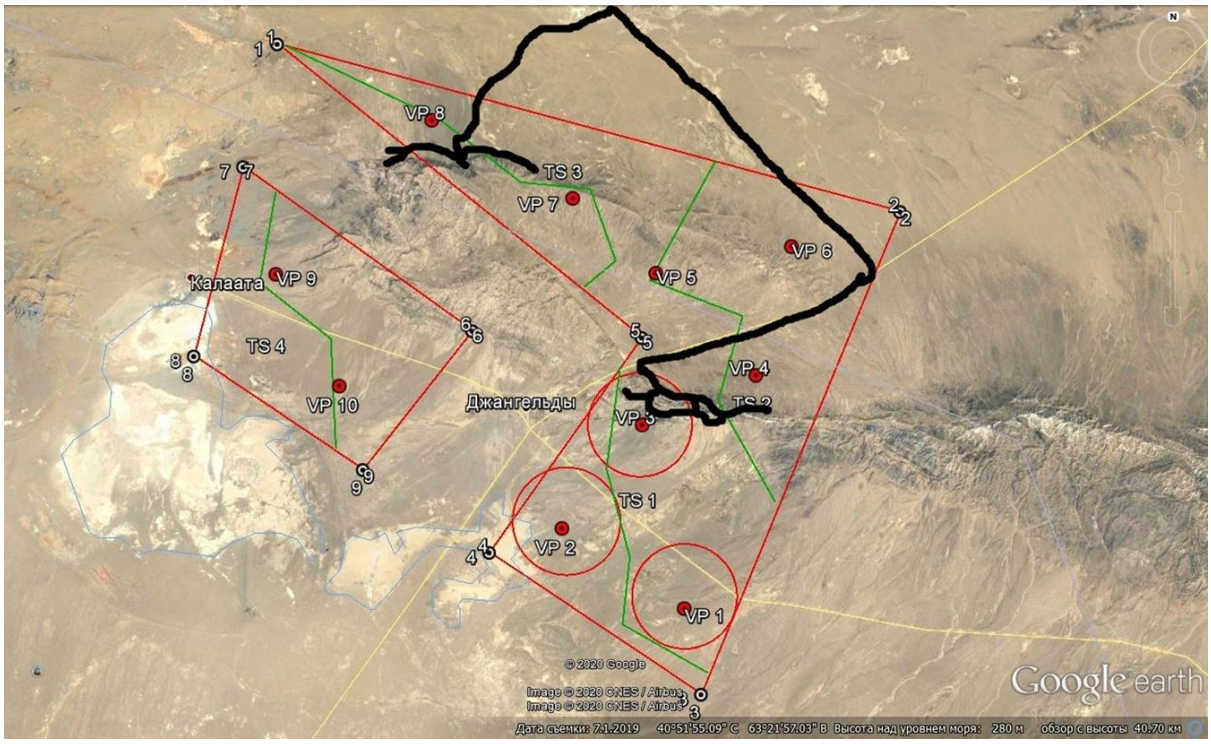
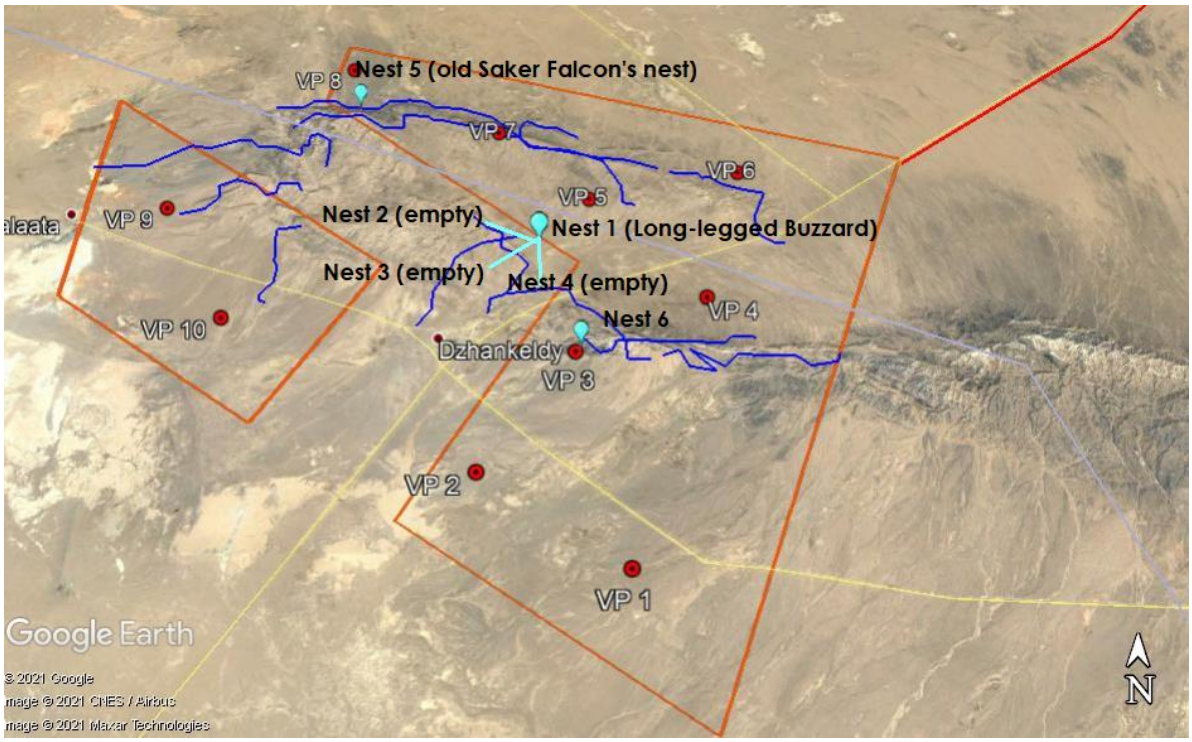


Figure 2-4 Nest Survey Routes during Spring



2.1.1.1.2 Dzhankeldy-Bash OHTL

The survey along the planned Dzhankeldy-Bash OHTL was carried out May and June 2021 at selected vantage points (VP). The points were places directly along the route of the transmission line or near it depending on the availability of access roads. The distance from the route in some places was generally not more than 1-2 km.

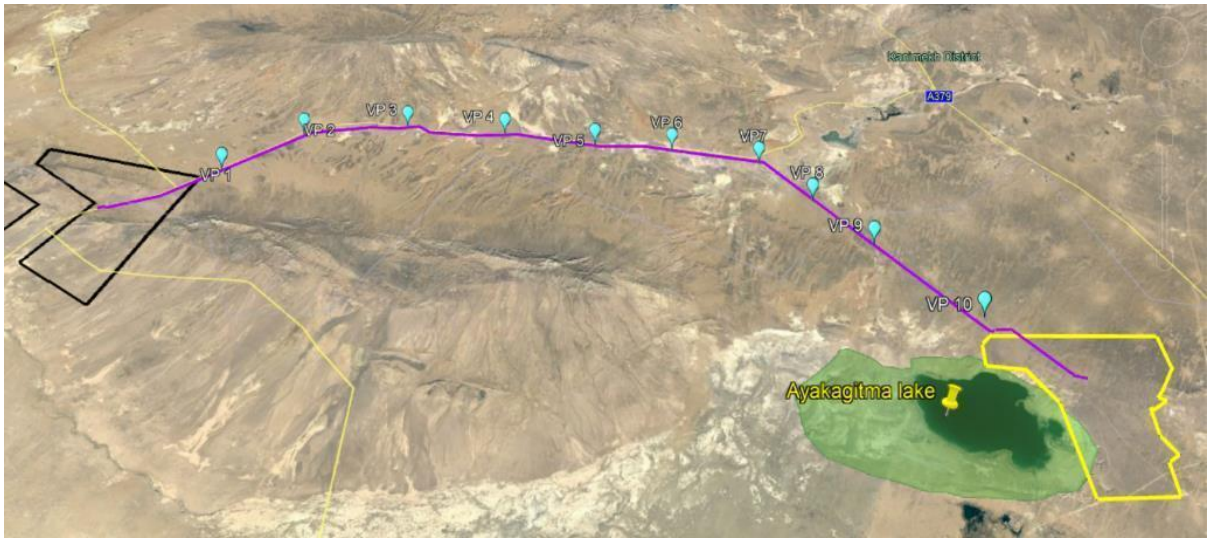
Given the homogenous landscape of the surveyed section, analogies were drawn between the surveyed area adjacent to the route and the route itself.

Visual observations of birds were made during the route survey. Bird sighting points were also marked using GPS. Bird species membership was determined visually using field binoculars with 8x magnification and Nikon and Fujifilm XT-20 digital cameras as well as audio recordings of bird voices (Xeno-canto Asia) and field bird identifiers (Mullarney, Svensson, Zetterstrom, Grant, 1999; Aye, Schweizer, Roth 2012).

Surveys were conducted at 11 selected points, in 1 km radius sections. Duration of observations was not less than 40 minutes at each vantage point. A survey of operating power lines within the project area was also carried out to assess bird mortality on operating OHTL.

Figure 2-5 Vantage points of the projected OHTL route in May 2021

Figure 2-6 Vantage points of the projected OHTL route in June 2021



Due to change of the route in June, the number of vantage points was reduced to 10.

2.1.1.2 Results

2.1.1.2.1 Dzhankeldy Wind Farm

Although critically endangered Sociable Lapwing are possibly occurring within the region and known to associate with agricultural fallow lands during migration, there have been no recorded sightings documenting the species during the Wind Farm surveys to date.

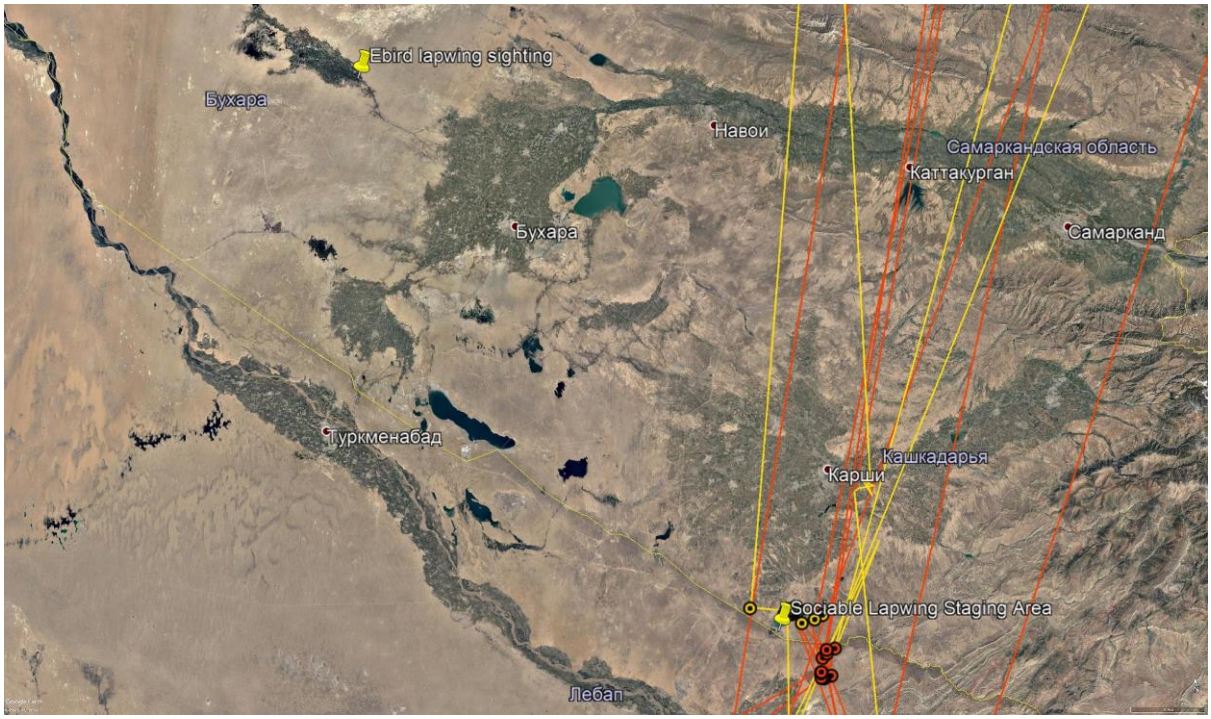
2.1.1.2.2 Dzhankeldy-Bash OHTL

There have been no recorded sightings documenting the Social Lapwing species during the OHTL survey to date.

2.1.2 Stakeholder Engagement

No known occurrence of Sociable Lapwing has been recorded by stakeholders within the project area of influence. Tracked birds have been shown to utilize migratory flyways in excess of 100km east of the project site (Figure 2-7).

Figure 2-7 Migratory Routes of Satellite Tagged Social Lapwings



2.2 Southern Even-fingered Gecko

The Southern Even-fingered Gecko (*Alsophylax laevis)* is listed as Critically Endangered on the IUCN Red List, due to a historic population crash and low numbers of sightings in the past 20-30 years.

The species occurs in "takyrs", which are bare, flat clay areas free from vegetation. Significant habitat loss is ongoing through ploughing and irrigation of this habitat for crop cultivation. There is no reliable global population estimate as no robust population studies have been undertaken in recent years

2.2.1 Baseline Survey

2.2.1.1 Methods

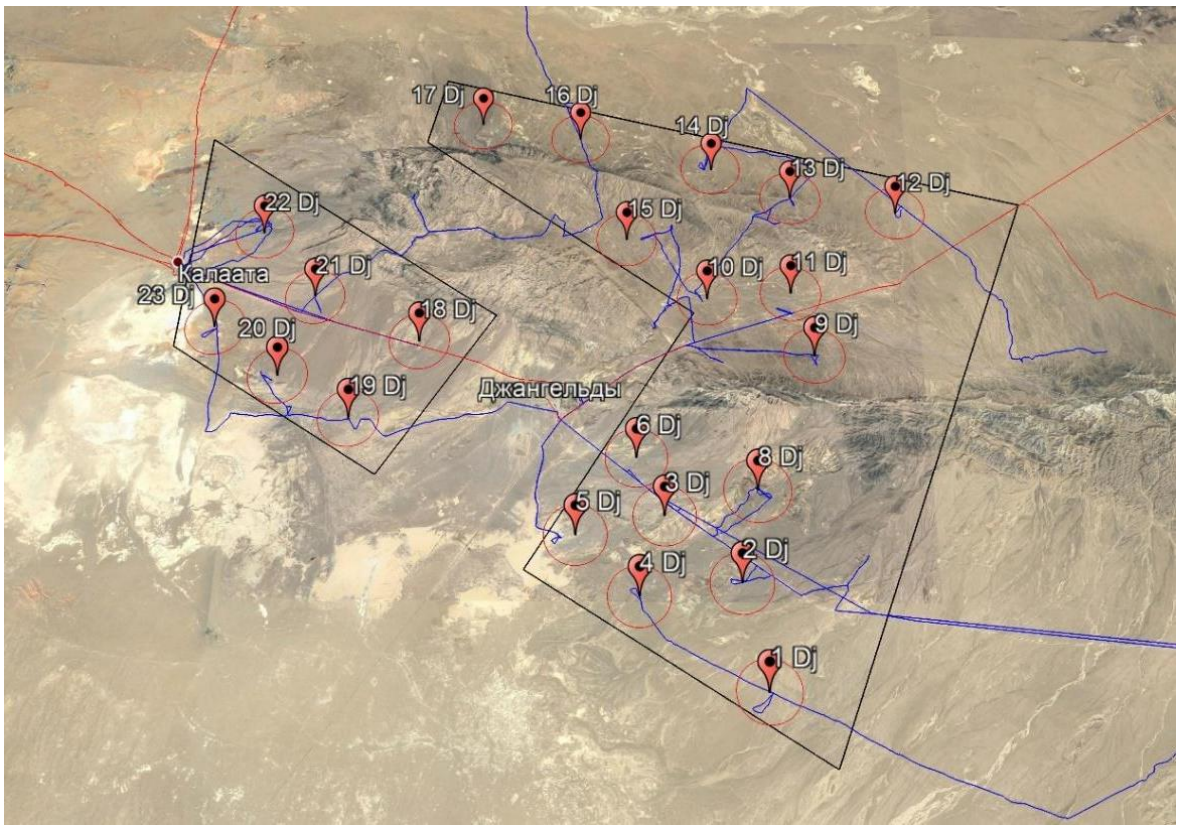
2.2.1.1.1 Dzhankeldy Wind Farm

Surveying was undertaken in late Spring 2021 and mid-Summer 2021, as these represent the seasons of highest reptile activity.

Being an elusive species, this nocturnal reptile was tracked by the clicking sound it makes when it vocalises. The males are generally more audible and can be heard within a radius of 100 metres or more. With two males to every female, the resulting survey count was multiplied by a factor of 0.3 to account for both sexes. Their abundance was estimated using the following population density scale for 1 hectare (Kuzyakin, 1962): 0.1 – 0.9 – rare, 1.0 – 9.9 – common, 10.0 and higher – abundant.

During the spring survey in April 2021, the transects and points within biotope suitable for Southern Even-fingered Gecko were examined for the possibility of conducting surveys in the summer.

Figure 2-8 Survey Points and Transects on the Dzhankeldy Project Territory



The second field trip to the survey points near the Kuldzhuktau mountains was carried out from June 19-22, 2021. The priority of this field visit was to conduct the quantitative assessment of Southern Even-fingered Gecko population at the points identified in spring as the most suitable. During the summer survey of the project area, a total of 6 km was covered. The transects passed through pre-selected survey points and their 1 kilometer radius (Figure 2-8).

2.2.1.1.2 Dzhankeldy-Bash OHTL

23 points along the 115km Dzhankeldy-Bash OHTL were surveyed from June 19-25, 2021.

Reptile survey was carried out both during the day and at night. Both day and night surveys were carried out at points that were identified as potential habitats of the Southern Even-fingered Gecko. In places that were identified as unsuitable biotope for the Southern Even-fingered Gecko, night records were not carried out.

Nocturnal survey was carried out after sunset, until about 2 am, when the activity of the Southern Even-fingered Gecko decreases.

2.2.1.2 Results

2.2.1.2.1 Dzhankeldy Wind Farm

During the Spring survey, the Southern Even-fingered Gecko was recorded at 4 points. The highest number of recordings were made at Dj 18 and Dj 6 (2) with a density of 3 individuals/hectare at each. Sites Dj 3 and Dj 8 recorded 1 gecko each. Densities amounted to 0.3 ind/ha on each of them.

The average night air temperature in April was 18°C, the soil temperature was 17°C, the air humidity was 35%. The spring abundance and density indicators for this species cannot be considered as a true representation of the population in the area due to low night temperatures and small percentage of individuals coming to the surface.

Figure 2-9 Southern Even-fingered Gecko at Dj 6 point in April 2021

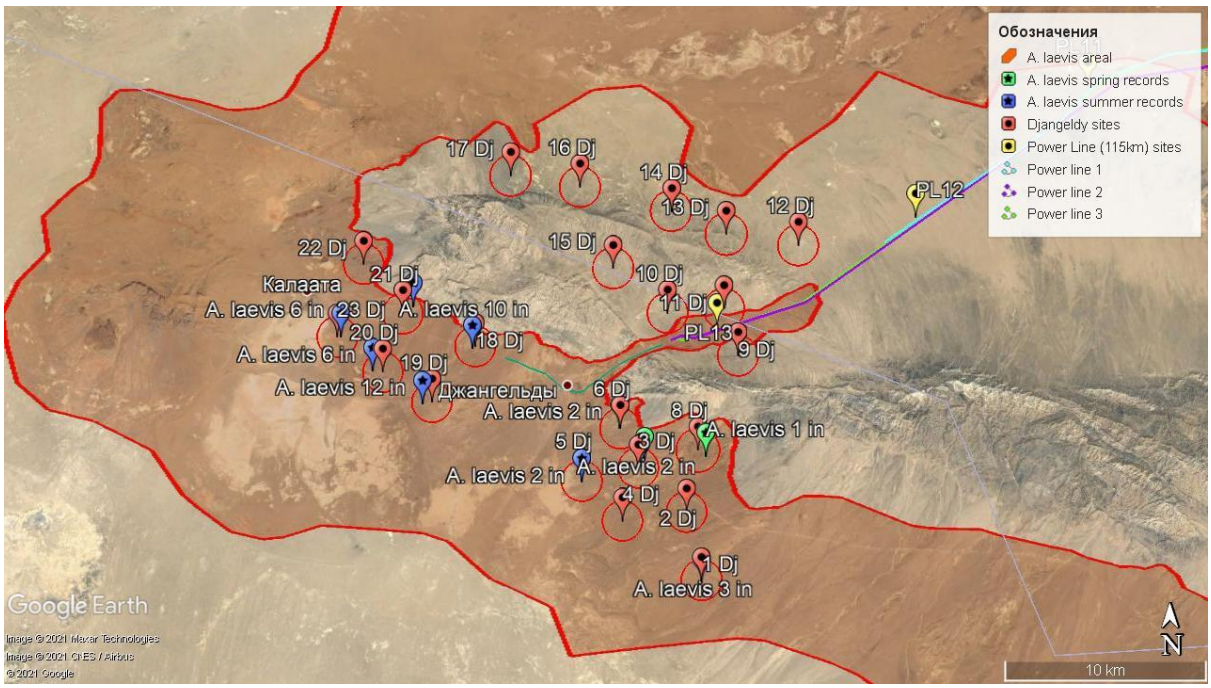
During the summer survey, the Southern Even-fingered Gecko was found at 8 survey points. A total of 47 individuals were recorded. The highest density of Southern Even-fingered Gecko was recorded at Dj 19 point and amounted to 16 ind/ha. The lowest was recorded at Dj (2.7 ind/ha)

The meteorological conditions during surveying were not ideal for recording SE Gecko, due to strong winds in the order of 15-18 m/s. However, it has been stated by the surveying expert that the species likely has a viable population and has indicated the extent of suitable habitat for the species (Figure 2-9).

It is worth noting that almost the entire southern foothill part of Kuldzhuktau is a potential habitat for the Southern Even-fingered Gecko (see points DJ 1, 2, 3, 4, 5, 6, 8, 11, 18, 19, 20, 21, 22, 23). On the contrary, most of the northern sub-mountain plain of Kuldzhuktau, as well as the outlier itself, is unsuitable habitat for this species.

Figure 2-10 Male Southern Even-fingered Gecko at Dj 8

Figure 2-11 Records of Southern Even-fingered Gecko and its Population Range

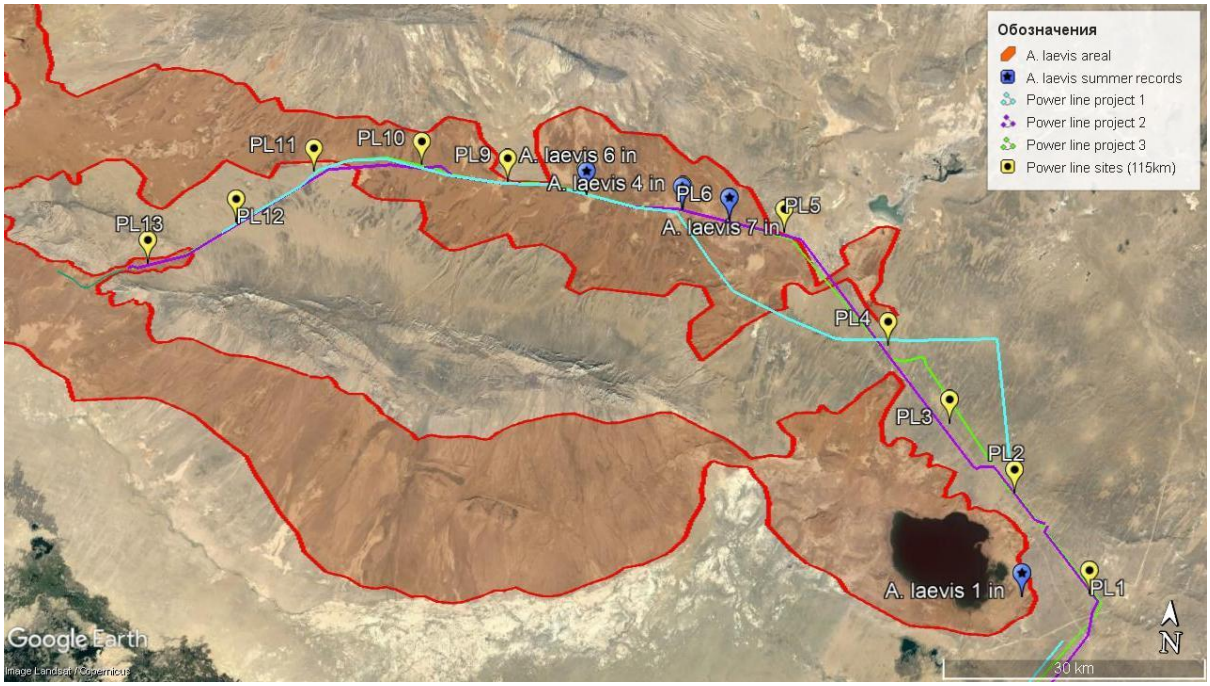


2.2.1.2.2 Dzhankeldy-Bash OHTL

A total of 17 individuals were recorded along the OHTL route. The highest density of the Southern Even-fingered gecko was recorded at PL 6 with 7 individuals and amounted to 9.3 individuals/hectare. PL 8 recorded 6 individuals and had a density of 8.1 individuals/hectare PL 7 recorded the least number (4) with a density of 5.2 individuals /hectare.

Figure 2-12 Male Southern Even-fingered Gecko Recorded at PL 6

Figure 2-13 Records of Southern Even-fingered Gecko and its Population Range



2.2.2 Stakeholder Engagement

As part of the CHA Stage 2 process, requests for information related to identified biodiversity aspects of concern were distributed to known experts in the field.

One such expert that was consulted as part of stakeholder engagement exercises is Roman Nazarov, expert herpetologist who has studied the Southern Even-fingered Gecko in central Uzbekistan.

The following passages have been excerpted from the response received from Roman Nazarov.

- "According to our data obtained during a recent National Geographic funded study conducted by an international group of scientists in 2019, the results from the DNA analysis of this population that indicates this population unique and distinct from all others in the area. Based on these data, the status of the population inhabiting Central Kyzylqum will be revised and described as a new locally endemic species to Uzbekistan."
- The below information relating to the natural history of the species has also been provided by Roman Nazarov.

<u>Smooth Even-fingered Gecko</u>

Species Name: *Alsophylax laevis* Nikolsky, 1907

English Name	Uzbek Name	Russian Name
Southern Even-fingered Gecko	Силлиқ гекконча	Гладкий геккончик

Size. The adult body size of this species does not exceed 4 cm, with its tail approximately equal to the length of the body.

Identifying Features. The Smooth even-fingered gecko is morphologically similar to *Alsophylax pipiens*, but can be separated by the absence of enlarged tubercles on the dorsal surface of the body and males having 8–13 cloacal pores.

Colouration. The colour of the dorsal surface of the body is from light grey to sandy-buffy. There is a wide dark brown stripe that extends from the tip of the muzzle, through the eye and above the ear opening, closing on the back of the head, forming a horseshoe shape. On the dorsal surface of the body there are four to seven transverse dark bands, and the intervals between these bands are usually less than the width of the dark bands themselves. Up to 11 transverse bands occur on the tail and the upper surface of the limbs have an indistinct dark pattern. Lastly, the ventral surface of the body is immaculate white.

Distribution and Subspecies. The range of the species consists of two isolated areas in Uzbekistan and Turkmenistan. Within Uzbekistan there are only two isolated populations in the Central Kizilqum Desert and in South Uzbekistan along the border of Afghanistan. Only a few specimens are known from Surkhandarya, from the Karasu riverbank near Termez.

Preferred Habitat. This species avoids saline areas and occurs on flat areas practically devoid of vegetation (takir). Deep cracks in the ground and insect holes serve as refuge. However, in the Uchquduk region it is found under small flat rocks on the slopes of low clay hills.

Ecology. *Diet* comprises small arthropods. *Activity*. These geckos are nocturnal, and leave their shelters at dusk, with a peak in activity between 22-23 hours. There is a sharp decline in activity after midnight. Like other members of the genus, *A. laevis* have acoustic communication. The territorial signal consists of a series of individual clicks, which can be restarted approximately up to 30 m.

Reproduction. The females lay eggs from late May to early July, possibly producing two or three clutches during the season, each consisting of one or two eggs. The first record of a juvenile, with body size is 1.5–2 cm, was observed on the beginning of August. Sexual maturity is probably reached at one year old.

Threatened Status. IUCN Red List Status - CR, URDB (2019) classifies the gecko as VU. Philip Bowles, chair of the IUCN Snake and Lizard Group (SLG) explained that *A. laevis* has been listed as CR on the IUCN Red List due to its population decline primarily within Turkmenistan. There appears to be a sharp downward trend and an increased focus of attention on this species is urgently needed to prevent its possible disappearance.

Known Threats and Conservation. The main threat to the southern even-fingered gecko is habitat loss, with over half its historical habitat having disappeared in the last 20 to 30 years. The species does not occur within any protected areas so the creation of a special reserve would be beneficial (Edge of Existence website) to this species but also all the others in the area. Recommended conservation actions include (i) creating of a special reserve in the southeast of Turkmenistan (IUCN Red List), (ii) developing methods to estimate the abundance for this secretive and nocturnal species and (iii) clarification of the taxonomic status of isolated populations (URDB).

Current Research. The natural history of *A. laevis* has been studied and described in several previous studies (Bogdanov,1968; Szczerbak and Golobev, 1986). Numerous specimens of this species were collected during 1960's to 1980's but were not assessed based on DNA analysis. Despite intensive survey efforts to update the taxonomy of *A. laevis* in recent years, only a few specimens of have been collected in Central Uzbekistan, which may be a result of decline in the population density, its elusive behavior, habitat destruction, or a combination of all of these issues. An international group of scientists from Uzbekistan, Russia, China and USA funded by National Geographic, conducted a joint study on the current status of several populations of the *A. laevis* in Central and South Uzbekistan. Dr. Roman Nazarov, an Uzbekistan-based herpetologist, is the coordinator of this scientific group and an invited expert of the SLG. Dr. Nazarov's results on the taxonomic and conservation status of *A. laevis* are in the process of being published. Preliminary genetic and anatomical data reveal that the population within Central Uzbekistan is a new species and deserves a critically endangered status.

2.3 Egyptian Vulture

The Egyptian Vulture (*Neophron percnopterus*) is listed as Endangered on the IUCN Red List, due to rapid decline proposed to be caused by secondary poisoning (after consumption of livestock carcasses treated with the veterinary drug diclofenac). However, general disturbance and habitat loss are also listed as threats of concern, along with the risk for power line electrocution and wind turbine collision.

It is a listed as a native breeder through much of Uzbekistan during the summer season. Although the migration strategy of the Egyptian Vulture differs between regions and sometimes between birds, the majority that breed in the project area can be expected to migrate southwards towards India or Africa to overwinter in warmer locales.

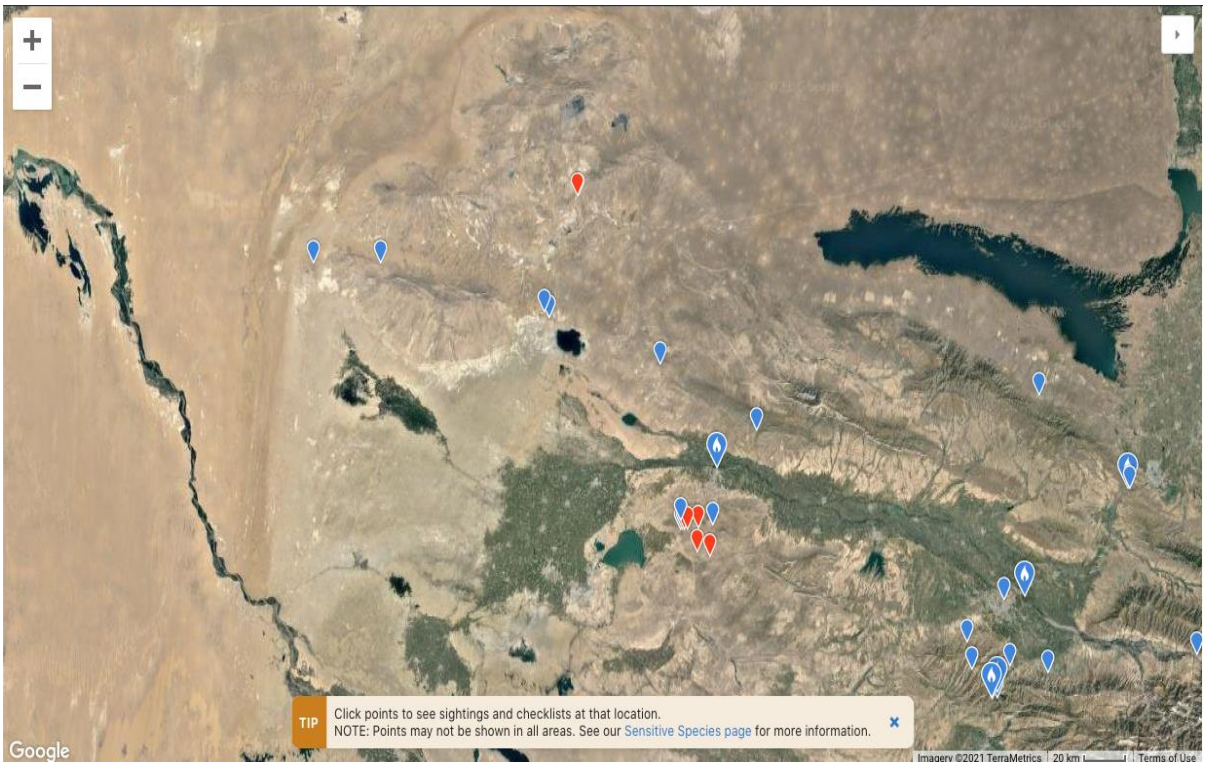
Preferred habitat includes lowland and montane regions over open, often arid, country, but this species also scavenges at human settlements.

The most recent estimate of the global population size is 18,000-57,000 individuals, roughly equivalent to 12,000-38,000 mature individuals.

This species has been recorded to occur within the area, both by citizen scientists as well as researchers. A total of 3-4 breeding pairs were found nesting in the adjacent cliffs in 2011.

The following map provides locations of sightings uploaded to *Ebird* by citizen scientists, documenting Egyptian Vulture in localities within 1km away from the project site.

Figure 2-14 Egyptian Vulture Ebird Records (Red and Blue)



2.3.1 Baseline Survey

2.3.1.1 Methods

2.3.1.1.1 Dzhankeldy Wind Farm

The Dzhankeldy WF site was comprehensively surveyed over one year (16 May 2020-20 May 2021) during all four seasons following the guidance of the Scottish Natural Heritage (SNH) guidelines (2017), which are currently the internationally accepted best-practice for onshore wind farm surveying and assessment.

A total of 10 Vantage Points (VPs) were surveyed to collect data on species, numbers, physical characteristics, and flight behaviour. The points are located so as to cover the project area as completely as possible (Figure 2-15).

The duration of survey at each vantage point was approximately 3 hours. During observations weather conditions such as wind speed and direction, and air temperature were recorded. Wind speed and air temperature were measured using an anemometer. Whenever possible, approximate flight altitude, speed, and flight direction of the birds were recorded every 15 seconds.

During the observations, photographing and short video shooting of the birds were carried out, which were used to confirm the correct species identification and obtain additional data on the number of individuals.

During the summer 2020, autumn 2020 and spring 2021 surveys Cliffs and ledges on the Northern sides of the Western Kuldzhuktau mountain range were examined for nests of large birds of prey to identify nesting species and collect data on their nesting ecology and behaviour.

Nest locations were recorded and mapped. During the survey optical devices such as binoculars and telescopes were used. Local residents and shepherds were interviewed for information on the presence of bird predator nests in the area. Due to the lack of large trees and shrubs, nesting birds in trees was excluded. Surveys were conducted both in the project area and in the surrounding area.

Figure 2-15 Vantage Points at Dzhankeldy Wind Farm Site

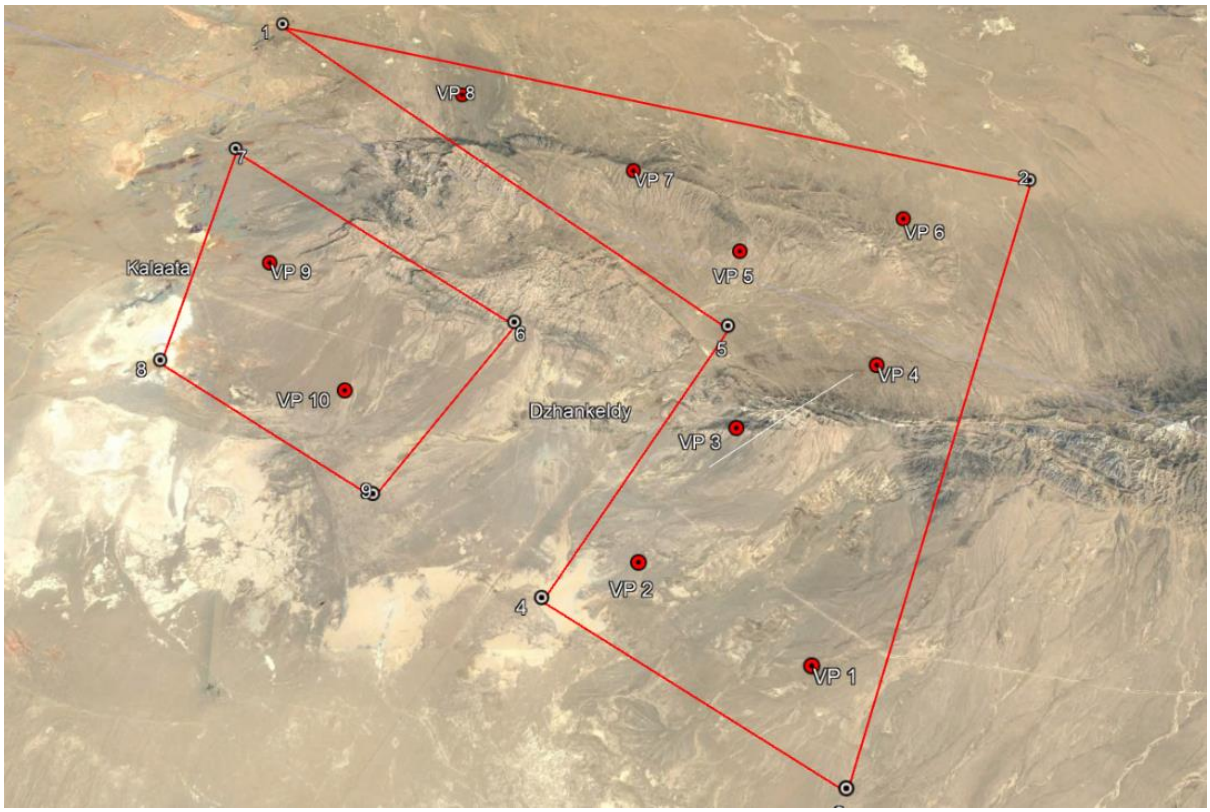


Figure 2-16 Nest Survey Routes during Summer

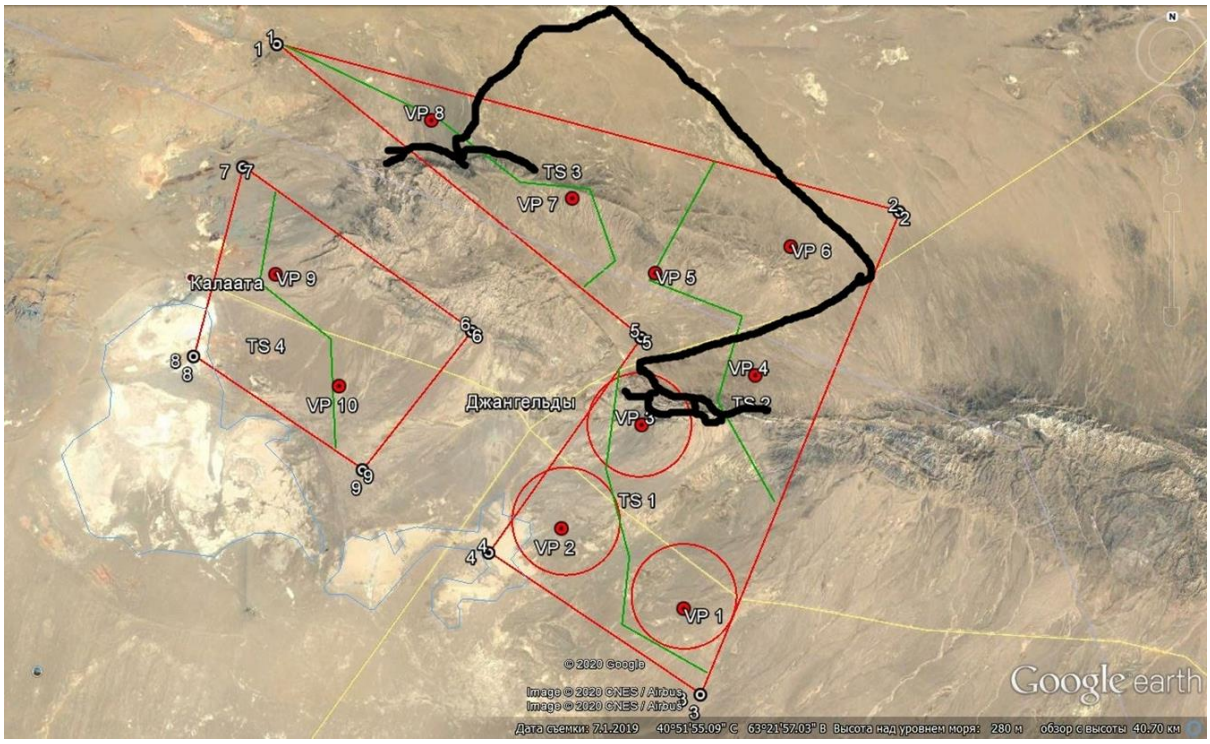
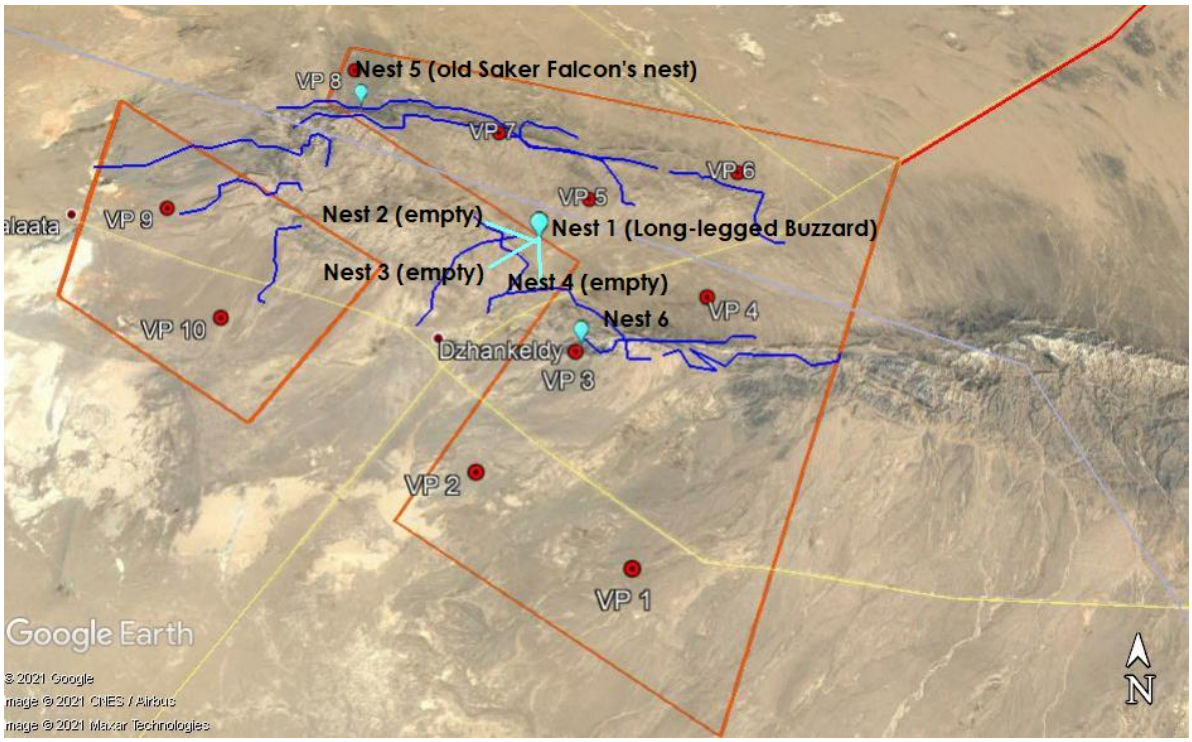


Figure 2-17 Nest Survey Routes during Spring



2.3.1.1.2 Dzhankeldy-Bash OHTL

The survey along the planned Dzhankeldy-Bash OHTL was carried out May and June 2021 at selected vantage points (VP). The points were places directly along the route of the transmission line or near it depending on the availability of access roads. The distance from the route in some places was generally not more than 1-2 km.

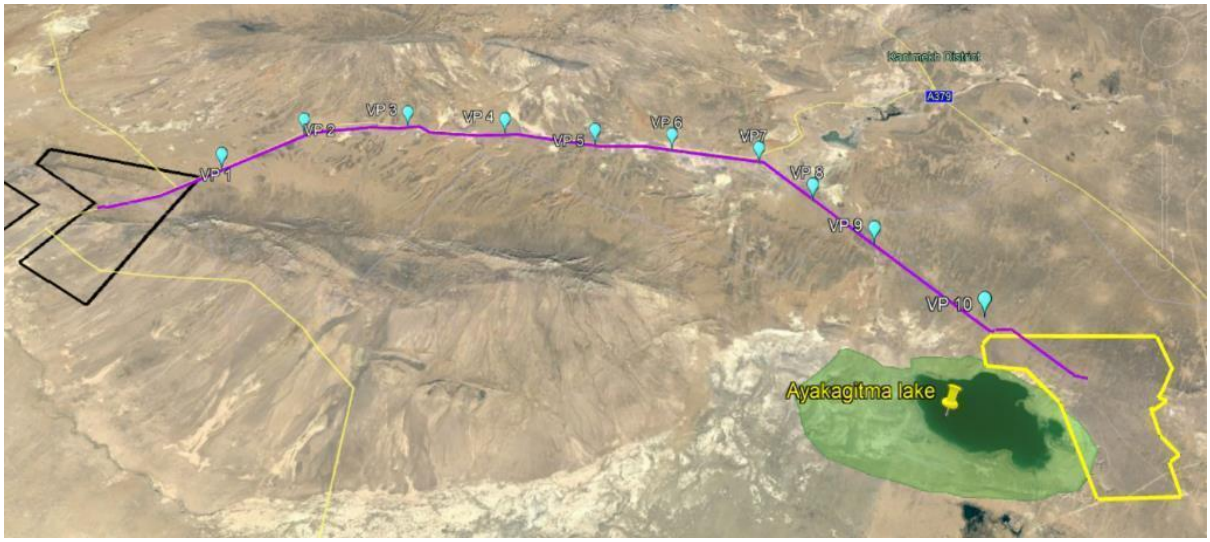
Given the homogenous landscape of the surveyed section, analogies were drawn between the surveyed area adjacent to the route and the route itself.

Visual observations of birds were made during the route survey. Bird sighting points were also marked using GPS. Bird species membership was determined visually using field binoculars with 8x magnification and Nikon and Fujifilm XT-20 digital cameras as well as audio recordings of bird voices (Xeno-canto Asia) and field bird identifiers (Mullarney, Svensson, Zetterstrom, Grant, 1999; Aye, Schweizer, Roth 2012).

Surveys were conducted at 11 selected points, in 1 km radius sections. Duration of observations was not less than 40 minutes at each vantage point. A survey of operating power lines within the project area was also carried out to assess bird mortality on operating OHTL.

Figure 2-18 Vantage points of the projected OHTL route in May 2021

Figure 2-19 Vantage points of the projected OHTL route in June 2021



Due to change of the route in June, the number of vantage points was reduced to 10.

2.3.1.2 Results

2.3.1.2.1 Dzhankeldy Wind Farm

Project surveys of the wind farm area recorded a total of 45 individuals over the course of one year. Peak sightings were seen in Summer 2020 with 31 individuals recorded. Most observations were made in June during this season (13) and the least in August (3). A single observation was made during the nest survey of this season.

12 sightings were made in Spring 2021 with 6 sightings each in April and May. Only one individual as recorded in Autumn 2020 in September and none during the winter survey 2020.

2.3.1.2.2 Dzhankeldy-Bash OHTL

The survey of the planned Dzhankeldy -Bash OHTL route recorded two individuals of this species in May and another two in June. The locations of the sightings, denoted as NP May and NP June, are marked in the map below.

Figure 2-20 Egyptian Vultures (NP) Sighted During the OHTL Survey

2.3.2 Stakeholder Engagement

As part of the CHA Stage 2 process, requests for information related to identified biodiversity aspects of concern were distributed to known experts in the field.

One such expert that was consulted as part of stakeholder engagement exercises is Anna Ten, expert ornithologist who conducted bird surveys in the area in 2011, 2018 and most recently in the summer of 2021.

Ten has observed Egyptian Vultures on all three survey efforts. Four breeding pairs were recorded in 2011. The ornithologists who conducted the bird surveys in 2020 shared photographic records of a nesting Egyptian vulture documented by Anna Ten in 2011 near Ayakagytma.

Sites surveyed in 2018 were Kuldzhuktau-Guzhumdy and Ayakagytma. The former lies in the cliffs east of the Dzhankeldy Wind Farm and the latter lies at the end of the Dzhankeldy-Bash OHTL route.

Though no breeding pairs were recorded in Kuldzhuktau-Guzhumdy. Four breeding pairs were sighted at Ayakagytma in 2018. This number increased to 5 during the 2021 survey she

conducted in the summer. The passages below are excerpted from the response received from Ten.

- Both territories (Kuldzhuktau and Ayakagitma), as well as the territory where the power line is planned, are of great importance for migratory bird species.
- The geographical location of Dzhankeldy between the western edge of the Kuldzhuktau ridge (at its highest point) and the Beltau rock formations create a kind of gateway for migrating species. Probably, all birds of predator, especially those that hunt during the flight, primarily harriers, buzzards, and falcons, will use the flight along the landscape depression.
- In turn, Ayakagitma is rich not only in birds of predator, but also in waterfowl and near-water birds. The air corridors along which waterfowl fly have not been studied.
- In 2018, we found 4 pairs of vultures. But in 2021, during a summer expedition, we recorded 5 pairs of vultures on IBA Ayakagytma, which indicates the global importance of this territory for the conservation of this species.

Figure 2-21 Records of Egyptian Vulture Sightings in the Project Area in 2018

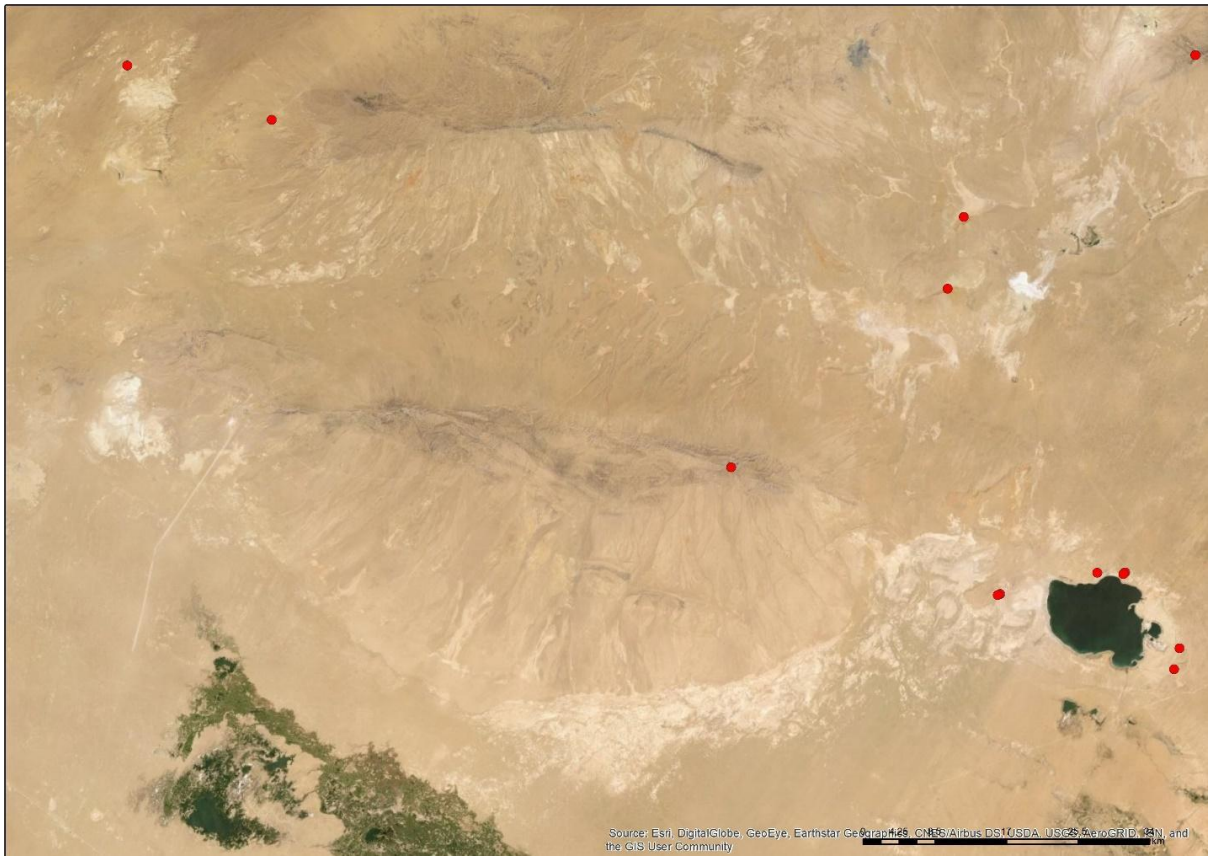
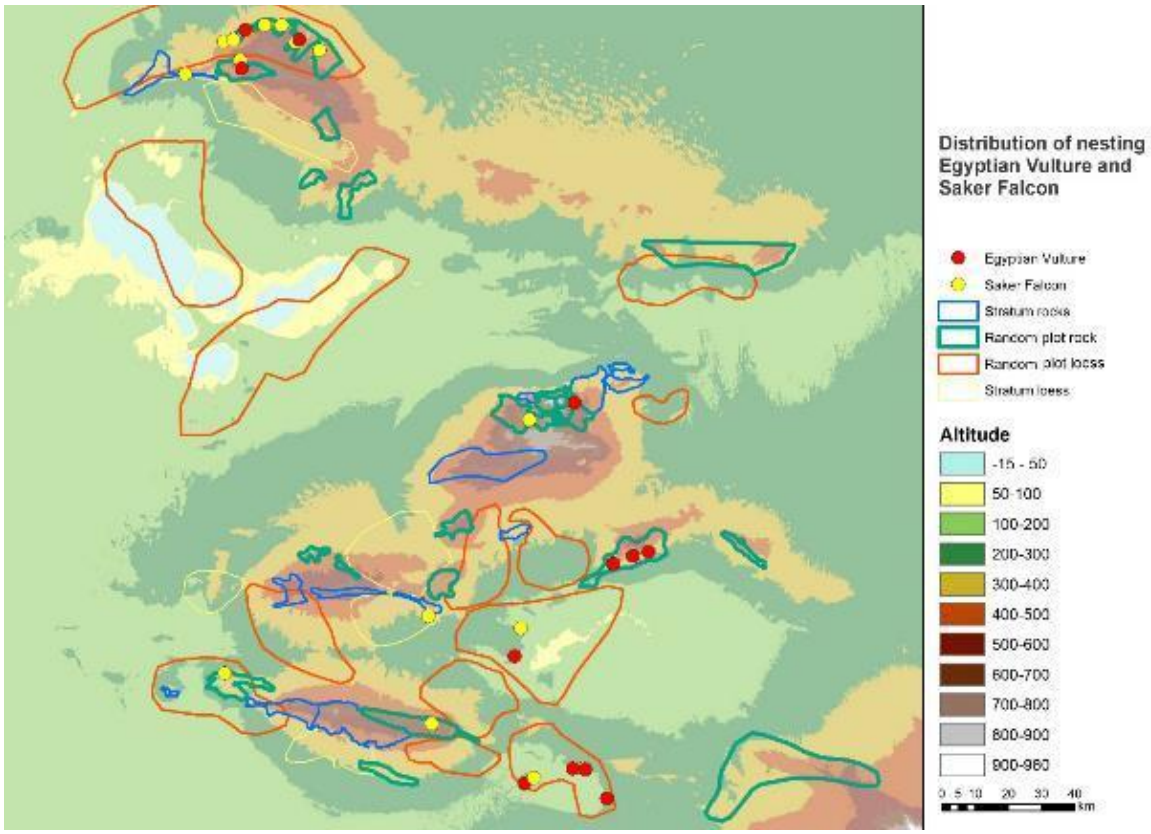


Figure 2-22 Distribution of Breeding Egyptian Vulture (Red) in the Project Area



Another expert ornithologist, Maxim Koshkin has also confirmed the presence of breeding Egyptian vultures at Ayakagytma, "These birds are known to be breeding in close proximity to the Bash site (and possibly Dzhankeldy)"."

Luiza Mardonova, from the State Committee of Uzbekistan on the Ecology and Environment, responsed to the request for information in kind, "Loess rocks bordering the Ayakagytma depression are good for nesting birds of prey; vulture, common kestrel, saker falcon, owl and other species that nest on the rocks."

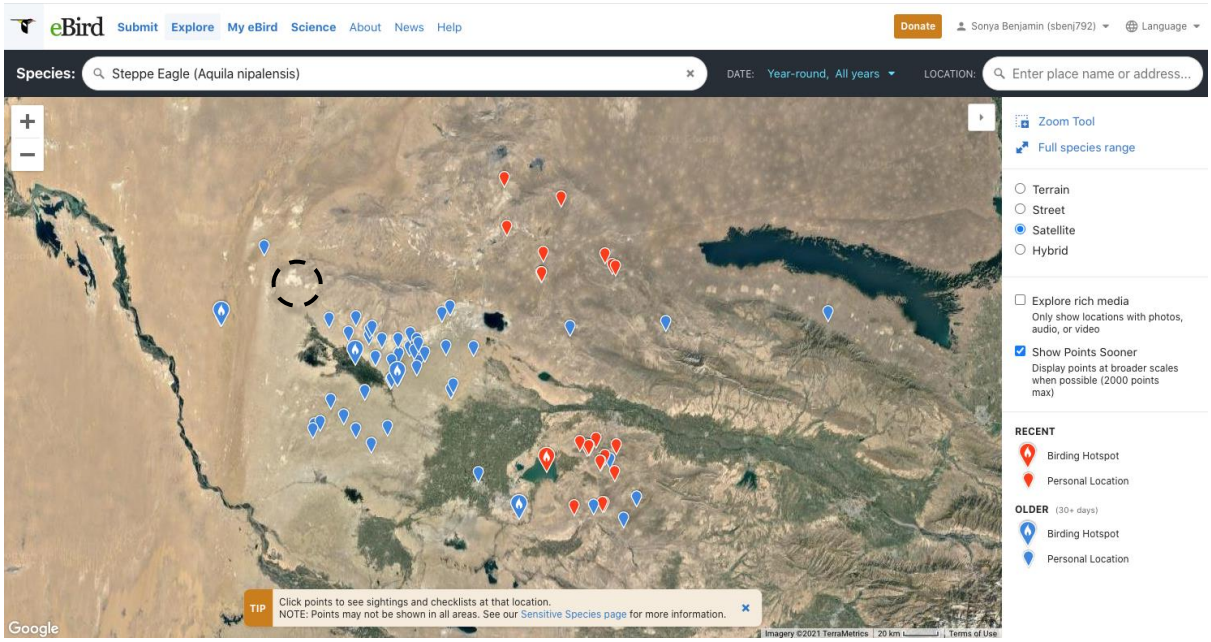
2.4 Steppe Eagle

The Steppe Eagle (*Aquila nipalensis)* is listed as Endangered on the IUCN Red List, due to rapid population decline across much of its global range.

It is a passage migrant through Uzbekistan, crossing southbound in the autumn months and returning northbound in the spring months to breed in the summer months. Migrants leave their breeding grounds between August and October/November, returning between January and May. It avoids sea crossings and thus forms large concentrations at bottleneck sites. The species is considered to be highly vulnerable to wind farms and power line impacts.

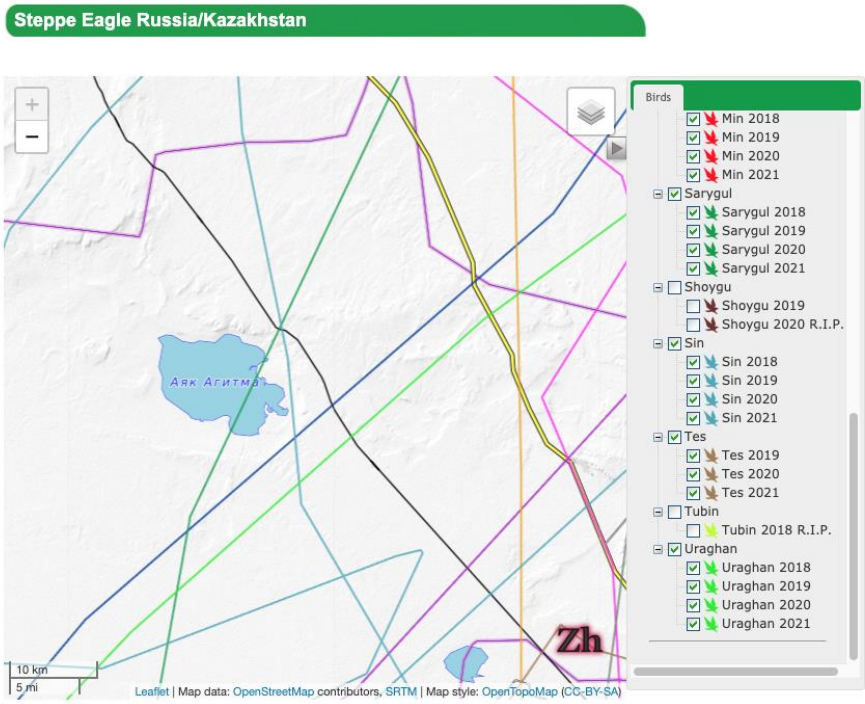
The global population is assumed to be below 37,000 pairs. Less than 10 individual migrants were recorded at the lake in 2008 and 2011. The following records are available on Ebird, documenting Steppe Eagle in localities within 15km away from the project site (dotted circle).

Figure 2-23 Steppe Eagle Ebird Records (Red and Blue) near the project site (dotted circle)



The map below showcases satellite tracking data on multiple individuals whose recorded flight paths were adjacent to or within the project's airspace.

Figure 2-24 Steppe Eagle Migration Flight Paths (near project area)



2.4.1 Baseline Survey

2.4.1.1 Methods

2.4.1.1.1 Dzhankeldy Wind Farm

The Dzhankeldy WF site was comprehensively surveyed over one year (16 May 2020-20 May 2021) during all four seasons following the guidance of the Scottish Natural Heritage (SNH) guidelines (2017), which are currently the internationally accepted best-practice for onshore wind farm surveying and assessment.

A total of 10 Vantage Points (VPs) were surveyed to collect data on species, numbers, physical characteristics, and flight behaviour. The points are located so as to cover the project area as completely as possible (Figure 2-26).

The duration of survey at each vantage point was approximately 3 hours. During observations weather conditions such as wind speed and direction, and air temperature were recorded. Wind speed and air temperature were measured using an anemometer. Whenever possible, approximate flight altitude, speed, and flight direction of the birds were recorded every 15 seconds.

During the observations, photographing and short video shooting of the birds were carried out, which were used to confirm the correct species identification and obtain additional data on the number of individuals.

During the summer 2020, autumn 2020 and spring 2021 surveys Cliffs and ledges on the Northern sides of the Western Kuldzhuktau mountain range were examined for nests of large birds of prey to identify nesting species and collect data on their nesting ecology and behaviour.

Nest locations were recorded and mapped. During the survey optical devices such as binoculars and telescopes were used. Local residents and shepherds were interviewed for information on the presence of bird predator nests in the area. Due to the lack of large trees and shrubs, nesting birds in trees was excluded. Surveys were conducted both in the project area and in the surrounding area.

Figure 2-25 Vantage Points at Dzhankeldy Wind Farm Site

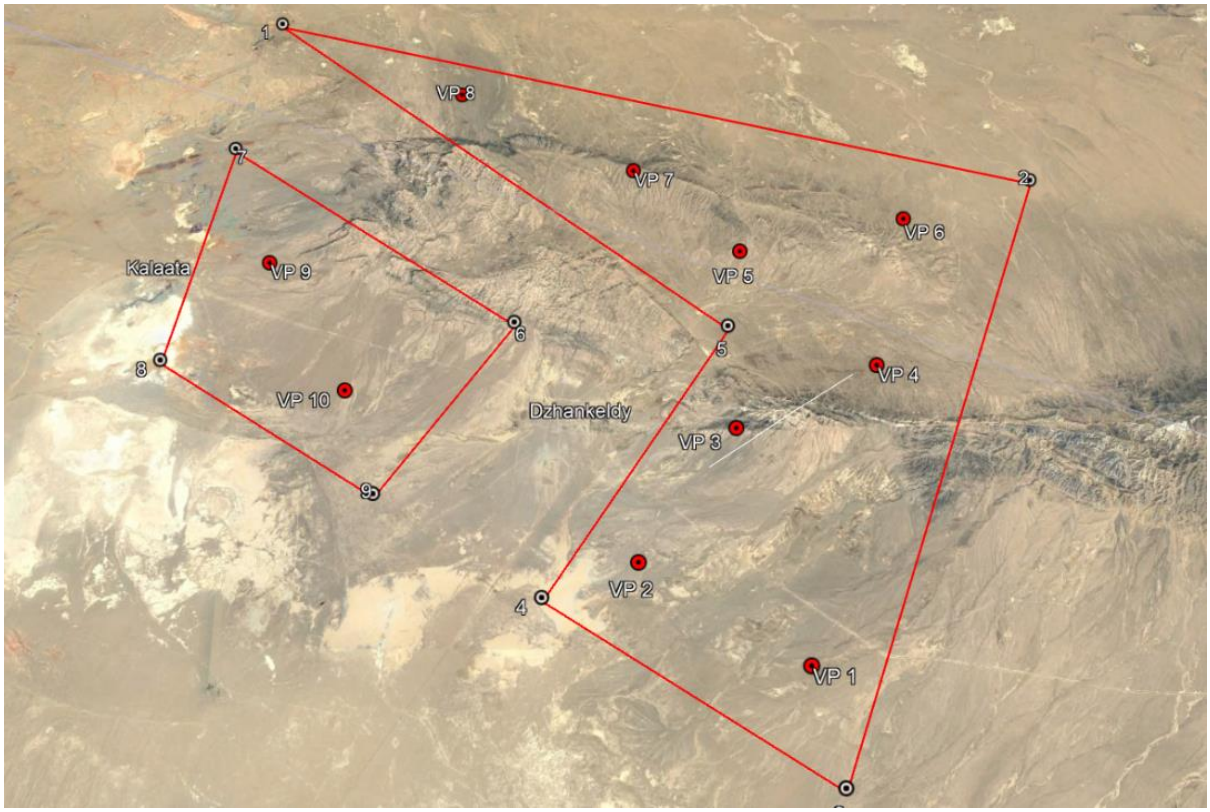


Figure 2-26 Nest Survey Routes during Summer

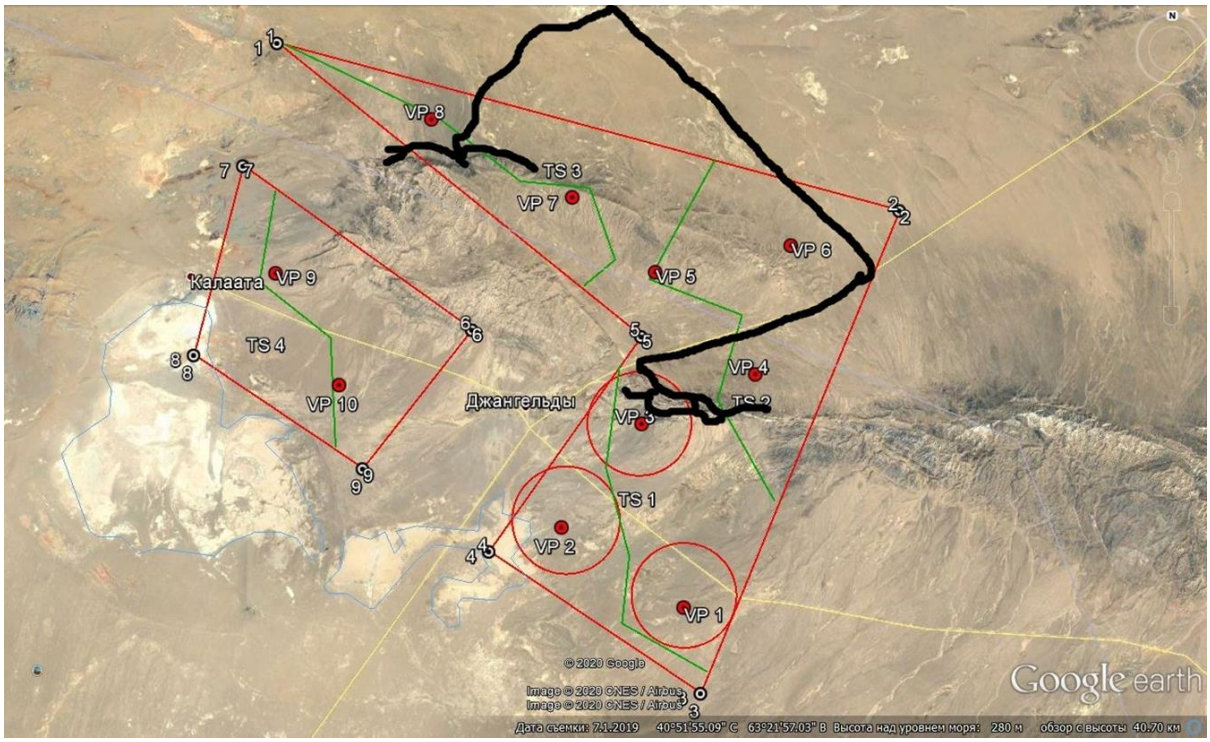
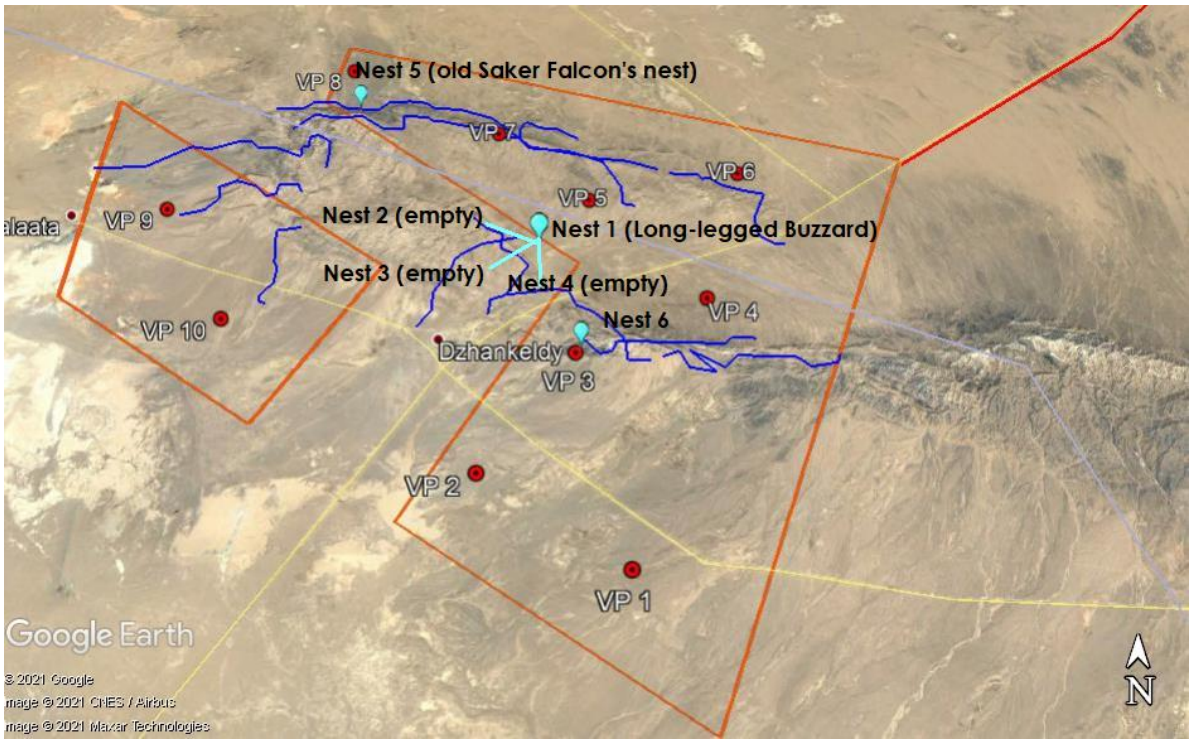


Figure 2-27 Nest Survey Routes during Spring



2.4.1.1.2 Dzhankeldy-Bash OHTL

The survey along the planned Dzhankeldy-Bash OHTL was carried out May and June 2021 at selected vantage points (VP). The points were places directly along the route of the transmission line or near it depending on the availability of access roads. The distance from the route in some places was generally not more than 1-2 km.

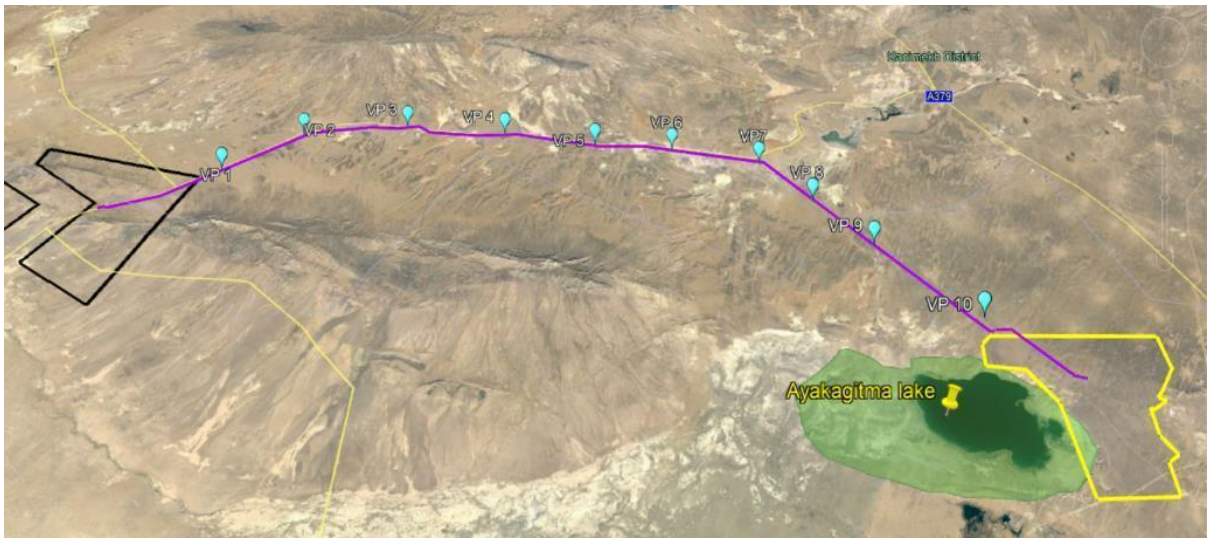
Given the homogenous landscape of the surveyed section, analogies were drawn between the surveyed area adjacent to the route and the route itself.

Visual observations of birds were made during the route survey. Bird sighting points were also marked using GPS. Bird species membership was determined visually using field binoculars with 8x magnification and Nikon and Fujifilm XT-20 digital cameras as well as audio recordings of bird voices (Xeno-canto Asia) and field bird identifiers (Mullarney, Svensson, Zetterstrom, Grant, 1999; Aye, Schweizer, Roth 2012).

Surveys were conducted at 11 selected points, in 1 km radius sections. Duration of observations was not less than 40 minutes at each vantage point. A survey of operating power lines within the project area was also carried out to assess bird mortality on operating OHTL.

Figure 2-28 Vantage points of the projected OHTL route in May 2021

Figure 2-29 Vantage points of the projected OHTL route in June 2021



Due to change of the route in June, the number of vantage points was reduced to 10.

2.4.1.2 Results

2.4.1.2.1 Dzhankeldy Wind Farm

The Steppe Eagle (*Aquila nipalensis*) was sighted throughout the survey period during all four seasons. The Autumn survey recorded the most sightings with 31 individuals. Peak activity was recorded in the month of September.

Summer and Winter surveys recorded 8 and 11 individuals respectively. The frequency of sightings troughed over Spring with only two individuals recorded during this period.

No nests of this species were recorded during the raptor nest surveys in the Kuldzhuktau mountain range.

2.4.1.2.2 Dzhankeldy-Bash OHTL

There were no recorded sightings of the Steppe Eagle during the OHTL surveys.

2.4.2 Stakeholder Engagement

As part of the stakeholder engagement exercises of the CHA Stage 2 process, requests for information related to conservation concerns of the Steppe eagle were distributed to known experts in the field.

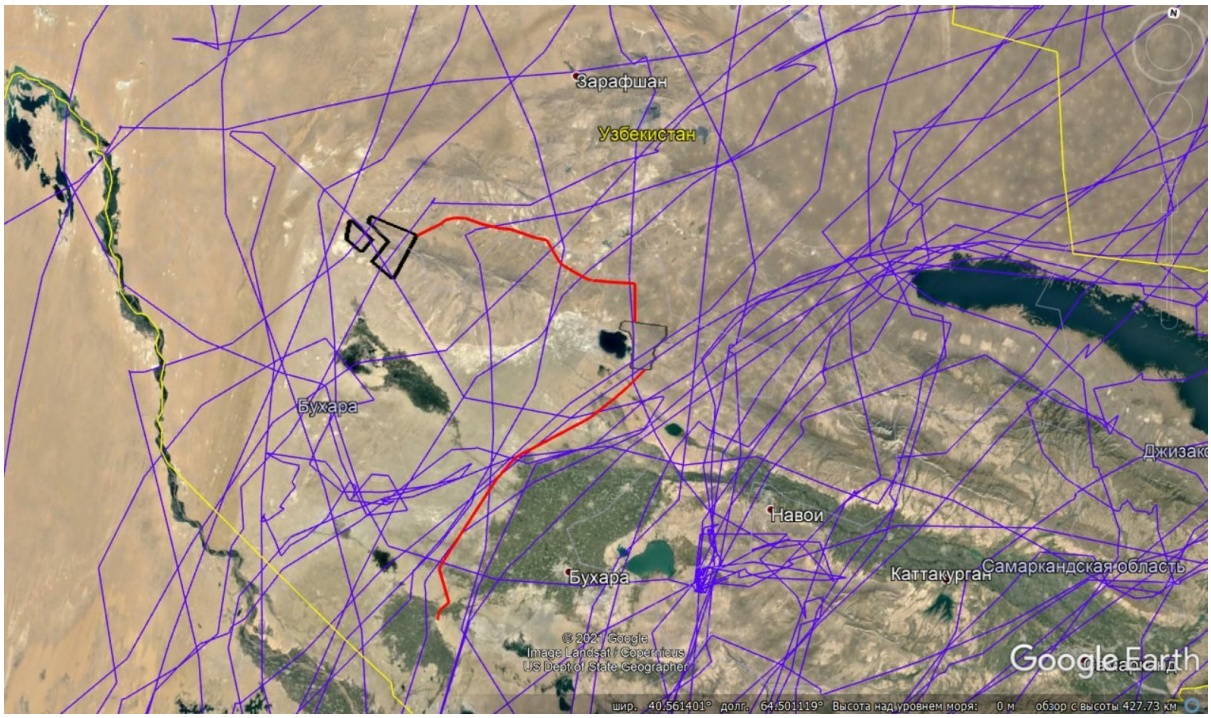
Anna Ten, expert ornithologist who conducted bird surveys in the project area in 2011, 2018 and most recently in the summer of 2021, has confirmed the presence of the Steppe eagle on the southern slopes of Kuldzhuktau.

Igor Koryakin, raptor expert from Russia who has tracked and studied the movement of Steppe eagles, their migration corridors, and nesting sites provided the map below which shows the movements of 14 satellite tracked Steppe Eagles with flight paths crossing through and near the wind farm site. Of the tracked eagles there are 4 flythroughs in Dzhankeldy and 5 over the OHTL route.

The passage below has been excerpted from the response received from him.

"The sites allocated for the wind farm are located in the western part of the eagle migration corridor, connecting nesting sites in Central and Eastern Kazakhstan, Western Mongolia and the Altai-Sayan region of Russia and wintering sites in Africa, the Arabian Peninsula, Iran and the Indu river."

Figure 2-30 Migration Routes of Satellite Tracked Steppe Eagles through the WF Site



The OHTL baseline survey provides an account of the historical data of Steppe Eagles deaths caused by power lines. The passage below is an excerpt from the survey.

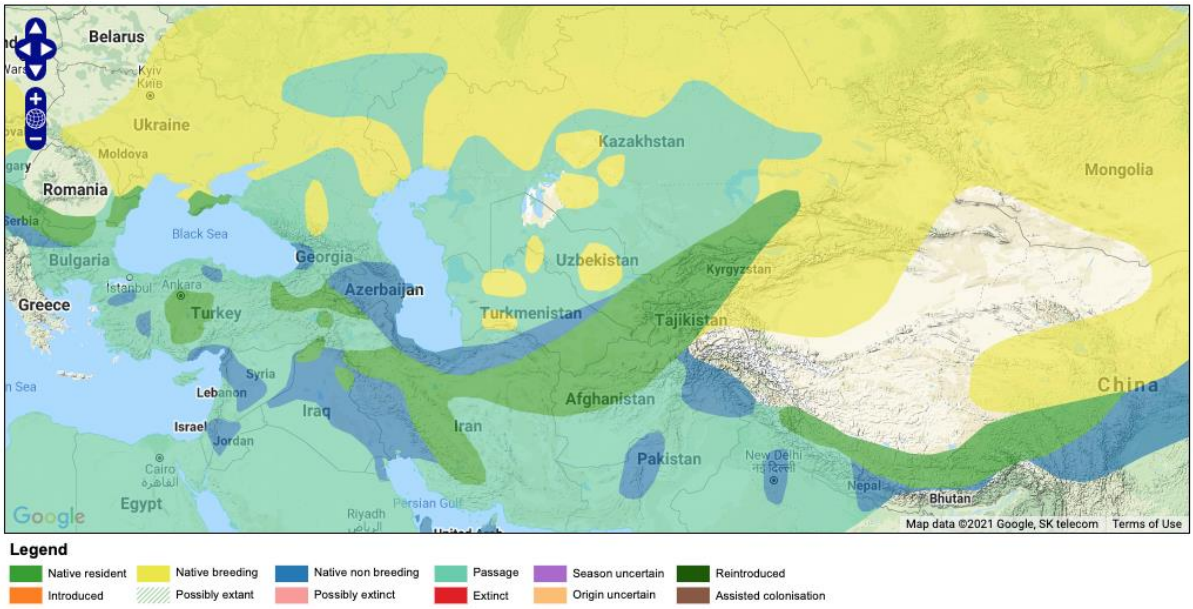
"In the central part of the Kyzylkum desert in September 2007, a Golden eagle, Steppe eagle, Griffon vulture and Houbara bustard were found dead from electrocution under the OHTL connected to the Navoi Mining and Metallurgical Plant (Kashkarov, 2007; IBA project newsletter in Uzbekistan, 2007). "

2.5 Saker Falcon

The Saker Falcon (*Falco cherrug*) is listed as Endangered on the IUCN Red List, due to a rapid population decline.

It is a potential summer breeder and sometime passage migrant through Uzbekistan, going southbound in the autumn months and returning northbound in the spring months to breed in the summer months. Migrant birds generally leave their breeding grounds in September and October, returning between February and May.

Figure 2-31 Saker Falcon Distribution



Saker Falcon hunts close to the ground in open terrain, combining rapid acceleration with high manoeuvrability, thus specialising on mid-sized diurnal terrestrial rodents (especially ground squirrels *Spermophilus*) of open grassy landscapes such as desert edge, semi-desert, steppes, agricultural and arid montane areas.

It uses copses or cliffs for nest sites and often occupies the old nests of other birds.

Major threats include:

- Collision and electrocution on power lines
- Decreased prey availability due to habitat loss
- Offtake for falconry

The global population is estimated at c.12,200-29,800 mature individuals.

2.5.1 Baseline Survey

2.5.1.1 Methods

2.5.1.1.1 Dzhankeldy Wind Farm

The Dzhankeldy WF site was comprehensively surveyed over one year (16 May 2020-20 May 2021) during all four seasons following the guidance of the Scottish Natural Heritage (SNH) guidelines (2017), which are currently the internationally accepted best-practice for onshore wind farm surveying and assessment.

A total of 10 Vantage Points (VPs) were surveyed to collect data on species, numbers, physical characteristics, and flight behaviour. The points are located so as to cover the project area as completely as possible (Figure 2-33).

The duration of survey at each vantage point was approximately 3 hours. During observations weather conditions such as wind speed and direction, and air temperature were recorded. Wind speed and air temperature were measured using an anemometer. Whenever possible, approximate flight altitude, speed, and flight direction of the birds were recorded every 15 seconds.

During the observations, photographing and short video shooting of the birds were carried out, which were used to confirm the correct species identification and obtain additional data on the number of individuals.

During the summer 2020, autumn 2020 and spring 2021 surveys Cliffs and ledges on the Northern sides of the Western Kuldzhuktau mountain range were examined for nests of large birds of prey to identify nesting species and collect data on their nesting ecology and behaviour.

Nest locations were recorded and mapped. During the survey optical devices such as binoculars and telescopes were used. Local residents and shepherds were interviewed for information on the presence of bird predator nests in the area. Due to the lack of large trees and shrubs, nesting birds in trees was excluded. Surveys were conducted both in the project area and in the surrounding area.

Figure 2-32 Vantage Points at Dzhankeldy Wind Farm Site

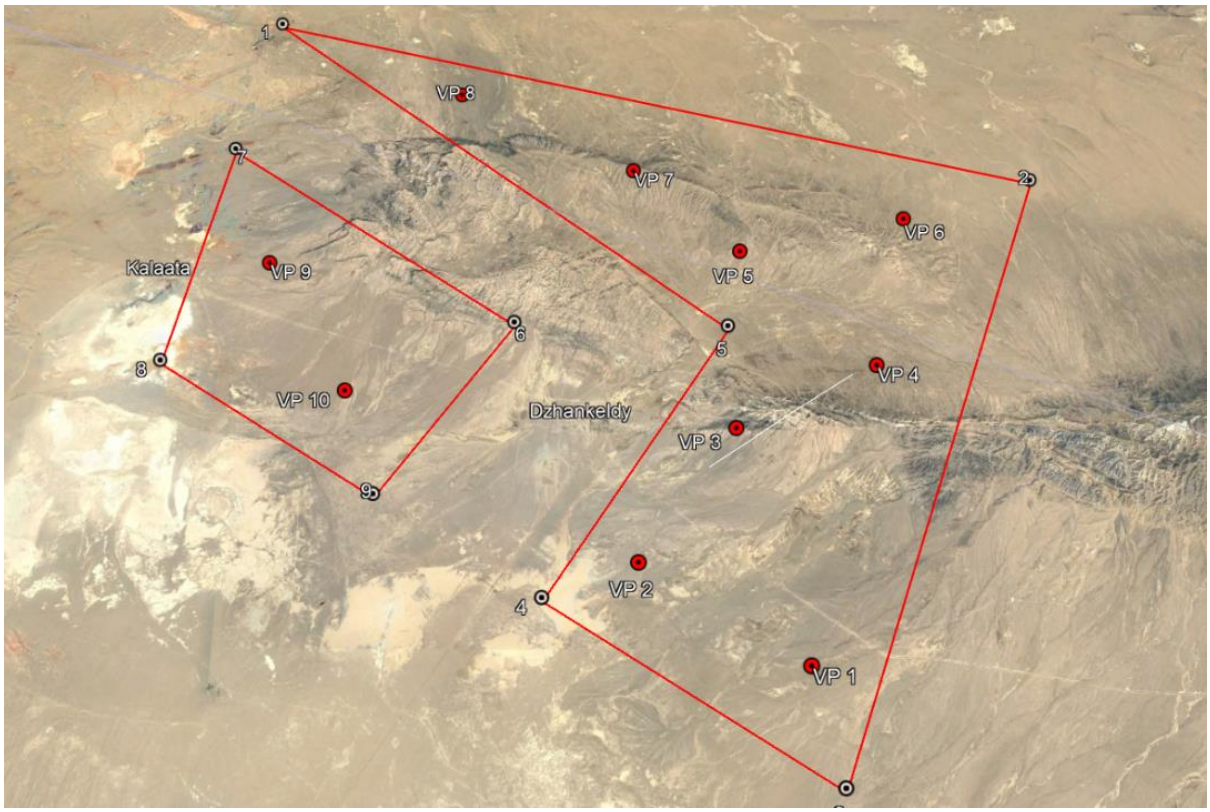


Figure 2-33 Nest Survey Routes during Summer

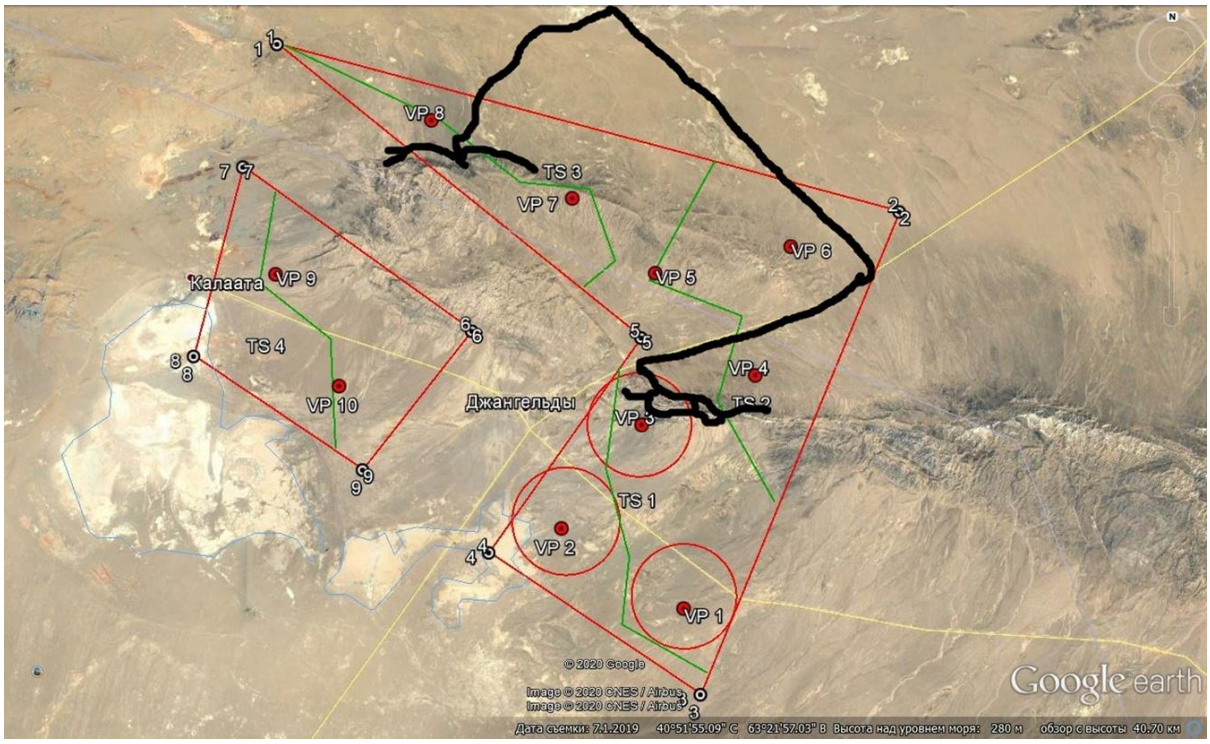
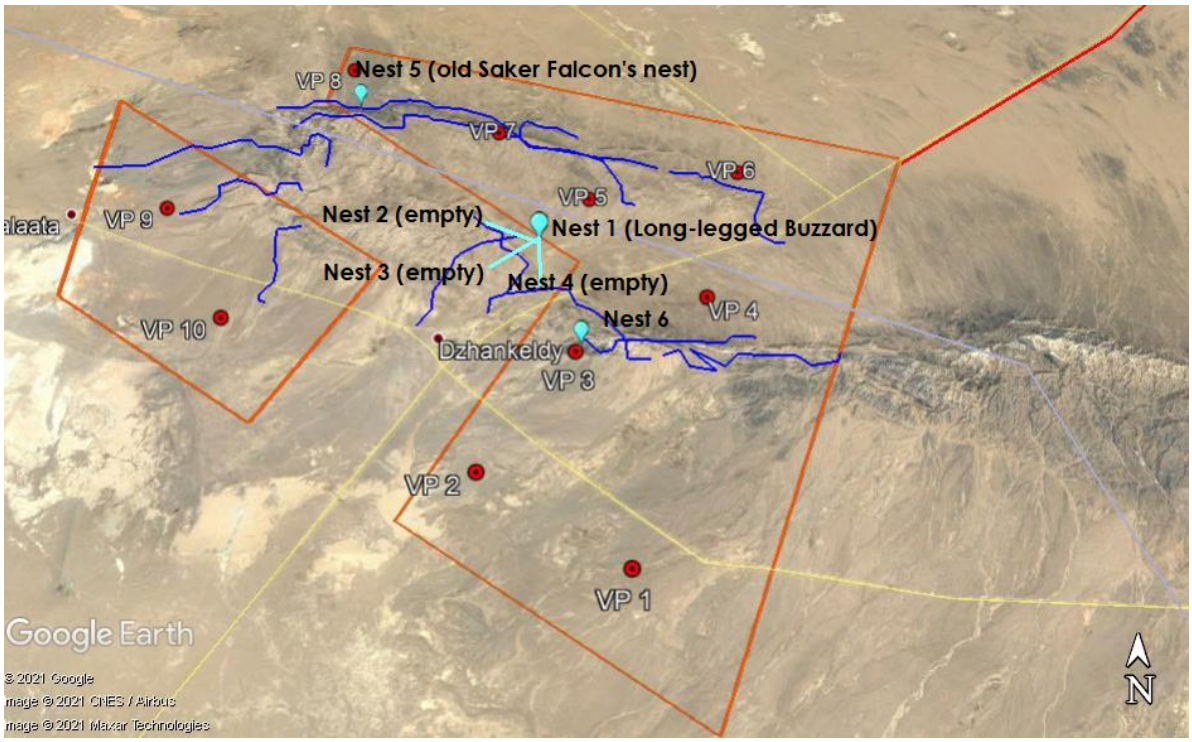


Figure 2-34 Nest Survey Routes during Spring



2.5.1.1.2 Dzhankeldy-Bash OHTL

The survey along the planned Dzhankeldy-Bash OHTL was carried out May and June 2021 at selected vantage points (VP). The points were places directly along the route of the transmission line or near it depending on the availability of access roads. The distance from the route in some places was generally not more than 1-2 km.

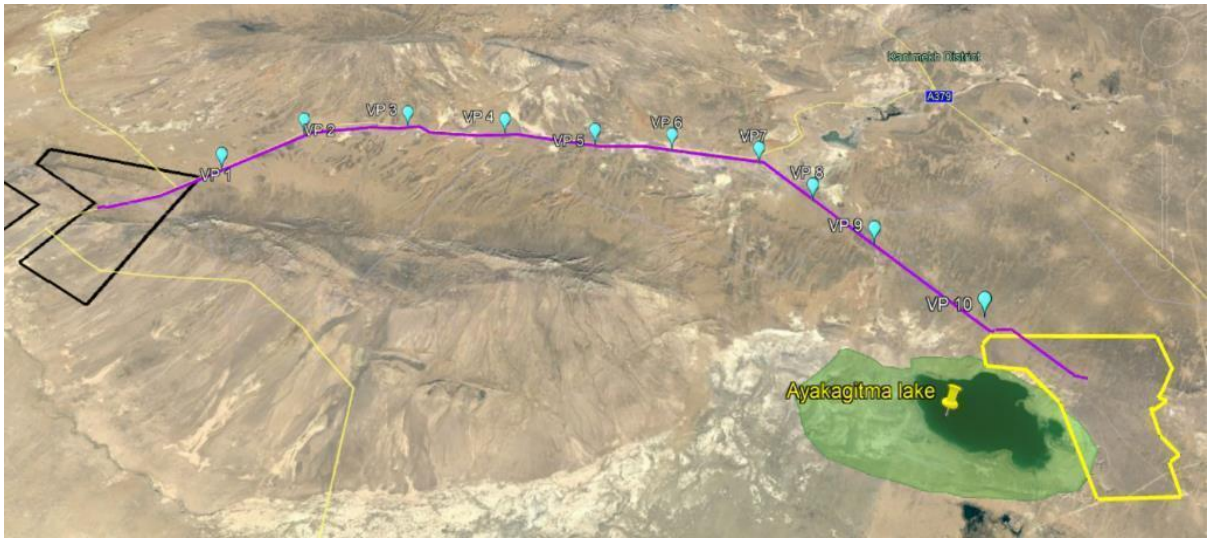
Given the homogenous landscape of the surveyed section, analogies were drawn between the surveyed area adjacent to the route and the route itself.

Visual observations of birds were made during the route survey. Bird sighting points were also marked using GPS. Bird species membership was determined visually using field binoculars with 8x magnification and Nikon and Fujifilm XT-20 digital cameras as well as audio recordings of bird voices (Xeno-canto Asia) and field bird identifiers (Mullarney, Svensson, Zetterstrom, Grant, 1999; Aye, Schweizer, Roth 2012).

Surveys were conducted at 11 selected points, in 1 km radius sections. Duration of observations was not less than 40 minutes at each vantage point. A survey of operating power lines within the project area was also carried out to assess bird mortality on operating OHTL.

Figure 2-35 Vantage points of the projected OHTL route in May 2021

Figure 2-36 Vantage points of the projected OHTL route in June 2021



Due to change of the route in June, the number of vantage points was reduced to 10.

2.5.1.2 Results

2.5.1.2.1 Dzhankeldy Wind Farm

There were no recorded sightings of the Saker Falcon during the baseline surveys.

2.5.1.2.2 Dzhankeldy-Bash OHTL

There were no recorded sightings of the Saker Falcon during the OHTL surveys.

2.5.2 Stakeholder Engagement

Anna Ten, expert ornithologist who was consulted as part of stakeholder engagement exercises conducted bird surveys in the area in 2011, 2018 and most recently in the summer of 2021.

In the 2018 survey, 3 nesting pairs were identified. The map below shows the location of Saker falcon sightings near the lake and its wider area. During Spring baseline survey 2021, one the nesting sites near VP 8 was visited by the ornithologist. The nest was unoccupied and unused.

Her paper, 'Akpetky lakes, Sarykamysh lake, Ayakaghytma lake, and their desert surrounds: three new Important Bird Areas in Uzbekistan' published in 2012 provides a record of one nesting pair and its nest in the loess cliffs bordering the Lake Ayakagytma

Figure 2-37 Saker falcon sightings in 2018 (image courtesy of Anna Ten)

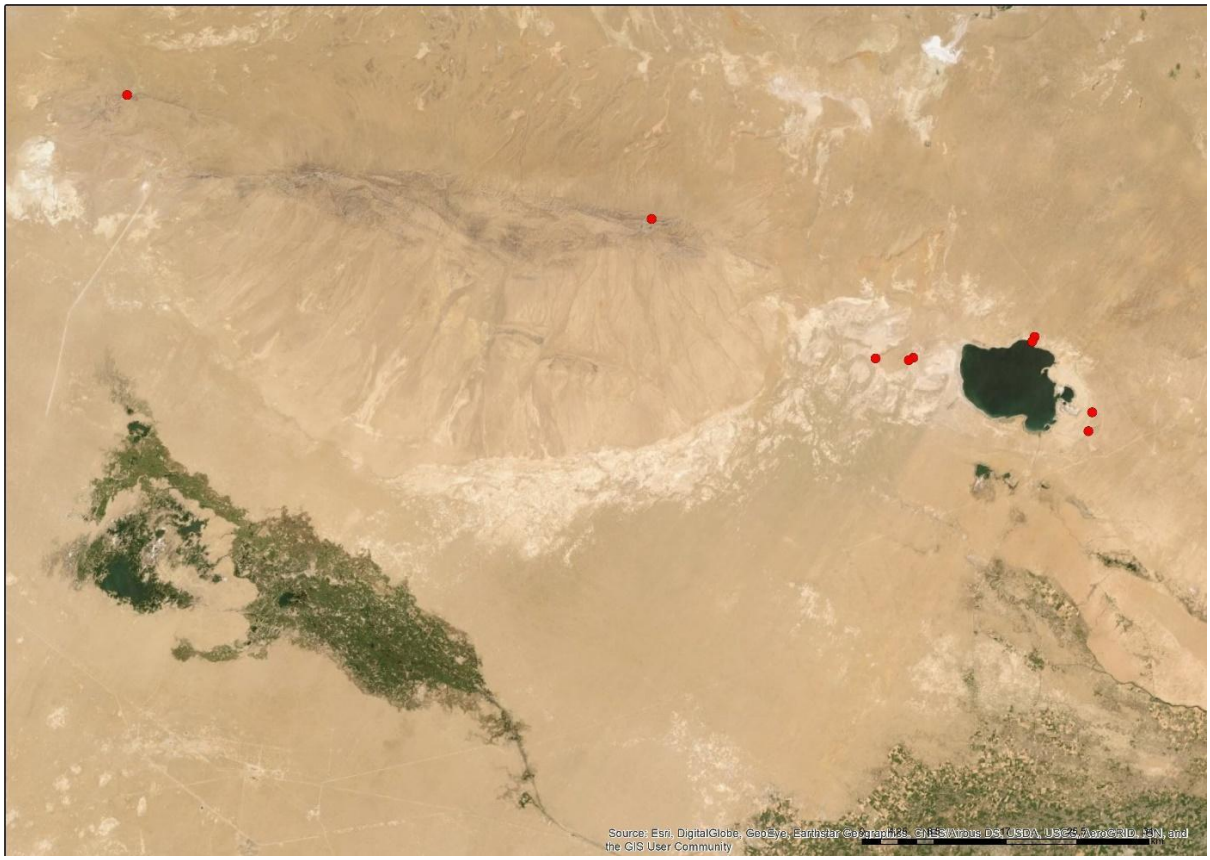


Figure 2-38 Distribution of Breeding Saker Falcons (Yellow) in the Project Area

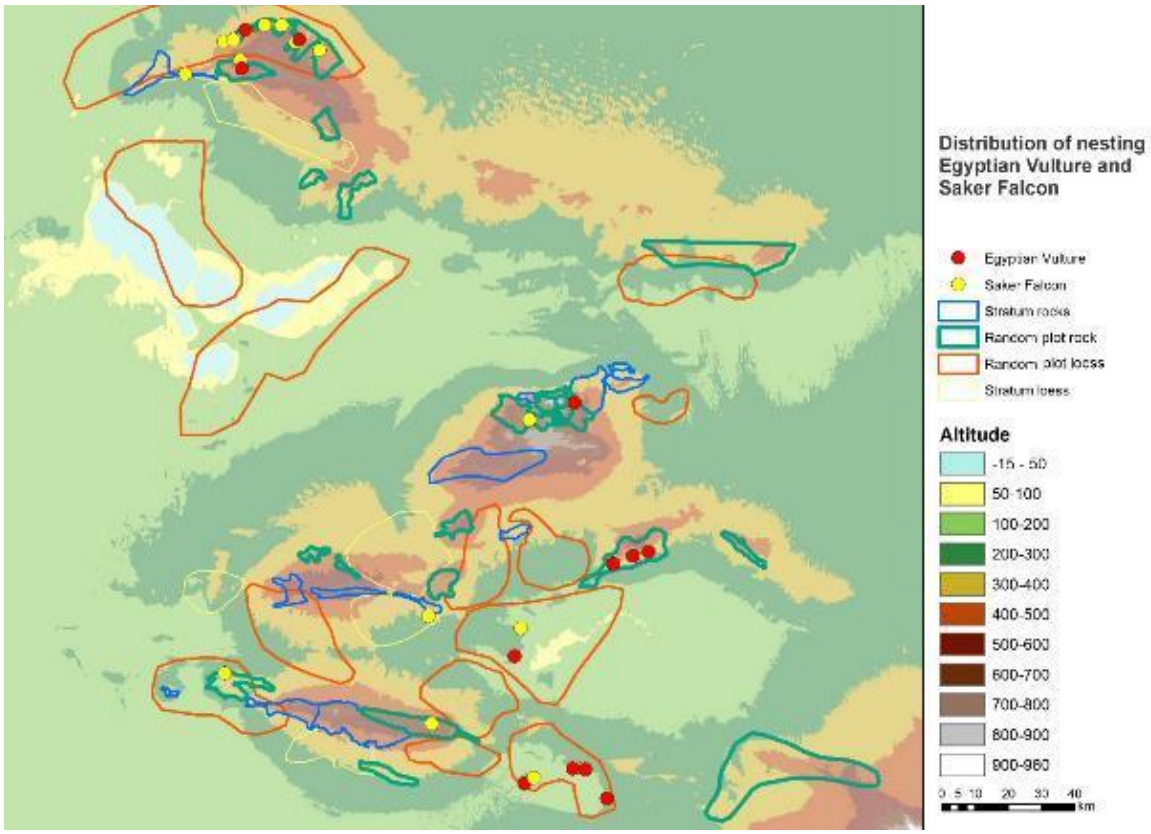


Figure 2-39 Saker falcon sighting in the cliffs near Ayakagytma (2011)

Figure 2-40 Saker falcon nest in the cliffs near Ayakagytma (2011)

Another expert ornithologist, Maxim Koshkin was consulted as part of the stakeholder engagement exercises. In his response he confirmed the presence of breeding Saker falcons in the Kyzulkum.

- "This species is known to breed and migrate through Kyzylkum and there is a potential threat for some migrants to be electrocuted on power lines or hit by turbine rotors"

The OHTL baseline survey provides an account of the historical data of Saker Falcon nests on OHTL towers. The passage below is an excerpt from the survey.

"One of the features of modern bird ecology is their adaptation to nesting on OHTL towers. …Researches of O. Mitropolsky, E. Fotteler and G. Tretiakov (1987) established nesting of Golden eagle and Saker falcon on OHTL in Kyzylkum, which allowed these species to expand their breeding ground deep into the desert. According to Zinoviev S. estimate (1990), up to 40% of nests of the Golden Eagle and 33% of nests of the Saker Falcon were located in the Kyzylkum Desert on OHTLs."

2.6 Pallas's Fish Eagle

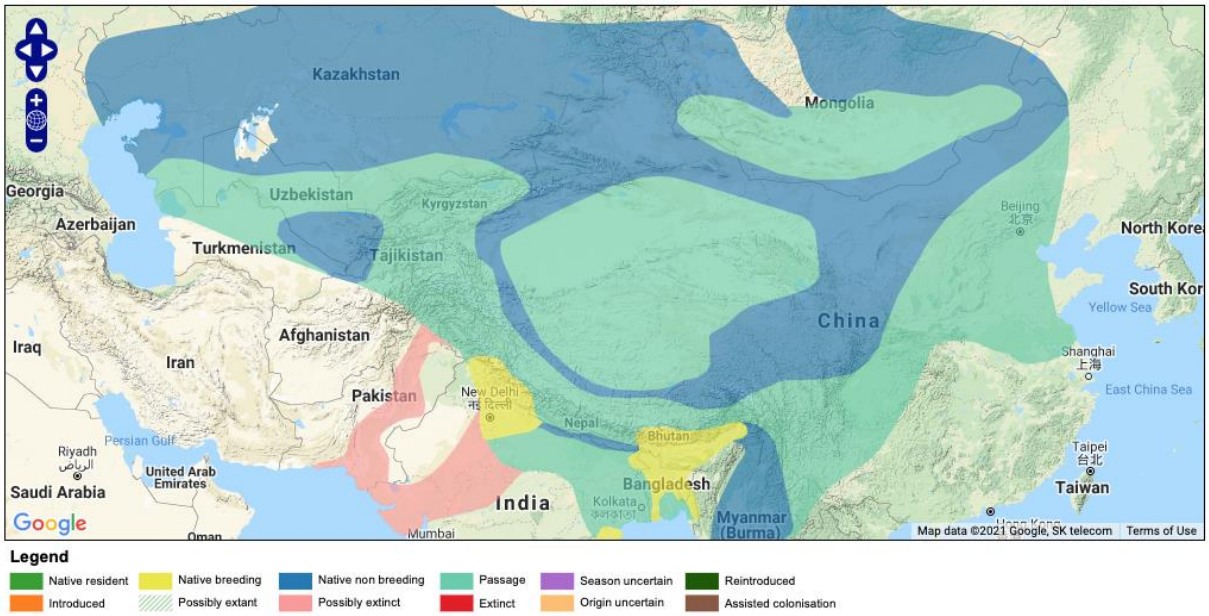
The Pallas's Fish-eagle (*Haliaeetus leucoryphus*) is listed as Endangered on the IUCN Red List, due to a small, declining population as a result of the widespread loss, degradation and disturbance of wetlands and breeding sites throughout its range.

It is a passage migrant and summer visitor through Uzbekistan, crossing southbound in the autumn months and returning northbound in the spring months. Breeding takes place from August-February in India, Myanmar and Bangladesh.

Global population is placed in the band of 1,000–2,499 mature individuals, which is considered to consist of a single migratory population.

This species was recorded in 2012 to be present in Dengizkul Lake, 160km to the south of the project area. No other records exist in the public literature for the project region.

Figure 2-41 Pallas's Fish Eagle distribution



2.6.1 Baseline Survey

2.6.1.1 Methods

2.6.1.1.1 Dzhankeldy Wind Farm

The Dzhankeldy WF site was comprehensively surveyed over one year (16 May 2020-20 May 2021) during all four seasons following the guidance of the Scottish Natural Heritage (SNH)

guidelines (2017), which are currently the internationally accepted best-practice for onshore wind farm surveying and assessment.

A total of 10 Vantage Points (VPs) were surveyed to collect data on species, numbers, physical characteristics, and flight behaviour. The points are located so as to cover the project area as completely as possible (Figure 2-43).

The duration of survey at each vantage point was approximately 3 hours. During observations weather conditions such as wind speed and direction, and air temperature were recorded. Wind speed and air temperature were measured using an anemometer. Whenever possible, approximate flight altitude, speed, and flight direction of the birds were recorded every 15 seconds.

During the observations, photographing and short video shooting of the birds were carried out, which were used to confirm the correct species identification and obtain additional data on the number of individuals.

During the Summer 2020, Autumn 2020 and Spring 2021 surveys cliffs and ledges on the Northern sides of the Western Kuldzhuktau mountain range were examined for nests of large birds of prey to identify nesting species and collect data on their nesting ecology and behaviour.

Nest locations were recorded and mapped. During the survey optical devices such as binoculars and telescopes were used. Local residents and shepherds were interviewed for information on the presence of bird predator nests in the area. Due to the lack of large trees and shrubs, nesting birds in trees was excluded. Surveys were conducted both in the project area and in the surrounding area.

Figure 2-42 Vantage Points at Dzhankeldy Wind Farm Site

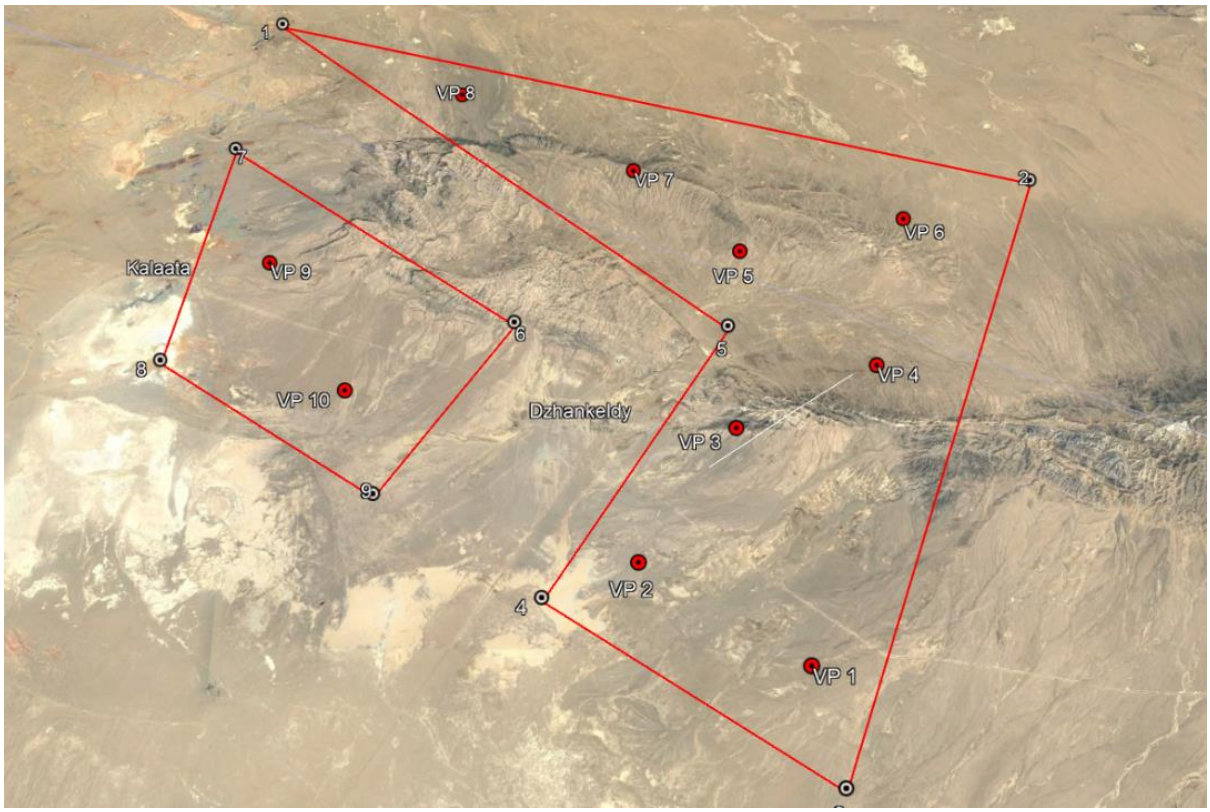


Figure 2-43 Nest Survey Routes during Summer

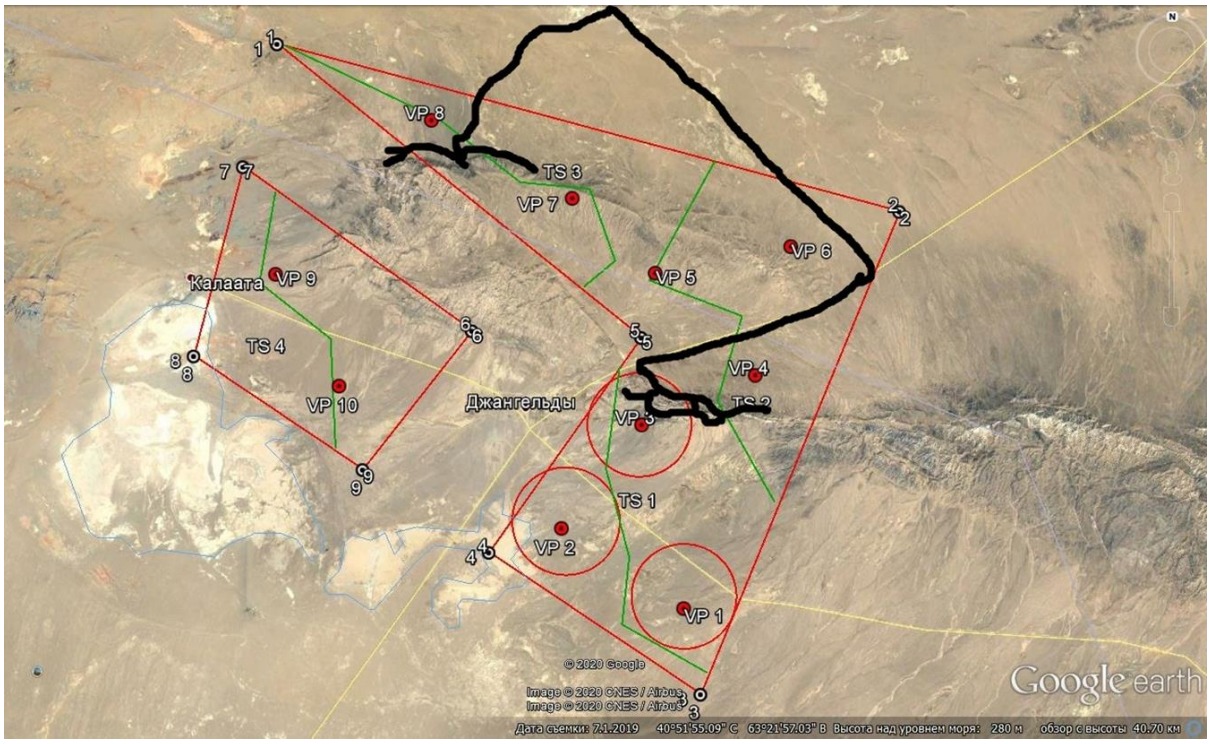
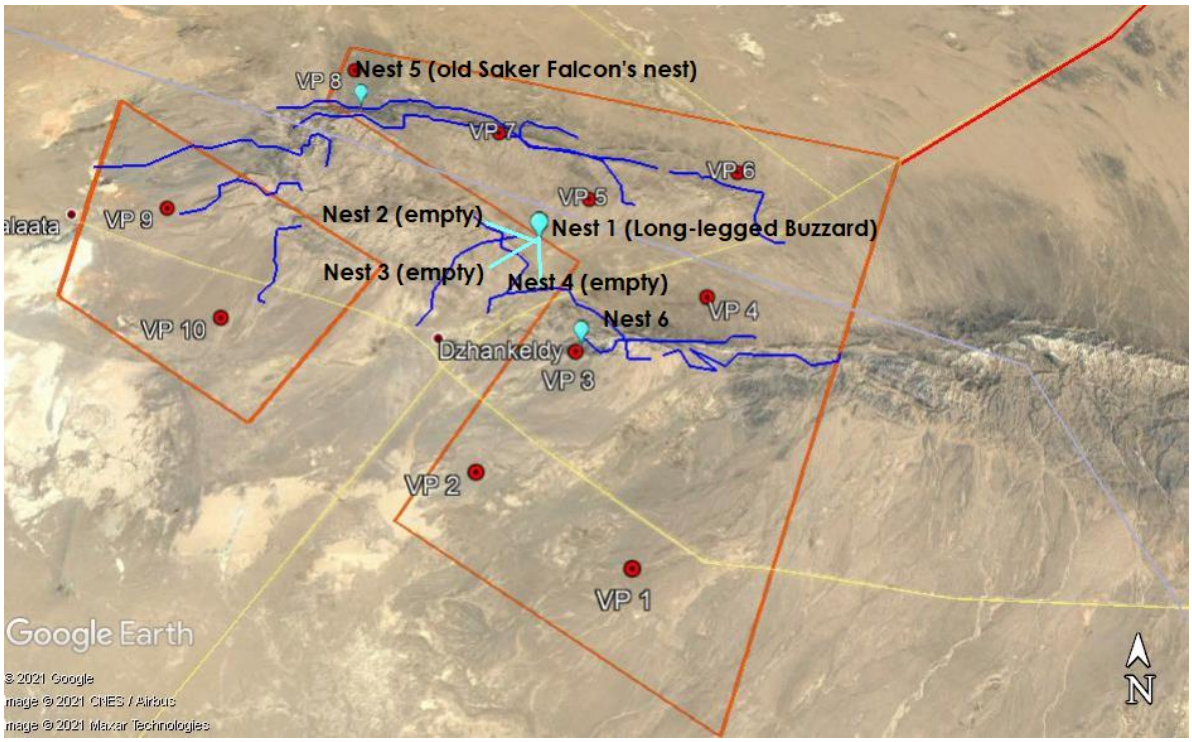


Figure 2-44 Nest Survey Routes during Spring



2.6.1.1.2 Dzhankeldy-Bash OHTL

The survey along the planned Dzhankeldy-Bash OHTL was carried out May and June 2021 at selected vantage points (VP). The points were places directly along the route of the transmission line or near it depending on the availability of access roads. The distance from the route in some places was generally not more than 1-2 km.

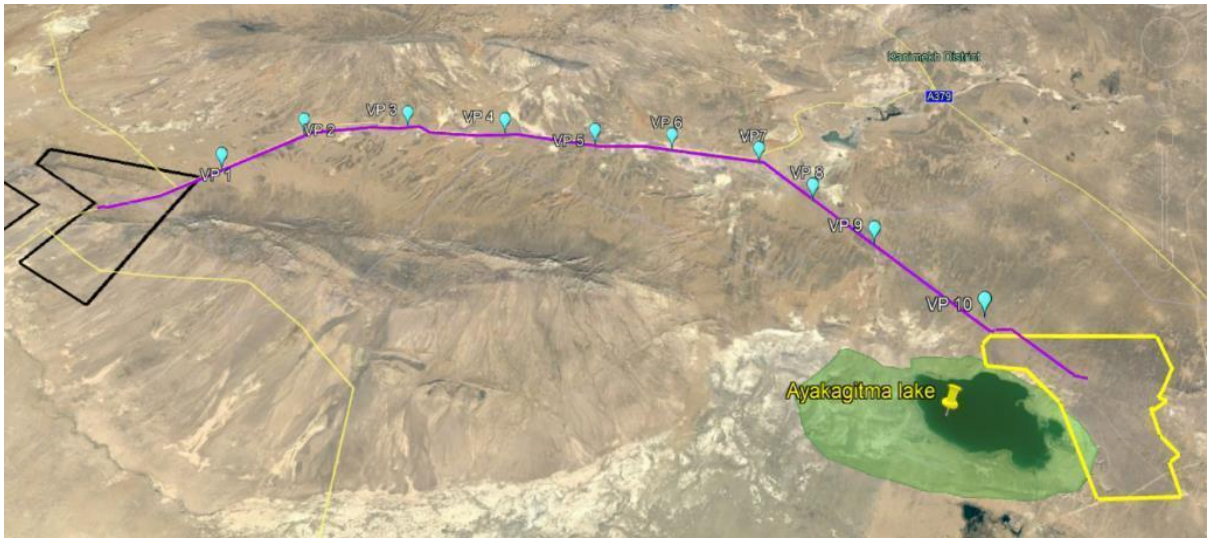
Given the homogenous landscape of the surveyed section, analogies were drawn between the surveyed area adjacent to the route and the route itself.

Visual observations of birds were made during the route survey. Bird sighting points were also marked using GPS. Bird species membership was determined visually using field binoculars with 8x magnification and Nikon and Fujifilm XT-20 digital cameras as well as audio recordings of bird voices (Xeno-canto Asia) and field bird identifiers (Mullarney, Svensson, Zetterstrom, Grant, 1999; Aye, Schweizer, Roth 2012).

Surveys were conducted at 11 selected points, in 1 km radius sections. Duration of observations was not less than 40 minutes at each vantage point. A survey of operating power lines within the project area was also carried out to assess bird mortality on operating OHTL.

Figure 2-45 Vantage points of the projected OHTL route in May 2021

Figure 2-46 Vantage points of the projected OHTL route in June 2021



Due to change of the route in June, the number of vantage points was reduced to 10.

2.6.1.2 Results

2.6.1.2.1 Dzhankeldy Wind Farm

There were no recorded sightings of this species during the baseline surveys.

2.6.1.2.2 Dzhankeldy-Bash OHTL

There were no recorded sightings of the species during the OHTL surveys.

2.6.2 Stakeholder Engagement

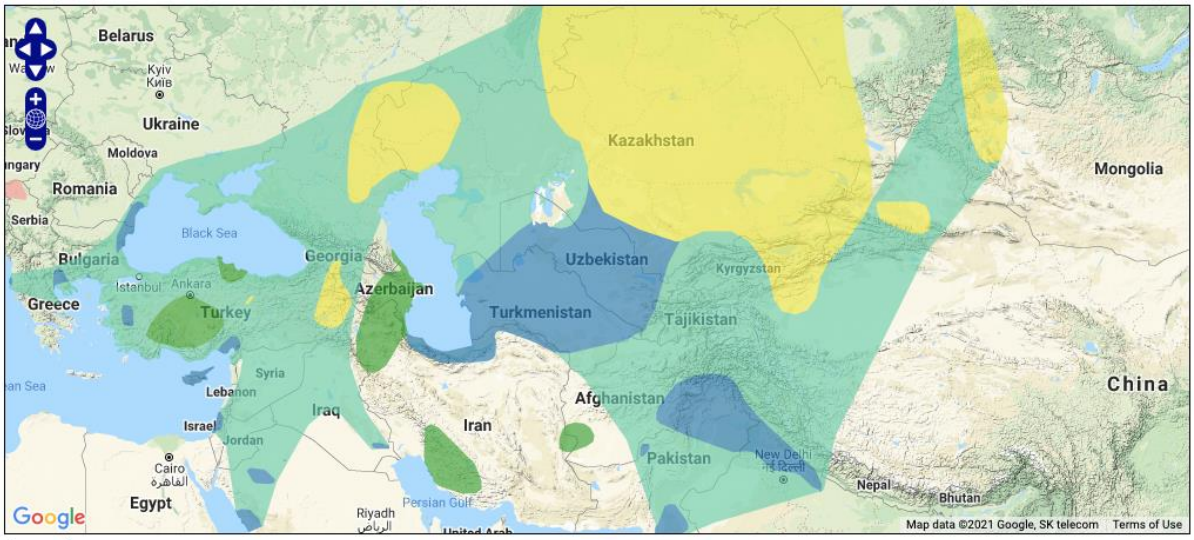
No known occurrence of the Pallas's Fish Eagle has been recorded by stakeholders within the project area of influence.

2.7 White-headed Duck

The White-headed Duck (*Oxyura leucocephala*) is listed as Endangered on the IUCN Red List, due to suspected population decline.

It is a passage migrant and potential winter visitor in Uzbekistan. It begins the migration to its wintering grounds in late August and generally arrives September-October. Birds depart in February and arrive back in the breeding range by early May.

Figure 2-47 White-headed Duck Distribution

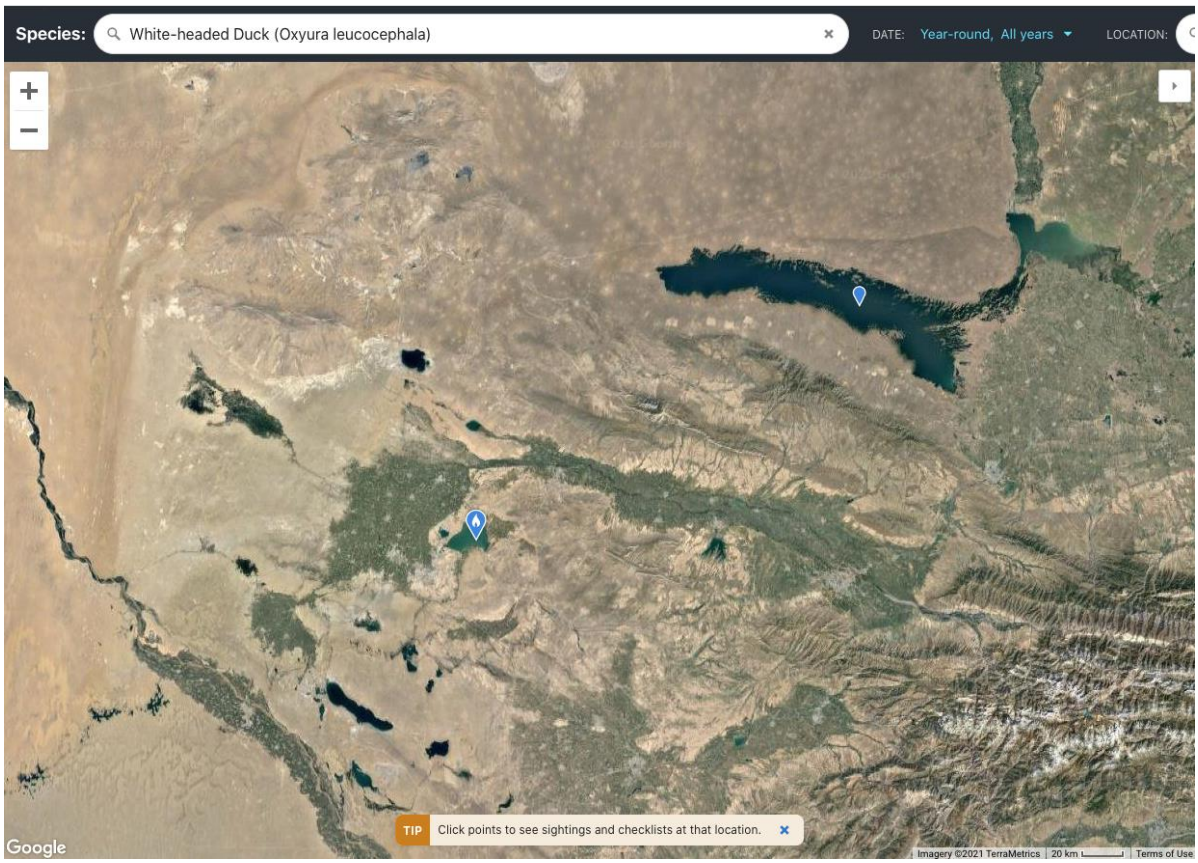


The species is highly gregarious outside of the breeding season with more than 10,000 gathering at some winter sites. During the winter the species inhabits larger, deeper alkaline or saline waters.

The greatest long-term threat to the species survival is thought to be competition and introgressive hybridisation with the North American Ruddy Duck *Oxyura jamaicensis*.

The following records are available on Ebird, documenting White-headed Duck in localities over 80km away from the project site.

Figure 2-48 EBird records of the White-headed Duck



2.7.1 Baseline Survey

2.7.1.1 Methods

2.7.1.1.1 Dzhankeldy Wind Farm

The Dzhankeldy WF site was comprehensively surveyed over one year (16 May 2020-20 May 2021) during all four seasons following the guidance of the Scottish Natural Heritage (SNH) guidelines (2017), which are currently the internationally accepted best-practice for onshore wind farm surveying and assessment.

A total of 10 Vantage Points (VPs) were surveyed to collect data on species, numbers, physical characteristics, and flight behaviour. The points are located so as to cover the project area as completely as possible (Figure 2-50).

The duration of survey at each vantage point was approximately 3 hours. During observations weather conditions such as wind speed and direction, and air temperature were recorded. Wind speed and air temperature were measured using an anemometer. Whenever possible,

approximate flight altitude, speed, and flight direction of the birds were recorded every 15 seconds.

During the observations, photographing and short video shooting of the birds were carried out, which were used to confirm the correct species identification and obtain additional data on the number of individuals.

During the summer 2020, autumn 2020 and spring 2021 surveys Cliffs and ledges on the Northern sides of the Western Kuldzhuktau mountain range were examined for nests of large birds of prey to identify nesting species and collect data on their nesting ecology and behaviour.

Nest locations were recorded and mapped. During the survey optical devices such as binoculars and telescopes were used. Local residents and shepherds were interviewed for information on the presence of bird predator nests in the area. Due to the lack of large trees and shrubs, nesting birds in trees was excluded. Surveys were conducted both in the project area and in the surrounding area.

Figure 2-49 Vantage Points at Dzhankeldy Wind Farm Site

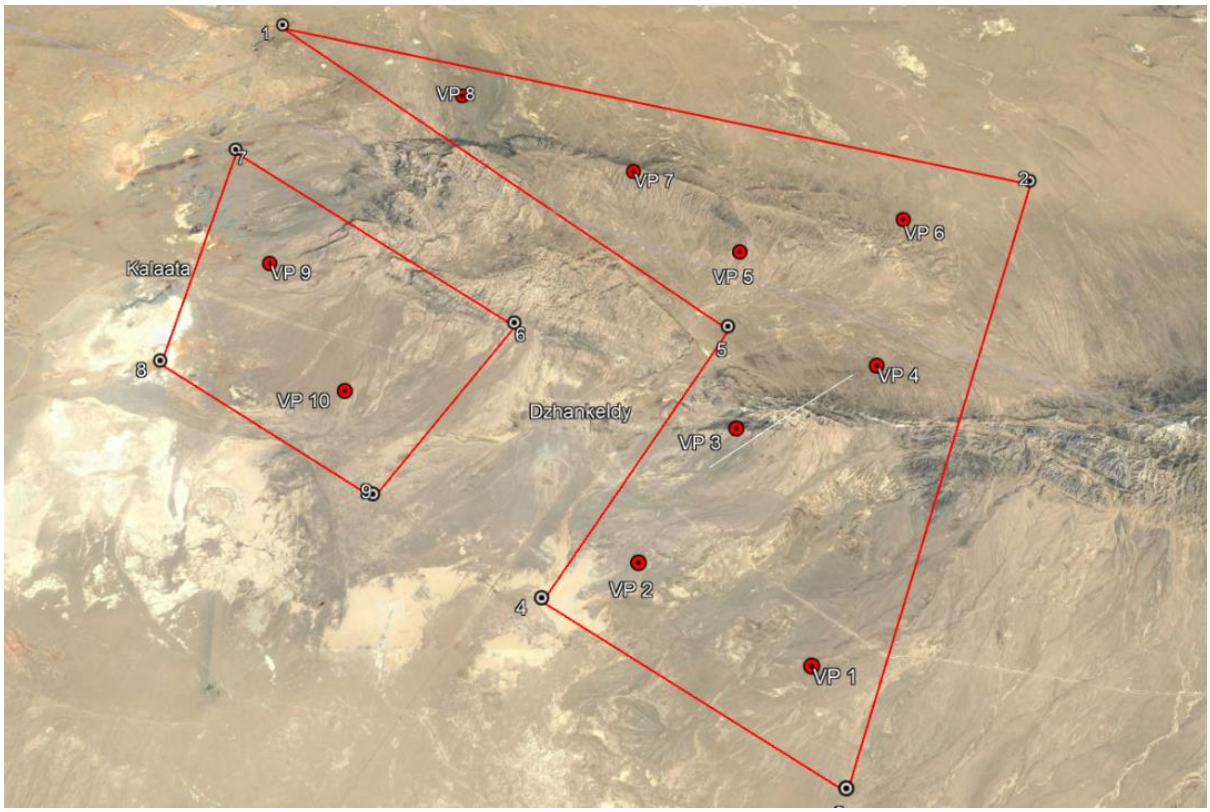


Figure 2-50 Nest Survey Routes during Summer

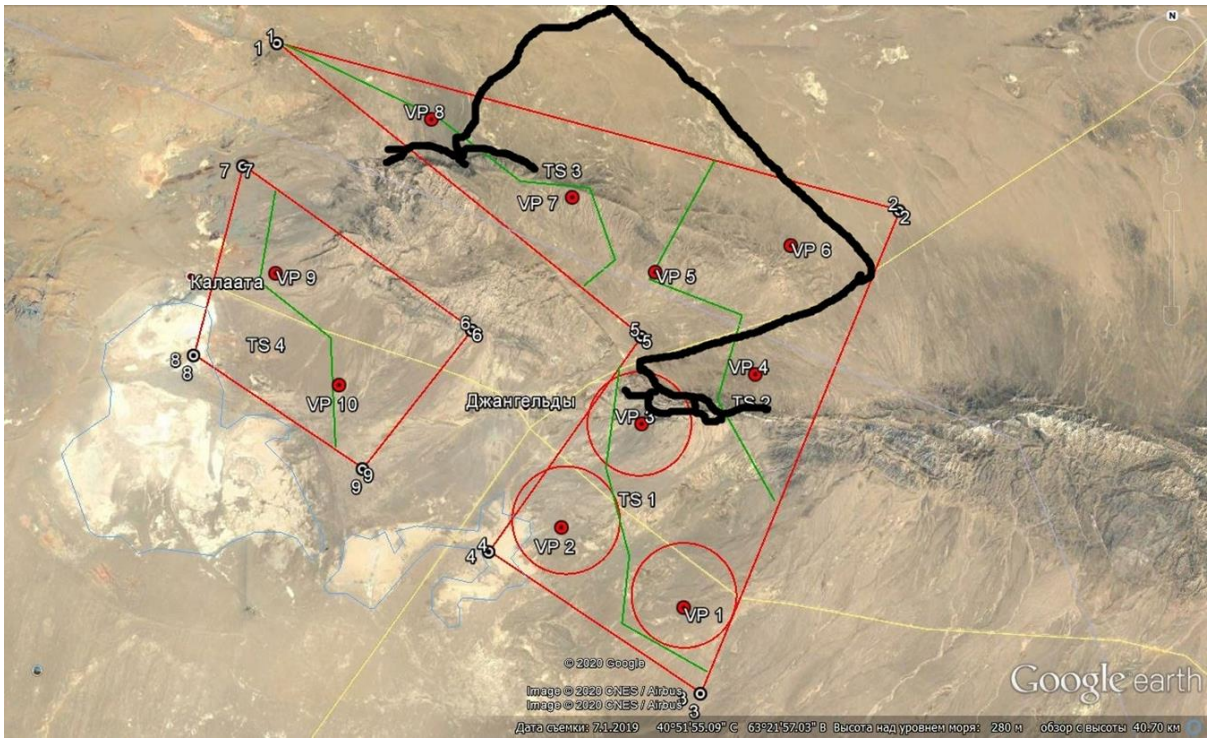
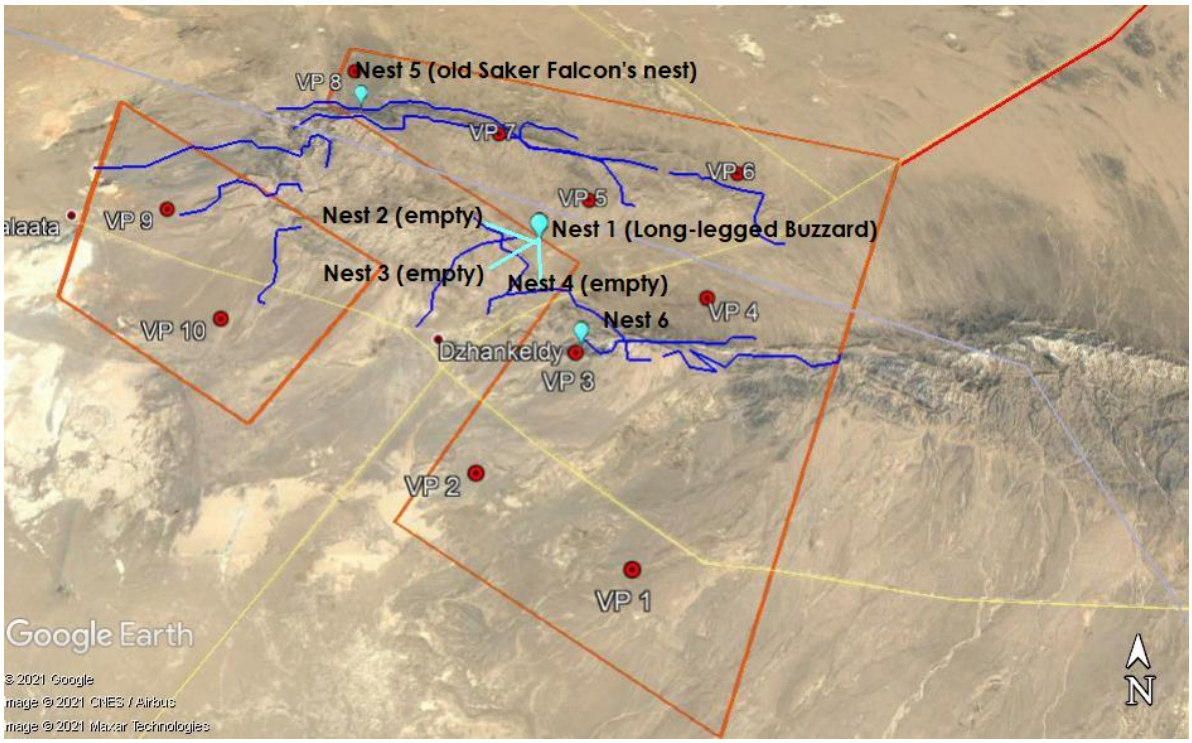


Figure 2-51 Nest Survey Routes during Spring



2.7.1.1.2 Dzhankeldy-Bash OHTL

The survey along the planned Dzhankeldy-Bash OHTL was carried out May and June 2021 at selected vantage points (VP). The points were places directly along the route of the transmission line or near it depending on the availability of access roads. The distance from the route in some places was generally not more than 1-2 km.

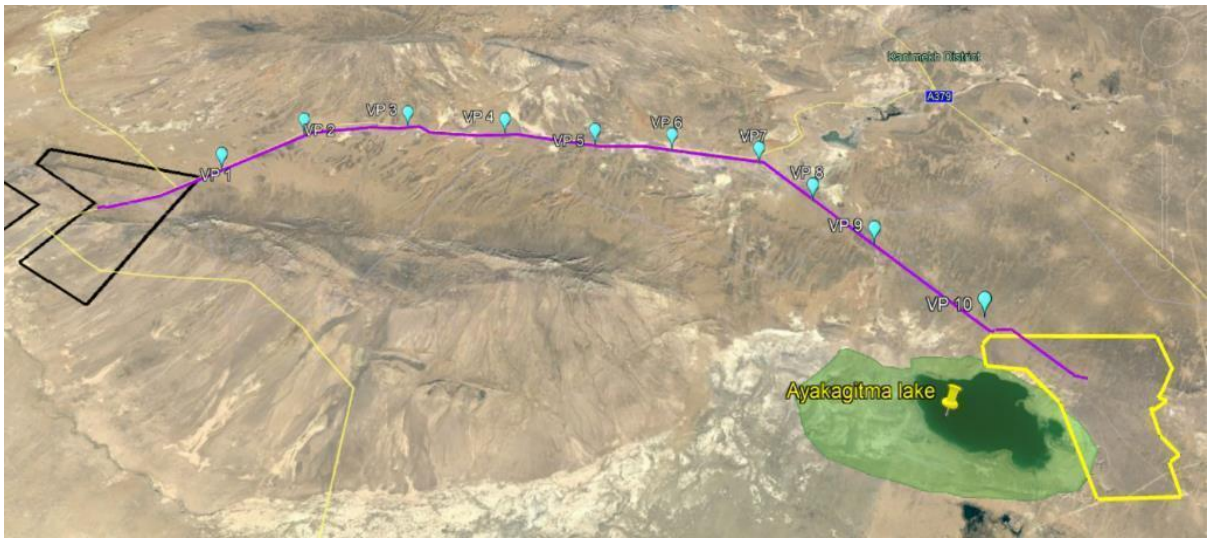
Given the homogenous landscape of the surveyed section, analogies were drawn between the surveyed area adjacent to the route and the route itself.

Visual observations of birds were made during the route survey. Bird sighting points were also marked using GPS. Bird species membership was determined visually using field binoculars with 8x magnification and Nikon and Fujifilm XT-20 digital cameras as well as audio recordings of bird voices (Xeno-canto Asia) and field bird identifiers (Mullarney, Svensson, Zetterstrom, Grant, 1999; Aye, Schweizer, Roth 2012).

Surveys were conducted at 11 selected points, in 1 km radius sections. Duration of observations was not less than 40 minutes at each vantage point. A survey of operating power lines within the project area was also carried out to assess bird mortality on operating OHTL.

Figure 2-52 Vantage points of the projected OHTL route in May 2021

Figure 2-53 Vantage points of the projected OHTL route in June 2021



Due to change of the route in June, the number of vantage points was reduced to 10.

2.7.1.2 Results

2.7.1.2.1 Dzhankeldy Wind Farm

There were no recorded sightings of this species during the baseline surveys.

2.7.1.2.2 Dzhankeldy-Bash OHTL

There were no recorded sightings of the species during the OHTL surveys.

2.7.2 Stakeholder Engagement

No known occurrence of the White-headed duck has been recorded by stakeholders within the project area of influence.

2.8 Goitered Gazelle

The Goitered Gazelle *Gazella subgutturosa* inhabits a wide range of semi-desert and desert habitats. The spatial distribution covers a large portion of Uzbekistan. Being of high ecological value, this species is listed as Vulnerable (VU) on the IUCN Red List and the Uzbekistan Red Data Book.

The main threats to this species are illegal hunting (for meat and to a lesser extent for trophies) and habitat loss.

Current estimations of the global population are 42,000 to 49,000 individuals. The 1% threshold would therefore be 420 individuals. The regional population is estimated at approximately 125-150 individuals

2.8.1 Baseline Survey

2.8.1.1 Methods

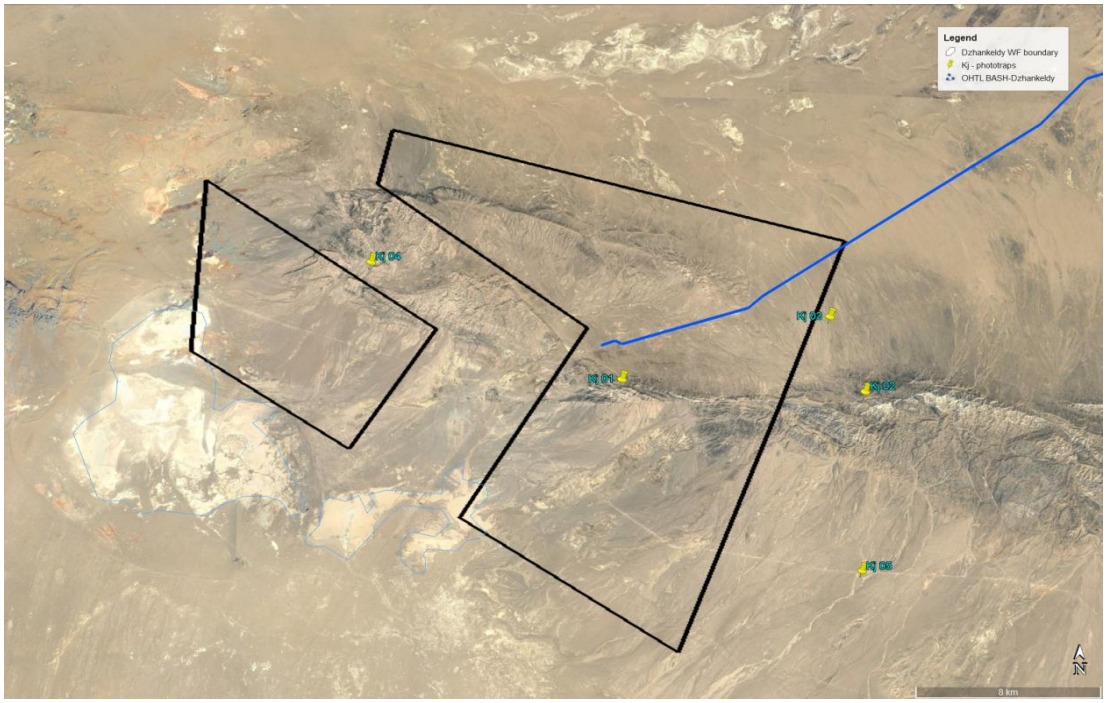
2.8.1.1.1 Dzhankeldy Wind Farm

Surveying was undertaken in Spring 2021 and Summer 2021, which represents the most active periods for mammals in the region. The survey was carried out in the Southeast Kyzylqum dessert, in the area of Ayakagytma lake and adjacent territories.

Camera traps were set from April 15 to June 25. Five standard Bushnell 119936C camera traps were installed at five locations.

The manual transect survey was undertaken by foot and with a vehicle in the daytime while only the vehicle was used at night time for nocturnal spotlighting. The walking transect survey aimed to account for species number and composition. Data was recorded through visual observations, using 10x binoculars to identify far sightings. Any signs of tracks and spoor were also recorded.

Figure 2-54 Camera trap locations (Yellow) within the Dzhankeldy WF Site



2.8.1.1.2 Dzhankeldy-Bash OHTL

On April 14 and June 20-22, 2021, transect surveys were carried out to collect data on the presence of non-volant mammal species along the planned Dzhankeldy-Bash OHTL route

A method of ground transect survey was employed with a combination of walking transects every 10 km. Walking transects were 1 km from the planned OHTL line. Presence of mammals were recorded through visual observation, animal tracks and spoor.

2.8.1.2 Results

2.8.1.2.1 Dzhankeldy Wind Farm

One individual was recorded during the survey of the project site at the foot hills of Kuldzhuktau. Gazelle dung was also recorded within the project site.

2.8.1.2.2 Dzhankeldy-Bash OHTL

No sightings of this species were made during the mammal survey of the planned OHTL route.

2.8.2 Stakeholder Engagement

The ecologists who authored the baseline also Interviewed local shepherds who confirmed the presence of this species in the area. The gazelles are usually seen in small groups of 2-5 individuals.

4 individuals were recorded during a nocturnal survey for reptiles along the OHTL route.

Expert assessment estimates around 50 individuals in the project area.

State Committee on Ecology and Environmental Protection of the Republic of Uzbekistan were contacted as part of the stakeholder engagement exercises conducted to understand biodiversity aspects of concern. In the response received from them, they have confirmed the presence of the Goitered Gazelle near the Lake Ayakagytma at the end of the OHTL route.

2.9 Marbled Polecat

The Marbled Polecat, *Vormela peregusna* is classified as 'Vulnerable' on the IUCN red list and the Uzbekistan Red Book. This mammal inhabits a wide range of semi-desert and desert habitats; its spatial distribution covers a majority of Uzbekistan.

It is a specialised predator, feeding mainly on desert and steppe rodents such as gerbils, and ground squirrels. The major threat to Marbled Polecat is the loss of natural steppe and desert habitats.

2.9.1 Baseline Survey

2.9.1.1 Methods

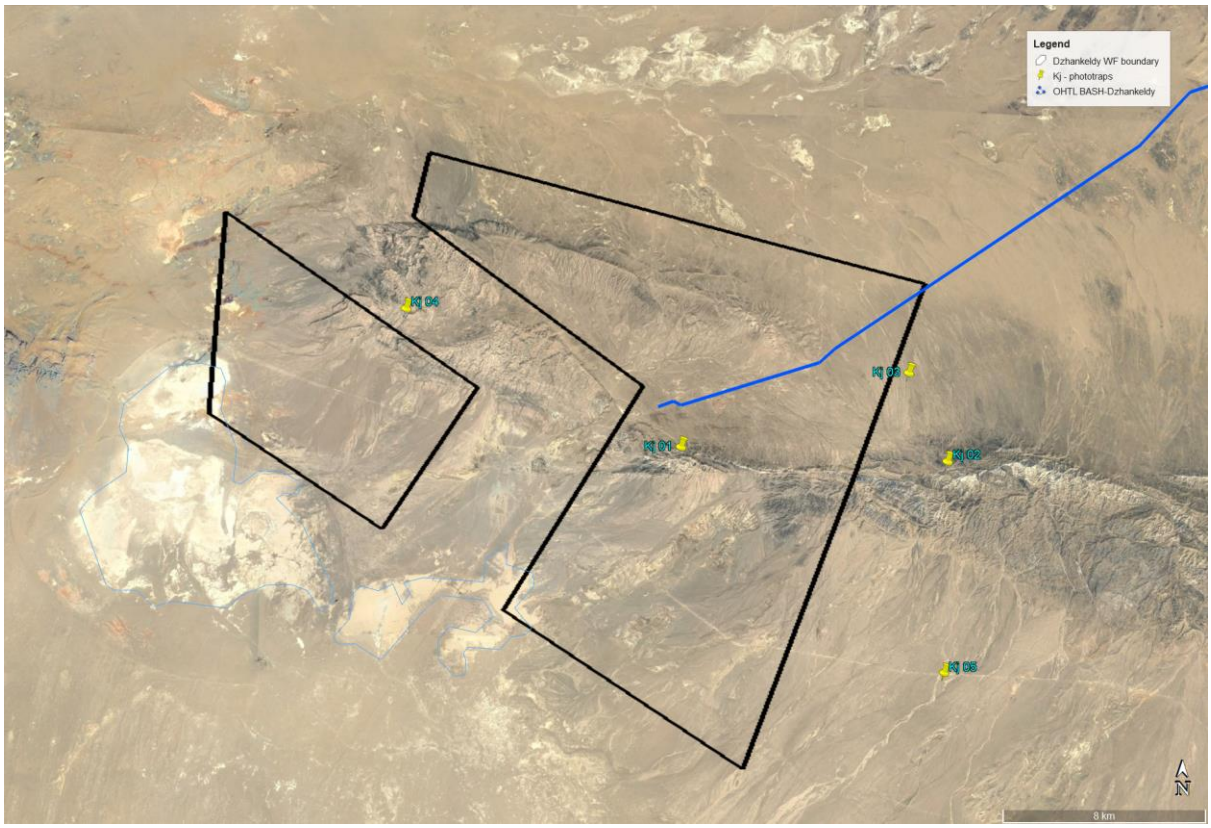
2.9.1.1.1 Dzhankeldy Wind Farm

Surveying was undertaken in Spring 2021 and Summer 2021, which represents the most active periods for mammals in the region. The survey was carried out in the Southeast Kyzylqum dessert, in the area of Ayakagytma lake and adjacent territories.

Camera traps were set from April 15 to June 25. Five standard Bushnell 119936C camera traps were installed at five locations.

The manual transect survey was undertaken by foot and with a vehicle in the daytime while only the vehicle was used at night time for nocturnal spotlighting. The walking transect survey aimed to account for species number and composition. Data was recorded through visual observations, using 10x binoculars to identify far sightings. Any signs of tracks and spoor were also recorded.

Figure 2-55 Camera trap locations (Yellow) within the Dzhankeldy WF Site



2.9.1.1.2 Dzhankeldy-Bash OHTL

On April 14 and June 20-22, 2021, transect surveys were carried out to collect data on the presence of non-volant mammal species along the planned Dzhankeldy-Bash OHTL route

A method of ground transect survey was employed with a combination of walking transects every 10 km. Walking transects were 1 km from the planned OHTL line. Presence of mammals were recorded through visual observation, animal tracks and spoor.

2.9.1.2 Results

2.9.1.2.1 Dzhankeldy Wind Farm

Although associated prey species was recorded throughout the site (rodents, ground squirrels and gerbils), no sightings of the Marbled Polecats were recorded during the baseline survey of the project site.

2.9.1.2.2 Dzhankeldy-Bash OHTL

Although associated prey species was recorded, no sightings of the Marbled Polecats were recorded during the baseline survey of the OHTL route. Given that mustelid spoor was recorded at Transect 6 along the route, it is possible that this species is present in the area.

2.9.2 Stakeholder Engagement

The ecologists of the baseline indicate that this species was recorded in the adjacent Karakata depression in the early 1900's.

2.10 Russian Tortoise

The Russian Tortoise *Testudo horsfieldii* is listed as Vulnerable on the IUCN Red List due to habitat loss and potential poaching for exotic wildlife trade. It inhabits both sandy and clayey deserts, plains, mountain slopes, depressions and valleys, gorges and mountain steppe up to 1,150 m above sea level. It avoids places with dense grass cover, as well as areas grazed intensively by livestock.

The spatial distribution of this species has not been mapped, however, it has been recorded to occur in Afghanistan; Armenia; Azerbaijan; China; Iran, Islamic Republic of; Kazakhstan; Kyrgyzstan; Pakistan; Russian Federation; Tajikistan; Turkmenistan; and Uzbekistan.

With little published information regarding their ecology or conservation, there are no global population estimates available for this species.

2.10.1 Baseline Survey

2.10.1.1 Methods

2.10.1.1.1 Dzhankeldy Wind Farm

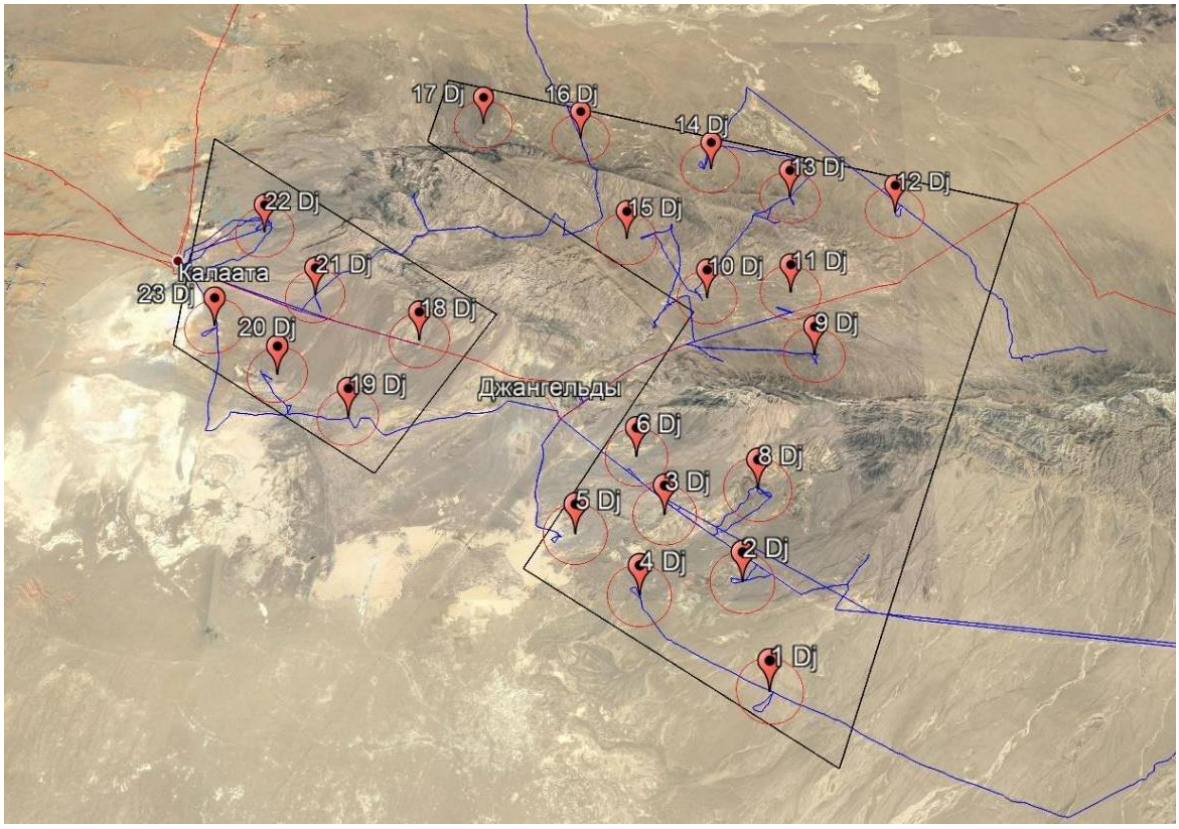
Surveying was undertaken in late Spring 2021 and mid-Summer 2021, as these represent the seasons of highest reptile activity.

The transect survey method was employed to quantitatively assess the abundance of the Russian Tortoise. Individuals encountered along both sides of a fixed line transect, 1km long were counted regardless of the distance they were identified at.

The perpendicular distance between the transect axis and each individual was measured and used to calculate the population density of this reptile in the wind farm area. The use of

perpendicular distances to carry out survey on a strip of limited width excludes underestimation of the population density of the Russian tortoise caused by a decrease in their detectability in remote parts of the survey strip, regardless of the degree of its limitation (Bondarenko and Chelintsev, 1996).

Figure 2-56 Survey Points and Transects on the Dzhankeldy Project Territory



2.10.1.1.2 Dzhankeldy-Bash OHTL

23 points along the 115km Dzhankeldy-Bash OHTL were surveyed from June 19-25, 2021.

Reptile survey was carried out both during the day and at night. Nocturnal survey was carried out after sunset, until about 2 am.

2.10.1.2 Results

2.10.1.2.1 Dzhankeldy Wind Farm

During the Spring survey, the Russian tortoise was found at 8 points. The highest density of the Russian tortoise was recorded at Dj 13 point and amounted to 3.99 ind/ha. However, similar

number of 2 tortoises per transect was observed at several other points: Dj 9, Dj 10, Dj 12 and Dj 14.

The average night air temperature in April was 18 °C, the soil temperature was 17 °C, the air humidity was 35%.

Figure 2-57 Russian Tortoise Recorded at Dj 10 during the Spring Survey

During the summer survey, the average night air temperature in June was 26-27°C, the soil temperature was 27-28°C, the air humidity was 20-25%

April is the period of the highest activity of the Russian Tortoise. Spring surveys registered a total of 14 individuals, while summer surveys registered none. In the summer months, it was almost impossible to find the Russian tortoise . This is consistent with the ecology of the species, as during this time the ephemeral vegetation dries up and the species enters a period of estivation (summer dormancy) which often flows into hibernation (winter dormancy).

Occasionally in summer, individual tortoises may be seen on the surface in places where fresh green grass is preserved. No such places were found on the project area.

The Russian tortoise was found at 8 points, which is 38% of the total number of observation points (21 points), most of which are located in the northern foothill part of the Kuldzhuktau mountains

2.10.1.2.2 Dzhankeldy-Bash OHTL

Although no sightings of the Russian Tortoise were made many burrows of this species were found at many surveys points during June. Since Russian tortoise is in a state of aestivation in the summer months, its presence in the area was determined by the remains and traces of the species vital activity (burrows, etc.)

It is of note that during the mammal survey in April, 120 Russian Tortoises were observed along the OHTL route.

Figure 2-58 Burrow of a Russian Tortoise Recorded at PL6 During the OHTL survey

2.10.2 Stakeholder Engagement

As part of the CHA Stage 2 process, requests for information related to identified biodiversity aspects of concern were distributed to known experts in the field. The following information was compiled from public databases:

- In habitat, the Russian tortoise is primarily a burrow-dweller. It prefers sandy or loamy ground in which to dig its burrow. The burrow is usually 30-78" (80-200 cm) long, ending in a widened chamber in which the tortoise is able to turn around. Spring rains are necessary to soften the soil sufficiently for the tortoise to dig its burrow. As the ground dries out, the

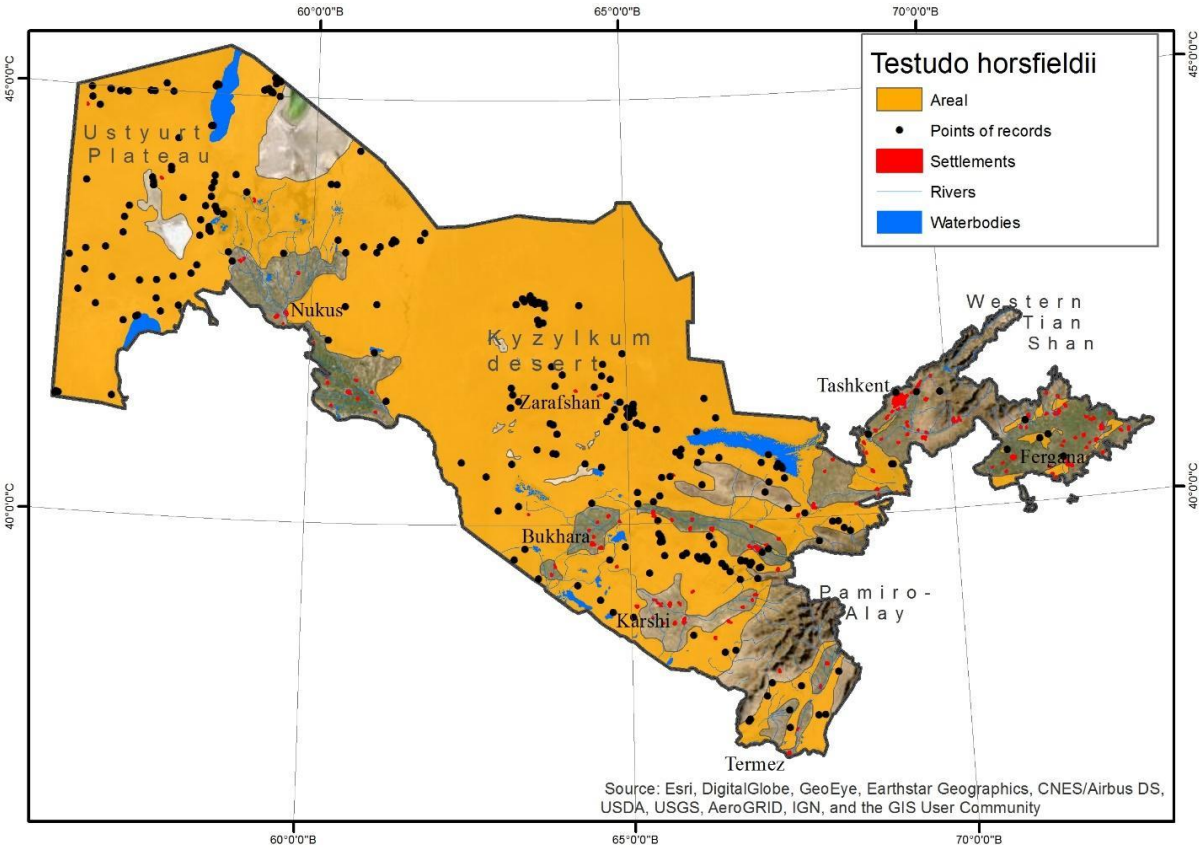
soil hardens into a solid crust, making excavations virtually impossible. The Russian tortoise retires to its burrow during the midday heat, as well as at night during its active period. In favored locations, many burrow exist in close proximity. Tortoises are known to visit adjacent burrows, and sometimes several tortoises spend the night in a single burrow.

- The Russian tortoise in the wild has a rather short period of peak activity, only three months out of the year. The tortoises emerge from hibernation in early spring (March-May) and immediately begin seeking mates.
- In May or June, the female lays 2-6 eggs, and may lay two (possibly three) additional clutches during the same season. The eggs usually incubate for 80 to 110 days in the wild. Hatchlings emerge in August or September, but sometimes the hatchlings overwinter in the nest and do not emerge until the following spring. In an incubator in captivity, where eggs are kept at a relatively constant temperature of 87° F (30.5° C), an incubation period of 60 to 75 days is typical. Hatchlings normally measure 1.25-1.33 inches (32-34 mm) in length. Growth is slow in this tortoise. While they reach sexual maturity at 10 years, they are considered full-grown at 20 to 30 years of age.
- The Russian tortoise remains active until June or July when activity slows. Summer temperatures exceeding 85° F (29° C) can be problematic; so, the tortoise generally emerges from its burrow only at dawn or at dusk in order to forage when temperatures are lower. Their ephemeral food plants are gone by this time as well. Many tortoises spend the summer in estivation, emerging briefly at the end of summer to feed on dried grasses and twigs prior to hibernation.

The State Committee of the Republic of Uzbekistan on Ecology and Environmental Protected who was also consulted as part of the CHA Stage 2 stakeholder engagement exercises have confirmed the presence of the Russian Tortoise in the project development area.

The map below extracted from the baseline survey report shows areal and known locations of the Russian tortoise in various regions of the Republic of Uzbekistan.

Figure 2-59 Known locations of the Russian Tortoise in Uzbekistan



2.11 Greater Spotted Eagle

The Greater Spotted Eagle, *Clanga clanga* is a passage migrant through Uzbekistan. Birds leave their breeding grounds in October and November and return in February and March. It is a Vulnerable (VU) species on the IUCN red list.

It occurs in lowland forests near wetlands, and on small mammals, waterbirds, frogs and snakes, hunting over swamps and wet meadows; birds soar to c.100 m high when hunting. Threats include electrocution, poaching, shooting, disturbance, and habitat loss.

Birds migrate on a broad front, tending to pass in singles, twos and threes; they do not concentrate at bottleneck sites to the extent of many other raptors. The below showcases the migratory route of a single individual which was tracked from 2014 through 2018. The zoomed-in map shows that the individual passed within 10-15km of the project site.

Figure 2-60 Greater Spotted Eagle Satellite Tracking

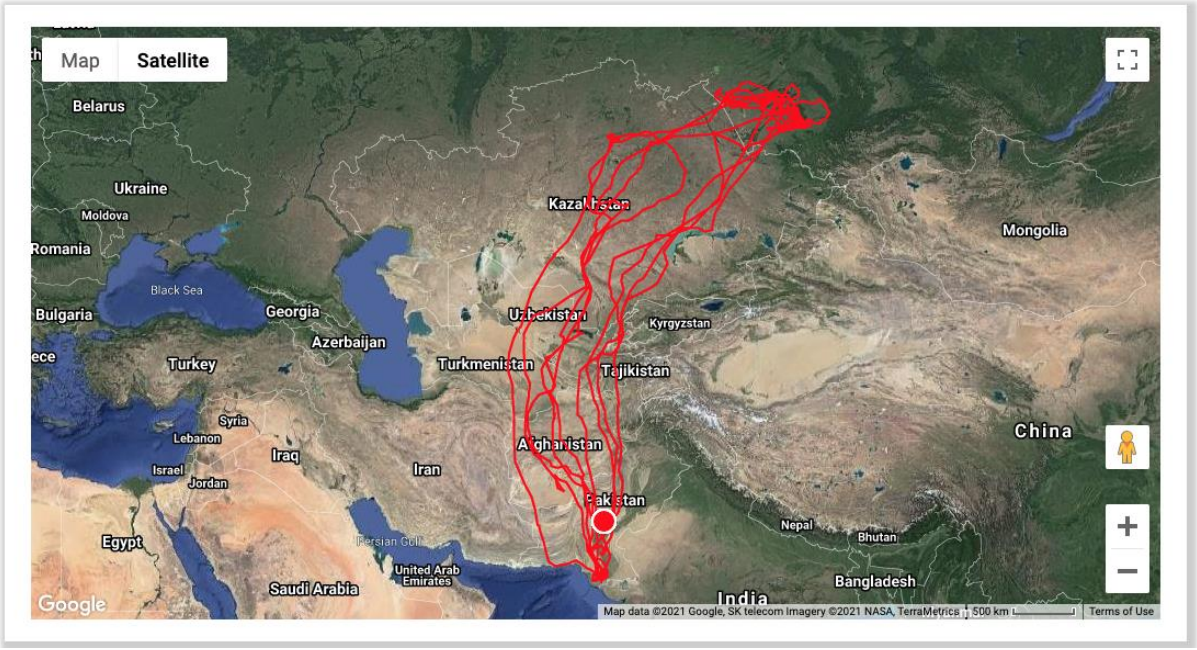
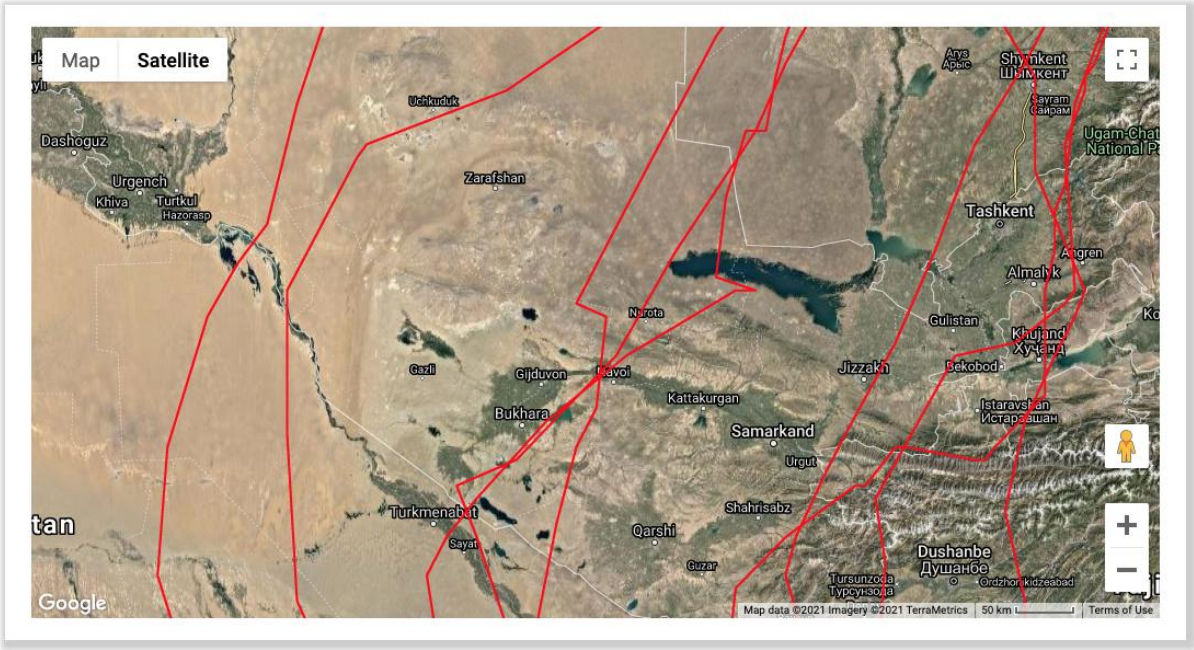


Figure 2-61 Greater Spotted Eagle Satellite Tracking (project region)



2.11.1 Baseline Survey

2.11.1.1 Methods

2.11.1.1.1 Dzhankeldy Wind Farm

The Dzhankeldy WF site was comprehensively surveyed over one year (16 May 2020-20 May 2021) during all four seasons following the guidance of the Scottish Natural Heritage (SNH) guidelines (2017), which are currently the internationally accepted best-practice for onshore wind farm surveying and assessment.

A total of 10 Vantage Points (VPs) were surveyed to collect data on species, numbers, physical characteristics, and flight behaviour. The points are located so as to cover the project area as completely as possible (Figure 2-63).

The duration of survey at each vantage point was approximately 3 hours. During observations weather conditions such as wind speed and direction, and air temperature were recorded. Wind speed and air temperature were measured using an anemometer. Whenever possible, approximate flight altitude, speed, and flight direction of the birds were recorded every 15 seconds.

During the observations, photographing and short video shooting of the birds were carried out, which were used to confirm the correct species identification and obtain additional data on the number of individuals.

During the summer 2020, autumn 2020 and spring 2021 surveys Cliffs and ledges on the Northern sides of the Western Kuldzhuktau mountain range were examined for nests of large birds of prey to identify nesting species and collect data on their nesting ecology and behaviour.

Nest locations were recorded and mapped. During the survey optical devices such as binoculars and telescopes were used. Local residents and shepherds were interviewed for information on the presence of bird predator nests in the area. Due to the lack of large trees and shrubs, nesting birds in trees was excluded. Surveys were conducted both in the project area and in the surrounding area.

Figure 2-62 Vantage Points at Dzhankeldy Wind Farm Site

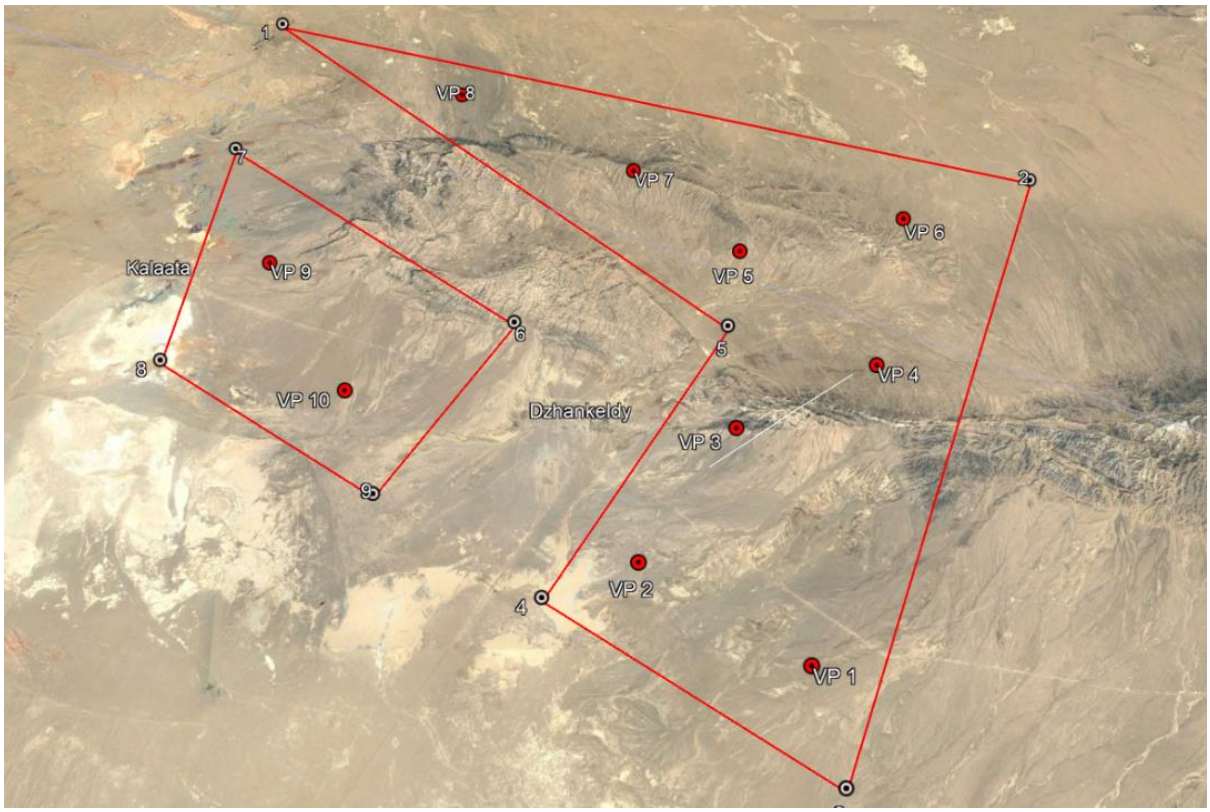


Figure 2-63 Nest Survey Routes during Summer

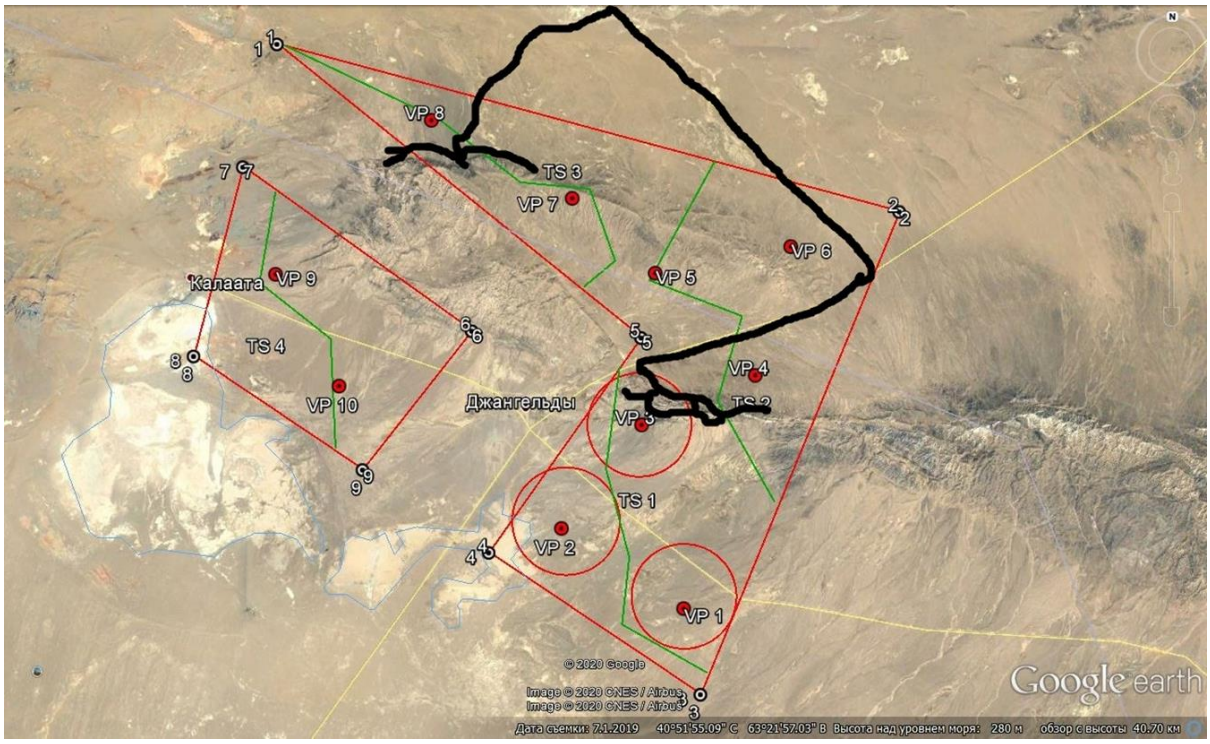
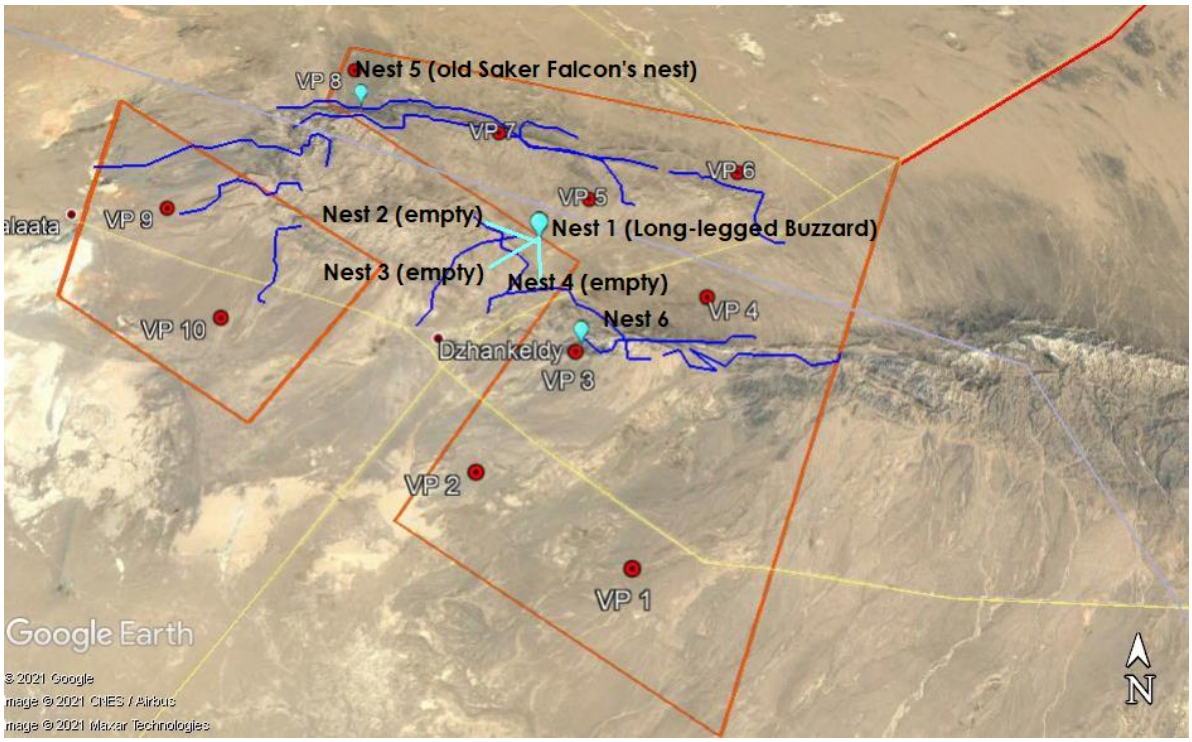


Figure 2-64 Nest Survey Routes during Spring



2.11.1.1.2 Dzhankeldy-Bash OHTL

The survey along the planned Dzhankeldy-Bash OHTL was carried out May and June 2021 at selected vantage points (VP). The points were places directly along the route of the transmission line or near it depending on the availability of access roads. The distance from the route in some places was generally not more than 1-2 km.

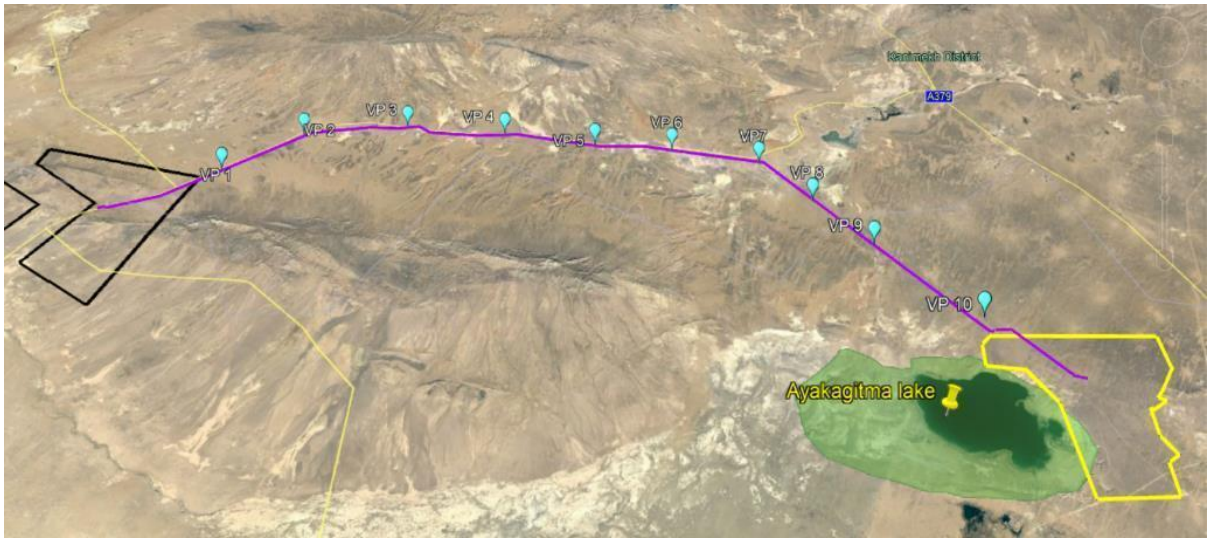
Given the homogenous landscape of the surveyed section, analogies were drawn between the surveyed area adjacent to the route and the route itself.

Visual observations of birds were made during the route survey. Bird sighting points were also marked using GPS. Bird species membership was determined visually using field binoculars with 8x magnification and Nikon and Fujifilm XT-20 digital cameras as well as audio recordings of bird voices (Xeno-canto Asia) and field bird identifiers (Mullarney, Svensson, Zetterstrom, Grant, 1999; Aye, Schweizer, Roth 2012).

Surveys were conducted at 11 selected points, in 1 km radius sections. Duration of observations was not less than 40 minutes at each vantage point. A survey of operating power lines within the project area was also carried out to assess bird mortality on operating OHTL.

Figure 2-65 Vantage points of the projected OHTL route in May 2021

Figure 2-66 Vantage points of the projected OHTL route in June 2021



Due to change of the route in June, the number of vantage points was reduced to 10.

2.11.1.2 Results

2.11.1.2.1 Dzhankeldy Wind Farm

Although the Greater Spotted Eagle are known to occur in the region, there were no recorded sightings documenting the species during the surveys.

2.11.1.2.2 Dzhankeldy-Bash OHTL

There were no sightings of the Greater-spotted Eagle during the OHTL survey.

2.11.2 Stakeholder Engagement

Stakeholder Anna Ten's records indicate the sighting of this species at the Lake Ayakagytma and its adjacent area in 2011. No other known occurrence of the Greater Spotted Eagle has been recorded by stakeholders within the project area of influence since.

2.12 Eastern Imperial Eagle

The Eastern Imperial Eagle *Aquila heliaca* is a summer breeder and passage migrant through Uzbekistan. It is a Vulnerable (VU) species on the IUCN red list.

It occurs in steppe, lowland and riverine forests and semi-deserts. It breeds in forests up to 1,000 m and also in steppe and agricultural areas with large trees, and on electricity pylons.

Southward migration between September and November, and birds migrate to the summer grounds between February and May. Birds are usually seen singly or in pairs.

Main threats include loss of breeding trees, disturbance, habitat loss, and electrocution.

The following depicts the satellite tracked flight paths of several Eastern Imperial Eagles which show that some individuals may pass through the project area on autumn and spring migrations.

Figure 2-67 Eastern Imperial Eagle Satellite Tracking

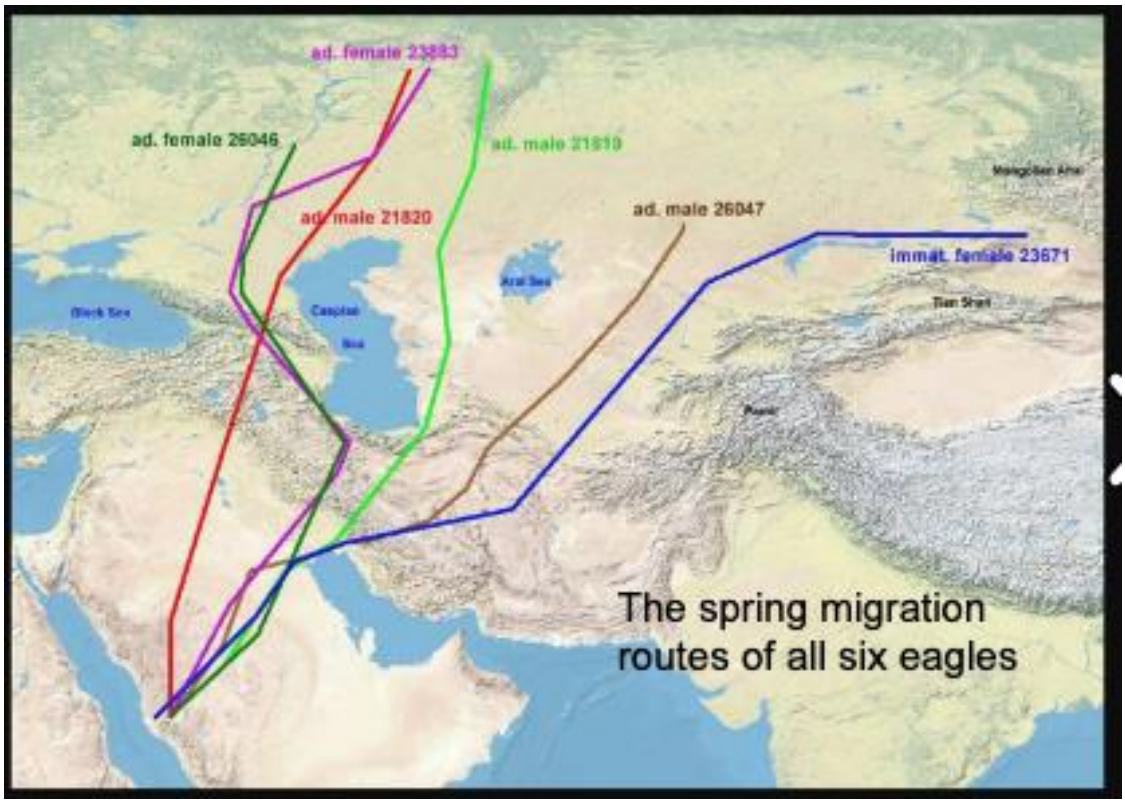


Figure 2-68 Eastern Imperial Eagle Satellite Tracking (cont.)

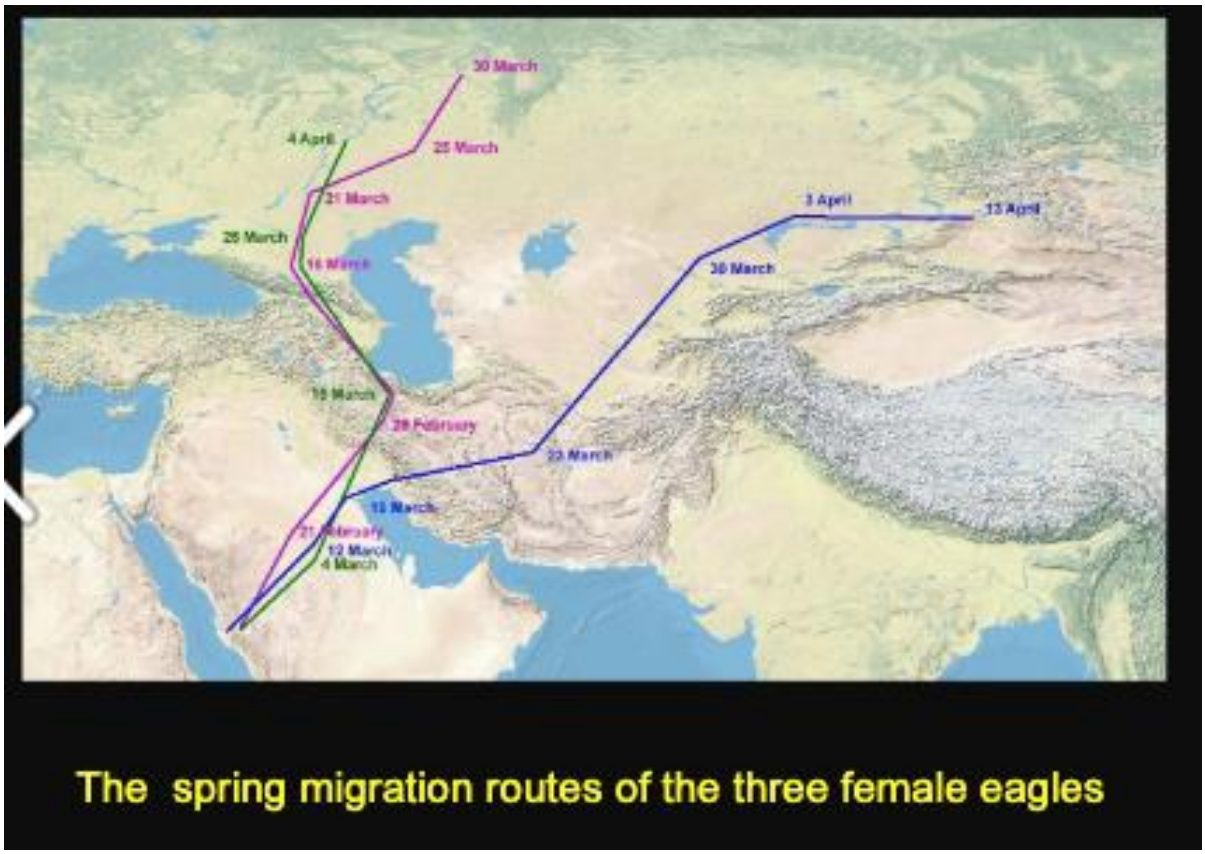
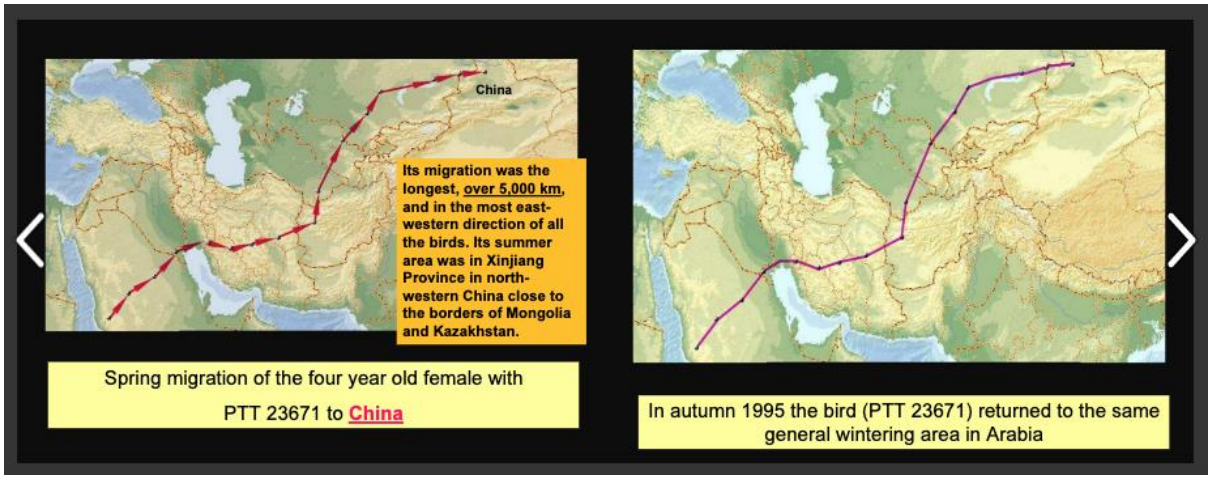


Figure 2-69 Eastern Imperial Eagle Satellite Tracking (cont.)



2.12.1 Baseline Survey

2.12.1.1 Methods

2.12.1.1.1 Dzhankeldy Wind Farm

The Dzhankeldy WF site was comprehensively surveyed over one year (16 May 2020-20 May 2021) during all four seasons following the guidance of the Scottish Natural Heritage (SNH) guidelines (2017), which are currently the internationally accepted best-practice for onshore wind farm surveying and assessment.

A total of 10 Vantage Points (VPs) were surveyed to collect data on species, numbers, physical characteristics, and flight behaviour. The points are located so as to cover the project area as completely as possible (Figure 2-71).

The duration of survey at each vantage point was approximately 3 hours. During observations weather conditions such as wind speed and direction, and air temperature were recorded. Wind speed and air temperature were measured using an anemometer. Whenever possible, approximate flight altitude, speed, and flight direction of the birds were recorded every 15 seconds.

During the observations, photographing and short video shooting of the birds were carried out, which were used to confirm the correct species identification and obtain additional data on the number of individuals.

During the summer 2020, autumn 2020 and spring 2021 surveys Cliffs and ledges on the Northern sides of the Western Kuldzhuktau mountain range were examined for nests of large birds of prey to identify nesting species and collect data on their nesting ecology and behaviour.

Nest locations were recorded and mapped. During the survey optical devices such as binoculars and telescopes were used. Local residents and shepherds were interviewed for information on the presence of bird predator nests in the area. Due to the lack of large trees and shrubs, nesting birds in trees was excluded. Surveys were conducted both in the project area and in the surrounding area.

Figure 2-70 Vantage Points at Dzhankeldy Wind Farm Site

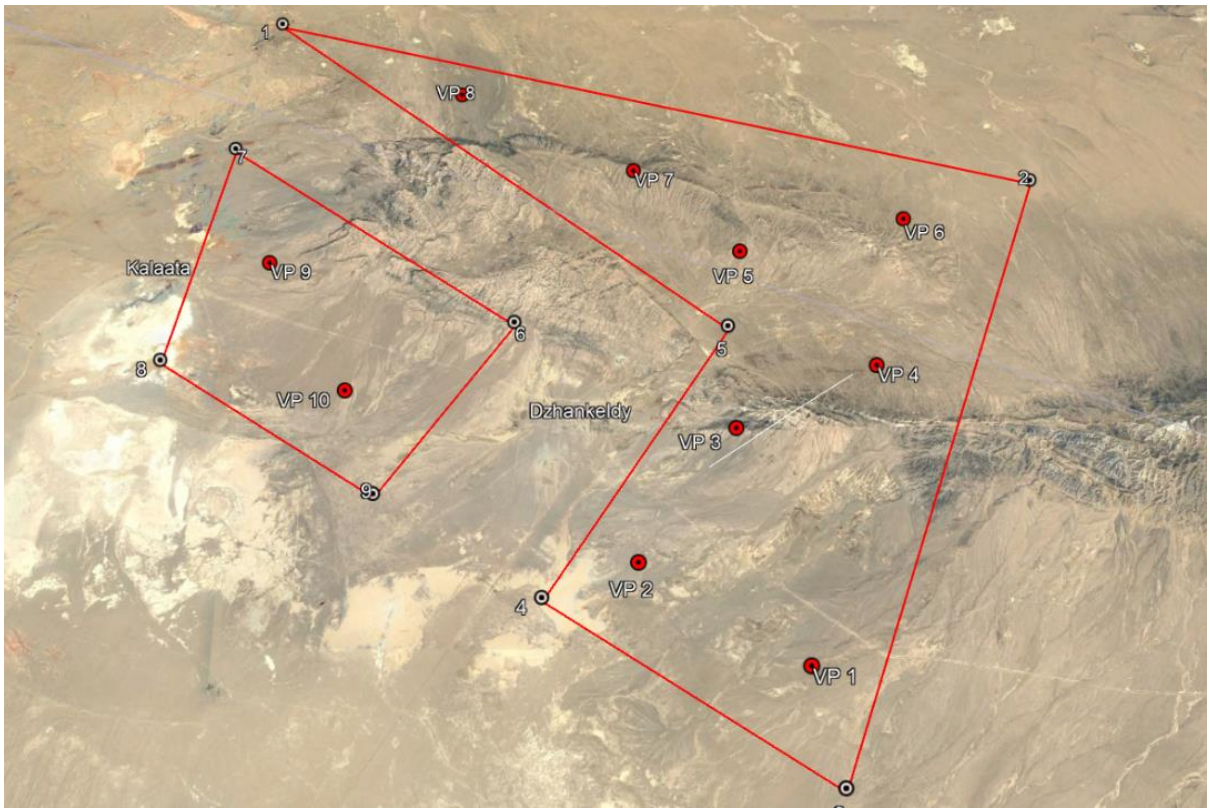


Figure 2-71 Nest Survey Routes during Summer

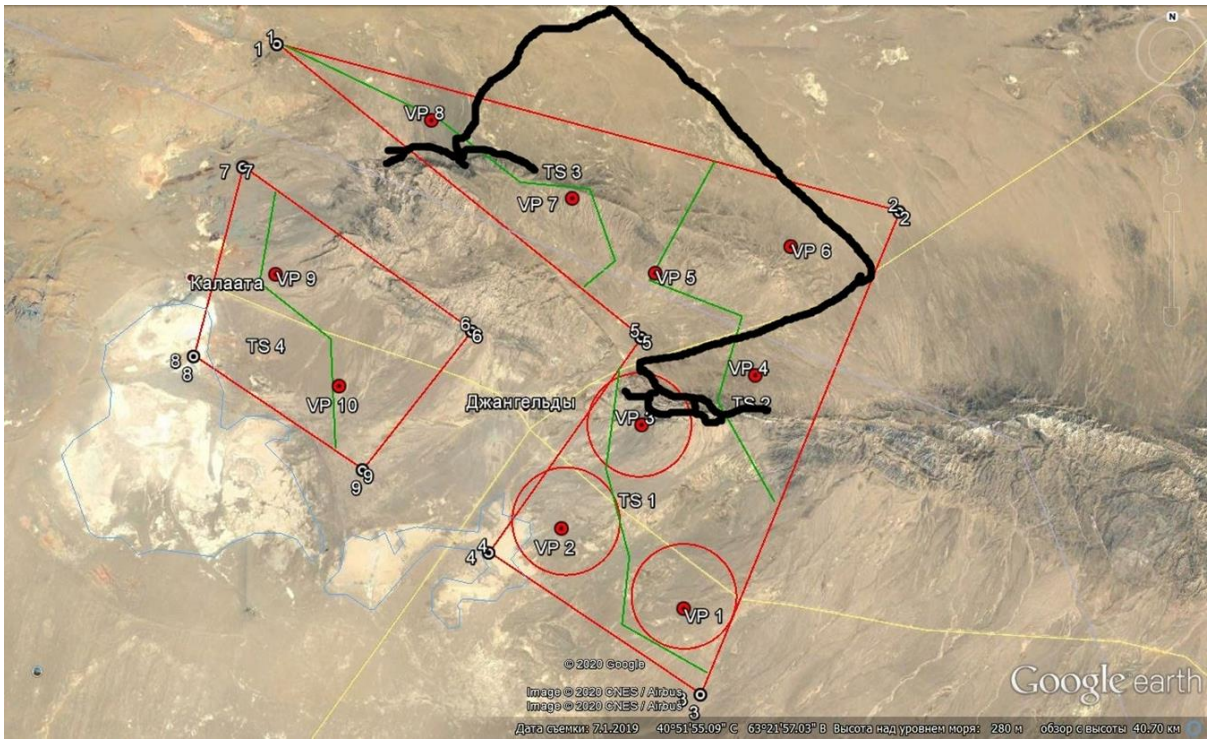
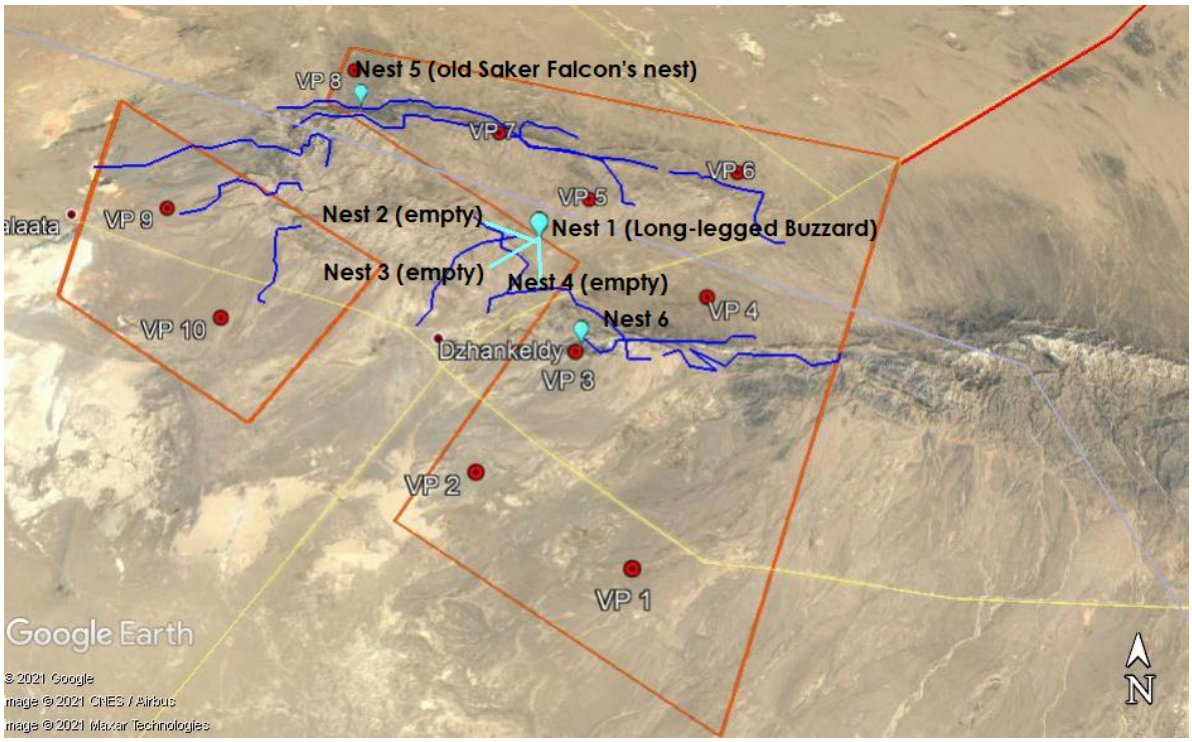


Figure 2-72 Nest Survey Routes during Spring



2.12.1.1.2 Dzhankeldy-Bash OHTL

The survey along the planned Dzhankeldy-Bash OHTL was carried out May and June 2021 at selected vantage points (VP). The points were places directly along the route of the transmission line or near it depending on the availability of access roads. The distance from the route in some places was generally not more than 1-2 km.

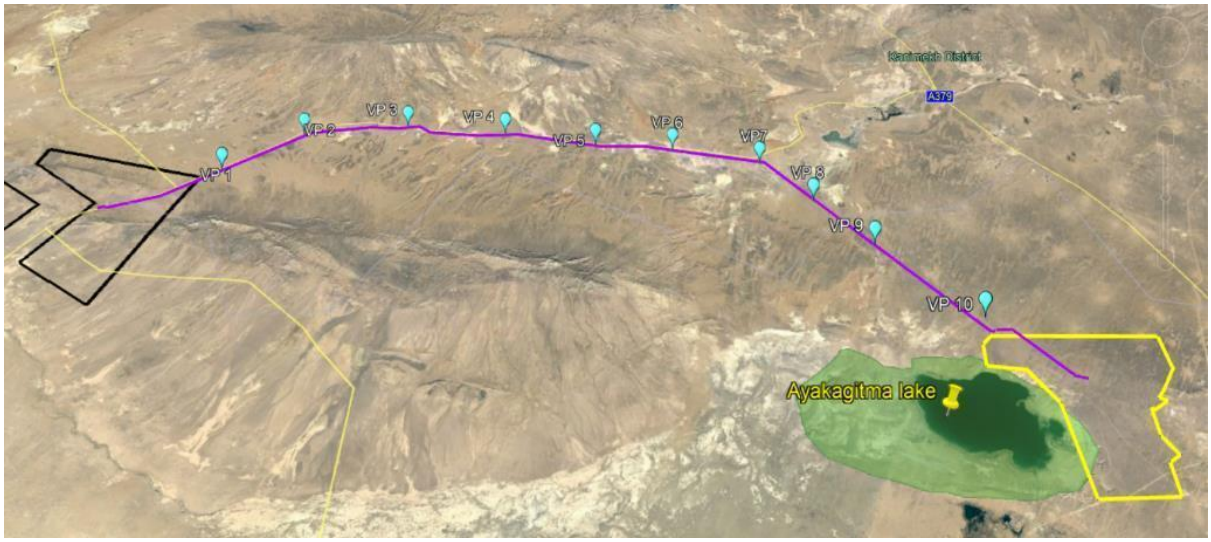
Given the homogenous landscape of the surveyed section, analogies were drawn between the surveyed area adjacent to the route and the route itself.

Visual observations of birds were made during the route survey. Bird sighting points were also marked using GPS. Bird species membership was determined visually using field binoculars with 8x magnification and Nikon and Fujifilm XT-20 digital cameras as well as audio recordings of bird voices (Xeno-canto Asia) and field bird identifiers (Mullarney, Svensson, Zetterstrom, Grant, 1999; Aye, Schweizer, Roth 2012).

Surveys were conducted at 11 selected points, in 1 km radius sections. Duration of observations was not less than 40 minutes at each vantage point. A survey of operating power lines within the project area was also carried out to assess bird mortality on operating OHTL.

Figure 2-73 Vantage points of the projected OHTL route in May 2021

Figure 2-74 Vantage points of the projected OHTL route in June 2021



Due to change of the route in June, the number of vantage points was reduced to 10.

2.12.1.2 Results

2.12.1.2.1 Dzhankeldy Wind Farm

A total of 8 individuals were recorded during the VP survey. Majority of the sightings were made during the Autumn survey; three in the month of September and four in October. Only individual was observed in December during the Winter Survey. None were seen during the summer and spring surveys.

2.12.1.2.2 Dzhankeldy-Bash OHTL

There were no recorded sightings of the Eastern Imperial Eagle along the proposed OHTL route nor within the project boundary.

2.12.2 Stakeholder Engagement

No known occurrence of the Eastern Imperial eagle has been recorded by stakeholders within the project area of influence.

2.13 Marbled Teal

The Marbled Teal (*Marmaronetta angustriostis*) is a resident, potential breeder and sometimes passage migrant through Uzbekistan. It is a Vulnerable (VU) species on the IUCN red list.

It inhabits fairly dry, steppe-like areas on shallow freshwater, brackish or alkaline ponds with well vegetated shorelines.

It has very nomadic tendencies, dispersing in search of suitable habitat in response to changing conditions; and is also highly gregarious.

Major threats include hunting, polluted and loss of suitable habitat, and accidental entanglement in fishing gear.

2.13.1 Baseline Survey

2.13.1.1 Methods

2.13.1.1.1 Dzhankeldy Wind Farm

The Dzhankeldy WF site was comprehensively surveyed over one year (16 May 2020-20 May 2021) during all four seasons following the guidance of the Scottish Natural Heritage (SNH) guidelines (2017), which are currently the internationally accepted best-practice for onshore wind farm surveying and assessment.

A total of 10 Vantage Points (VPs) were surveyed to collect data on species, numbers, physical characteristics, and flight behaviour. The points are located so as to cover the project area as completely as possible (Figure 2-77).

The duration of survey at each vantage point was approximately 3 hours. During observations weather conditions such as wind speed and direction, and air temperature were recorded. Wind speed and air temperature were measured using an anemometer. Whenever possible,

approximate flight altitude, speed, and flight direction of the birds were recorded every 15 seconds.

During the observations, photographing and short video shooting of the birds were carried out, which were used to confirm the correct species identification and obtain additional data on the number of individuals.

During the summer 2020, autumn 2020 and spring 2021 surveys Cliffs and ledges on the Northern sides of the Western Kuldzhuktau mountain range were examined for nests of large birds of prey to identify nesting species and collect data on their nesting ecology and behaviour.

Nest locations were recorded and mapped. During the survey optical devices such as binoculars and telescopes were used. Local residents and shepherds were interviewed for information on the presence of bird predator nests in the area. Due to the lack of large trees and shrubs, nesting birds in trees was excluded. Surveys were conducted both in the project area and in the surrounding area.

Figure 2-75 Vantage Points at Dzhankeldy Wind Farm Site

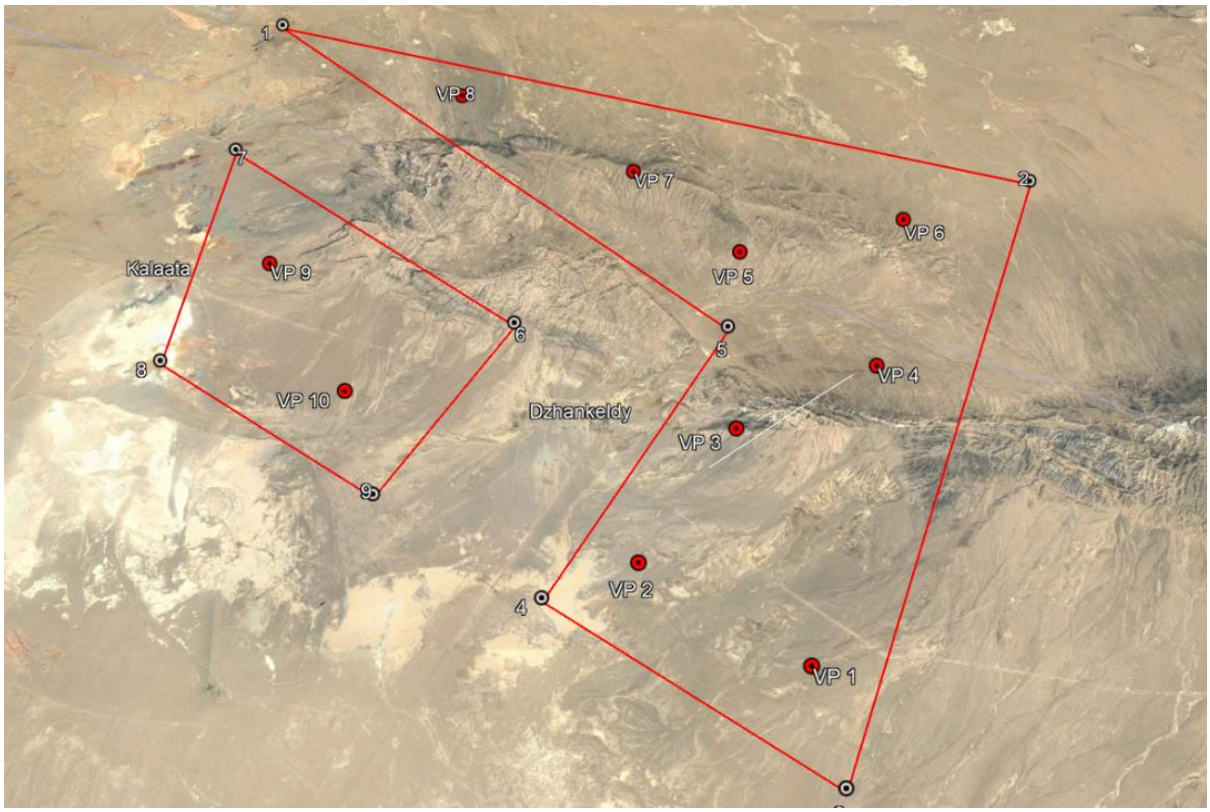


Figure 2-76 Nest Survey Routes during Summer

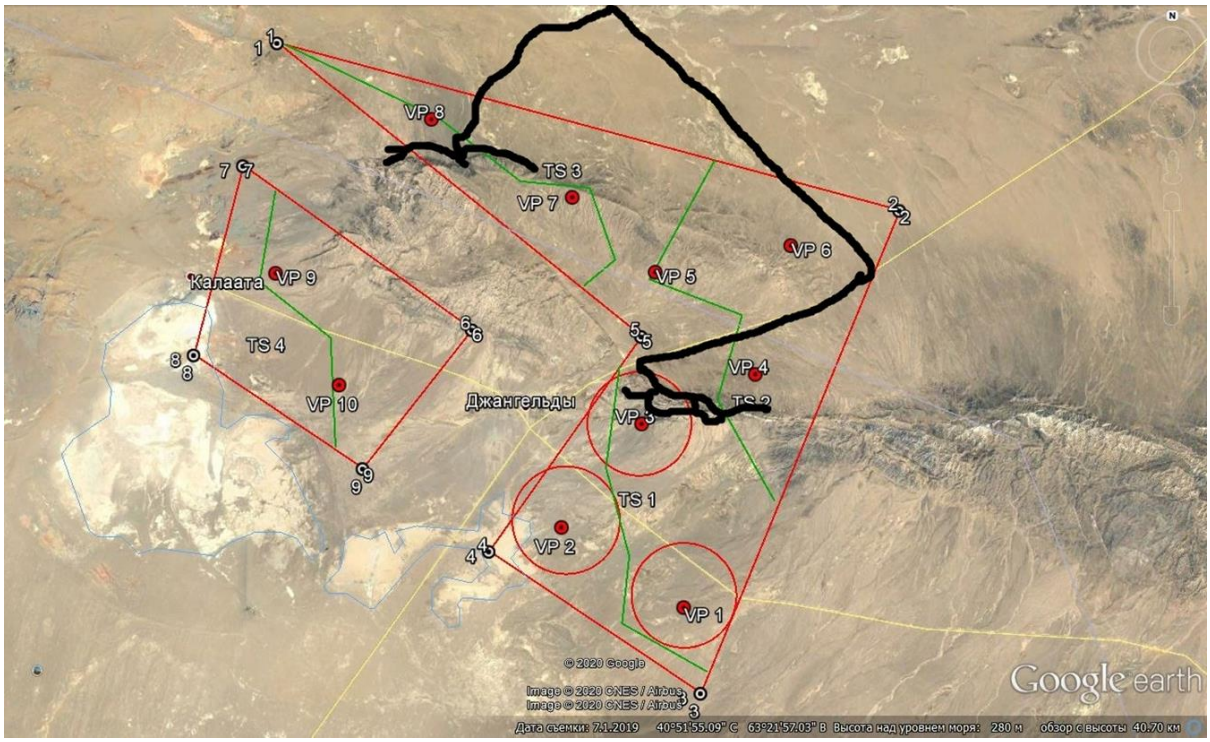
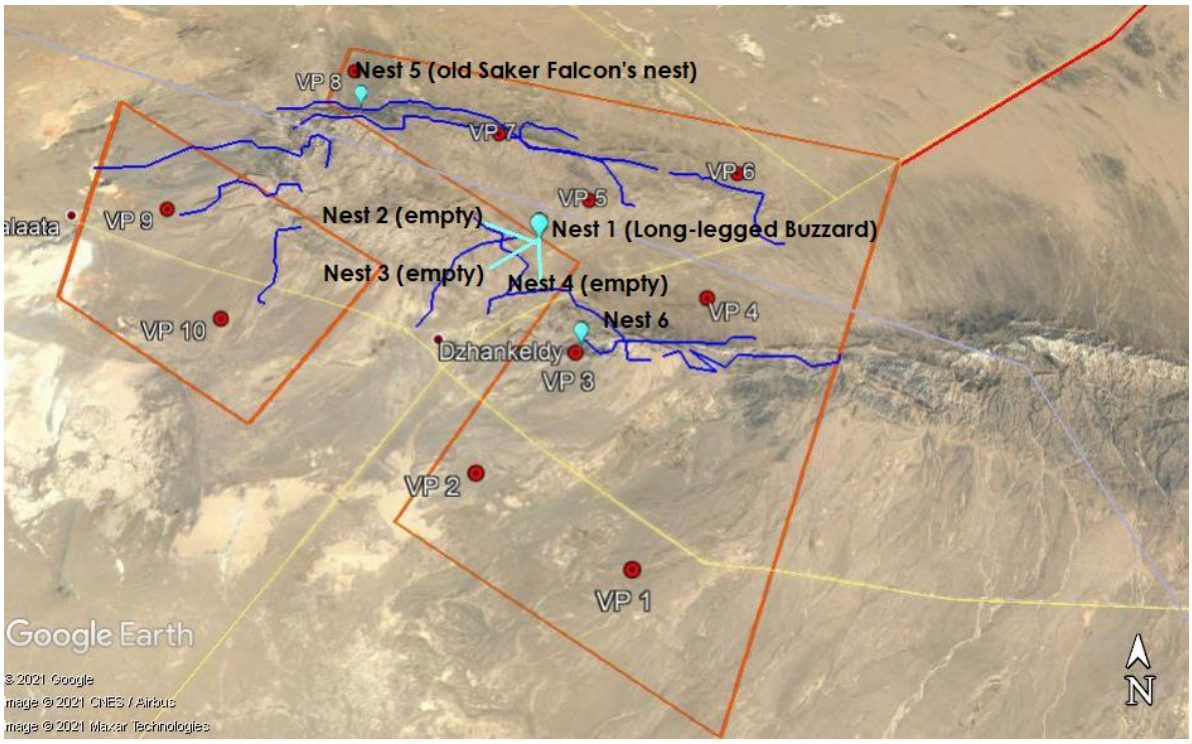


Figure 2-77 Nest Survey Routes during Spring



2.13.1.1.2 Dzhankeldy-Bash OHTL

The survey along the planned Dzhankeldy-Bash OHTL was carried out May and June 2021 at selected vantage points (VP). The points were places directly along the route of the transmission line or near it depending on the availability of access roads. The distance from the route in some places was generally not more than 1-2 km.

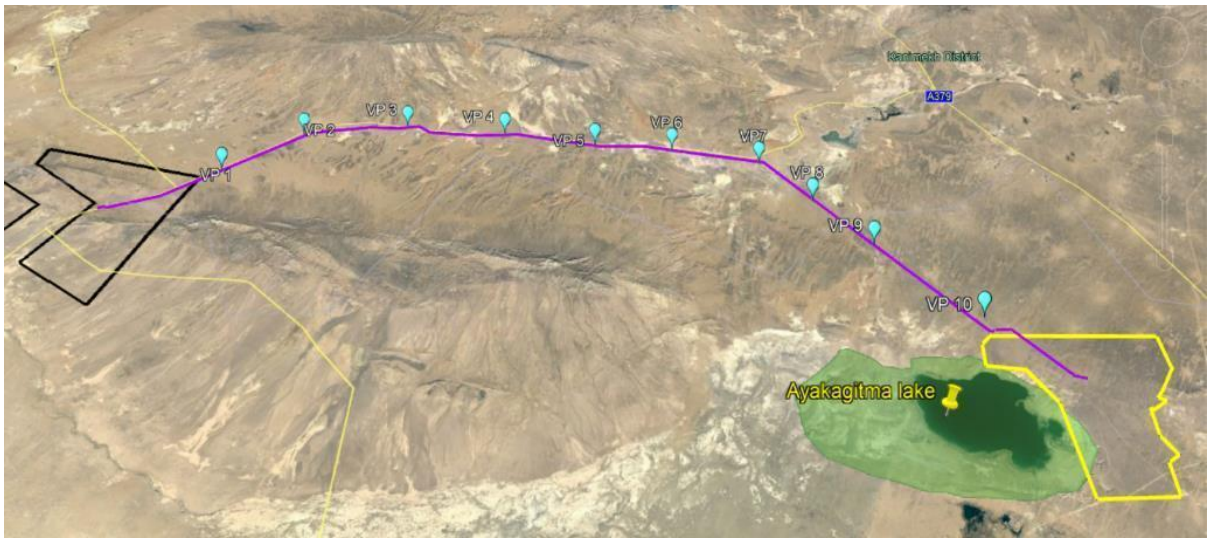
Given the homogenous landscape of the surveyed section, analogies were drawn between the surveyed area adjacent to the route and the route itself.

Visual observations of birds were made during the route survey. Bird sighting points were also marked using GPS. Bird species membership was determined visually using field binoculars with 8x magnification and Nikon and Fujifilm XT-20 digital cameras as well as audio recordings of bird voices (Xeno-canto Asia) and field bird identifiers (Mullarney, Svensson, Zetterstrom, Grant, 1999; Aye, Schweizer, Roth 2012).

Surveys were conducted at 11 selected points, in 1 km radius sections. Duration of observations was not less than 40 minutes at each vantage point. A survey of operating power lines within the project area was also carried out to assess bird mortality on operating OHTL.

Figure 2-78 Vantage points of the projected OHTL route in May 2021

Figure 2-79 Vantage points of the projected OHTL route in June 2021



Due to change of the route in June, the number of vantage points was reduced to 10.

2.13.1.2 Results

2.13.1.2.1 Dzhankeldy Wind Farm

Although the Marbled Teal are known to occur in the region, there were no recorded sightings of the species during the VP surveys.

2.13.1.2.2 Dzhankeldy-Bash OHTL

There were no recorded sightings of this species during the OHTL surveys

2.13.2 Stakeholder Engagement

No known occurrence of the Marbled Teal has been recorded by stakeholders within the project area of influence.

2.14 Lesser White-fronted Goose

The Lesser White -fronted Goose (*Anser erythropus*) is a passage migrant throughout Uzbekistan. Southbound migration begins in August/September. Northbound migration begins in late February and return to breeding grounds occur in May/June.

During winter and on migration, this species frequents open short grassland in the steppe and semi-arid zones; winter roosting colonies are also formed on large lakes and rivers.

This species is highly gregarious outside of the breeding season.

Major threats include illegal poaching and accidental shooting, breeding disturbances, and climate change (as tundra habitat is required for breeding). It is a Vulnerable (VU) species on the IUCN red list.

2.14.1 Baseline Survey

2.14.1.1 Methods

2.14.1.1.1 Dzhankeldy Wind Farm

The Dzhankeldy WF site was comprehensively surveyed over one year (16 May 2020-20 May 2021) during all four seasons following the guidance of the Scottish Natural Heritage (SNH) guidelines (2017), which are currently the internationally accepted best-practice for onshore wind farm surveying and assessment.

A total of 10 Vantage Points (VPs) were surveyed to collect data on species, numbers, physical characteristics, and flight behaviour. The points are located so as to cover the project area as completely as possible (Figure 2-82).

The duration of survey at each vantage point was approximately 3 hours. During observations weather conditions such as wind speed and direction, and air temperature were recorded. Wind speed and air temperature were measured using an anemometer. Whenever possible, approximate flight altitude, speed, and flight direction of the birds were recorded every 15 seconds.

During the observations, photographing and short video shooting of the birds were carried out, which were used to confirm the correct species identification and obtain additional data on the number of individuals.

During the summer 2020, autumn 2020 and spring 2021 surveys Cliffs and ledges on the Northern sides of the Western Kuldzhuktau mountain range were examined for nests of large birds of prey to identify nesting species and collect data on their nesting ecology and behaviour.

Nest locations were recorded and mapped. During the survey optical devices such as binoculars and telescopes were used. Local residents and shepherds were interviewed for information on the presence of bird predator nests in the area. Due to the lack of large trees

and shrubs, nesting birds in trees was excluded. Surveys were conducted both in the project area and in the surrounding area.

Figure 2-80 Vantage Points at Dzhankeldy Wind Farm Site

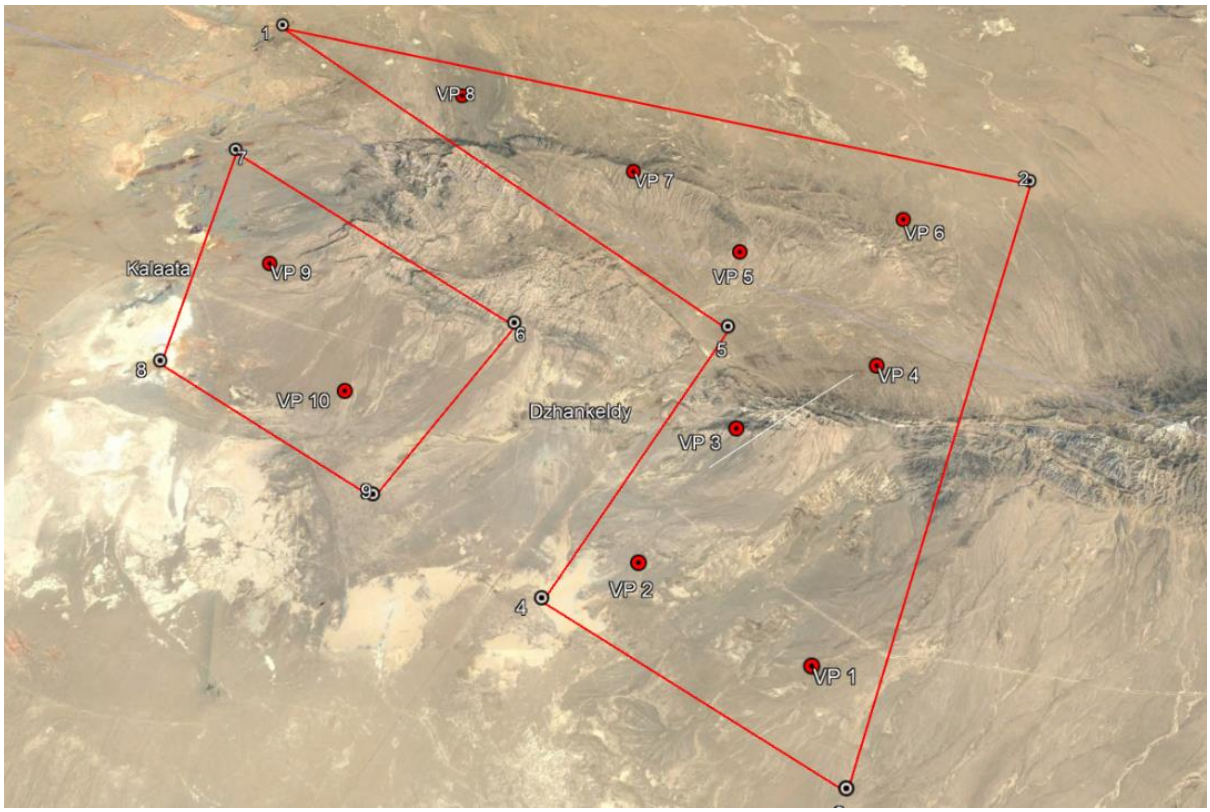


Figure 2-81 Nest Survey Routes during Summer

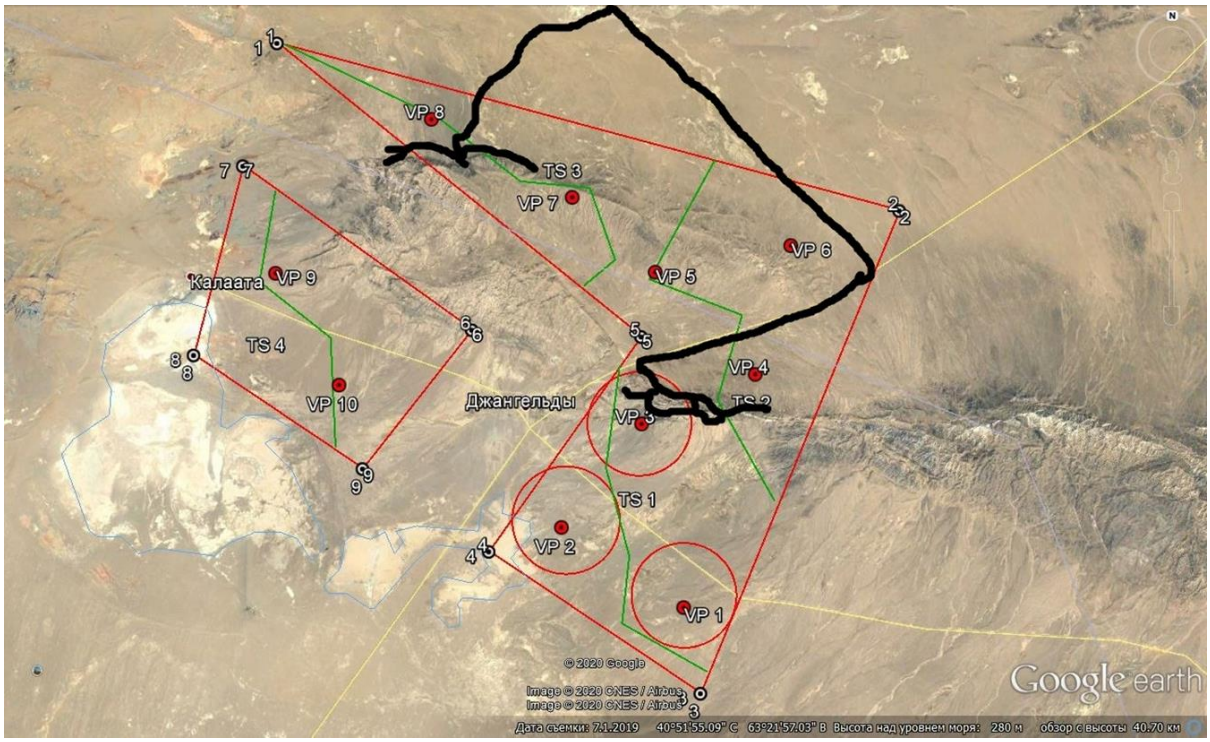
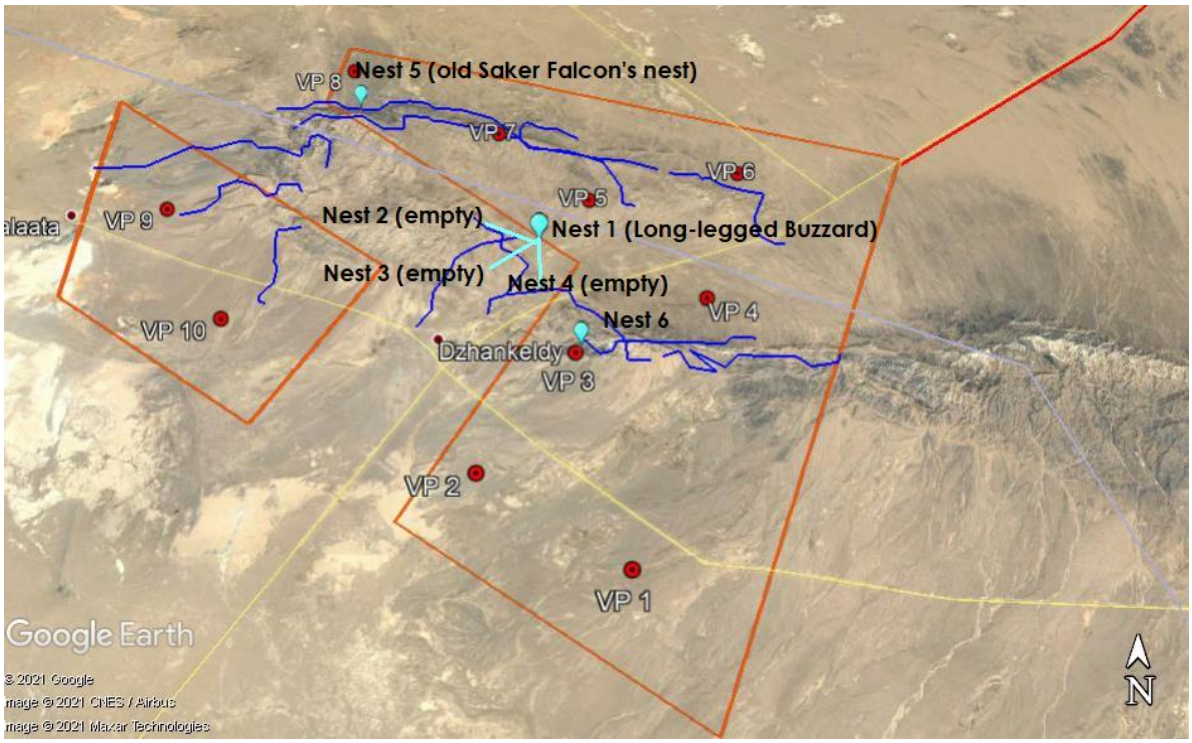


Figure 2-82 Nest Survey Routes during Spring



2.14.1.1.2 Dzhankeldy-Bash OHTL

The survey along the planned Dzhankeldy-Bash OHTL was carried out May and June 2021 at selected vantage points (VP). The points were places directly along the route of the transmission line or near it depending on the availability of access roads. The distance from the route in some places was generally not more than 1-2 km.

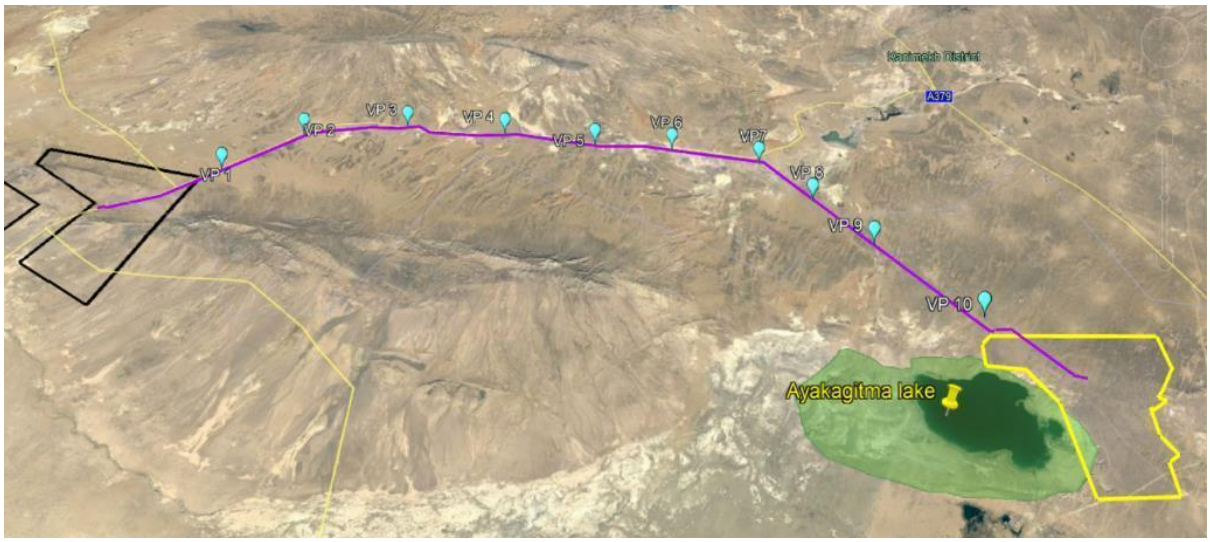
Given the homogenous landscape of the surveyed section, analogies were drawn between the surveyed area adjacent to the route and the route itself.

Visual observations of birds were made during the route survey. Bird sighting points were also marked using GPS. Bird species membership was determined visually using field binoculars with 8x magnification and Nikon and Fujifilm XT-20 digital cameras as well as audio recordings of bird voices (Xeno-canto Asia) and field bird identifiers (Mullarney, Svensson, Zetterstrom, Grant, 1999; Aye, Schweizer, Roth 2012).

Surveys were conducted at 11 selected points, in 1 km radius sections. Duration of observations was not less than 40 minutes at each vantage point. A survey of operating power lines within the project area was also carried out to assess bird mortality on operating OHTL.

Figure 2-83 Vantage points of the projected OHTL route in May 2021

Figure 2-84 Vantage points of the projected OHTL route in June 2021



Due to change of the route in June, the number of vantage points was reduced to 10.

2.14.1.2 Results

2.14.1.2.1 Dzhankeldy Wind Farm

Although the Lesser White-fronted Goose are known to occur in the region, there were no recorded sightings of the species during the VP surveys.

2.14.1.2.2 Dzhankeldy-Bash OHTL

There were no recorded sightings of this species during the OHTL surveys

2.14.2 Stakeholder Engagement

No known occurrence of the Lesser White-fronted Goose has been recorded by stakeholders within the project area of influence.

2.15 Common Pochard

The Common Pochard (*Aythya ferina*) is a potential breeder in Uzbekistan. It is a Vulnerable (VU) species on the IUCN red list.

Breeding begins in April/May. Breeds in habitat such as large lakes, slow-flowing rivers, reservoirs, brackish waters, marshes, weirs.

Major threats include nest predation from introduced mammals, habitat loss and disturbance, hunting, and decline in water quality.

2.15.1 Baseline Survey

2.15.1.1 Methods

2.15.1.1.1 Dzhankeldy Wind Farm

The Dzhankeldy WF site was comprehensively surveyed over one year (16 May 2020-20 May 2021) during all four seasons following the guidance of the Scottish Natural Heritage (SNH) guidelines (2017), which are currently the internationally accepted best-practice for onshore wind farm surveying and assessment.

A total of 10 Vantage Points (VPs) were surveyed to collect data on species, numbers, physical characteristics, and flight behaviour. The points are located so as to cover the project area as completely as possible (Figure 2-87).

The duration of survey at each vantage point was approximately 3 hours. During observations weather conditions such as wind speed and direction, and air temperature were recorded. Wind speed and air temperature were measured using an anemometer. Whenever possible, approximate flight altitude, speed, and flight direction of the birds were recorded every 15 seconds.

During the observations, photographing and short video shooting of the birds were carried out, which were used to confirm the correct species identification and obtain additional data on the number of individuals.

During the summer 2020, autumn 2020 and spring 2021 surveys Cliffs and ledges on the Northern sides of the Western Kuldzhuktau mountain range were examined for nests of large birds of prey to identify nesting species and collect data on their nesting ecology and behaviour.

Nest locations were recorded and mapped. During the survey optical devices such as binoculars and telescopes were used. Local residents and shepherds were interviewed for information on the presence of bird predator nests in the area. Due to the lack of large trees and shrubs, nesting birds in trees was excluded. Surveys were conducted both in the project area and in the surrounding area.

Figure 2-85 Vantage Points at Dzhankeldy Wind Farm Site

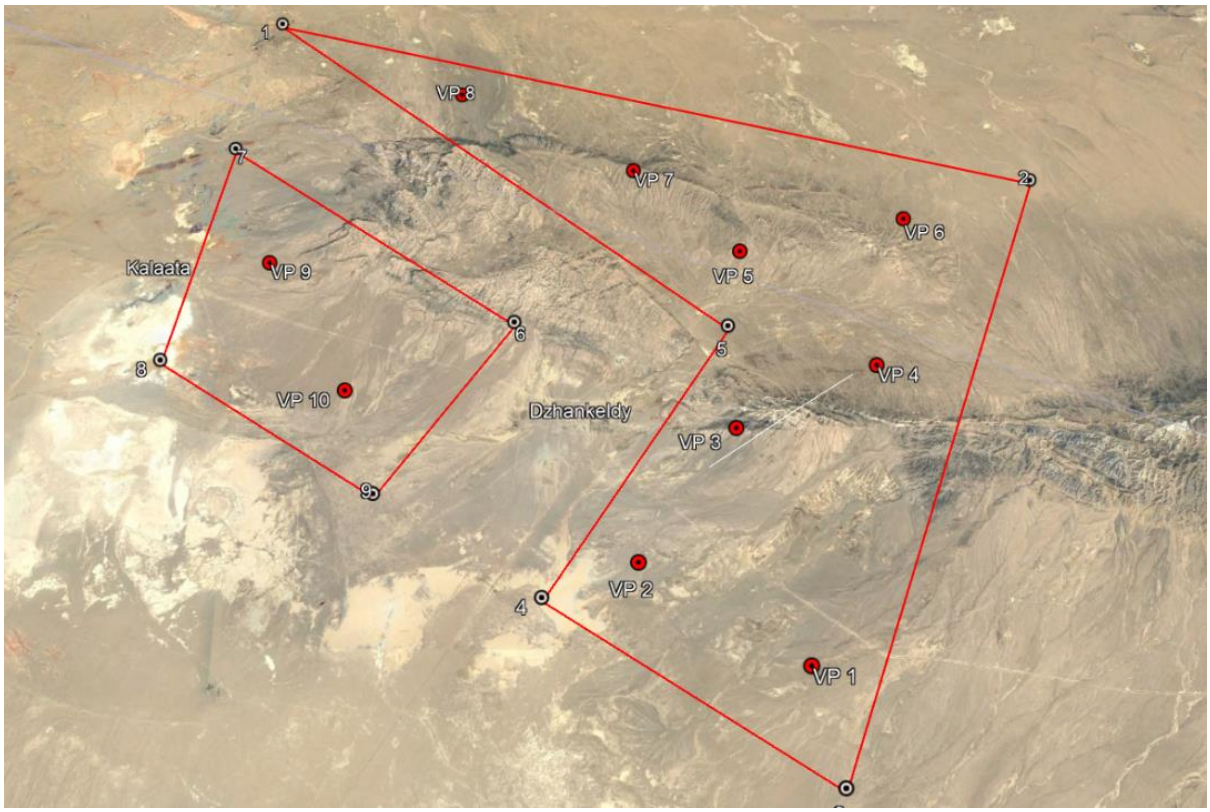


Figure 2-86 Nest Survey Routes during Summer

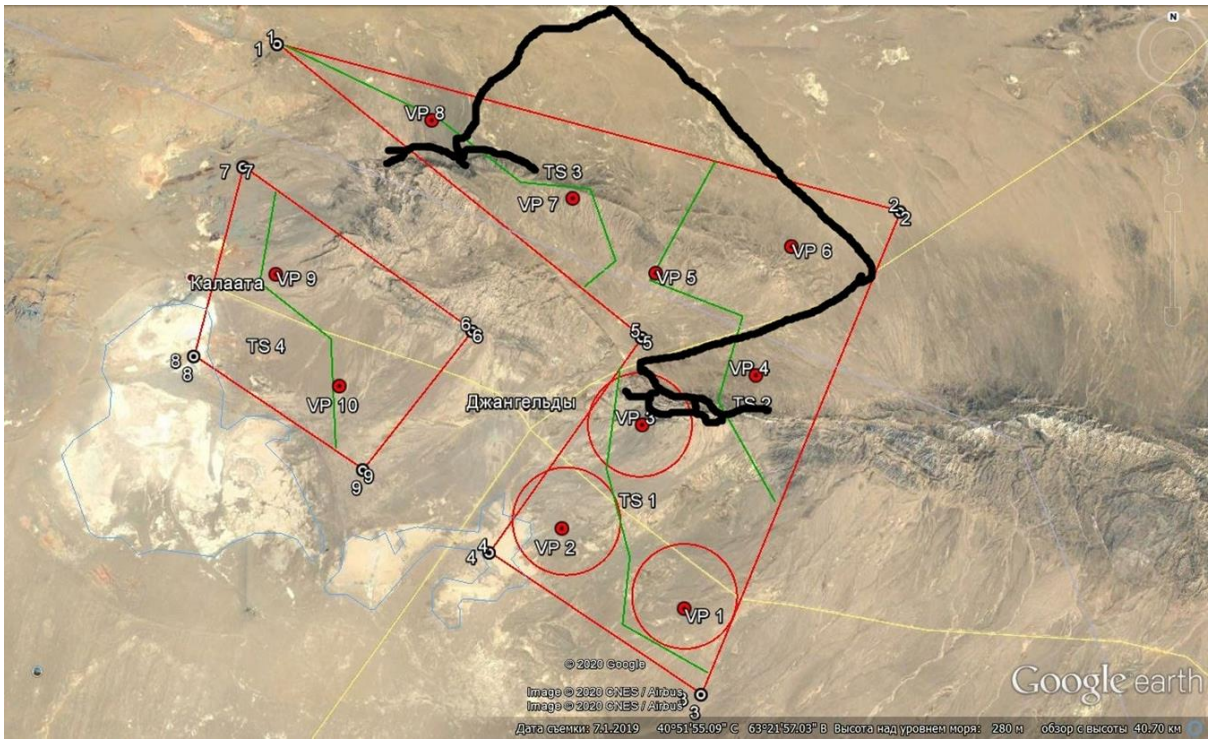
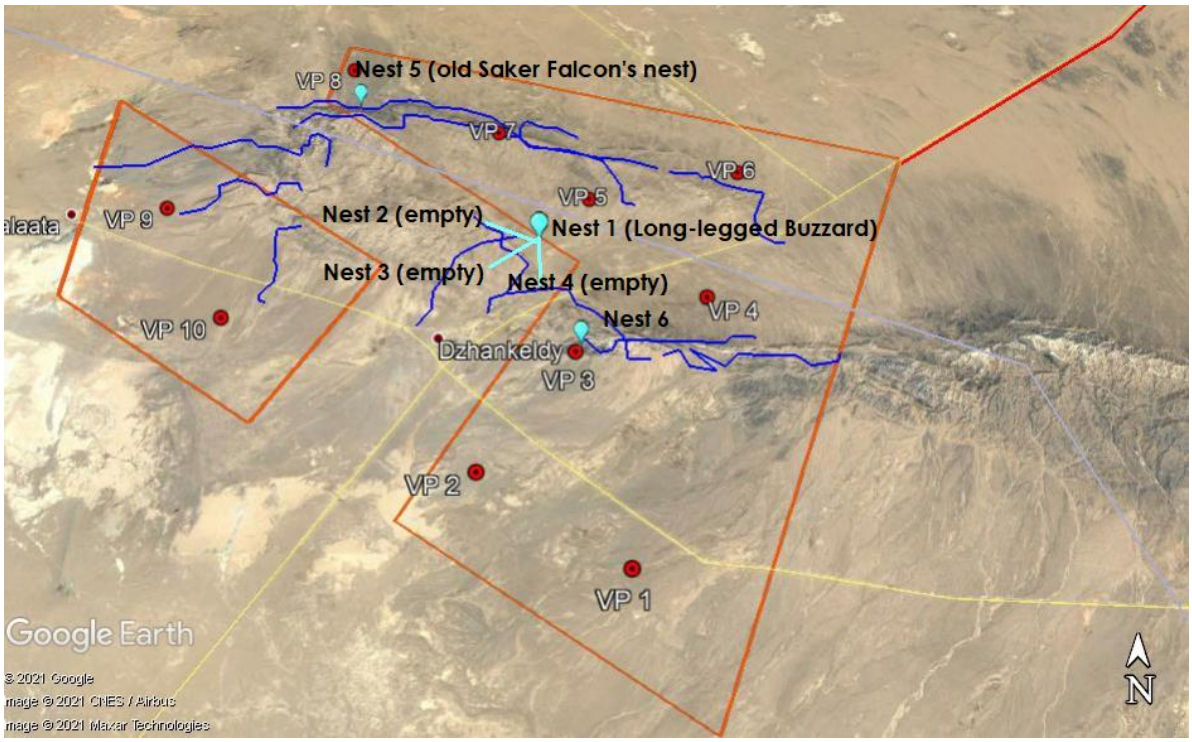


Figure 2-87 Nest Survey Routes during Spring



2.15.1.1.2 Dzhankeldy-Bash OHTL

The survey along the planned Dzhankeldy-Bash OHTL was carried out May and June 2021 at selected vantage points (VP). The points were places directly along the route of the transmission line or near it depending on the availability of access roads. The distance from the route in some places was generally not more than 1-2 km.

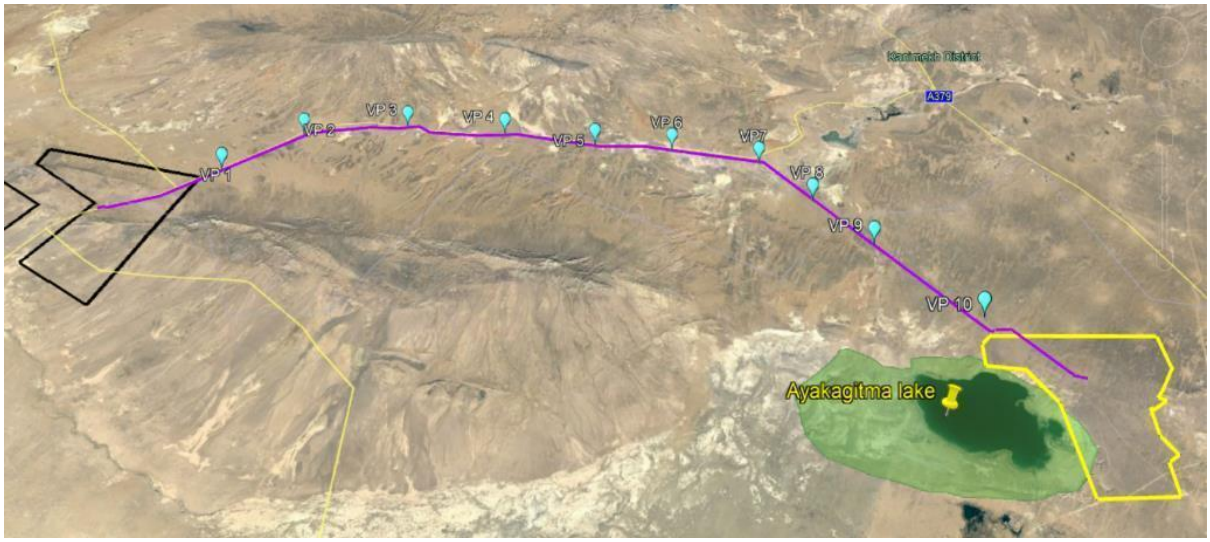
Given the homogenous landscape of the surveyed section, analogies were drawn between the surveyed area adjacent to the route and the route itself.

Visual observations of birds were made during the route survey. Bird sighting points were also marked using GPS. Bird species membership was determined visually using field binoculars with 8x magnification and Nikon and Fujifilm XT-20 digital cameras as well as audio recordings of bird voices (Xeno-canto Asia) and field bird identifiers (Mullarney, Svensson, Zetterstrom, Grant, 1999; Aye, Schweizer, Roth 2012).

Surveys were conducted at 11 selected points, in 1 km radius sections. Duration of observations was not less than 40 minutes at each vantage point. A survey of operating power lines within the project area was also carried out to assess bird mortality on operating OHTL.

Figure 2-88Vantage points of the projected OHTL route in May 2021

Figure 2-89 Vantage points of the projected OHTL route in June 2021



Due to change of the route in June, the number of vantage points was reduced to 10.

2.15.1.2 Results

2.15.1.2.1 Dzhankeldy Wind Farm

Although the Common Pochard are known to occur in the region, there were no recorded sightings of the species during the VP surveys of the Dzhankeldy Wind Farm.

2.15.1.2.2 Dzhankeldy -Bash OHTL

There were no recorded sightings of this species during the OHTL surveys.

2.15.2 Stakeholder Engagement

4500 common pochards were recorded in this area during water bird surveys conducted by the Department of Biology of the Bukhara State University and the Bukhara State Medical Institute, employees of the Bukhara Regional Department of Ecology and Environmental Protection, the Bukhara regional branch of the Sports Association of Hunters and Fishermen of Uzbekistan in March 2020 Lake Ayakagytma.

2.16 Great Bustard

The Great Bustard (*Otis tarda*) is a passage migrant through Uzbekistan. It is a Vulnerable (VU) species on the IUCN red list.

Preferred habitat is open, flat or somewhat rolling landscapes, usually with a mixture of crops and grasslands/steppe .

Major threats include habitat loss, fragmentation and disturbance; as well as collision with powerlines and wind turbines.

2.16.1 Baseline Survey

2.16.1.1 Methods

2.16.1.1.1 Dzhankeldy Wind Farm

The Dzhankeldy WF site was comprehensively surveyed over one year (16 May 2020-20 May 2021) during all four seasons following the guidance of the Scottish Natural Heritage (SNH) guidelines (2017), which are currently the internationally accepted best-practice for onshore wind farm surveying and assessment.

A total of 10 Vantage Points (VPs) were surveyed to collect data on species, numbers, physical characteristics, and flight behaviour. The points are located so as to cover the project area as completely as possible (Figure 2-92).

The duration of survey at each vantage point was approximately 3 hours. During observations weather conditions such as wind speed and direction, and air temperature were recorded. Wind speed and air temperature were measured using an anemometer. Whenever possible, approximate flight altitude, speed, and flight direction of the birds were recorded every 15 seconds.

During the observations, photographing and short video shooting of the birds were carried out, which were used to confirm the correct species identification and obtain additional data on the number of individuals.

During the summer 2020, autumn 2020 and spring 2021 surveys Cliffs and ledges on the Northern sides of the Western Kuldzhuktau mountain range were examined for nests of large birds of prey to identify nesting species and collect data on their nesting ecology and behaviour.

Nest locations were recorded and mapped. During the survey optical devices such as binoculars and telescopes were used. Local residents and shepherds were interviewed for information on the presence of bird predator nests in the area. Due to the lack of large trees and shrubs, nesting birds in trees was excluded. Surveys were conducted both in the project area and in the surrounding area.

Figure 2-90 Vantage Points at Dzhankeldy Wind Farm Site

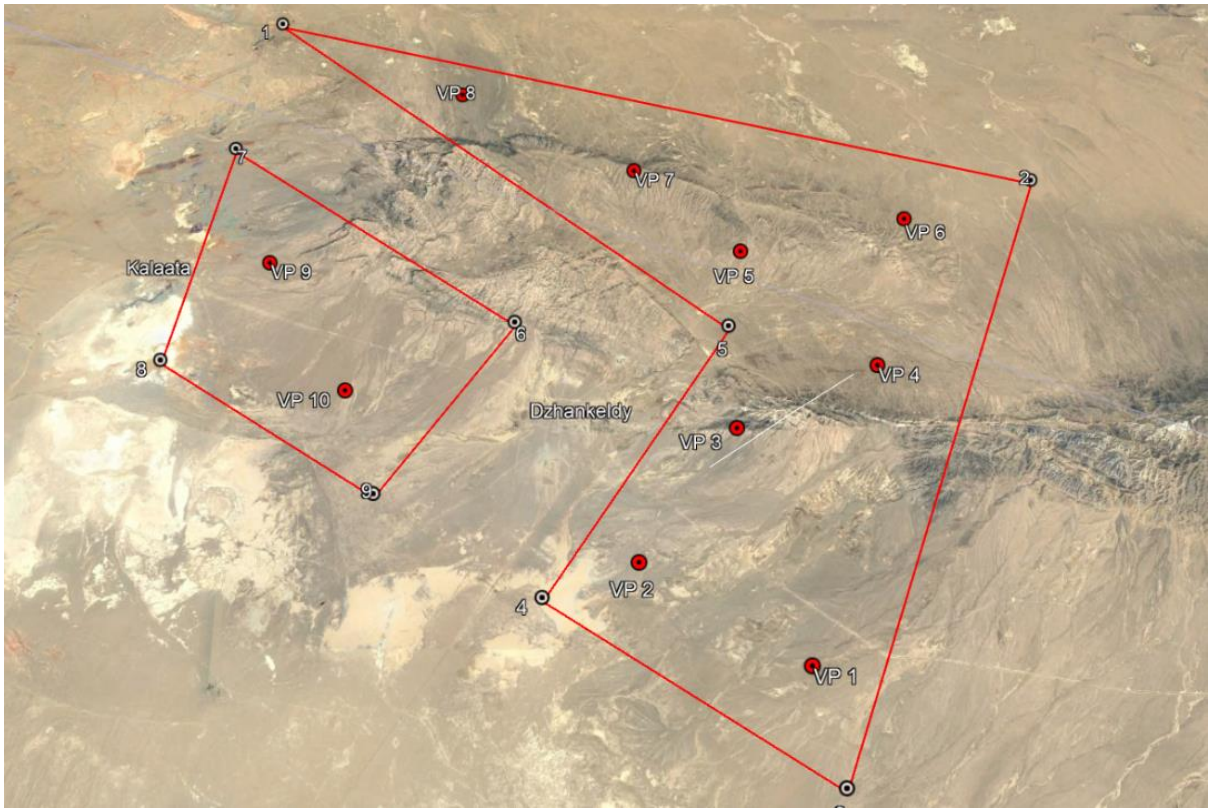


Figure 2-91 Nest Survey Routes during Summer

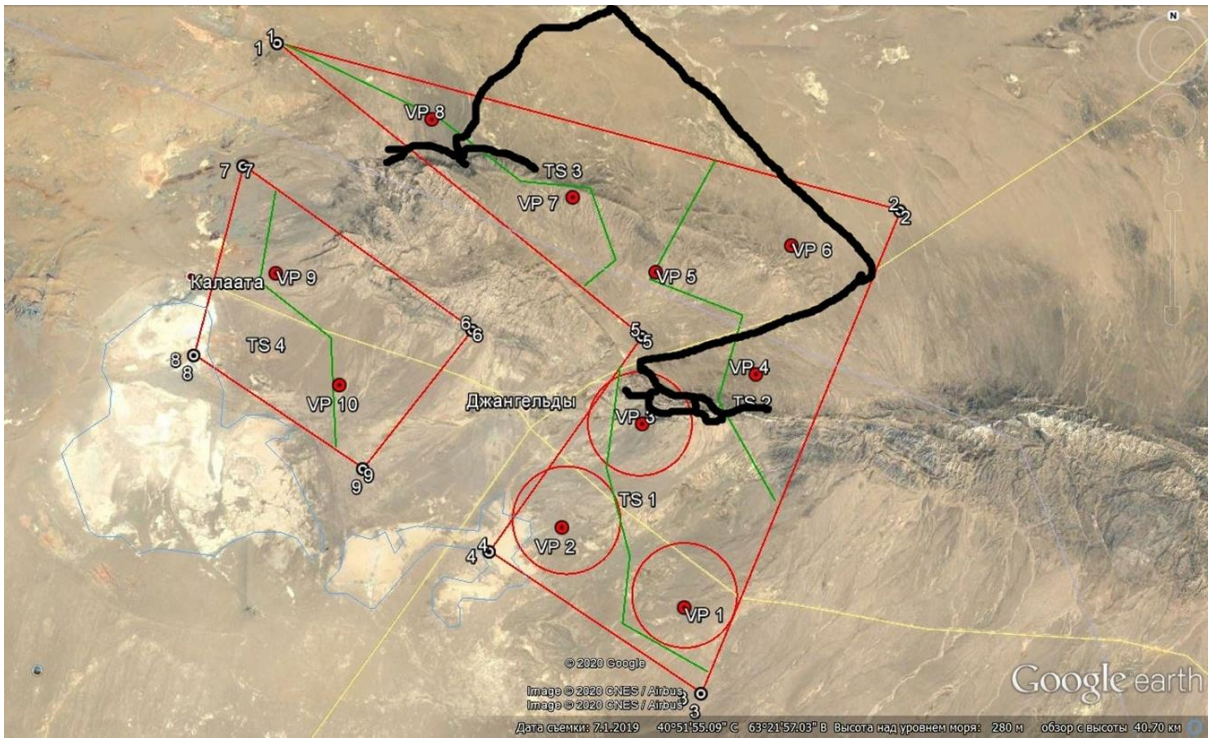
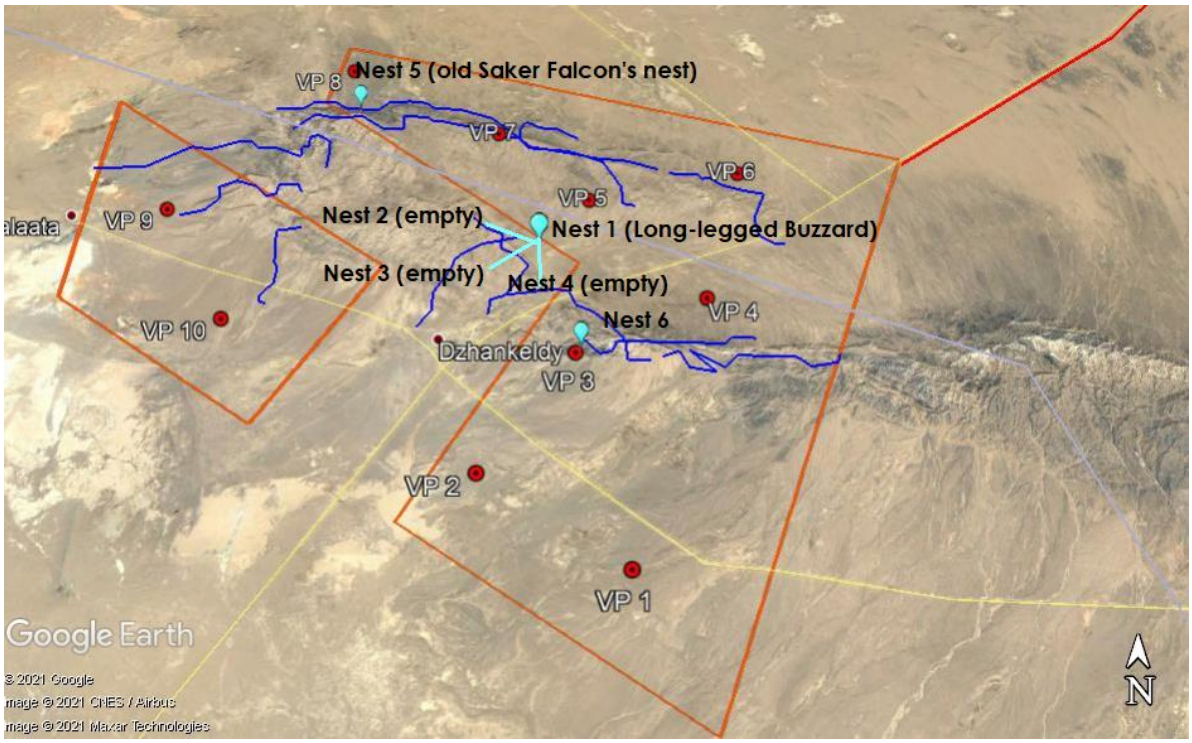


Figure 2-92 Nest Survey Routes during Spring



2.16.1.1.2 Dzhankeldy-Bash OHTL

The survey along the planned Dzhankeldy-Bash OHTL was carried out May and June 2021 at selected vantage points (VP). The points were places directly along the route of the transmission line or near it depending on the availability of access roads. The distance from the route in some places was generally not more than 1-2 km.

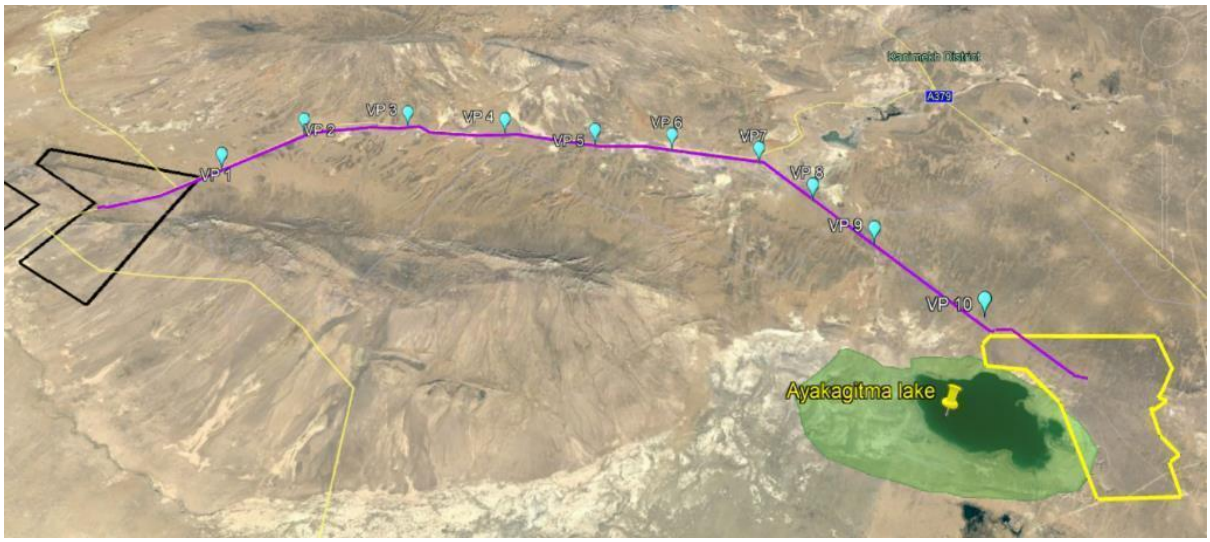
Given the homogenous landscape of the surveyed section, analogies were drawn between the surveyed area adjacent to the route and the route itself.

Visual observations of birds were made during the route survey. Bird sighting points were also marked using GPS. Bird species membership was determined visually using field binoculars with 8x magnification and Nikon and Fujifilm XT-20 digital cameras as well as audio recordings of bird voices (Xeno-canto Asia) and field bird identifiers (Mullarney, Svensson, Zetterstrom, Grant, 1999; Aye, Schweizer, Roth 2012).

Surveys were conducted at 11 selected points, in 1 km radius sections. Duration of observations was not less than 40 minutes at each vantage point. A survey of operating power lines within the project area was also carried out to assess bird mortality on operating OHTL.

Figure 2-93 Vantage points of the projected OHTL route in May 2021

Figure 2-94 Vantage points of the projected OHTL route in June 2021



Due to change of the route in June, the number of vantage points was reduced to 10.

2.16.1.2 Results

2.16.1.2.1 Dzhankeldy Wind Farm

Although the Great Bustard are known to occur in the region, there were no recorded sightings of the species during the VP surveys.

2.16.1.2.2 Dzhankeldy -Bash OHTL

There were no recorded sightings of this species during the OHTL surveys.

2.16.2 Stakeholder Engagement

No known occurrence of the Great Bustard has been recorded by stakeholders within the project area of influence.

2.17 Asian Houbara

The Asian Houbara *Chlamydotis macqueenii* is a breeding resident in Uzbekistan. It is listed as Vulnerable, VU on the IUCN red list

Preferred habitat is open, arid and sparsely vegetated steppe and semi-desert.

Major threats include habitat loss, fragmentation and disturbance; collision with powerlines; and hunting (falconry) or offtake (for falconry training). ‘

The Houbara Bustard breeding program is being implemented in Uzbekistan by *Emirates Center for the Conservation of Houbara.* Ayakagytma lake and the project site are covered by Houbara Bustard breeding program.

The wind farm project is located in the research area of the scientific group of the University of East-Anglia UK (led by Dr. John Burnside). Their surveys indicate that the project area of Navoi Bash is important for nesting and migration of Asian Houbara [1] [2].

2.17.1 Baseline Survey

2.17.1.1 Methods

2.17.1.1.1 Dzhankeldy Wind Farm

The Dzhankeldy WF site was comprehensively surveyed over one year (16 May 2020-20 May 2021) during all four seasons following the guidance of the Scottish Natural Heritage (SNH) guidelines (2017), which are currently the internationally accepted best-practice for onshore wind farm surveying and assessment.

A total of 10 Vantage Points (VPs) were surveyed to collect data on species, numbers, physical characteristics, and flight behaviour. The points are located so as to cover the project area as completely as possible (Figure 2-97).

The duration of survey at each vantage point was approximately 3 hours. During observations weather conditions such as wind speed and direction, and air temperature were recorded. Wind speed and air temperature were measured using an anemometer. Whenever possible, approximate flight altitude, speed, and flight direction of the birds were recorded every 15 seconds.

During the observations, photographing and short video shooting of the birds were carried out, which were used to confirm the correct species identification and obtain additional data on the number of individuals.

During the summer 2020, autumn 2020 and spring 2021 surveys Cliffs and ledges on the Northern sides of the Western Kuldzhuktau mountain range were examined for nests of large

[1] Burnside, R.J., Collar, N.J., Dolman, P.M. (2017) Comparative migration strategies of wild and captive-bred Asian Houbara Chlamydotis macqueenii. Ibis 159,374–389. doi: 10.1111/ibi.12462

[2] Burnside, Buchan, C., Salliss, D., Collar, N.J., Dolman, P.M. (2020) Releases of Asian houbara must respect genetic and geographic origin to preserve inherited migration behaviour: evidence from a translocation experiment. Royal Society Open Science, https://doi.org/10.1098/rsos.200250

birds of prey to identify nesting species and collect data on their nesting ecology and behaviour.

Nest locations were recorded and mapped. During the survey optical devices such as binoculars and telescopes were used. Local residents and shepherds were interviewed for information on the presence of bird predator nests in the area. Due to the lack of large trees and shrubs, nesting birds in trees was excluded. Surveys were conducted both in the project area and in the surrounding area.

Figure 2-95 Vantage Points at Dzhankeldy Wind Farm Site

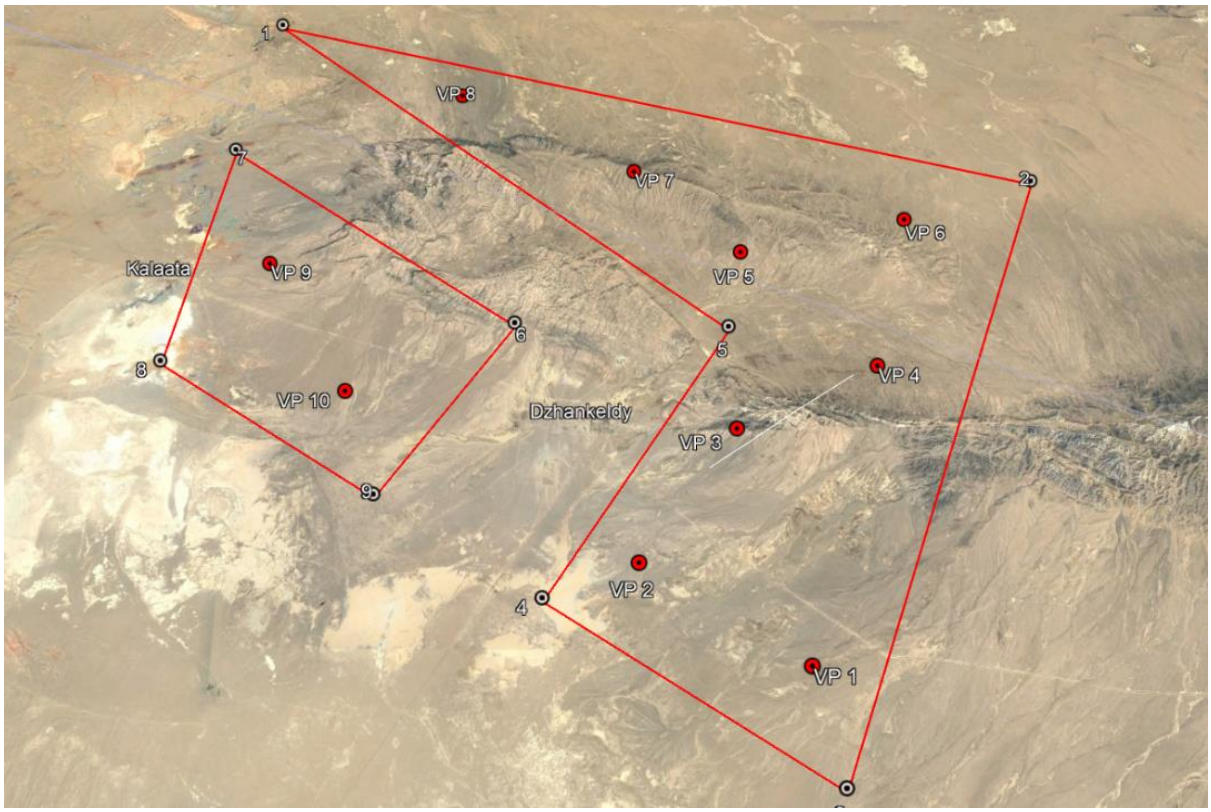


Figure 2-96 Nest Survey Routes during Summer

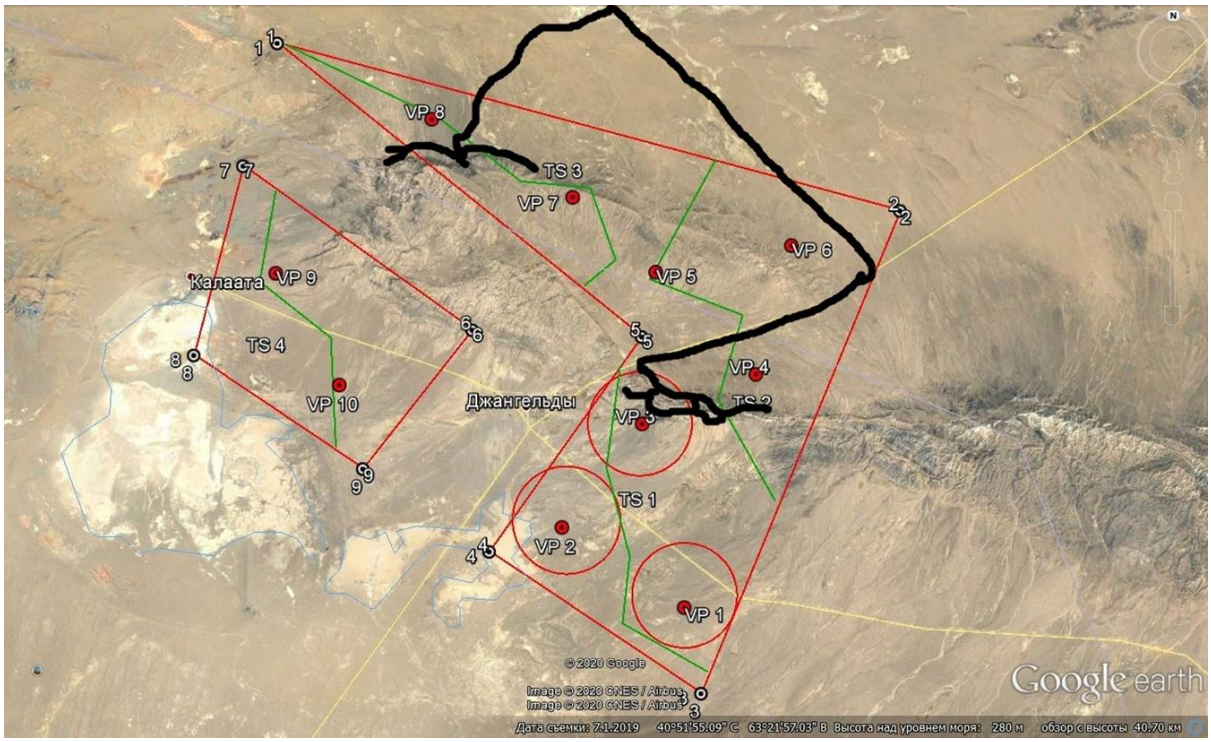
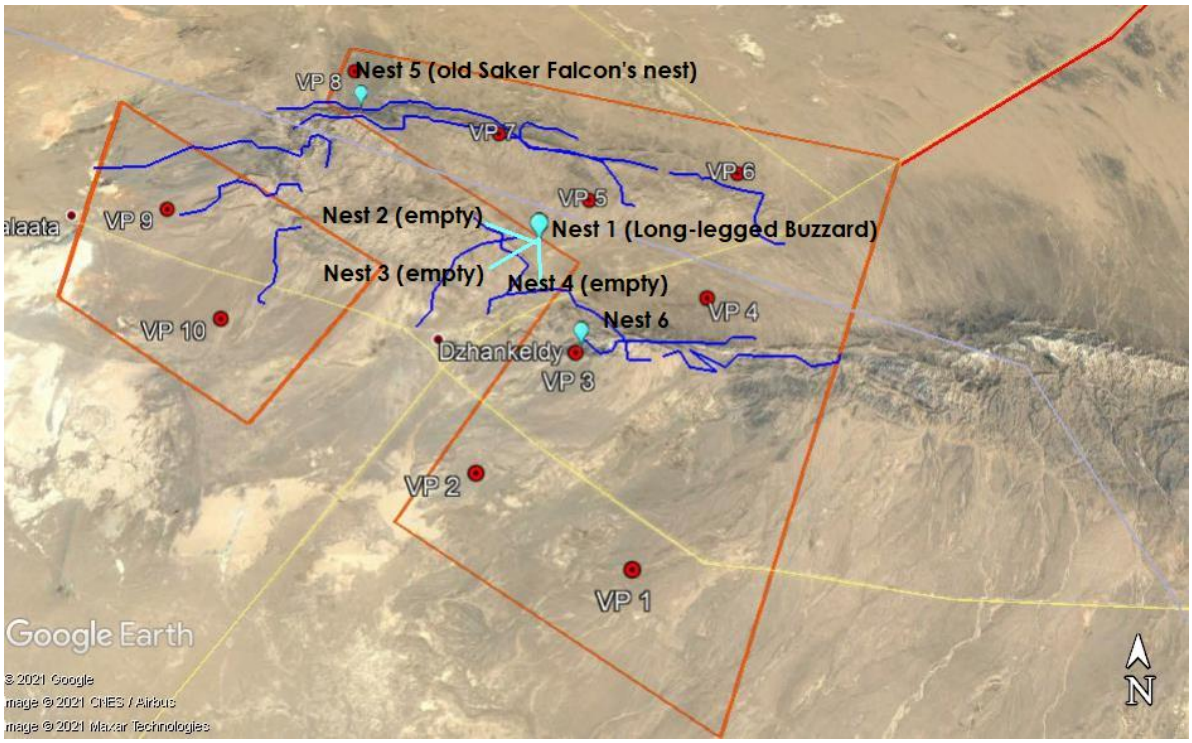


Figure 2-97 Nest Survey Routes during Spring

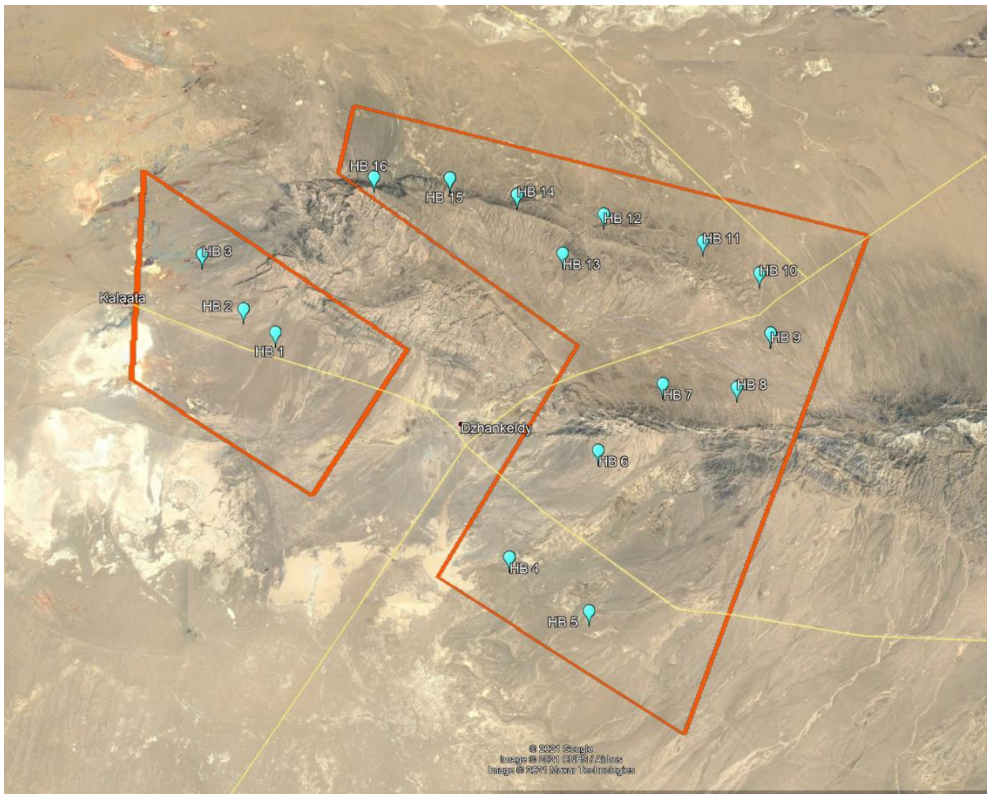


During spring 2021 specialized Asian Houbara surveys were undertaken during the peak Houbara mating season, which is one of the only times that Houbara can readily be viewed, due to the specie's intensively secretive and shy nature.

During the breeding season (March–May) displaying males (and also floating males) are conspicuous and can be apparent from long distances. This provides an opportunity for male population assessment with a relatively high degree of accuracy [3] .

Surveys were conducted on 5, 7, 10, 11, 14, 16, 22 and 23 April and on 10, 12-16 and 19 May 2021 during morning and evening hours from 6-10AM and 16-20 PM. The Houbara were surveyed from 16 points in April May with a minimum distance of 2-2.5km between each other from locations of high relief (Figure 2-100).

Figure 2-98 Houbara Observation Points at the Dzhankeldy Wind Farm Site



2.17.1.1.2 Dzhankeldy-Bash OHTL

The survey along the planned Dzhankeldy-Bash OHTL was carried out May and June 2021 at selected vantage points (VP). The points were places directly along the route of the

[3] Koshkin, M.A., Burnside, R.J., Collar, N.J., Guilherme, J.L., Showler, D.A., Dolman, P.M. (2016a) Effects of habitat and land use on breeding season density of male Asian Houbara Chlamydotis macqueenii. Journal of Ornithology 157, 811–823. doi

transmission line or near it depending on the availability of access roads. The distance from the route in some places was generally not more than 1-2 km.

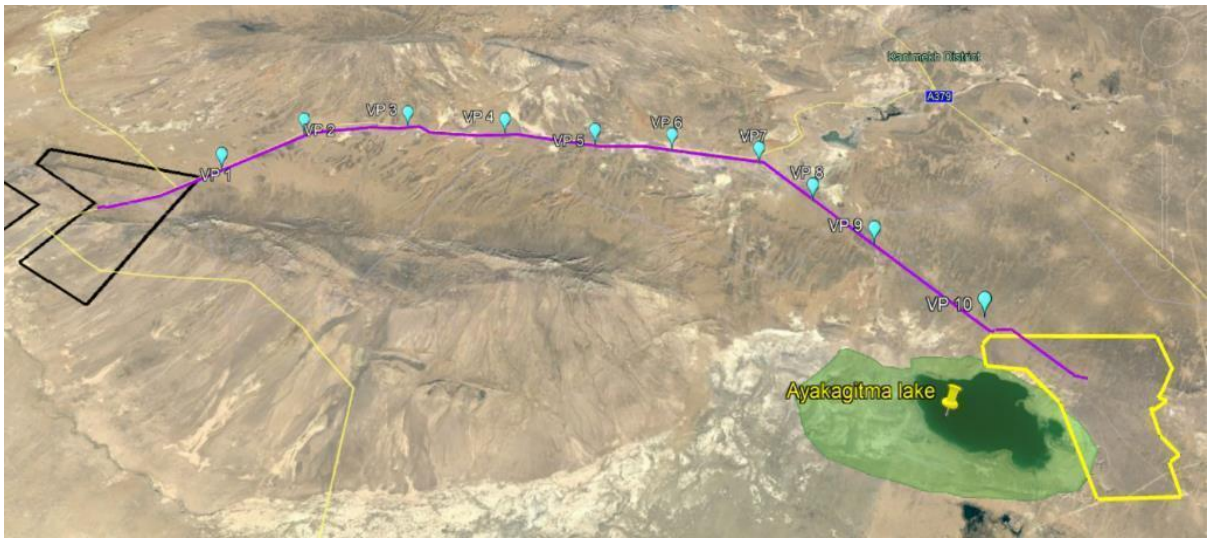
Given the homogenous landscape of the surveyed section, analogies were drawn between the surveyed area adjacent to the route and the route itself.

Visual observations of birds were made during the route survey. Bird sighting points were also marked using GPS. Bird species membership was determined visually using field binoculars with 8x magnification and Nikon and Fujifilm XT-20 digital cameras as well as audio recordings of bird voices (Xeno-canto Asia) and field bird identifiers (Mullarney, Svensson, Zetterstrom, Grant, 1999; Aye, Schweizer, Roth 2012).

Surveys were conducted at 11 selected points, in 1 km radius sections. Duration of observations was not less than 40 minutes at each vantage point. A survey of operating power lines within the project area was also carried out to assess bird mortality on operating OHTL.

Figure 2-99 Vantage points of the projected OHTL route in May 2021

Figure 2-100 Vantage points of the projected OHTL route in June 2021



Due to change of the route in June, the number of vantage points was reduced to 10.

2.17.1.2 Results

2.17.1.2.1 Dzhankeldy Wind Farm

VP survey efforts recorded four individuals in the spring. Three sightings were made in April, one at VP 9 and two at VP 10. One other was recorded in May at VP 6.

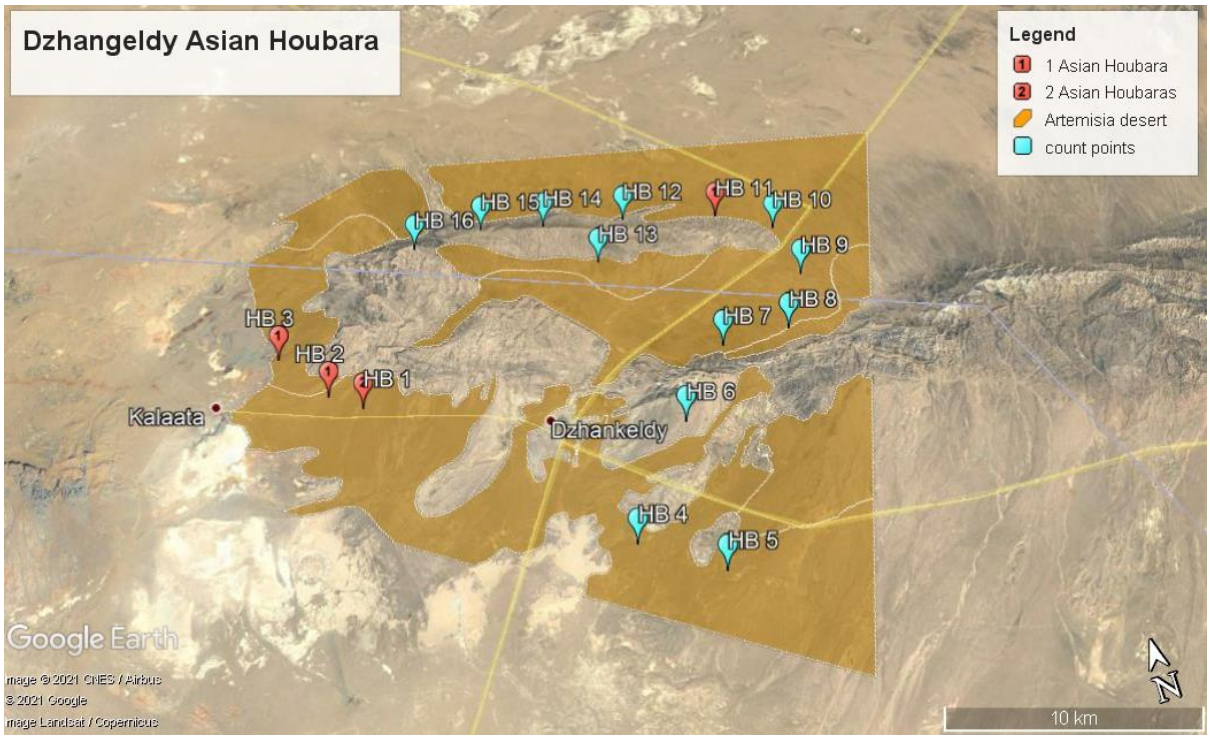
Figure 2-101 Houbara Bustard Chicks Caught on Camera Trap During Mammal Survey

In total, five (5) bustards were recorded during the Houbara Bustard Survey. The density of this species is 0.090 (0.081-0.1) birds (males)/km^2 (95% CI) [4]. The total area of suitable habitat within the Project site is 317km^2. Therefore, an extrapolated total population is estimated as 58 breeding individuals [5].

[4] Koshkin, M.A., Burnside, R.J., Collar, N.J., Guilherme, J.L., Showler, D.A., Dolman, P.M. (2016a) Effects of habitat and land use on breeding season density of male Asian Houbara Chlamydotis macqueenii. Journal of Ornithology 157, 811–823. doi: 10.1007/s10336-015-1320-4

[5] Combreau, O., Qiao, J., Lawrence, M., Gao, X. J. Yao, J., Yang, W. and Launay, F. (2002) Breeding success in a Houbara Bustard Chlamydotis [undulata] macqueenii population on the eastern fringe of the Jungar Basin, People's Republic of China. Ibis 144: E45–E56.

Figure 2-102 Houbara habitats and counts at Dzhankeldy in April-May 2021



2.17.1.2.2 Dzhankeldy-Bash OHTL

There were four sightings of the Asian Houbara along the planned OHTL, outside the VPs. Three were recorded in May near the wind farm and one was recorded near the lake at Ayakagytma . The point denoted as ' Chu' representing the location of the houbara sighting is shown in the map below (Figure 2-106)

Figure 2-103 Houbara sightings during the Dzhankeldy-Bash OHTL survey

2.17.2 Stakeholder Engagement

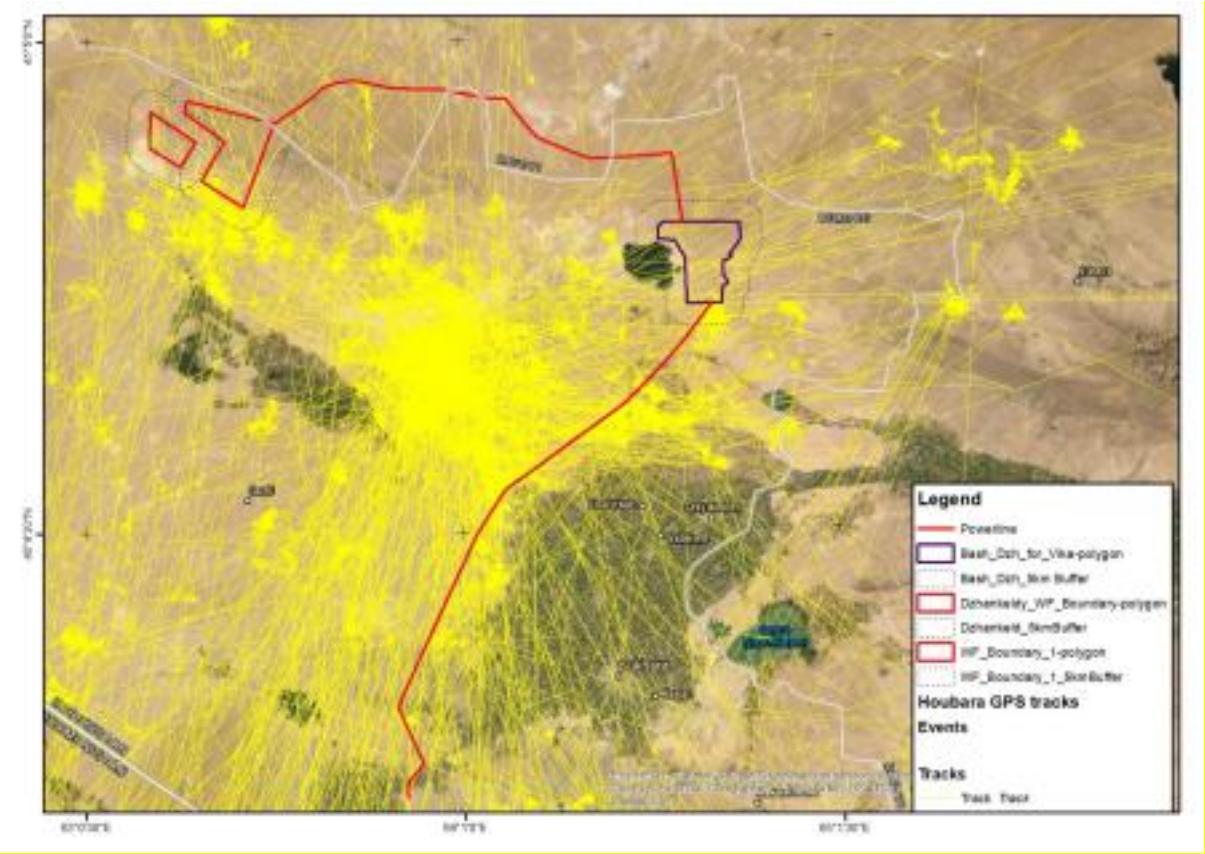
As part of the CHA Stage 2 process, requests for information related to identified biodiversity aspects of concern were distributed to known experts in the field.

Maxim Koshkin, an expert ornithologist and former survey member with the Houbara Bustard Breeding Program was consulted during the stakeholder engagement exercises for more information on the conservation concerns for this species. In his response to the RFI he has confirmed the presence of breeding birds within the wind farm site.

Stakeholder consultation exchanges with Houbara Research Specialists, Dr. Robert J. Burnside and Maxim Koshkin confirmed the use of the project site and OHTL by both breeding and non-breeding Asian Houbara using GPS tracking data. The project site comprises of a mixture different Houbara habitats all of which are of good quality. The estimated density of Asian Houbara in the project area is between 0.284-0.416 birds per km^2 (Robert J. Burnside., per comms)

The following figure provides the tracking data obtained from 48 wild Asian Houbara tracked between 2011-2021 indicating that the that the birds breeding in Bukhara move extensively throughout the region and many of the tracks cross over the project footprint.

Figure 2-104 Satellite tracking data of tagged Asian Houbara



Authors of the baseline study have also provided migration routes of satellite tracked individuals released and studied by the Emirates Centre for the Conservation of Houbara (Figure 2-107and Figure 2-108) and literature which indicate passage through Central Uzbekistan and the project site [6] [7].

[6] Burnside, R.J., Collar, N.J., Dolman, P.M. (2017) Comparative migration strategies of wild and captive bred Asian Houbara Chlamydotis macqueenii. Ibis 159,374–389. doi: 10.1111/ibi.12462

[7] Burnside, Buchan, C., Salliss, D., Collar, N.J., Dolman, P.M. (2020) Releases of Asian houbara must respect genetic and geographic origin to preserve inherited migration behaviour: evidence from a translocation experiment. Royal Society Open Science, https://doi.org/10.1098/rsos.200250

Figure 2-105 Migration routes used by wild Asian houbara adults from three different breeding populations in Uzbekistan

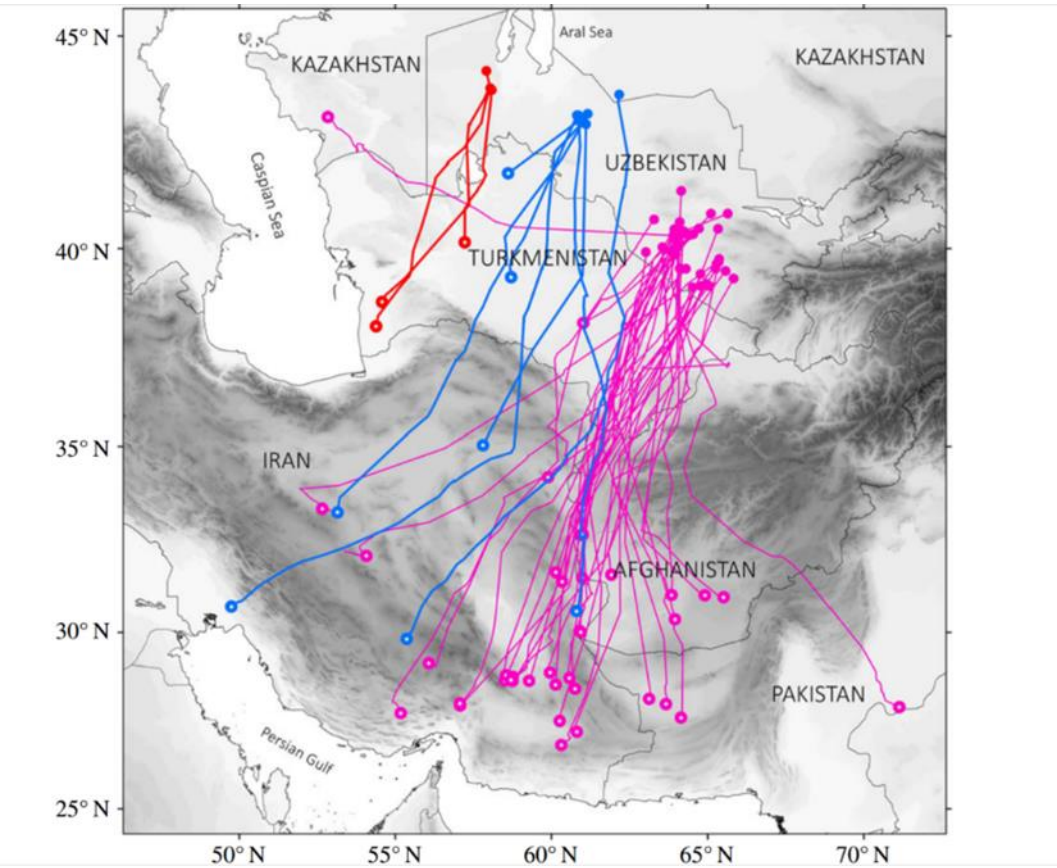
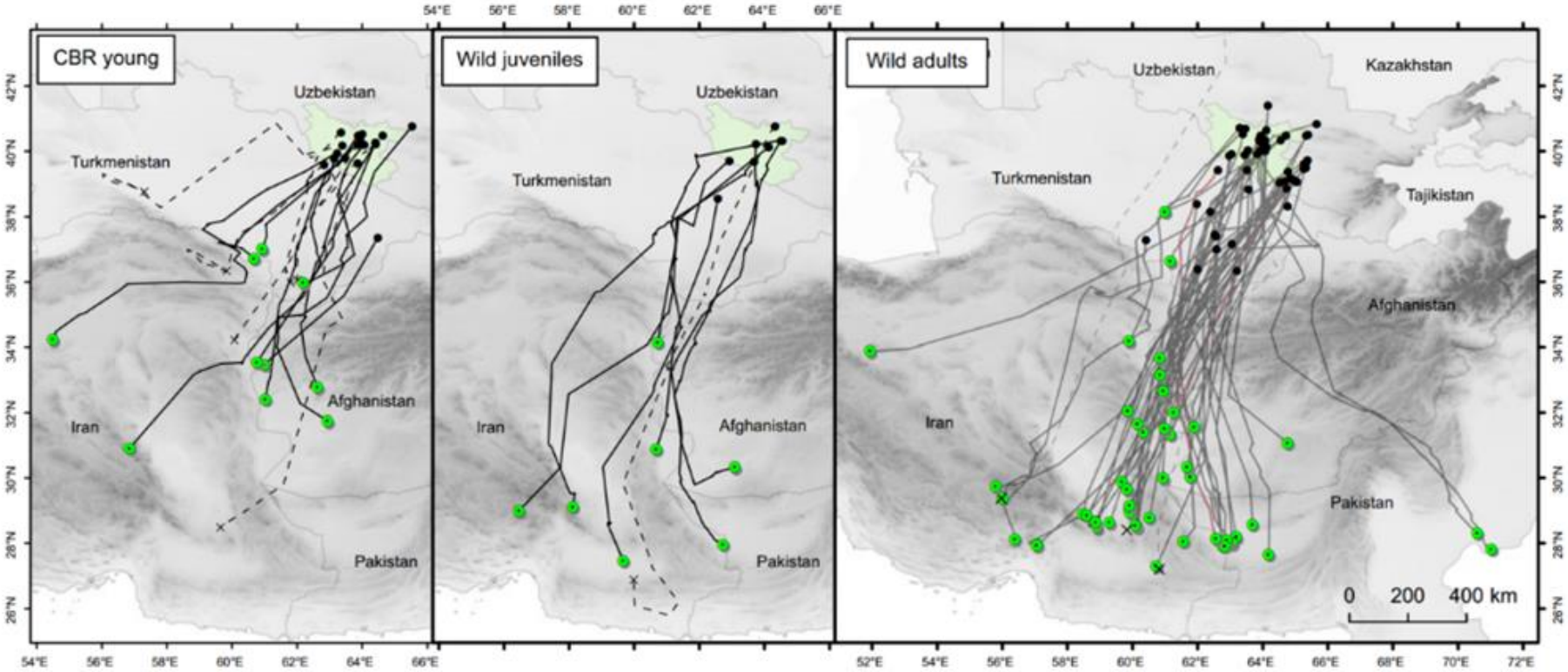


Figure 2-106 Autumn migration movements of Asian Houbara



The OHTL baseline survey provides an account of the historical data of a Houbara Bustard death caused by power lines. The passage below is an excerpt from the survey.

"In the central part of the Kyzylkum desert in September 2007, a Golden eagle, Steppe eagle, Griffon vulture **and Houbara bustard** were found dead from electrocution under the OHTL connected to the Navoi Mining and Metallurgical Plant (Kashkarov, 2007; IBA project newsletter in Uzbekistan, 2007). "

2.18 European Turtle Dove

The European Turtle Dove (*Streptopelia turtur*) is a breeding resident in Uzbekistan. It is a Vulnerable (VU) species on the IUCN red list.

The species uses a variety of woodland types, as well as steppe and semi-desert and frequents agricultural land for feeding. It may use hedges, borders of forest, groves, spinneys, coppices, young tree plantations, scrubby wasteland, woody marshes, scrub and garigue.

Breeding commences in April and can last until September. The nest is a small platform of twigs lined with plant material and placed in the lowest parts of trees (Tucker and Heath 1994) and in shrubs and hedges.

Main threats include habitat loss, loss of resources due to agricultural practices (chemical herbicides), illegal hunting, parasite infections, and competition with generalist species with expanding populations such as Eurasian Collared Dove and Common Myna.

2.18.1 Baseline Survey

2.18.1.1 Methods

2.18.1.1.1 Dzhankeldy Wind Farm

The Dzhankeldy WF site was comprehensively surveyed over one year (16 May 2020-20 May 2021) during all four seasons following the guidance of the Scottish Natural Heritage (SNH) guidelines (2017), which are currently the internationally accepted best-practice for onshore wind farm surveying and assessment.

A total of 10 Vantage Points (VPs) were surveyed to collect data on species, numbers, physical characteristics, and flight behaviour. The points are located so as to cover the project area as completely as possible (Figure 2-109).

The duration of survey at each vantage point was approximately 3 hours. During observations weather conditions such as wind speed and direction, and air temperature were recorded.

Wind speed and air temperature were measured using an anemometer. Whenever possible, approximate flight altitude, speed, and flight direction of the birds were recorded every 15 seconds.

During the observations, photographing and short video shooting of the birds were carried out, which were used to confirm the correct species identification and obtain additional data on the number of individuals.

During the summer 2020, autumn 2020 and spring 2021 surveys Cliffs and ledges on the Northern sides of the Western Kuldzhuktau mountain range were examined for nests of large birds of prey to identify nesting species and collect data on their nesting ecology and behaviour.

Nest locations were recorded and mapped. During the survey optical devices such as binoculars and telescopes were used. Local residents and shepherds were interviewed for information on the presence of bird predator nests in the area. Due to the lack of large trees and shrubs, nesting birds in trees was excluded. Surveys were conducted both in the project area and in the surrounding area.

Figure 2-107 Vantage Points at Dzhankeldy Wind Farm Site

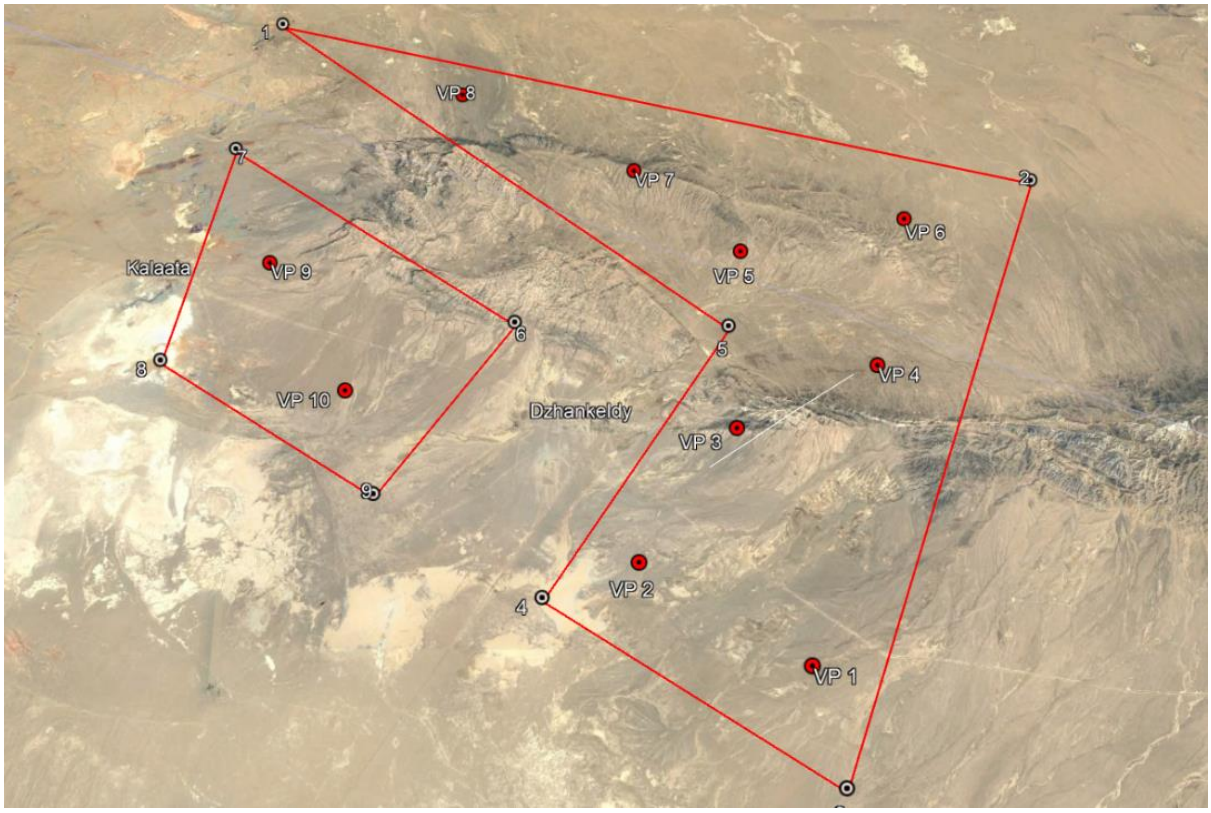


Figure 2-108 Nest Survey Routes during Summer

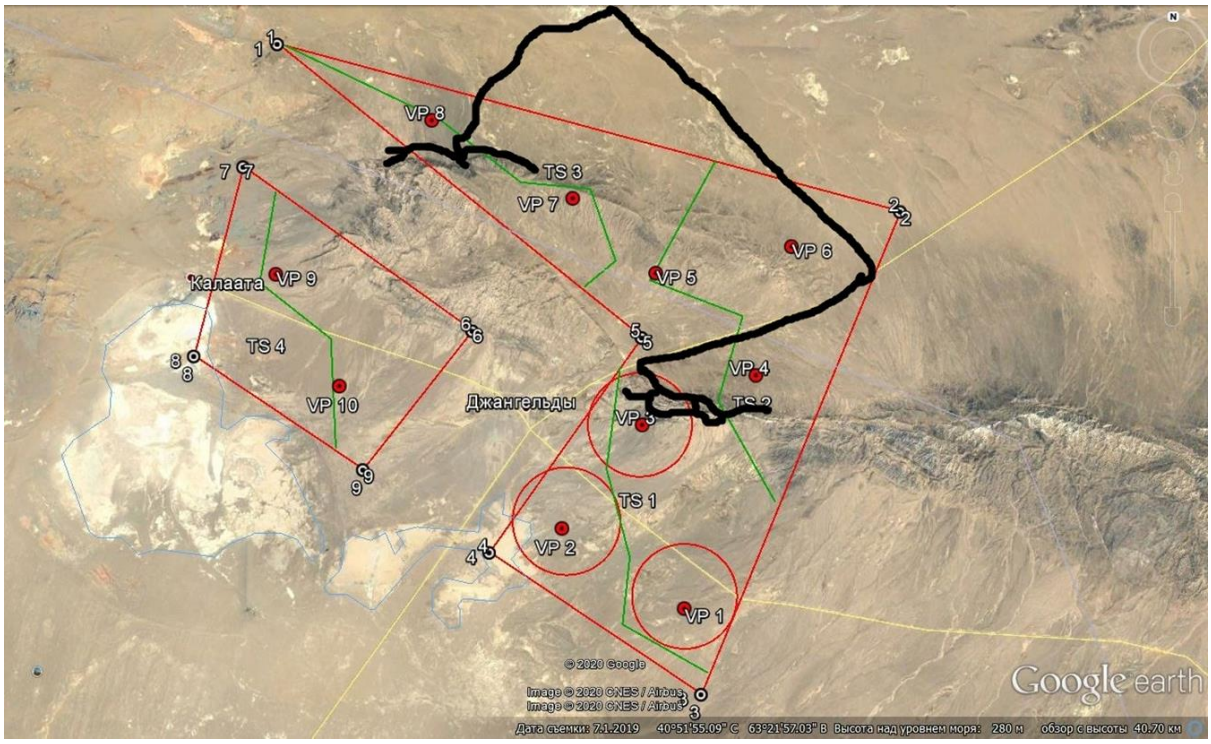
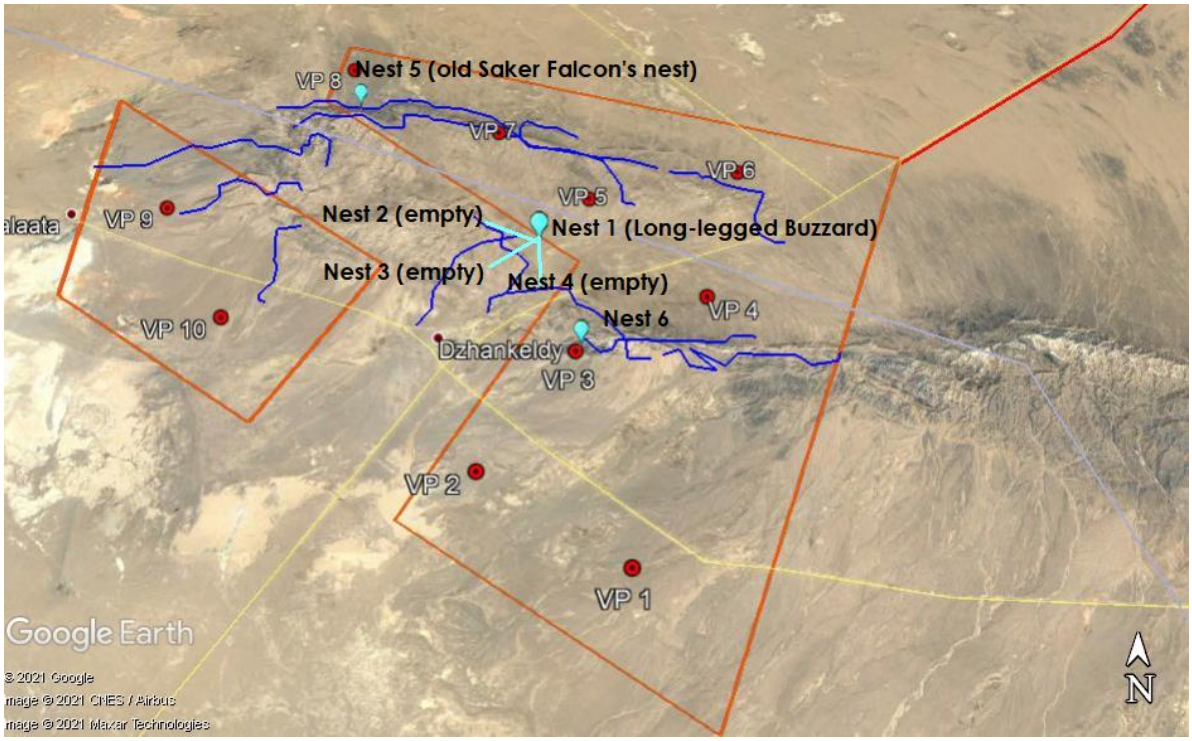


Figure 2-109 Nest Survey Routes during Spring



2.18.1.1.2 Dzhankeldy-Bash OHTL

The survey along the planned Dzhankeldy-Bash OHTL was carried out May and June 2021 at selected vantage points (VP). The points were places directly along the route of the transmission line or near it depending on the availability of access roads. The distance from the route in some places was generally not more than 1-2 km.

Given the homogenous landscape of the surveyed section, analogies were drawn between the surveyed area adjacent to the route and the route itself.

Visual observations of birds were made during the route survey. Bird sighting points were also marked using GPS. Bird species membership was determined visually using field binoculars with 8x magnification and Nikon and Fujifilm XT-20 digital cameras as well as audio recordings of bird voices (Xeno-canto Asia) and field bird identifiers (Mullarney, Svensson, Zetterstrom, Grant, 1999; Aye, Schweizer, Roth 2012).

Surveys were conducted at 11 selected points, in 1 km radius sections. Duration of observations was not less than 40 minutes at each vantage point. A survey of operating power lines within the project area was also carried out to assess bird mortality on operating OHTL.

Figure 2-110 Vantage points of the projected OHTL route in May 2021

Figure 2-111 Vantage points of the projected OHTL route in June 2021

Due to change of the route in June, the number of vantage points was reduced to 10.

2.18.1.2 Results

2.18.1.2.1 Dzhankeldy Wind Farm

Although the European Turtle Dove are known to occur in the region, there were no recorded sightings of the species during the VP surveys.

2.18.1.2.2 Dzhankeldy-Bash OHTL

There were no sightings of the European Turtle Dove during the OHTL survey.

2.18.2 Stakeholder Engagement

No known occurrence of the European Turtle Dove has been recorded by stakeholders within the project area of influence.

2.19 Yellow-eyed Pigeon

The Yellow-eyed Pigeon (*Columba eversmanni*) is a breeding resident in Uzbekistan. t is a Vulnerable (VU) species on the IUCN red list.

It breeds in holes in trees, buildings, cliffs, earth banks, and potentially on power lines in semi-arid and desert areas, including around human settlement and in woodland. In winter, it occurs in open areas with scattered trees, often with agricultural crops, and in areas with suitable fruiting trees, where it roosts and feeds gregariously.

Hunting in both its breeding and wintering grounds has been the primary cause of its decline and continues to be a major threat; loss of suitable woodland habitat is also a contributing factor.

2.19.1 Baseline Survey

2.19.1.1 Methods

2.19.1.1.1 Dzhankeldy Wind Farm

The Dzhankeldy WF site was comprehensively surveyed over one year (16 May 2020-20 May 2021) during all four seasons following the guidance of the Scottish Natural Heritage (SNH) guidelines (2017), which are currently the internationally accepted best-practice for onshore wind farm surveying and assessment.

A total of 10 Vantage Points (VPs) were surveyed to collect data on species, numbers, physical characteristics, and flight behaviour. The points are located so as to cover the project area as completely as possible (Figure 2-114).

The duration of survey at each vantage point was approximately 3 hours. During observations weather conditions such as wind speed and direction, and air temperature were recorded. Wind speed and air temperature were measured using an anemometer. Whenever possible, approximate flight altitude, speed, and flight direction of the birds were recorded every 15 seconds.

During the observations, photographing and short video shooting of the birds were carried out, which were used to confirm the correct species identification and obtain additional data on the number of individuals.

During the summer 2020, autumn 2020 and spring 2021 surveys Cliffs and ledges on the Northern sides of the Western Kuldzhuktau mountain range were examined for nests of large birds of prey to identify nesting species and collect data on their nesting ecology and behaviour.

Nest locations were recorded and mapped. During the survey optical devices such as binoculars and telescopes were used. Local residents and shepherds were interviewed for information on the presence of bird predator nests in the area. Due to the lack of large trees and shrubs, nesting birds in trees was excluded. Surveys were conducted both in the project area and in the surrounding area.

Figure 2-112 Vantage Points at Dzhankeldy Wind Farm Site

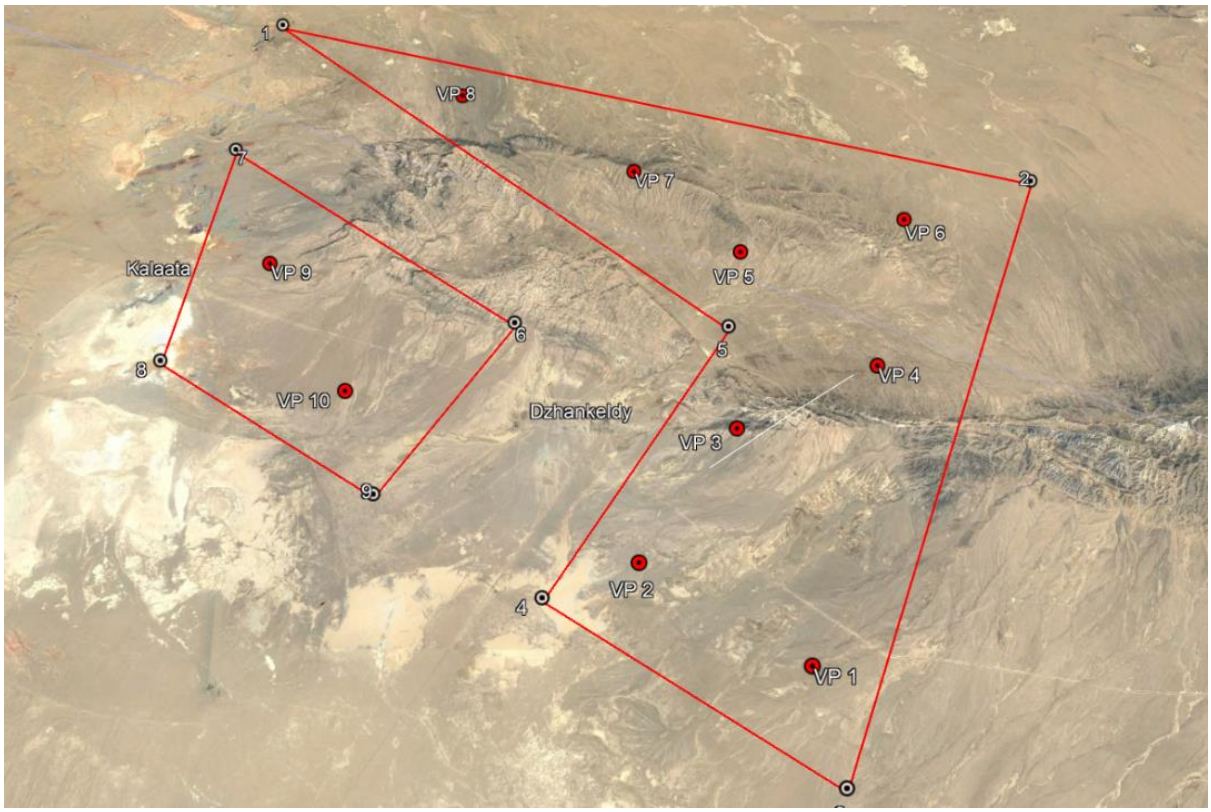


Figure 2-113 Nest Survey Routes during Summer

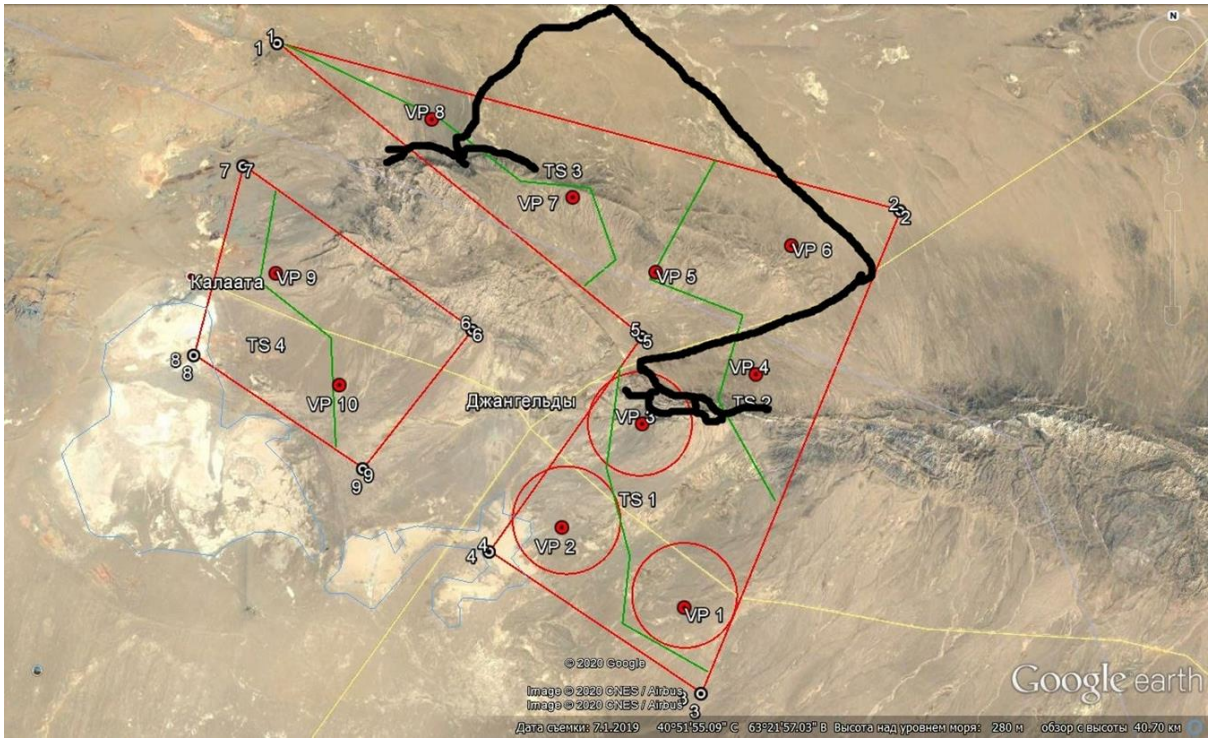
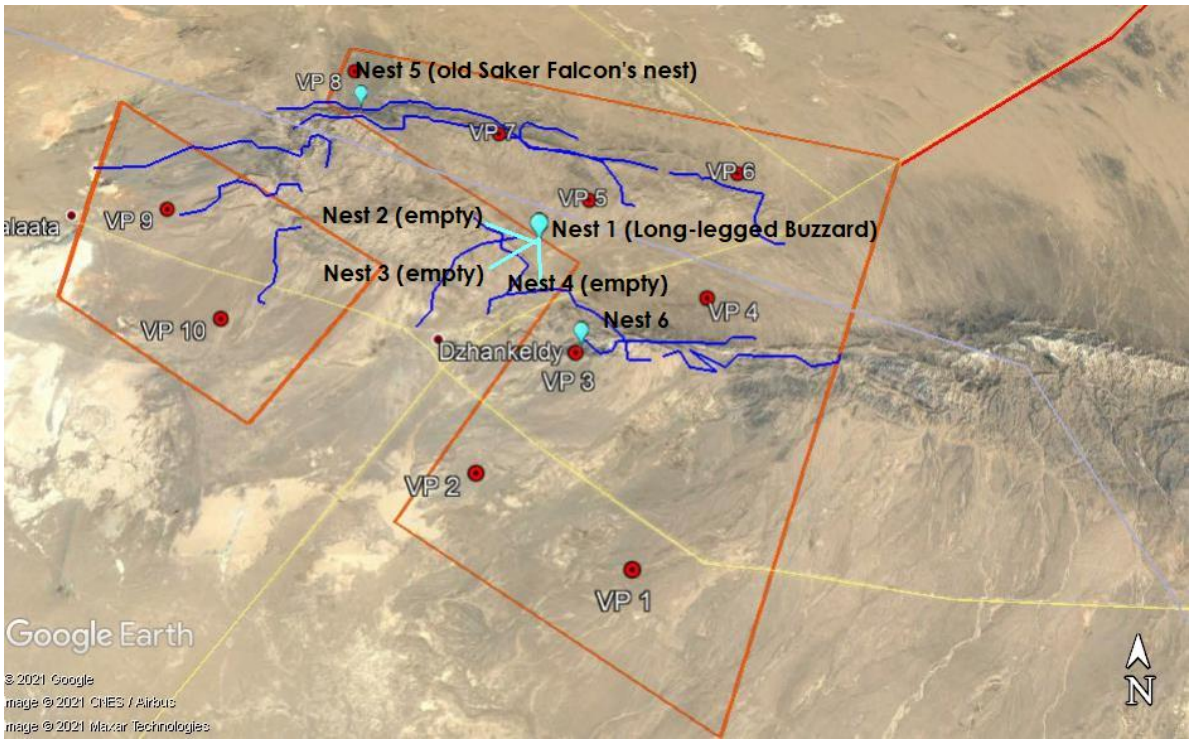


Figure 2-114 Nest Survey Routes during Spring



2.19.1.1.2 Dzhankeldy-Bash OHTL

The survey along the planned Dzhankeldy-Bash OHTL was carried out May and June 2021 at selected vantage points (VP). The points were places directly along the route of the transmission line or near it depending on the availability of access roads. The distance from the route in some places was generally not more than 1-2 km.

Given the homogenous landscape of the surveyed section, analogies were drawn between the surveyed area adjacent to the route and the route itself.

Visual observations of birds were made during the route survey. Bird sighting points were also marked using GPS. Bird species membership was determined visually using field binoculars with 8x magnification and Nikon and Fujifilm XT-20 digital cameras as well as audio recordings of bird voices (Xeno-canto Asia) and field bird identifiers (Mullarney, Svensson, Zetterstrom, Grant, 1999; Aye, Schweizer, Roth 2012).

Surveys were conducted at 11 selected points, in 1 km radius sections. Duration of observations was not less than 40 minutes at each vantage point. A survey of operating power lines within the project area was also carried out to assess bird mortality on operating OHTL.

Figure 2-115 Vantage points of the projected OHTL route in May 2021

Figure 2-116 Vantage points of the projected OHTL route in June 2021

Due to change of the route in June, the number of vantage points was reduced to 10.

2.19.1.2 Results

2.19.1.2.1 Dzhankeldy Wind Farm

Although the Yellow-eyed Pigeon are known to occur in the region, there were no recorded sightings of the species during the VP surveys.

2.19.1.2.2 Dzhankeldy-Bash OHTL

There were no sightings of the Yellow-eyed pigeon during the OHTL survey.

2.19.2 Stakeholder Engagement

No known occurrence of the Yellow-eyed Pigeon has been recorded by stakeholders within the project area of influence.

2.20 Bokhara Whiskered Bat

The Bokhara Whiskered Bat *Myotis bucharensis* is listed as Critically Endangered (CR) in the Uzbekistan Red Data Book and thought to be potentially extinct. It is listed as Data Deficient (DD) on the IUCN Red List.

2.20.1 Baseline Survey

2.20.1.1 Methods

2.20.1.1.1 Dzhankeldy Wind Farm

Bat surveys were undertaken via the deployment of static acoustic detectors (Wildlife Acoustics Song Meter SM4) as well as manual roost searches. The schedule of surveys conducted are as follows:

- 2020 Summer/Autumn: Static Acoustic Detector Survey
- 2021 Spring/Summer: Static Acoustic Detector Survey
- 2021 Spring/Summer (breeding season): Manual Roost Search

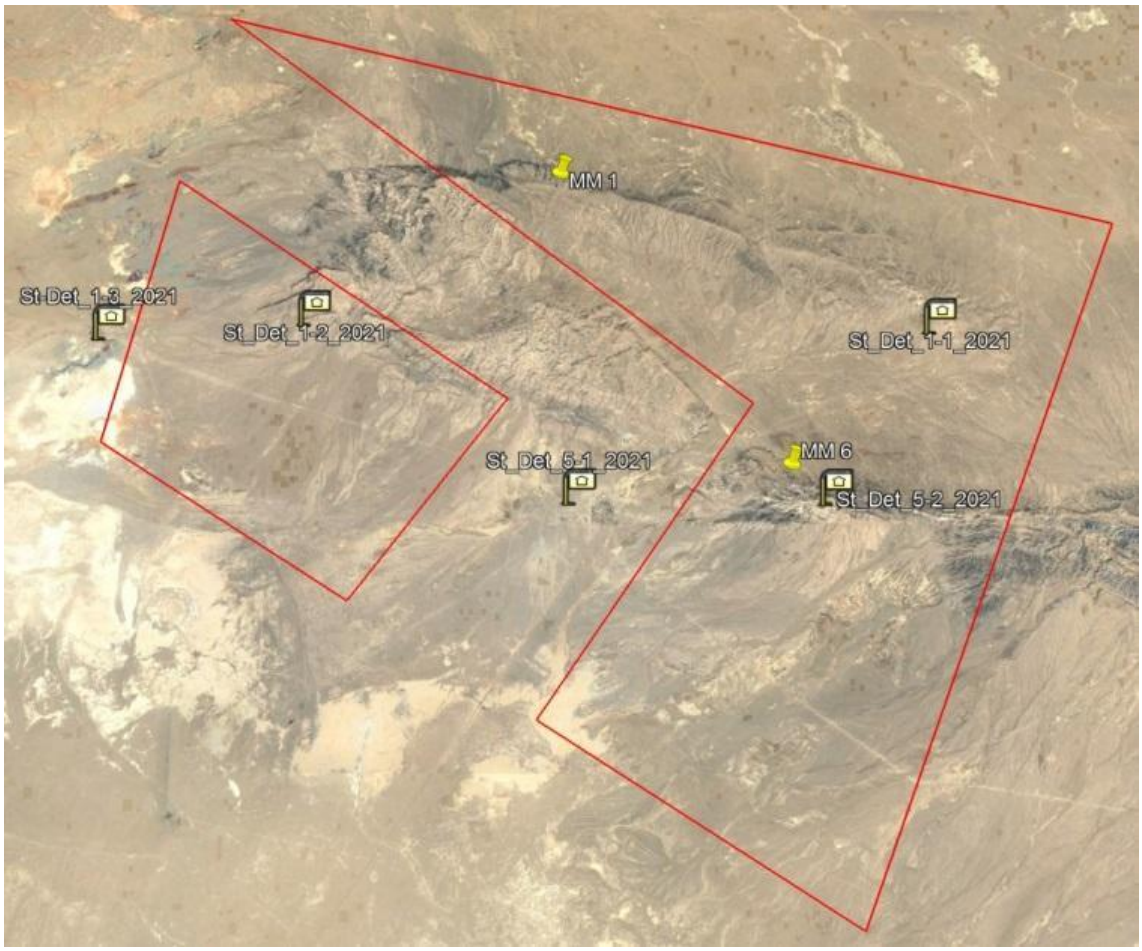
Given the lack of bat activity expected within the region during the winter months, bat acoustic surveys are restricted to the 7-month warm period of the year, extending from the beginning of April through the end of October.

During the 2020 acoustic survey data was collected from three locations in the summer and at five locations in the Autumn.

In 2021, the detectors were deployed at seven locations. At two locations the detectors were installed on meteorological masts at a height of 45m.

Data collected at a height was better suited to assess the bat activity during feeding and migrations. At other locations the detectors were deployed at ground level or on buildings/sheds.

Figure 2-117 Locations of static bat detectors deployed at Dzhankeldy in 2021



The Kaleidoscope Pro Auto Analysis program with predetermined parameters of ultrasonic calls belonging European bats found in Uzbekistan were used for the primary processing of audio recordings.

The BatSound 4 program was then employed to measure the call parameters and cross check the identification of bat calls made by the Kaleidoscope Pro Auto Analysis program. Bat call parameters known for European bat populations [8] and bat species from neighboring countries

[8] Barataud, M., Acoustic Ecology of European Bats. Species Identification, Study of Their Habitats and Foraging Behavior, Paris: Biotope, Meze; Museum National d'Histoire Naturelle, 2015.

for Uzbekistan [9] (Benda et al., 2012) were used for analysis and identification. Bat calls were identified to species level where possible.

Relative abundance, Frequency of occurrence and acoustic activity index were calculated for a quantitative assessment of bat populations in the area. Relative abundance is the relative number of locations where calls of some species were registered. The frequency of occurrence is the frequency at which calls of some species are recorded among all types of calls (excluding noise, social calls and unidentified calls). Acoustic activity index (AI) is the average number of calls registered on one location for one day of monitoring.

The possible location of bat roosts, which would be used for residential bats, maternity colonies, hibernating, and mating, is of importance to understand Specialized bat roost searches were undertaken within the project boundaries and area of influence in Spring 2021 and Summer 2021.

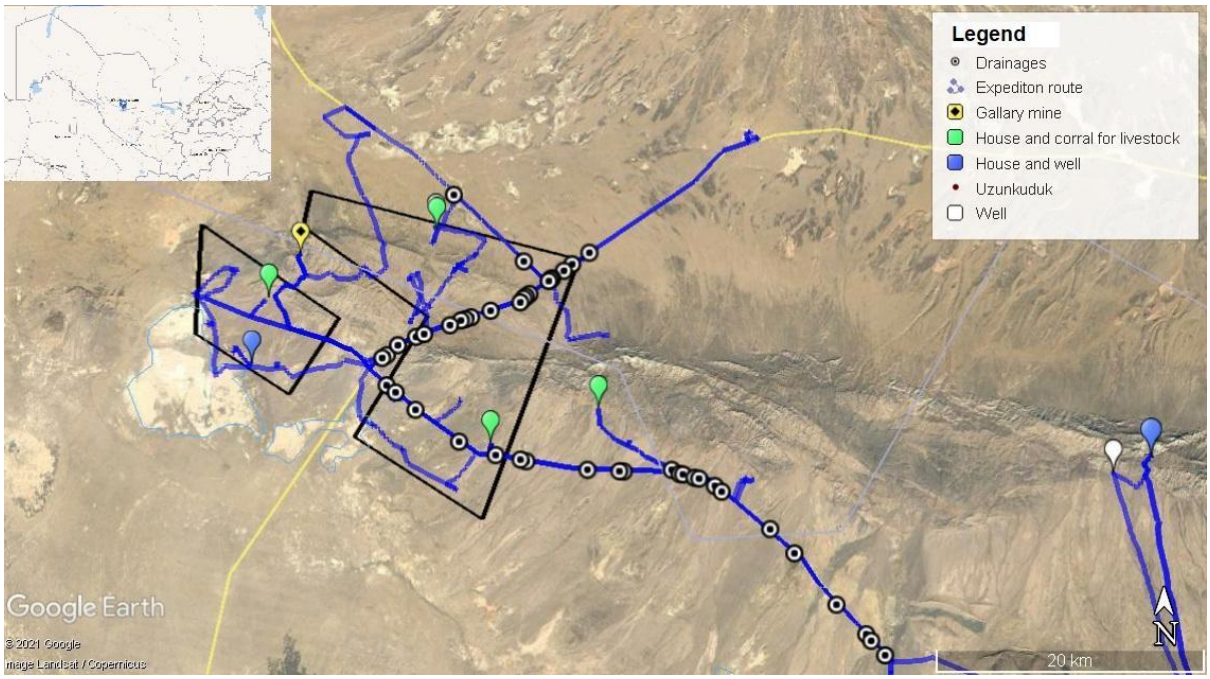
The roost survey included a desktop analysis of potential bat roost locations in the project area. Each location was then thoroughly examined, both for the presence of bats themselves, and for signs of their presence – excrement, food remains, *etc*. Concrete drainage tunnels under roads were also identified as common bat roosting locations.

Each surveyed location was mapped and documented. The suitability of the objects for bats as either a temporary roost or a permanent one and the potential degree of disturbance/threat was recorded.

Where necessary the height, width and length of the roost were measured. When bats were detected, the surface temperature was measured, their species, gender, age and number were determined. Species identification was carried out according to generally accepted methods (Kuzyakin, 1950; Bogdanov, 1953; Dietz, von Helversen 2004). The captured bats were examined, photographed and immediately released in the places of capture.

[9] Benda P., Faizolâhi K, Andreas M., Obuch J., Reiter A., Ševčík M., Uhrin M., Vallo P., Ashrafi S. Bats (Mammalia: Chiroptera) of the Eastern Mediterranean and Middle East. Part 10. Bat fauna of Iran. Acta Soc. Zool. Bohem. 2012. 76: 163–582.

Figure 2-118 Bat Roost Survey Transects at Dzhankeldy Wind Farm Site

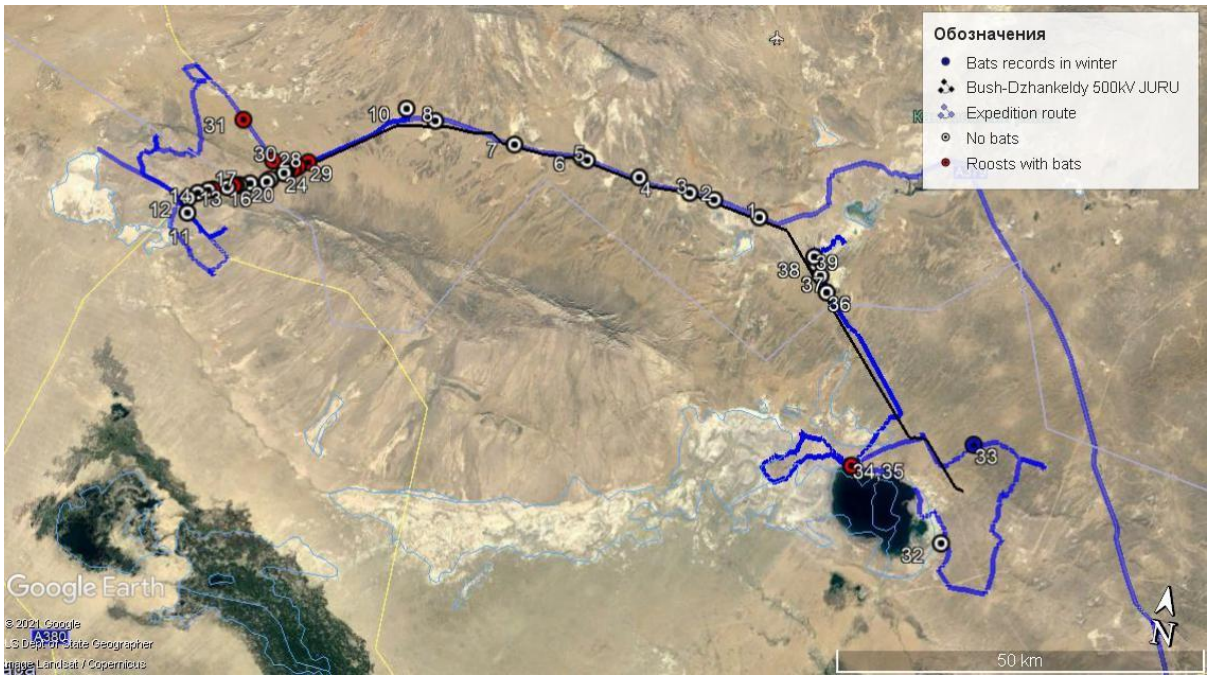


2.20.1.1.2 Dzhankeldy-Bash OHTL

Bat roost searches were undertaken along the planned OHTL in Summer 2021. The roost survey included a desktop analysis of potential bat roost locations in the project area. Each location was then thoroughly examined, both for the presence of bats themselves, and for signs of their presence – excrement, food remains, *etc*. Concrete drainage tunnels under roads were also identified as common bat roosting locations.

Each surveyed location was mapped and documented. The suitability of the objects for bats as either a temporary roost or a permanent one and the potential degree of disturbance/threat was recorded.

Figure 2-119 Bat Roost Survey Transect along Dzhankeldy-Bash OHTL



2.20.1.2 Results

2.20.1.2.1 Dzhankeldy Wind Farm

This species was not detected by the static acoustic monitoring effort. 54 potential roost places were examined. There were no sightings recorded during the manual roost search.

2.20.1.2.2 Dzhankeldy-Bash OHTL

This species was not detected by the static acoustic monitoring effort. 39 potential roost places were examined during the manual roost search. No sightings of the Bhokara Whiskered Bat were recorded.

2.20.2 Stakeholder Engagement

No known occurrence of the Bhokara Whiskered Bat has been recorded by stakeholders within the project area of influence

2.21 Striped Hyaena

The Striped Hyaena, *Hyaena hyaena* is listed as CR in the Uzbekistan Red Data Book due to the presence of a locally distributed subspecies. It is listed at Near Threatened (NT) on the IUCN red list.

Recent records show the presence is in the far south of Uzbekistan near the country's borders; however, this is a far-ranging species so the possibility that it will occur has not been discounted.

2.21.1 Baseline Survey

2.21.1.1 Methods

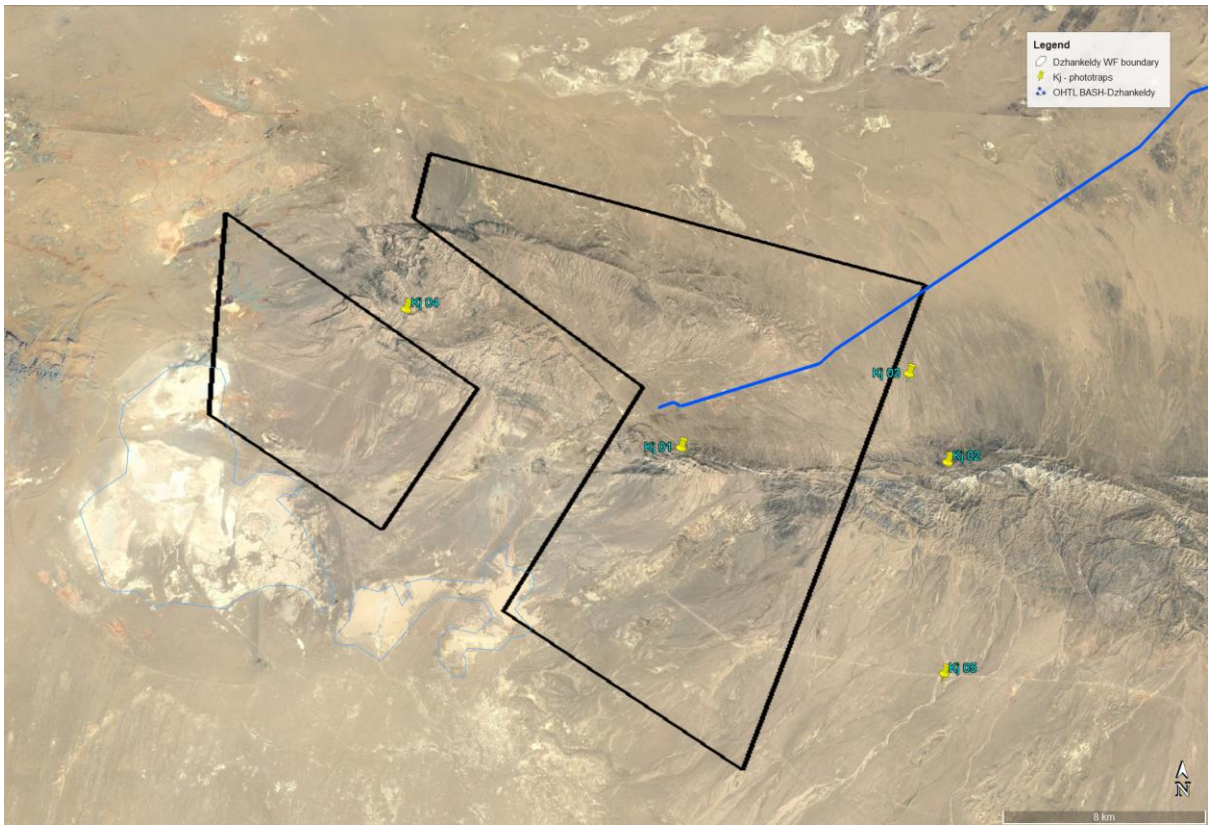
2.21.1.1.1 Dzhankeldy Wind Farm

Surveying was undertaken in Spring 2021 and Summer 2021, which represents the most active periods for mammals in the region. The survey was carried out in the Southeast Kyzylqum dessert, in the area of Ayakagytma lake and adjacent territories.

Camera traps were set from April 15 to June 25. Five standard Bushnell 119936C camera traps were installed at five locations.

The manual transect survey was undertaken by foot and with a vehicle in the daytime while only the vehicle was used at night time for nocturnal spotlighting. The walking transect survey aimed to account for species number and composition. Data was recorded through visual observations, using 10x binoculars to identify far sightings. Any signs of tracks and spoor were also recorded.

Figure 2-120 Camera trap locations (Yellow) within the Dzhankeldy WF Site



2.21.1.1.2 Dzhankeldy-Bash OHTL

On April 14 and June 20-22, 2021, transect surveys were carried out to collect data on the presence of non-volant mammal species along the planned Dzhankeldy-Bash OHTL route

A method of ground transect survey was employed with a combination of walking transects every 10 km. Walking transects were 1 km from the planned OHTL line. Presence of mammals were recorded through visual observation, animal tracks and spoor.

2.21.1.2 Results

2.21.1.2.1 Dzhankeldy Wind Farm

There were no recorded sightings of the Striped Hyena during the baseline surveys.

2.21.1.2.2 Dzhankeldy-Bash OHTL

There were no recorded sightings of the Striped Hyena during the OHTL surveys.

2.21.2 Stakeholder Engagement

No known occurrence of the Striped Hyaena has been recorded by stakeholders within the project area of influence

2.22 Turkmen Caracal

The Turkmen Caracal (Desert Lynx), *Caracal caracal* is listed as Critically Endangered (CR) on the Uzbekistan Red List due to the presence of a locally distributed subspecies. This species in listed as Least Concern (LC) on the IUCN Red List included in Appendix I of CITES.

It has been recorded throughout a majority of Uzbekistan[10] and its presence in the project area is considered to be likely. Its diet consists primarily of Tolai Hare *Lepus tolai*, Gerbils Gerbellidae, Jerboas, Dipodidae, birds, reptiles, and insects. It is known to hunt the Goitered *Gazelle Gazella subgutturosa*, Red Fox *Vulpes vulpes*, and lambs of Domestic Sheep *Ovis aries*..

The species is threatened by habitat loss and fragmentation, poaching, retaliatory and incidental killings.

2.22.1 Baseline Survey

2.22.1.1 Methods

2.22.1.1.1 Dzhankeldy Wind Farm

Surveying was undertaken in Spring 2021 and Summer 2021, which represents the most active periods for mammals in the region. The survey was carried out in the Southeast Kyzylqum dessert, in the area of Ayakagytma lake and adjacent territories.

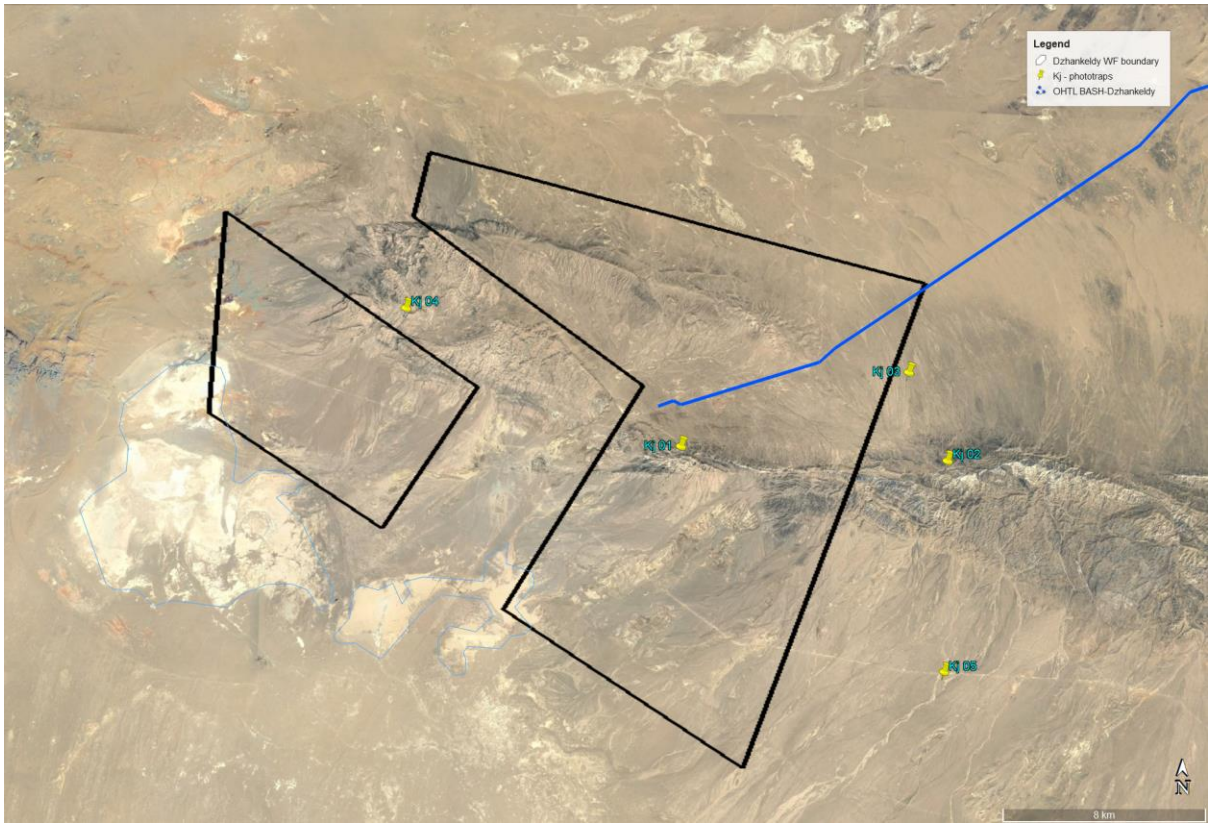
Camera traps were set from April 15 to June 25. Five standard Bushnell 119936C camera traps were installed at five locations.

The manual transect survey was undertaken by foot and with a vehicle in the daytime while only the vehicle was used at night time for nocturnal spotlighting. The walking transect survey aimed to account for species number and composition. Data was recorded through visual

[10] Gritsina, Mariya Alexeevna. "The Caracal Caracal caracal Schreber, 1776 (Mammalia: Carnivora: Felidae) in Uzbekistan." *Journal of Threatened Taxa* 11.4 (2019): 13470-13477

observations, using 10x binoculars to identify far sightings. Any signs of tracks and spoor were also recorded.

Figure 2-121 Camera trap locations (Yellow) within the Dzhankeldy WF Site



2.22.1.1.2 Dzhankeldy-Bash OHTL

On April 14 and June 20-22, 2021, transect surveys were carried out to collect data on the presence of non-volant mammal species along the planned Dzhankeldy-Bash OHTL route

A method of ground transect survey was employed with a combination of walking transects every 10 km. Walking transects were 1 km from the planned OHTL line. Presence of mammals were recorded through visual observation, animal tracks and spoor.

2.22.1.2 Results

2.22.1.2.1 Dzhankeldy Wind Farm

No observations of the caracal were made during the baseline surveys. However, the presence of its prey species (Tolai hare, gerbils and jerboas) indicate that it may be present in the Dzhankeldy Wind Farm development site.

2.22.1.2.2 Dzhankeldy-Bash OHTL

There were no recorded sightings of the Turkmen Caracal during the OHTL surveys.

2.22.2 Stakeholder Engagement

Sightings of caracals have been documented through interviews with villagers and shepherds encountered on an expedition extending from Central Ustyurt Plateau past the Kyzllqum to the Bhukara region carried out by Maria Gritsina from the Academy of Sciences, Uzbekistan [11]. The paper reports sightings of caracals in 2012 and 2013 in the villages of Kalaata and Dzhankeldy close to the project site.

Another stakeholder, F. Salimov, who is an official of the Bukhara Regional Department of the State Committee for Nature Protection, observed caracals several times near the above-mentioned village of Dzankeldy and on the shore of Lake Zamonbobo in the past 10–15 years.

2.23 Eurasian Otter

The Eurasian Otter *Lutra Lutra* is listed as EN in the Uzbekistan Red Data Book due to the presence of a locally distributed subspecies. It is not expected to be present in the project area as recent data indicates it is only found in the upper flood-lands of the Amudarya River and Western Parmie-Alay .

2.23.1 Baseline Survey

2.23.1.1 Methods

2.23.1.1.1 Dzhankeldy Wind Farm

Surveying was undertaken in Spring 2021 and Summer 2021, which represents the most active periods for mammals in the region. The survey was carried out in the Southeast Kyzylqum dessert, in the area of Ayakagytma lake and adjacent territories.

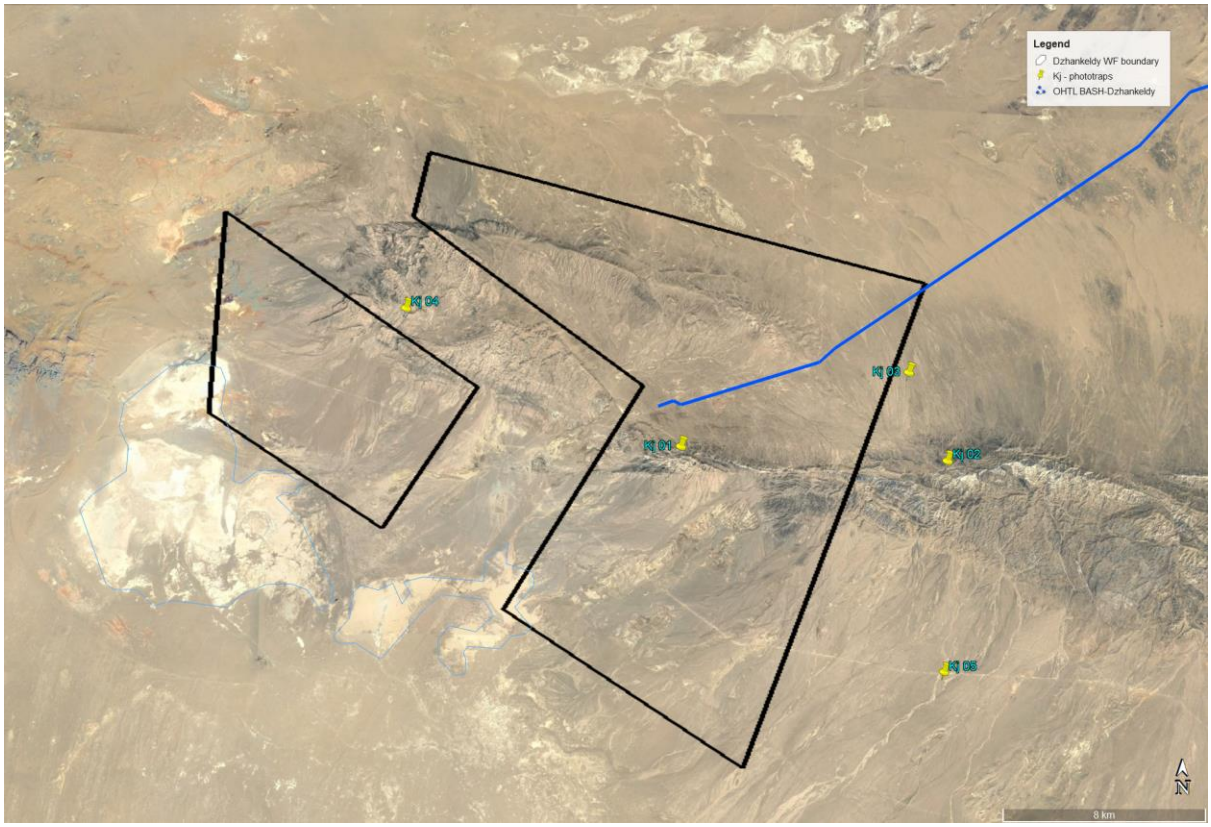
Camera traps were set from April 15 to June 25. Five standard Bushnell 119936C camera traps were installed at five locations.

The manual transect survey was undertaken by foot and with a vehicle in the daytime while only the vehicle was used at night time for nocturnal spotlighting. The walking transect survey aimed to account for species number and composition. Data was recorded through visual

[11] Gritsina Mariya The Caracal Caracal caracal Schreber, 1776 (Mammalia: Carnivora: Felidae) in Uzbekistan. Journal of Threatened Taxa | www.threatenedtaxa.org | 12 March 2019 | 11(4): 13470–13477.

observations, using 10x binoculars to identify far sightings. Any signs of tracks and spoor were also recorded.

Figure 2-122 Camera trap locations (Yellow) within the Dzhankeldy WF Site



2.23.1.1.2 Dzhankeldy-Bash OHTL

On April 14 and June 20-22, 2021, transect surveys were carried out to collect data on the presence of non-volant mammal species along the planned Dzhankeldy-Bash OHTL route

A method of ground transect survey was employed with a combination of walking transects every 10 km. Walking transects were 1 km from the planned OHTL line. Presence of mammals were recorded through visual observation, animal tracks and spoor.

2.23.1.2 Results

2.23.1.2.1 Dzhankeldy Wind Farm

There were no recorded sightings of the Eurasian Otter during the baseline surveys.

2.23.1.2.2 Dzhankeldy-Bash OHTL

There were no recorded sightings of the Eurasian Otter during the OHTL surveys.

2.23.2 Stakeholder Engagement

No known occurrence of the Eurasian Otter has been recorded by stakeholders within the project area of influence.

2.24 Tarim Red Deer

The Tarim Red Deer, *Cervus hangul* is listed as Endangered (EN) in the Uzbekistan Red Data Book due to the presence of a locally distributed subspecies. It is classified as a species of Least Concern (LC) on the IUCN Red List.

It occupies the flood-land of Amudarya River and is known to make migratory movements.

2.24.1 Baseline Survey

2.24.1.1 Methods

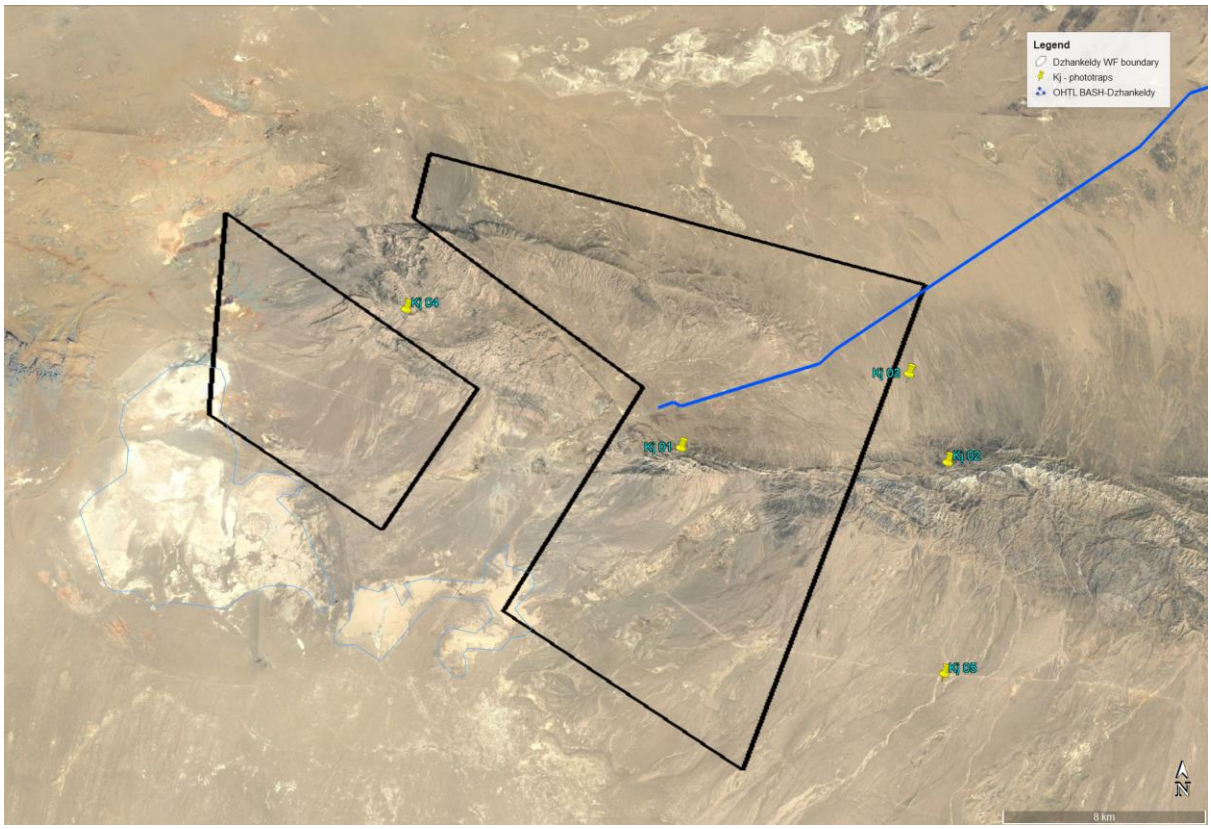
2.24.1.1.1 Dzhankeldy Wind Farm

Surveying was undertaken in Spring 2021 and Summer 2021, which represents the most active periods for mammals in the region. The survey was carried out in the Southeast Kyzylqum dessert, in the area of Ayakagytma lake and adjacent territories.

Camera traps were set from April 15 to June 25. Five standard Bushnell 119936C camera traps were installed at five locations.

The manual transect survey was undertaken by foot and with a vehicle in the daytime while only the vehicle was used at night time for nocturnal spotlighting. The walking transect survey aimed to account for species number and composition. Data was recorded through visual observations, using 10x binoculars to identify far sightings. Any signs of tracks and spoor were also recorded.

Figure 2-123 Camera trap locations (Yellow) within the Dzhankeldy WF Site



2.24.1.1.2 Dzhankeldy-Bash OHTL

On April 14 and June 20-22, 2021, transect surveys were carried out to collect data on the presence of non-volant mammal species along the planned Dzhankeldy-Bash OHTL route

A method of ground transect survey was employed with a combination of walking transects every 10 km. Walking transects were 1 km from the planned OHTL line. Presence of mammals were recorded through visual observation, animal tracks and spoor.

2.24.1.2 Results

2.24.1.2.1 Dzhankeldy Wind Farm

There were no recorded sightings of the Tarim Red Deer during the baseline surveys.

2.24.1.2.2 Dzhankeldy-Bash OHTL

There were no recorded sightings of the Tarim Red Deer during the OHTL surveys.

2.24.2 Stakeholder Engagement

No known occurrence of the Tarim Red Deer has been recorded by stakeholders within the project area of influence.

2.25 Dalmatian Pelican

Dalmatian Pelican, *Pelecanus crispus* is listed as EN in the Uzbekistan Red Data Book as it is a nesting and migratory species which has declined regionally due to water regime changes in the Aral region.

2.25.1 Baseline Survey

2.25.1.1 Methods

2.25.1.1.1 Dzhankeldy Wind Farm

The Dzhankeldy WF site was comprehensively surveyed over one year (16 May 2020-20 May 2021) during all four seasons following the guidance of the Scottish Natural Heritage (SNH) guidelines (2017), which are currently the internationally accepted best-practice for onshore wind farm surveying and assessment.

A total of 10 Vantage Points (VPs) were surveyed to collect data on species, numbers, physical characteristics, and flight behaviour. The points are located so as to cover the project area as completely as possible (Figure 2-126).

The duration of survey at each vantage point was approximately 3 hours. During observations weather conditions such as wind speed and direction, and air temperature were recorded. Wind speed and air temperature were measured using an anemometer. Whenever possible, approximate flight altitude, speed, and flight direction of the birds were recorded every 15 seconds.

During the observations, photographing and short video shooting of the birds were carried out, which were used to confirm the correct species identification and obtain additional data on the number of individuals.

During the summer 2020, autumn 2020 and spring 2021 surveys Cliffs and ledges on the Northern sides of the Western Kuldzhuktau mountain range were examined for nests of large birds of prey to identify nesting species and collect data on their nesting ecology and behaviour.

Nest locations were recorded and mapped. During the survey optical devices such as binoculars and telescopes were used. Local residents and shepherds were interviewed for information on the presence of bird predator nests in the area. Due to the lack of large trees and shrubs, nesting birds in trees was excluded. Surveys were conducted both in the project area and in the surrounding area.

Figure 2-124 Vantage Points at Dzhankeldy Wind Farm Site

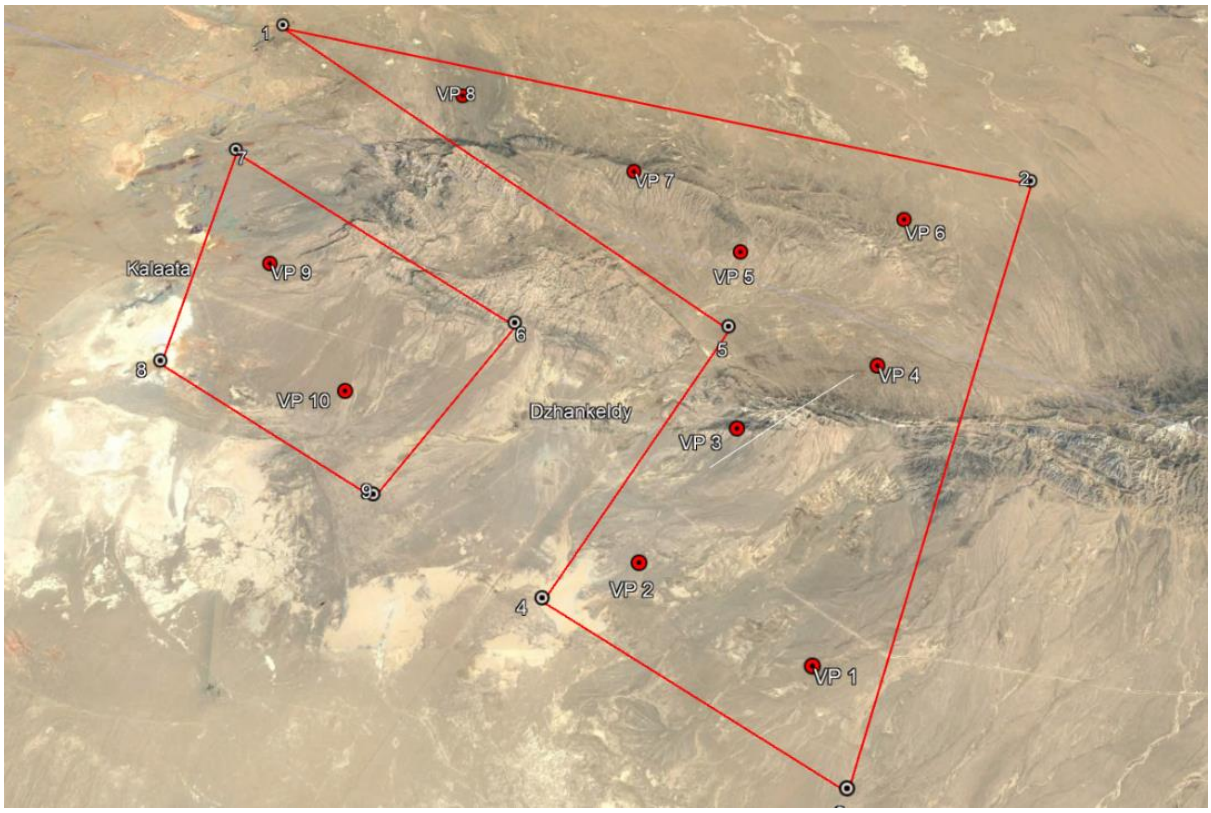


Figure 2-125 Nest Survey Routes during Summer

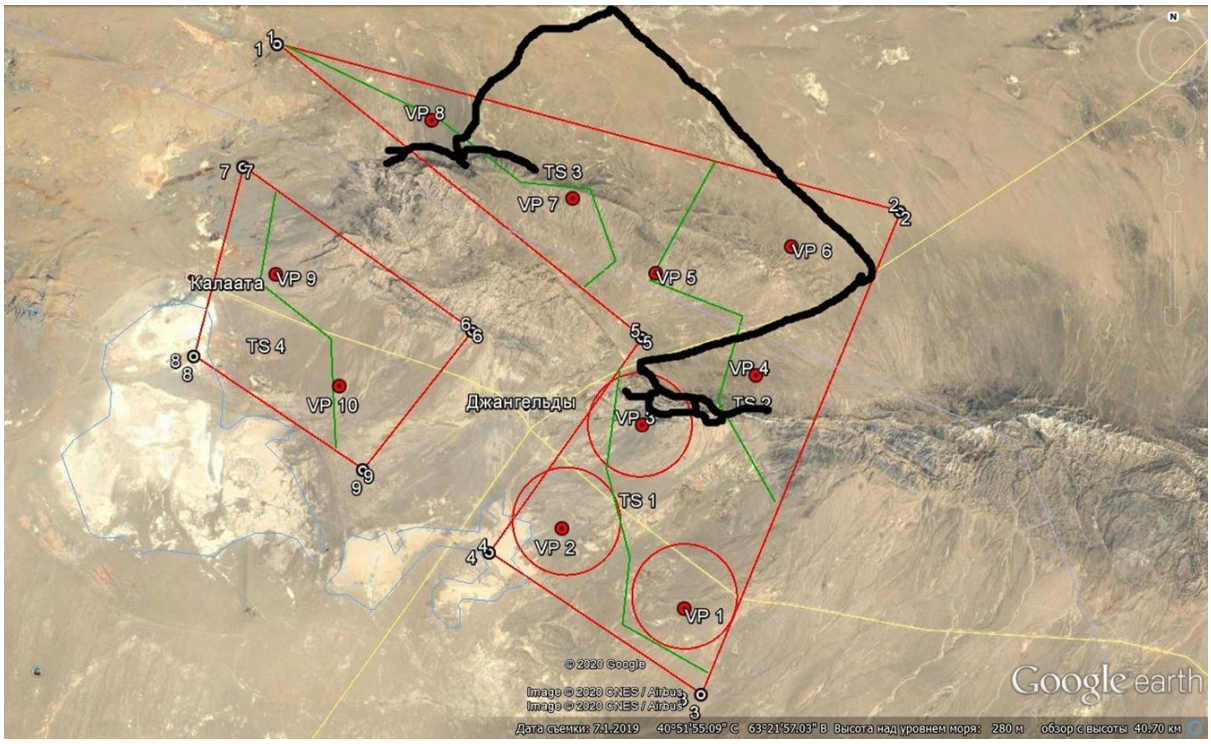
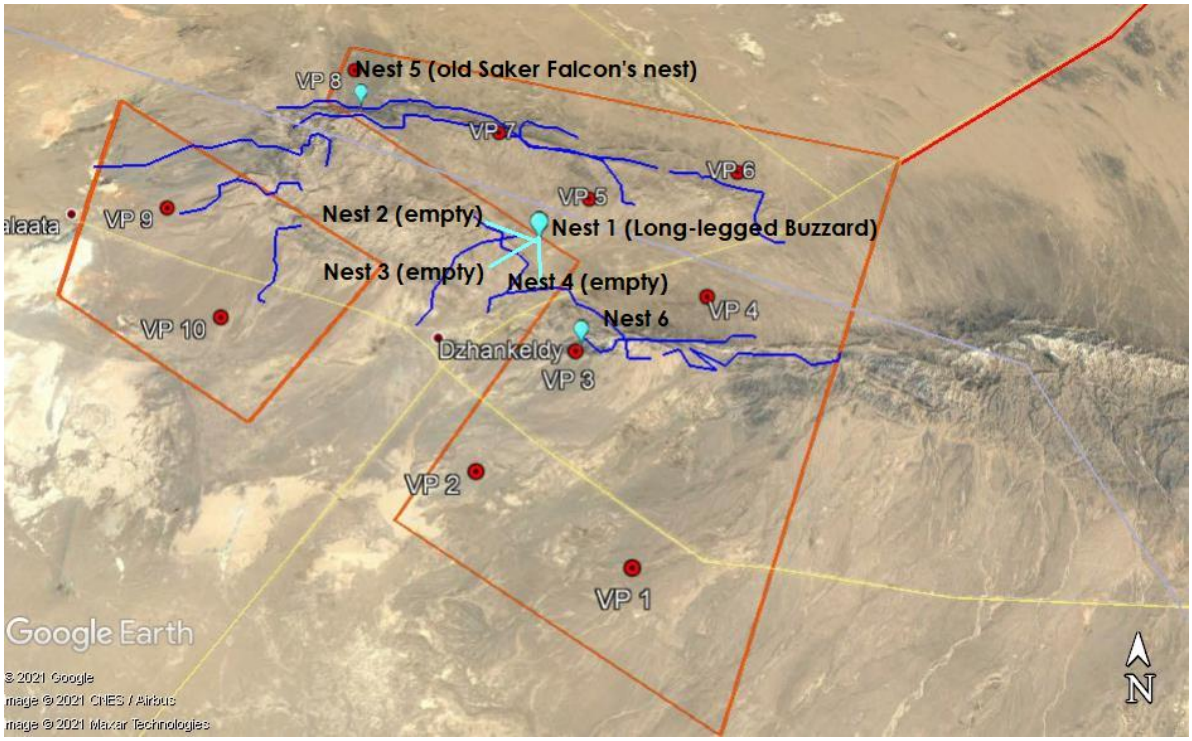


Figure 2-126 Nest Survey Routes during Spring



2.25.1.1.2 Dzhankeldy-Bash OHTL

The survey along the planned Dzhankeldy-Bash OHTL was carried out May and June 2021 at selected vantage points (VP). The points were places directly along the route of the transmission line or near it depending on the availability of access roads. The distance from the route in some places was generally not more than 1-2 km.

Given the homogenous landscape of the surveyed section, analogies were drawn between the surveyed area adjacent to the route and the route itself.

Visual observations of birds were made during the route survey. Bird sighting points were also marked using GPS. Bird species membership was determined visually using field binoculars with 8x magnification and Nikon and Fujifilm XT-20 digital cameras as well as audio recordings of bird voices (Xeno-canto Asia) and field bird identifiers (Mullarney, Svensson, Zetterstrom, Grant, 1999; Aye, Schweizer, Roth 2012).

Surveys were conducted at 11 selected points, in 1 km radius sections. Duration of observations was not less than 40 minutes at each vantage point. A survey of operating power lines within the project area was also carried out to assess bird mortality on operating OHTL.

Figure 2-127 Vantage points of the projected OHTL route in May 2021

Figure 2-128 Vantage points of the projected OHTL route in June 2021

Due to change of the route in June, the number of vantage points was reduced to 10.

2.25.1.2 Results

2.25.1.2.1 Dzhankeldy Wind Farm

Although the Dalmatian Pelican are known to occur in the region, there were no recorded sightings of the species during the VP surveys.

2.25.1.2.2 Dzhankeldy-Bash OHTL

There were no recorded sightings of the Dalmatian Pelican during the OHTL surveys.

2.25.2 Stakeholder Engagement.

The OHTL baseline survey provides an account of the historical data of Dalmatian pelican deaths caused by power lines. The passage below is an excerpt from the survey.

"OHTLs located near water bodies, which are places of waterfowl concentration, pose a particular danger. According to the Institute of Zoology of the Academy of Sciences of Uzbekistan, Dalmatian Pelicans *Pelicanus crispus* regularly die on the 220 kV OHTL that runs from Kyzyltepa substation along the western shore of Tudakul Lake (Navoi region). During the 2002-2005 winter surveys, up to three dead birds were regularly found here. During the visit to the lake in January 2004, 7 dead burnt birds were found under wires at once (Lanovenko, 2007)."

3 ENDEMIC SPECIES

3.1 Flora

3.1.1 Baseline Survey

3.1.1.1 Methods

3.1.1.1.1 Dzhankeldy Wind Farm

The field studies were conducted in spring and summer seasons 2021 by traditional methods of botanical survey commonly used for sampling and mapping of native non-forest vegetation, recognition of floristic composition and spatial patterns of plant communities (Field geobotany, 1959–1976; Granitov, 1980; Kent, 2011)[12] [13] [14]

All vantage points from the bird survey and the project site were inspected. A check-list of plant species recorded for the project site was compiled.

The structure of vegetation communities was described on 50x50 m quadrat plots chosen in an area with homogeneous vegetation and representative for each habitat type . For each quadrat, the landscape and vegetation were photographed and documented.

Species cover and abundance was determined using the Braun-Blanquet cover-abundance scale (1965) widely used in geobotanical and ecological studies as rapid visual assessment technique, but robust and highly repeatable, minimizing among-observer differences:

+ – occasional and less than 1% cover of the sample plot area;

1 – abundant with low cover, or less abundant but with higher cover, 1–5% of the sample plot area;

2 – abundant with >5–25% of the sample plot area, irrespective of the number of individuals;

[12] Field geobotany. In 4 vol. (1959–1976) Academy of Sciences of the USSR, Moscow & Leningrad. (In Russian).

[13] Granitov A.I. (ed.) (1980) Methodological guidelines for geobotanical survey of natural rangelands in Uzbekistan. Uzgiprozem, Tashkent. 170 pp. (In Russian)

[14] Kent M. (2011) Vegetation Description and Data Analysis: A Practical Approach, 2nd Edition. Wiley-Blackwell. 428 pp.

3 – >25–50% cover of the sample plot area, irrespective of the number of individuals;

4 – >50–75% cover of the sample plot area, irrespective of the number of individuals;

5 – >75% cover of the sample plot area, irrespective of the number of individuals.

The relative abundance of each species also was assessed using the DAFOR scale: D = Dominant; A = Abundant, F = Frequent, O = Occasional, R = Rare.

3.1.1.1.2 Dzhankeldy-Bash OHTL

The route of the OHTL about 100m in width was also surveyed. The survey methodology followed that which was undertaken at the Dzhankeldy Wind Farm site. A checklist of plant species recorded along the OHTL was complied.

3.1.1.2 Results

3.1.1.2.1 Dzhankeldy Wind Farm

The checklist of vascular plants recorded within the project site during the field survey in April and June includes 49 species.

The majority of species recorded are considered to be common and are not threatened. One species is listed as EN and four species are listed as VU on the Uzbekistan Red Data Book. These are presented in the table below.

Table 3-1 Dzhankeldy Wind Farm – Threatened and Important Flora

Species	Abundance on Site	Range	IUCN /RDB Status
Acanthophyllum cyrtostegium Vved.	Rare	Endemic	Not Evaluated (NE) / UzbRDB 3 (vulnerable, declining species)
Calligonum zakirovii (Khalk.) Czerep.	Rare	Endemic	Not Evaluated (NE) / UzbRDB 1 (endangered species)
Eremurus korolkowii Regel (see note below)	Occasional to Rare	Endemic	Not Evaluated (NE) / UzbRDB 2 (rare species) in former editions, currently excluded

Species	Abundance on Site	Range	IUCN /RDB Status
Ferula kyzylkumica Korovin	Occasional to Rare	Endemic	Not Evaluated (NE) / UzbRDB 3 (vulnerable, declining species)
Tulipa lehmanniana Merckl.	Occasional to Rare	Regional	Not Evaluated (NE) / UzbRDB 3 (vulnerable, declining species)

Further, White Saxaul and Black Saxaul were both identified during surveying, which are nationally protected trees.

Figure 3-1 Flowering *T. lehmanniana* at Dzhankeldy

Figure 3-2 *Ferula kyzylkumica* at Dzhankeldy

3.1.1.2.2 Dzhankeldy-Bash OHTL

A total of 52 plant species were identified along the Bash-Karakul OHTL route. 3 species are listed on Uzbekistan Red Data Book.

Table 3-2 Dzhankeldy–Bash OHTL - Threatened and Important Flora

Species	Abundance on Site	Range	IUCN /RDB Status
Acanthophyllum cyrtostegium Vved.	Rare	Endemic	Not Evaluated (NE) / UzbRDB 3 (vulnerable, declining species)
Calligonum zakirovii (Khalk.) Czerep.	Rare	Endemic	Not Evaluated (NE) / UzbRDB 1 (endangered species)
Tulipa lehmanniana Merckl.	Occasional to Rare	Regional	Not Evaluated (NE) / UzbRDB 3 (vulnerable, declining species)

Figure 3-3 Flowering *Acanthophyllum cyrtostegium* recorded along the OHTL route

Figure 3-4 *Calligonum zakirovii* recorded along the Bash-Karakul OHTL route

3.1.2 Stakeholder Engagement

The Institute of Botany of the Academy of Sciences of the Republic of Uzbekistan, the botany experts consulted as part of the stakeholder engagement exercises provided a monograph that details the rare and endemic species of flora of Uzbekistan. The reginal distribution of the endemic species recorded in the Dzhankeldy project area extracted from the monograph are shown below.

Figure 3-5 Distribution of *Acanthophyllum cyrtostegium*

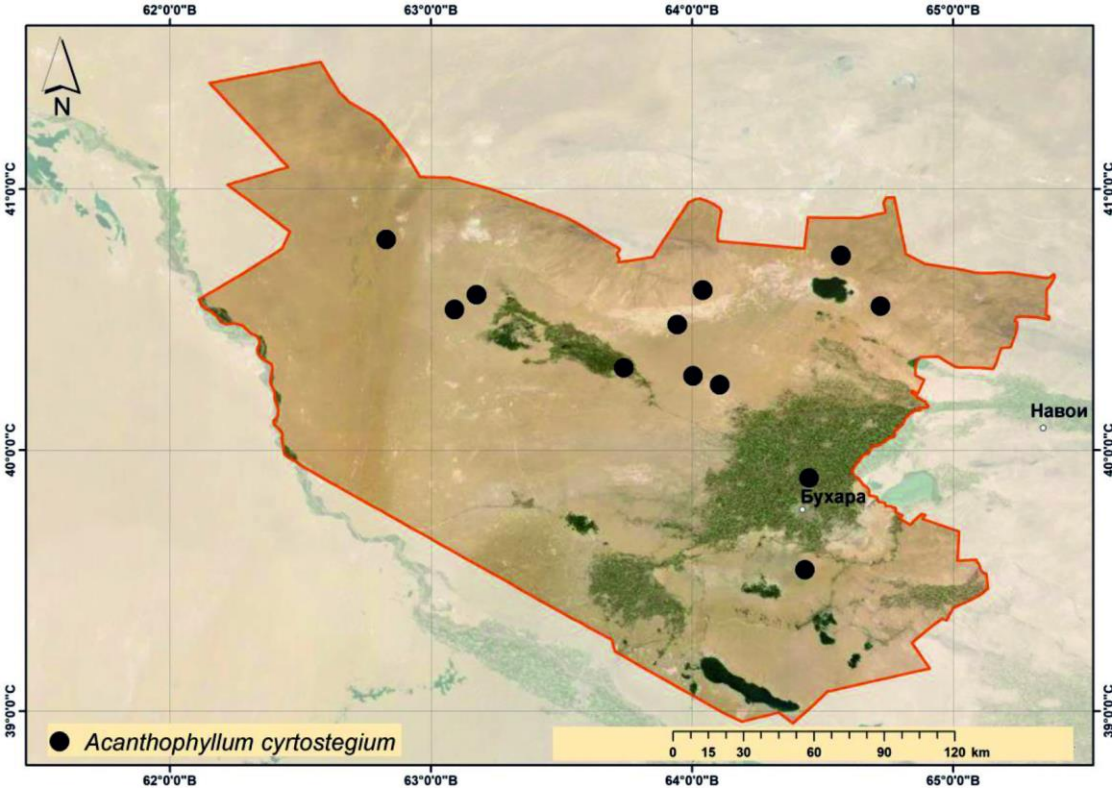


Figure 3-6 Distribution of *Tulipa lehmanniana*

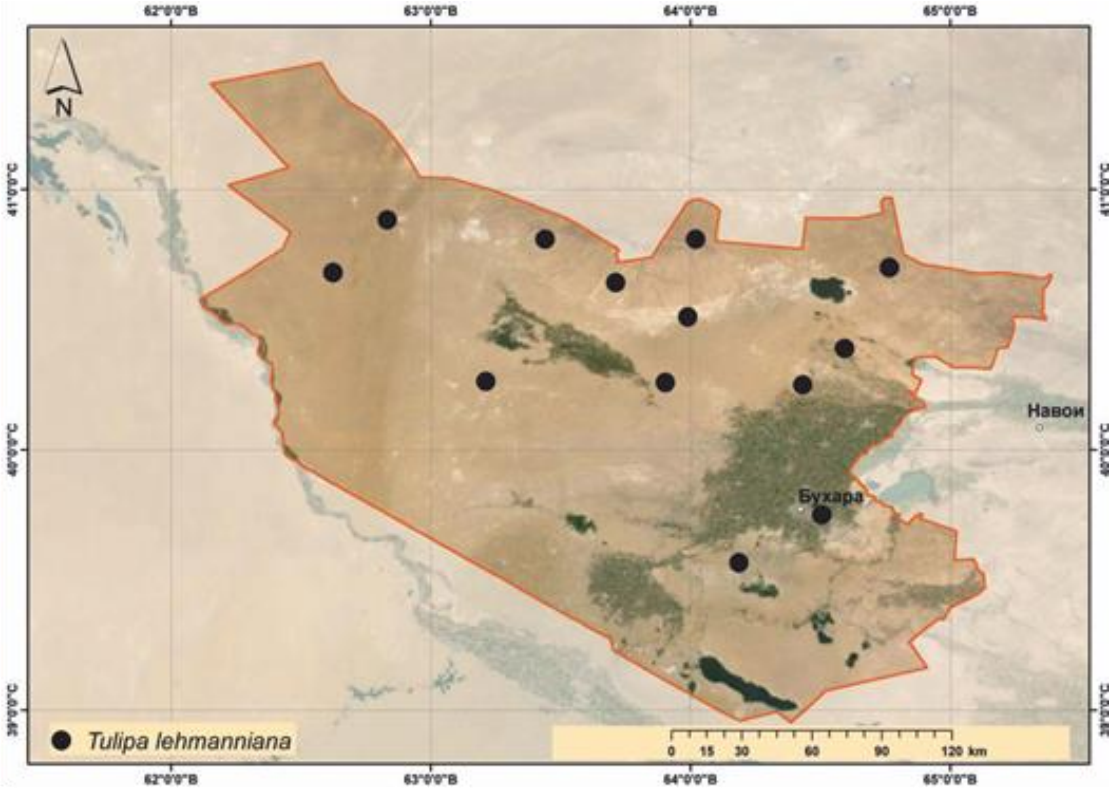


Figure 3-7 Distribution of *Ferula kyzylkumica*

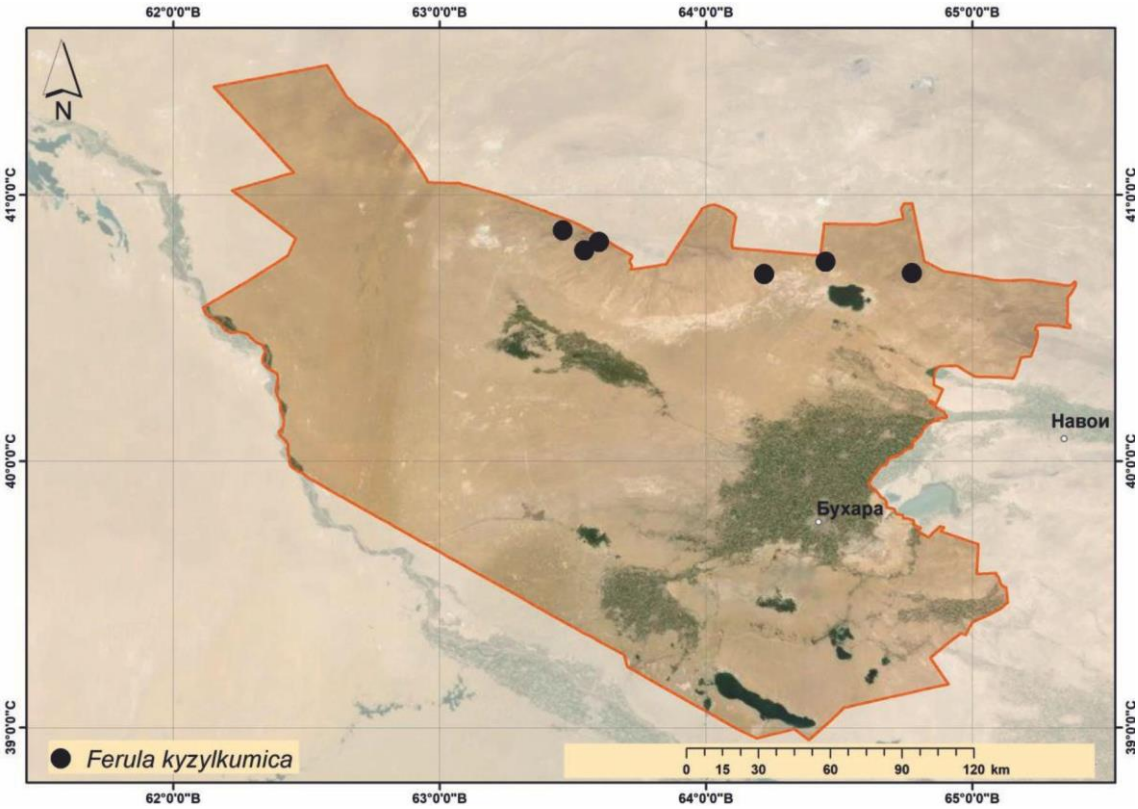
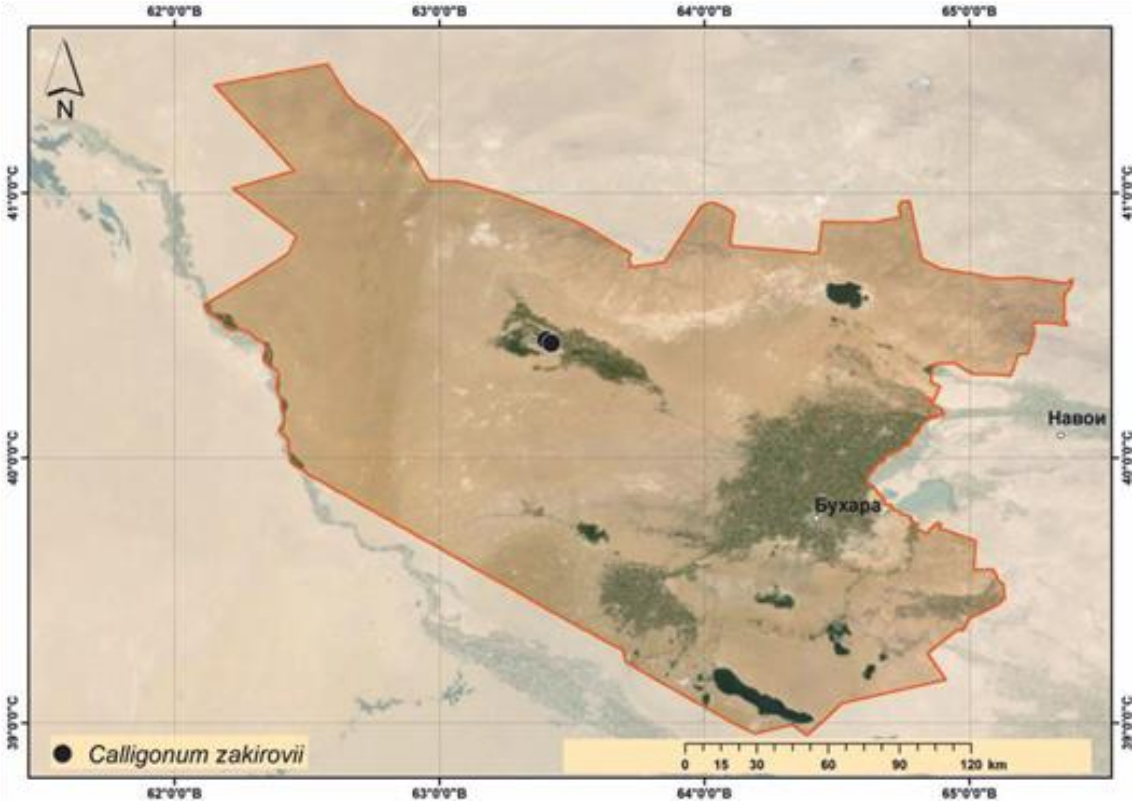


Figure 3-8 Distribution of *Calligonum zakirovii*



3.2 Invertebrate

Several species of endemic moths have been recorded within Uzbekistan. Further, ongoing research continues to identify new species of invertebrates. It is considered highly likely that range-restricted invertebrates may be present within the project site.

3.2.1 Baseline Survey

3.2.1.1 Methods

3.2.1.1.1 Dzhankeldy Wind Farm

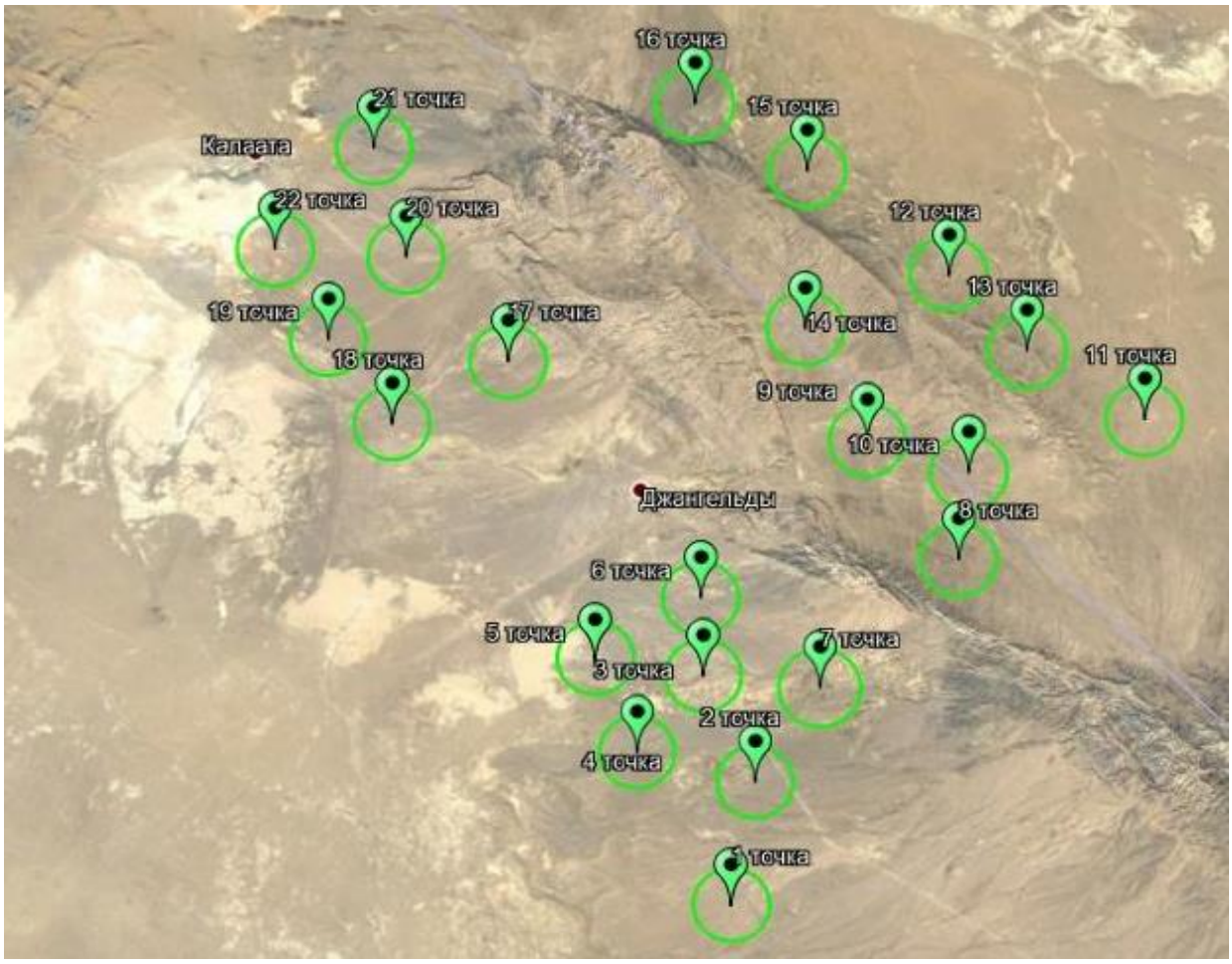
Invertebrate surveying was undertaken in the Spring, from 15-17 April 2021, which is the optimal time as invertebrate populations are at a peak due to the increase in available vegetation. 22 locations were surveyed on the project territory of Dzhankeldy WF.

Transect and area surveys were used in this study. Transects were employed for noticeable and easily identifiable large-size species. Transects were 1 km long and 2 m wide

On complex topographies, the 1 km transect was divided into two 500-metre or five 200-metre sections, depending on the terrain. Insects along the transects were caught using a net.

Specimens that could not be identified in the field was identified at the entomology laboratory at the Institute of Zoology, Academy of Sciences of Uzbekistan, under a digital microscope.

Figure 3-9 Invertebrate survey locations on the project territory of Bash WF



3.2.1.1.2 Dzhankeldy-Bash OHTL

Invertebrate surveying was undertaken in the Spring, from 7 to 9 May 2021. 11 locations were surveyed along planned OHTL from Dzhankeldy-Bash (Figure 3-10).

Figure 3-10 Invertebrate survey locations along the Bash-Karakul OHTL route

3.2.1.2 Results

3.2.1.2.1 Dzhankeldy Wind Farm

The recorded entomofauna was typical for this area. No endemic or red list species were observed at the Dzhankeldy Wind Farm site.

3.2.1.2.2 Dzhankeldy-Bash OHTL

The recorded entomofauna was typical for this area. No endemic or red list species were observed along the Dzhankeldy-Bash OHTL route.

3.2.2 Stakeholder Engagement

No known occurrence of endangered invertebrate species has been recorded by stakeholders within the project area of influence.

4 Migratory and Congregating

4.1 Bats

Many bat species and population are known to migrate, although research and knowledge around bat migration lags far behind that of bird migration.

Bats also commonly display congregatory behaviour. Colonies can form in suitable caves and other shelters; roosting is common during hibernation and breeding; and some species display flocking tendencies during foraging.

Of the 22 bat species likely to inhabit Bash Wind Farm project area, 4 are known to be migratory, whilst others are suspected to be sedentary: the migratory species being *Myotis capaccinii, Nyctalus noctule, Tadarida teniotis,* and *Vespertilio murinus*; which belong to the families Molossidae and Vespertilionidae.

4.1.1 Baseline Survey

4.1.1.1 Methods

4.1.1.1.1 Dzhankeldy Wind Farm

Bat surveys were undertaken via the deployment of static acoustic detectors (Wildlife Acoustics Song Meter SM4) as well as manual roost searches. The schedule of surveys conducted are as follows:

- 2020 Summer/Autumn: Static Acoustic Detector Survey
- 2021 Spring/Summer: Static Acoustic Detector Survey
- 2021 Spring/Summer (breeding season): Manual Roost Search

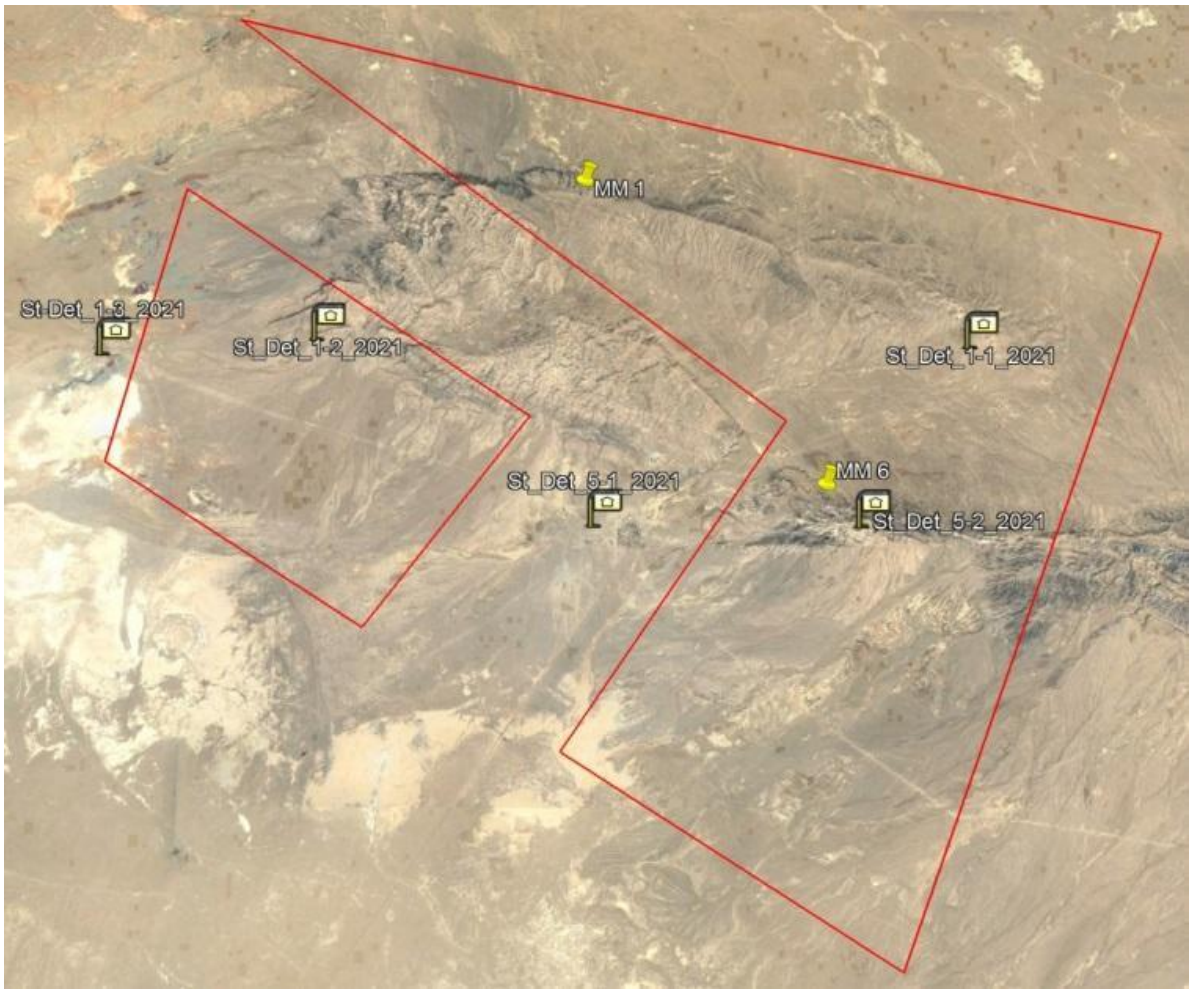
Given the lack of bat activity expected within the region during the winter months, bat acoustic surveys are restricted to the 7-month warm period of the year, extending from the beginning of April through the end of October.

During the 2020 acoustic survey data was collected from three locations in the summer and at five locations in the Autumn.

In 2021, the detectors were deployed at seven locations. At two locations the detectors were installed on meteorological masts at a height of 45m.

Data collected at a height was better suited to assess the bat activity during feeding and migrations. At other locations the detectors were deployed at ground level or on buildings/sheds.

Figure 4-1 Locations of static bat detectors deployed at Dzhankeldy in 2021



The Kaleidoscope Pro Auto Analysis program with predetermined parameters of ultrasonic calls belonging European bats found in Uzbekistan were used for the primary processing of audio recordings.

The BatSound 4 program was then employed to measure the call parameters and cross check the identification of bat calls made by the Kaleidoscope Pro Auto Analysis program. Bat call parameters known for European bat populations (Barataud, 2015) and bat species from neighboring countries for Uzbekistan (Benda et al., 2012) were used for analysis and identification. Bat calls were identified to species level where possible.

Relative abundance, Frequency of occurrence and acoustic activity index were calculated for a quantitative assessment of bat populations in the area. Relative abundance is the relative

number of locations where calls of some species were registered. The frequency of occurrence is the frequency at which calls of some species are recorded among all types of calls (excluding noise, social calls and unidentified calls). Acoustic activity index (AI) is the average number of calls registered on one location for one day of monitoring.

The possible location of bat roosts, which would be used for residential bats, maternity colonies, hibernating, and mating, is of importance to understand Specialized bat roost searches were undertaken within the project boundaries and area of influence in Spring 2021 and Summer 2021.

The roost survey included a desktop analysis of potential bat roost locations in the project area. Each location was then thoroughly examined, both for the presence of bats themselves, and for signs of their presence – excrement, food remains, *etc*. Concrete drainage tunnels under roads were also identified as common bat roosting locations.

Each surveyed location was mapped and documented. The suitability of the objects for bats as either a temporary roost or a permanent one and the potential degree of disturbance/threat was recorded.

Where necessary the height, width and length of the roost were measured. When bats were detected, the surface temperature was measured, their species, gender, age and number were determined. Species identification was carried out according to generally accepted methods (Kuzyakin, 1950; Bogdanov, 1953; Dietz, von Helversen 2004). The captured bats were examined, photographed and immediately released in the places of capture.

Figure 4-2 Bat Roost Survey Transects at Dzhankeldy Wind Farm Site

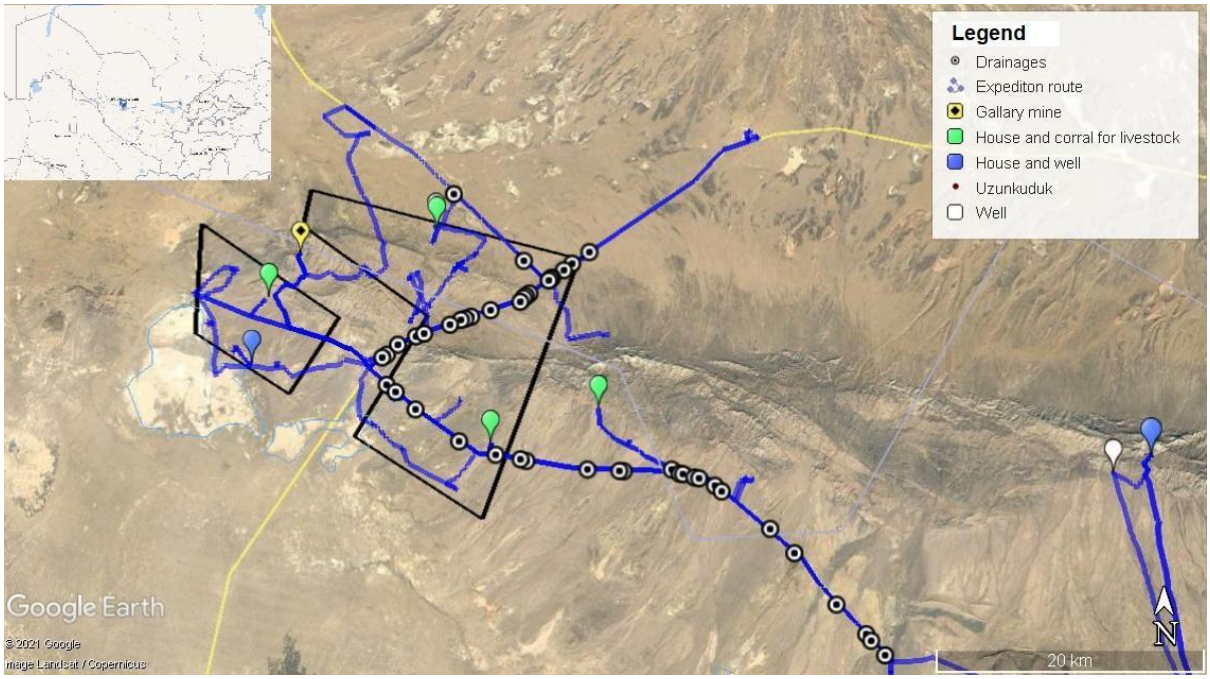


Figure 4-3 Bat Detector Installation on a Weather Mast

Figure 4-4 Bat Detector Deployed on Buildings and at Ground Level

4.1.1.1.2 Dzhankeldy-Bash OHTL

Bat roost searches were undertaken along the planned OHTL in Summer 2021. The roost survey included a desktop analysis of potential bat roost locations in the project area. Each location was then thoroughly examined, both for the presence of bats themselves, and for signs of their presence – excrement, food remains, *etc*. Concrete drainage tunnels under roads were also identified as common bat roosting locations.

Each surveyed location was mapped and documented. The suitability of the objects for bats as either a temporary roost or a permanent one and the potential degree of disturbance/threat was recorded.

Figure 4-5 Bat Roost Survey Transect along Dzhankeldy-Bash OHTL

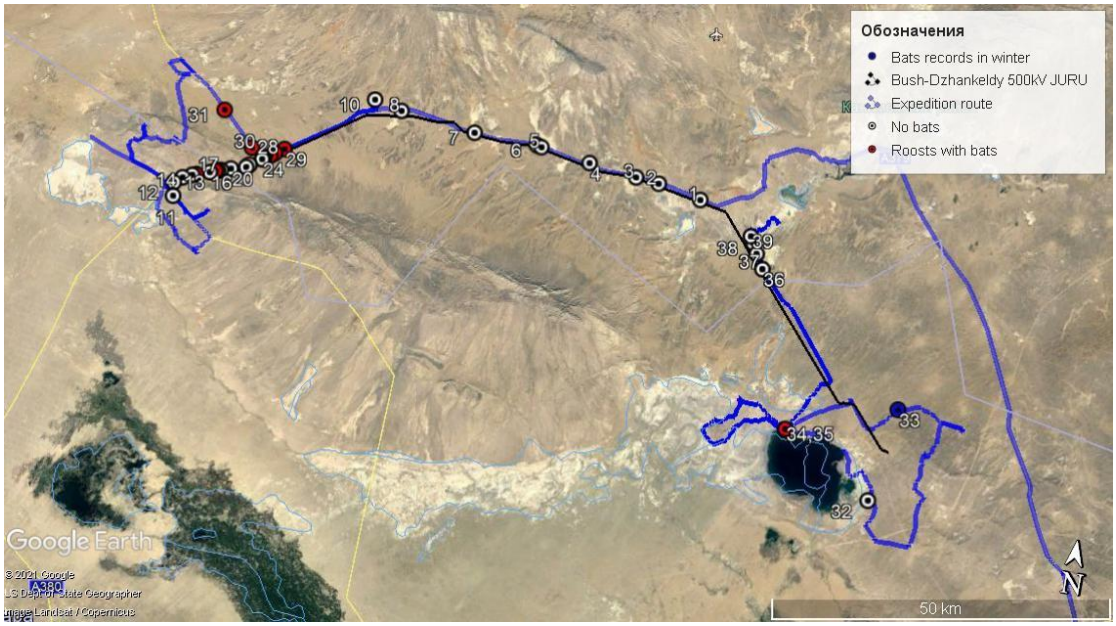


Table 4-1 Locations of the static acoustic bat detectors during the bat surveys

Summer/Autumn Survey 2020			
№ location	Location Name	Coordinates	
		N°	E°
1	1	40.863240	63.382458
2	2	40.906448	63.430447
3	3	40.844369	63.375156
4	4	40.876365	63.287573
5	5	40.936270	63.307306
Spring/Summer Survey 2021			
№ location	Location name	Coordinates	
		°N	°E
1	St_Det_1-1_2021	40.894312	63.441857
2	St_Det_1-2_2021	40.896349	63.243392
3	St_Det_1-3_2021	40.892886	63.178319
4	St_Det_5-1_2021	40.876365	63.287573
5	St_Det_5-2_2021	40.936270	63.307306
6	MM-1 (met mast 13)	40.932164	63.320189
7	MM-6 (met mast 15)	40.859143	63.392653

4.1.1.2 Results

4.1.1.2.1 Dzhankeldy Wind Farm

Summer/Autumn 2020 survey

Calls of 6 bats species were recorded in the project area. Calls of genus Eptesicus and V. murinus are dominant in the datasets. Calls of this species dominate in both summer and autumn. Calls of other bat species are much less common.

A low density of the bat population is typical for the project's area (total AI = 1.77 signals per day). AI differs between different locations no more than twofold (from 1.2 to 2.4).

Table 4-2 Species identified during bat surveys in 2020

Species	Summer and Autumn		
	All	Relative abundance, %	Frequency of occurrence, %
Eptesicus bottae	12	15,8	60
Eptesicus serotinus	23	30,3	100
Nyctalus noctula	3	3,9	60

Species	Summer and Autumn		
	All	Relative abundance, %	Frequency of occurrence, %
Pipistrellus pipistrellus	2	2,6	40
Rhinolophus bocharicus	6	7,9	100
Vespertilio murinus	30	39,5	100
Total:	76	100,0	
Days of work	43		
Acoustic activity index (AI)	1,77		

Table 4-3 Species identified during bat surveys of Summer 2020

Species	Summer 2020					
	1	2	3	Total	Relative abundance, %	Frequency of occurrence, %
Eptesicus bottae	9	2	1	12	15,8	60
Eptesicus serotinus	3	0	1	4	30,3	100
Nyctalus noctula	1	0	0	1	3,9	60
Pipistrellus pipistrellus	0	0	1	1	2,6	40
Rhinolophus bocharicus	1	1	1	3	7,9	100
Vespertilio murinus	2	8	8	18	39,5	100
Total:	16	11	12	39	100,0	
Days of work	10	5	5	20		
Acoustic activity index (AI)	1,6	2,2	2,4	2		

Table 4-4 Species identified during bat surveys of Autumn 2020

Species	Autumn 2020							
	1	2	4	5	3*	Total	Relative abundance, %	Frequency of occurrence, %
Eptesicus bottae	1	2	4	5	3	0	0,0	0
Eptesicus serotinus	1	2	4	5	3	20 (19**)	51.4	100
Nyctalus noctula	1	2	4	5	3	2	5.4	40

Species	Autumn 2020							
	1	2	4	5	3*	Total	Relative abundance, %	Frequency of occurrence, %
Pipistrellus pipistrellus	1	2	4	5	3	1	2.7	20
Rhinolophus bocharicus	1	2	4	5	3	3	8.1	60
Vespertilio murinus	1	2	4	5	3	13 (12**)	32.4	100
Total:	1	2	4	5	3	39 (37**)	100.0	
Days of work	5	5	8	5	17*	40 (23**)		
Acoustic activity index (AI)	1.4	1.2	2.1	1.4	0.12*	1.6 **		

Spring/Summer 2021 survey

The data obtained in 2021 indicate very large fluctuations in bats activity in the project area, from 0 to 358 registrations of flights per night. Nights with high activity of bats (more than 50 registrations per night) are very rare - approximately once every 10 days. Without these "nights of high activity" the average activity of bats in the project area is rather low - about 6,7 registrations per night.

The reasons for the bursts of bats activity are not known. This may be an activity associated with bats migration through the project area, or due to the temporary attractiveness of the vicinity of the meteorological masts for some feed objects, which in turn attract bats.

Figure 4-6 Bat calls recorded in April 2021 Showing Fluctuations in Bats Activity

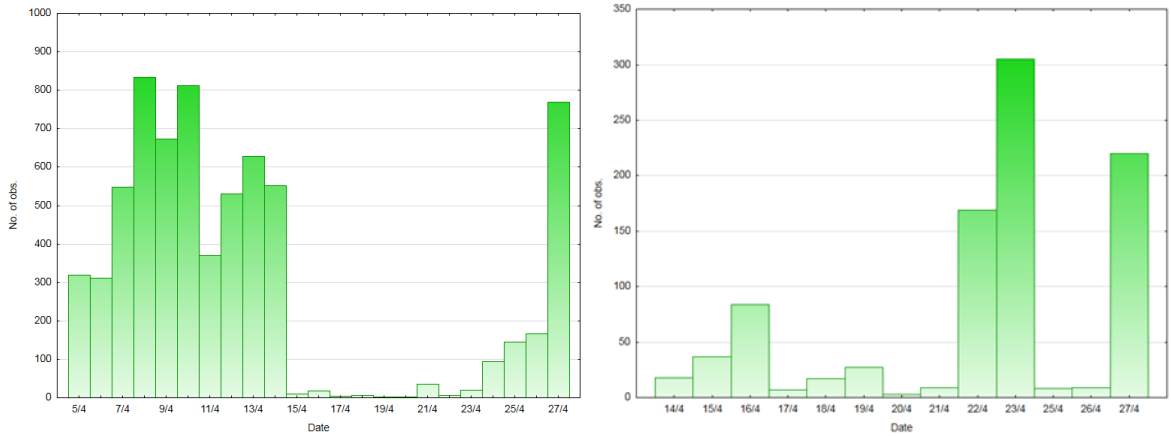
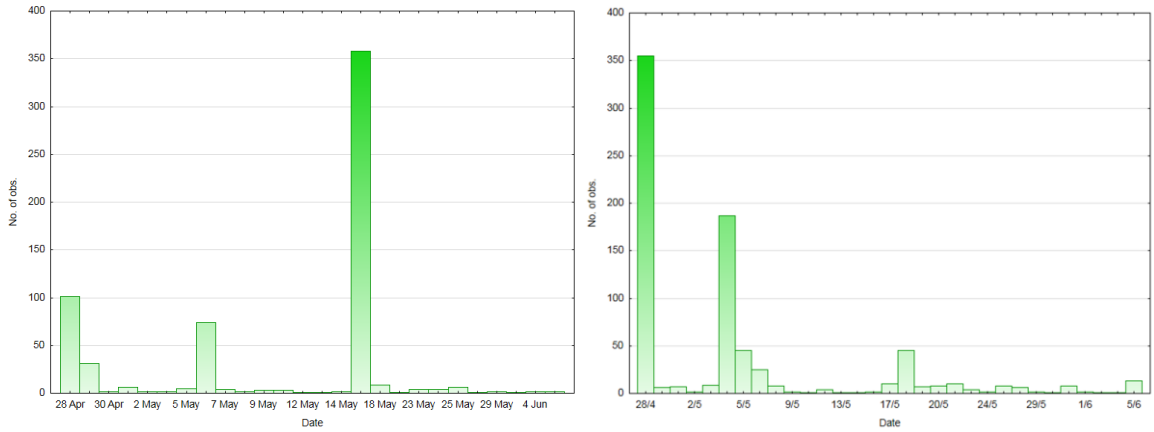


Figure 4-7 Bat calls recorded in May 2021 Showing Fluctuations in Bats Activity



Calls of 5 bats species were found on the project's area: *Eptesicus sp. (Eptesicus bottae and Eptesicus serotinus), Pipistrellus pipistrellus, Rhinolophus bocharicus, Vespertilio murinus.*

Only calls of the genus *Eptesicus* and *V. murinus* were recorded on meteorological masts in the project site. Calls of the other two species (*P. kuhli* and *R. s bocharicus*) were found at "near ground" locations, on buildings and sheds.

Table 4-5 Bats Recorded During Spring/Summer Survey 2021 on Meteorological Masts

Species	29 April - 1 May				23-25 May				Total calls	Avg Bat Calls/Night (AI)
	MM-1 (Meteomast 13)		MM-6 (Meteomast 15)		MM-1 (Meteomast 13)		MM-6 (Meteomast 15)			
	Call pass	RA, %	Call pass	RA, %	Call pass	RA, %	Call pass	RA, %		
Eptesicus sp. (E. bottae+E. serotinus)	**3**	7,7	**6**	46,2	**6**	42,9	**5**	35,7	20	1,7

Species	29 April - 1 May				23-25 May				Total calls	Avg Bat Calls/Night (AI)
	MM-1 (meteomast 13)		MM-6 (meteomast 15)		MM-1 (meteomast 13)		MM-6 (meteomast 15)			
	Call pass	RA, %	Call pass	RA, %	Call pass	RA, %	Call pass	RA, %		
Vespertilio murinus	**36**	92,3	**7**	53,8	**8**	57,1	**9**	64,3	60	5
Total:	**39**		**13**		**14**		**14**		80	6,7

Bat Roost Survey 2021

54 potential roost places were examined. Bat roost searches found a high number of suitable roosting locations, both anthropogenic (most of which were draining tunnels under the roads) and natural. Two species were recorded during roost searches, *Rhinolophus bocharicus* and *Eptesicus bottae*. The locations of roosting colonies are provided in the following maps .

An obvious anthropogenic threat to *Eptesicus bottae* Ognev's serotine bats is the regular repair work of draining tunnels, as a result of which the cracks inhabited by this species are smoothed. In particular, 5 individuals of Ognev's serotine bats were recorded in the draining tunnel No. 13 on April. In June, the same tunnel was examined again. It was noted that the the cracks were repaired, and no bats were recorded. It is not known if the bats left the roost during the repair work. No other obvious anthropogenic threats were noted.

All bat species recorded in the project area in 2020 and 2021, are classified as Least concern (LC) by IUCN.

Figure 4-8 Roosting Bat Colonies *Rhinolophus bocharicus*

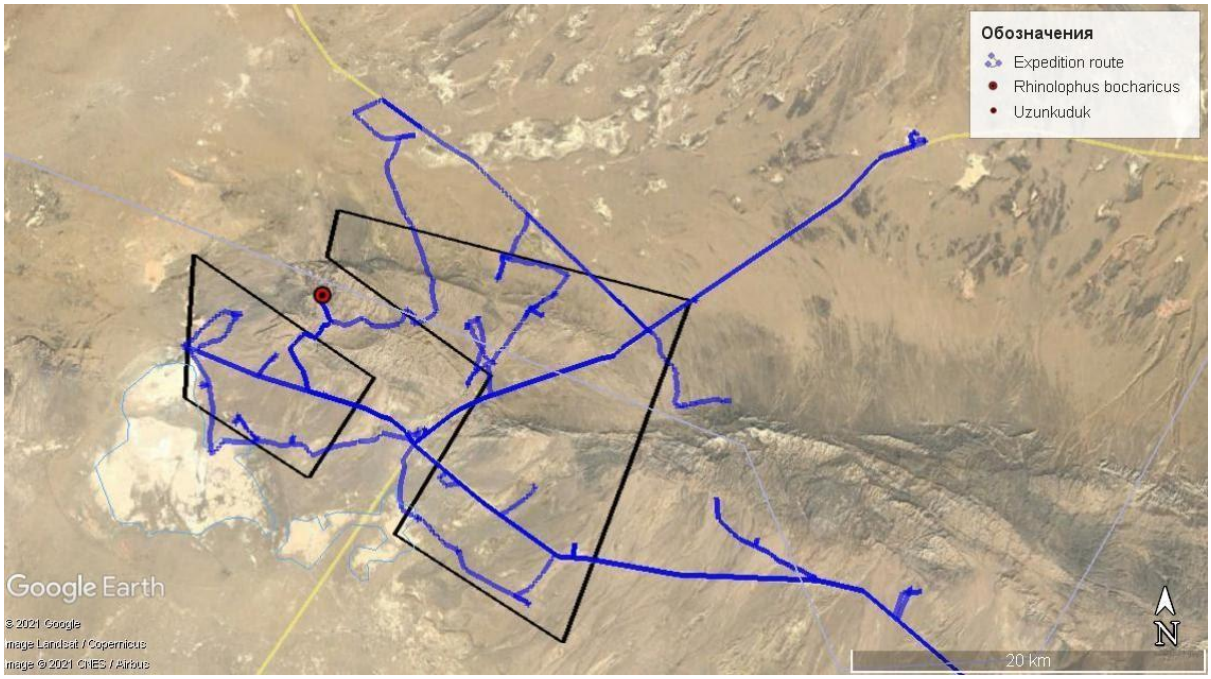


Figure 4-9 *Rhinolophus bocharicus* at Beltau, an area close to Dzhankeldy

Figure 4-10 *Rhinolophus bocharicus* at Beltau, an area close to Dzhankeldy

Figure 4-11 Roosting Bat Colonies *Eptesicus bottae*

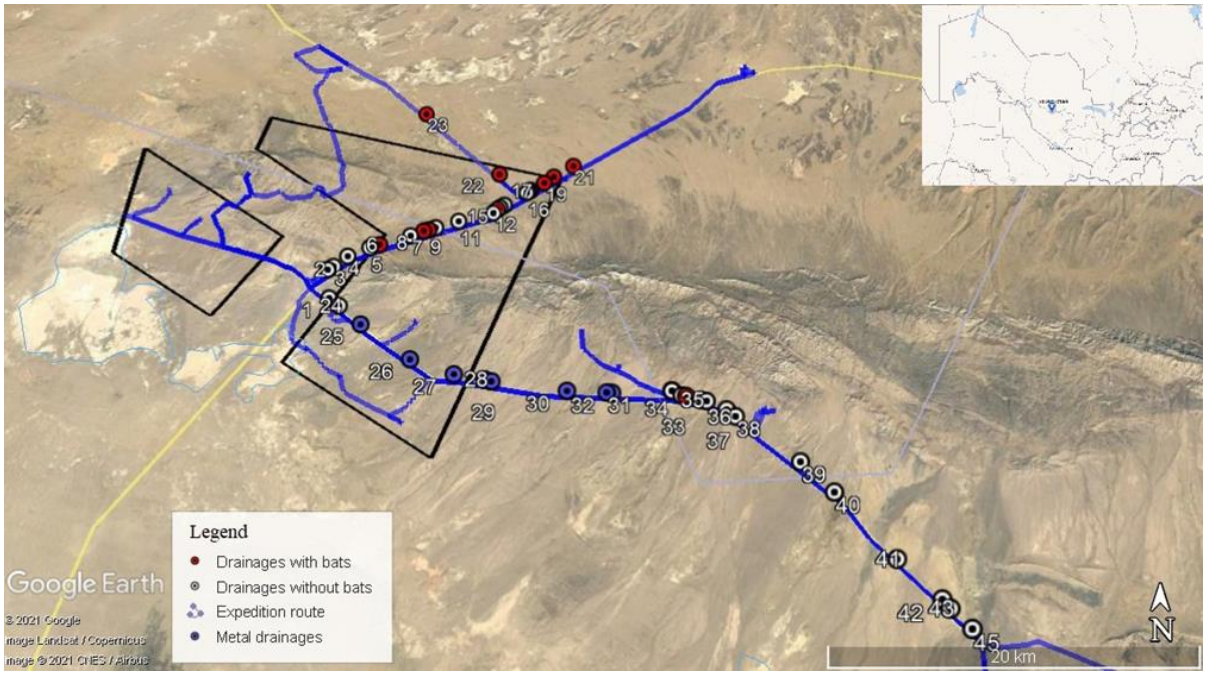


Figure 4-12 *Eptesicus bottae* Inside Concrete Drainage Tunnel

Figure 4-13 Common Bat Roost- Concrete Drainage Tunnel

4.1.1.2.2 Dzhankeldy-Bash OHTL

A total of 39 potential habitats were visited of which 23 roosts were suitable for bats. Two species were recorded during roost searches, Ognev's serotine bat *(Eptesicus bottae) and* Common pipistrelle bat *(Pipistrellus pipistrellus)*.

Figure 4-14 Bat Roosts Surveyed Along the OHTL Route

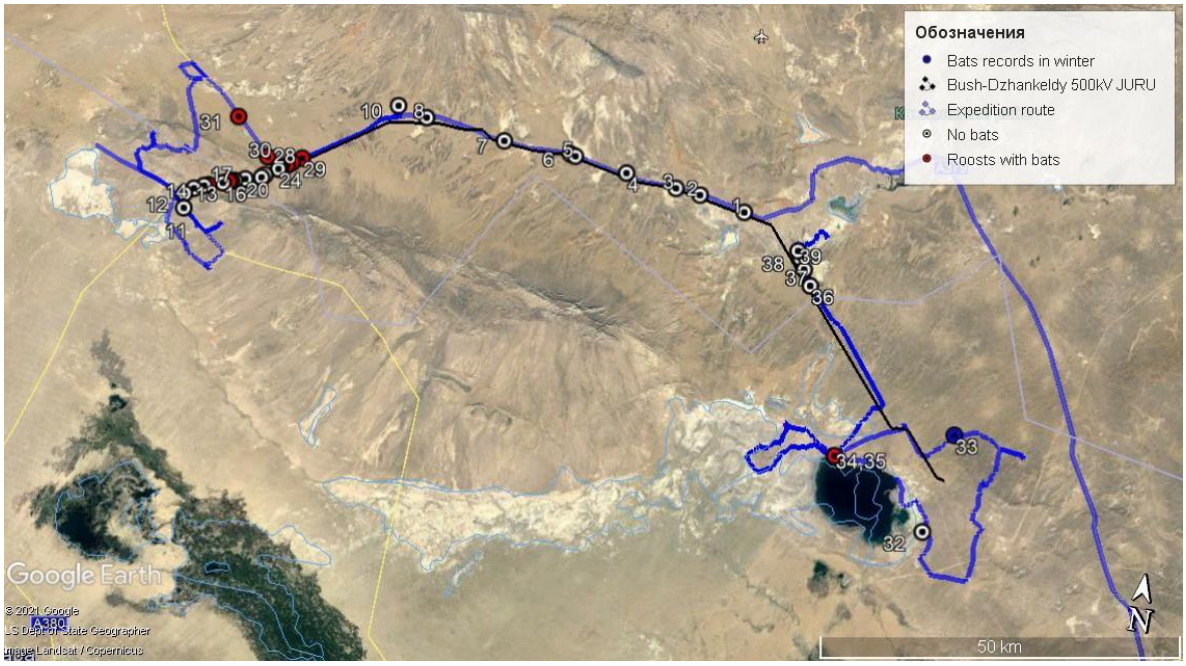


Figure 4-15 Roosts with Ognev's serotine bat (*Eptesicus bottae*)

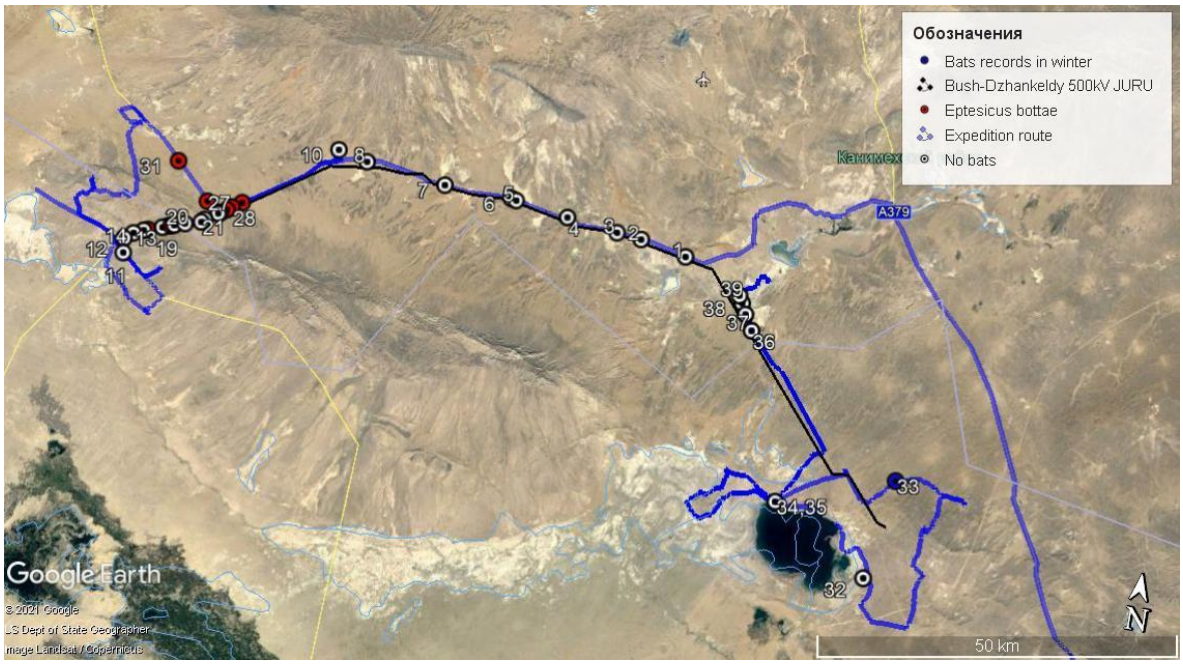


Figure 4-16 Roosts with Common pipistrelle bat (*Pipistrellus pipistrellus*)

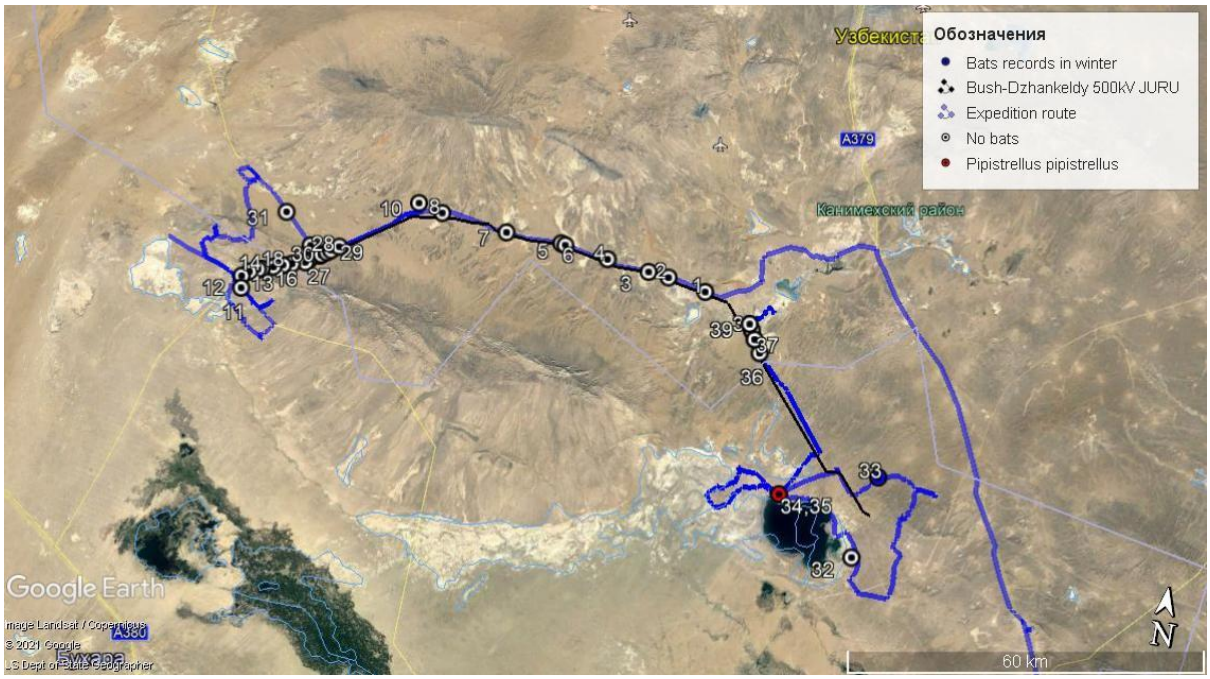


Figure 4-17 Common pipistrelle bat Recorded at Ayakagytma Village

4.1.2 Stakeholder Engagement

The local residents of Ayakagytma were consulted during the baseline survey who identified one of the roost locations as a wintering habitat. An owner of house where a colony was found said that colony had been around for 25 years and that the bats were common inhabitants of their villages.

The presence of roost numbered 12 on the maps above were identified by mammal experts of the baseline survey for the Bash Wind Farm Project.

Another stakeholder, B.R.Kholmatov, Director of Institute of Zoology, Uzbekistan Academy of Sciences who was requested for information on biodiversity concerns has confirmed the presence of bat roosts in the cliffs of the Ayakagytma depression.

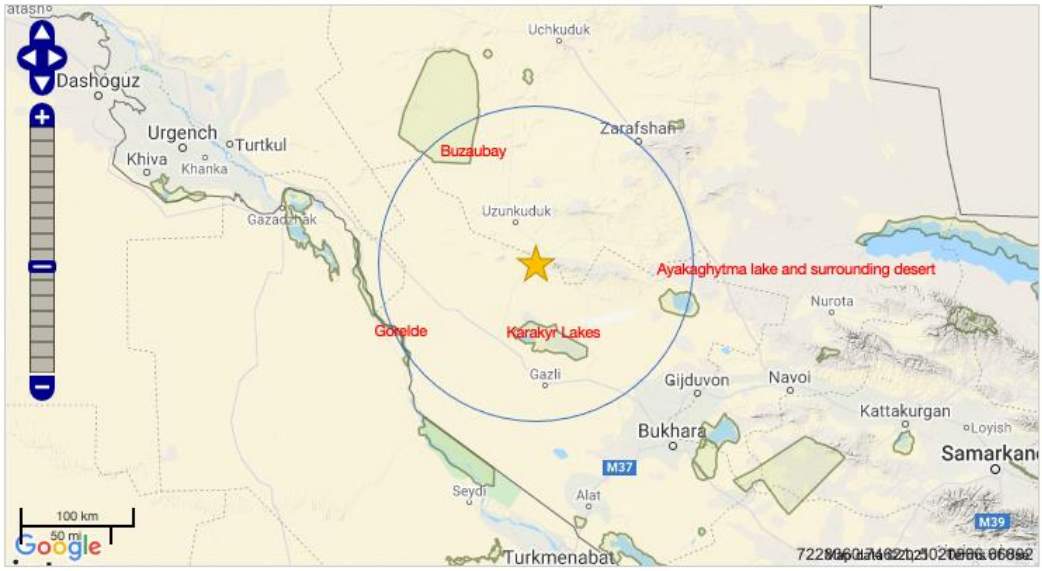
The Institute of Zoology, Uzbekistan Academy of Sciences were consulted as part of the stakeholder engagement exercises of the CHA stage 2 process. The passages below are an excerpt from the response received from the institute.

- The slopes of the low-mountain range of Kuldzhuktau are habitats of bats, among which there presumably rare red book species.

4.2 Waterbirds

A number of Important Bird Areas were highlighted that exist in the immediate area as well as several in the larger region.

Figure 4-18 IBAs within 100km of the Project Site



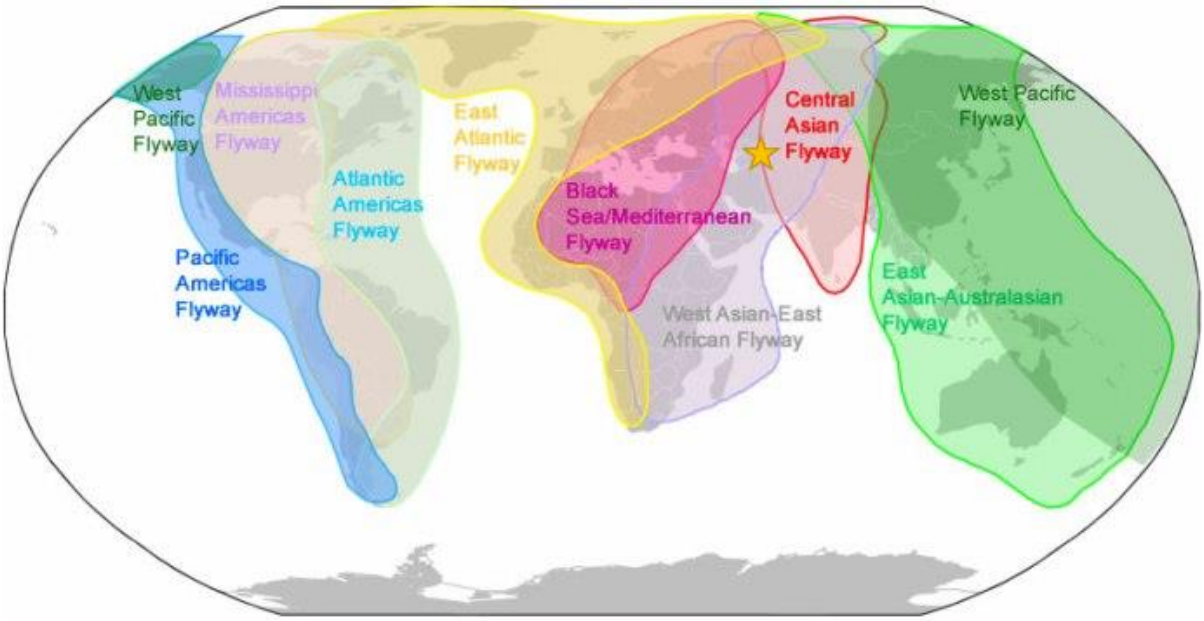
The following IBAs are within a 100km buffer zone of the project site:

- Karakyr Lakes, located 30km to the south, a prominent wintering site for waterfowl and waterbirds;
- Buzaubay, located 80km to the north; a stretch of desert steppe habitat wherein 36 species of birds have been recorded to breed;
- Ayakaghytma lake and surrounding desert, located 85km to the east; a prominent wintering site for waterfowl and waterbirds; and
- Gorelde, located 85km to the west; about 160 species have been recorded from the IBA (29% of the avifauna of Central Asia), the site is part of the major migratory flyway of waterbirds and waterfowl along the Amudarya valley.

MIGRATORY FLIGHT PATH ANALYSIS

The project site is also located within the convergence of two major migratory flyways; the Central Asian Flyway and the West Asian/East African Flyway.

Figure 4-19 Project location in relation to global migratory bird flyways



An assessment of the landforms surrounding the project site enables us to predict a general flight path of migratory flocks*, which typically avoids expanses of flat desert and mountain features and follows along coastlines or river deltas to wetland staging areas and stopover sites. (*migratory flight path prediction is an imperfect science. Migration pathways vary by type of birds, species, age, and even individuals year by year. However, very broad, general patterns can be made based on these behavioural assumptions.).

The following figures showcase the likely pathways that migrating birds may follow when heading south towards wintering grounds during early autumn.

Figure 4-20 Predicted flight path analysis for migratory birds (1)

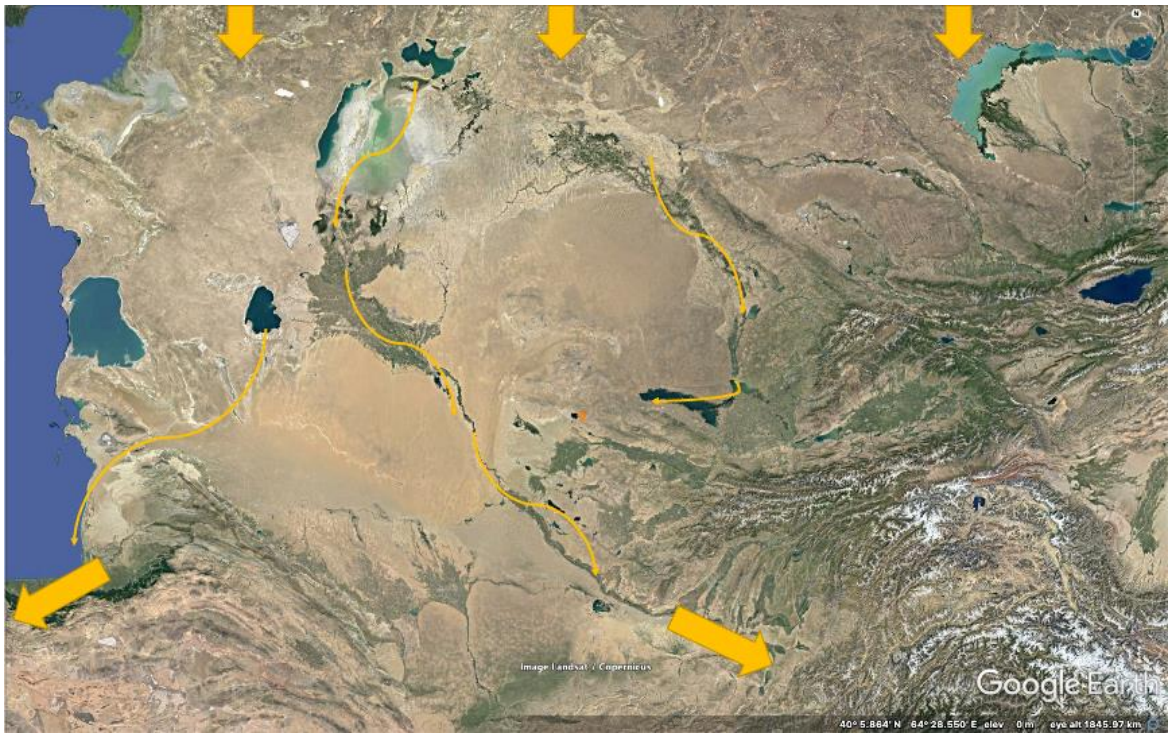
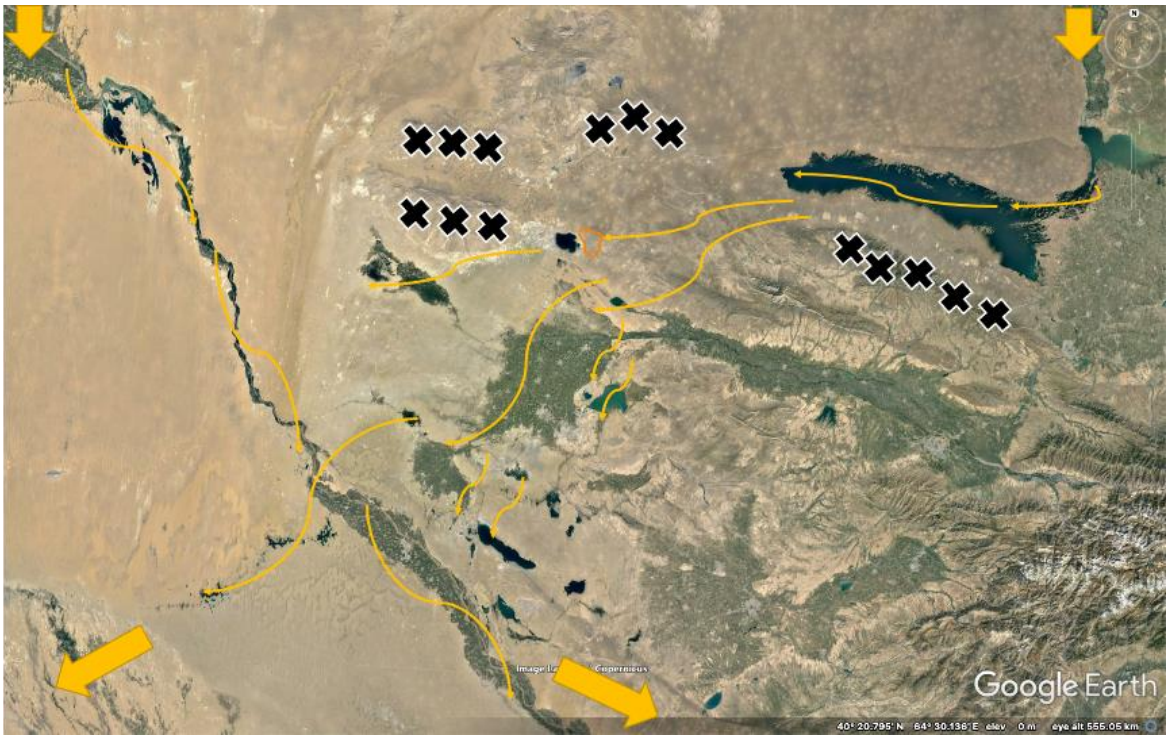
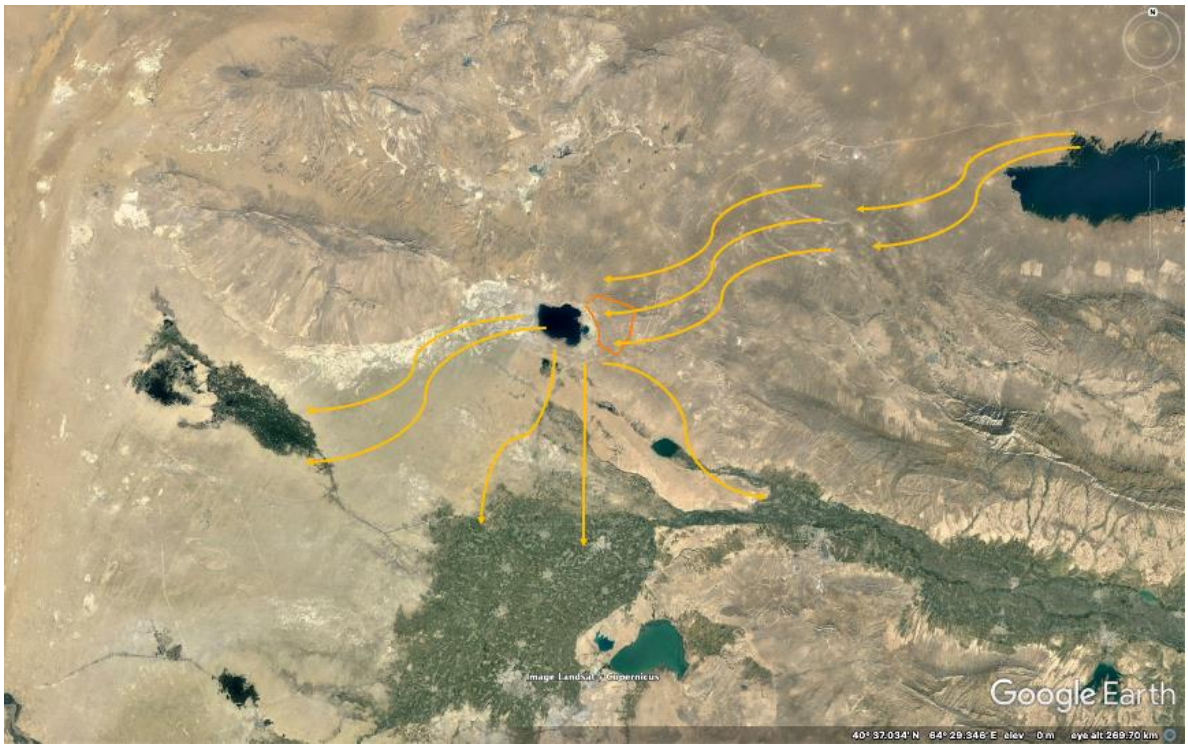


Figure 4-21 Predicted flight path analysis for migratory birds (2)



Based on the location of various lake and river deltas, and the mountain landforms to the north and east of the project site, it is likely that the majority of migratory birds would not cross the airspace of the site.

Figure 4-22 Predicted flight path analysis for migratory birds (3)



The predicted migratory flight paths anticipate high levels of flight activity occurring in the project site airspace, especially during autumn migration.

4.2.1 Baseline Survey

4.2.1.1 Methods

4.2.1.1.1 Dzhankeldy Wind Farm

The Dzhankeldy WF site was comprehensively surveyed over one year (16 May 2020-20 May 2021) during all four seasons following the guidance of the Scottish Natural Heritage (SNH) guidelines (2017), which are currently the internationally accepted best-practice for onshore wind farm surveying and assessment.

A total of 10 Vantage Points (VPs) were surveyed to collect data on species, numbers, physical characteristics, and flight behaviour. The points are located so as to cover the project area as completely as possible (Figure 4-23).

The duration of survey at each vantage point was approximately 3 hours. During observations weather conditions such as wind speed and direction, and air temperature were recorded. Wind speed and air temperature were measured using an anemometer. Whenever possible,

approximate flight altitude, speed, and flight direction of the birds were recorded every 15 seconds.

During the observations, photographing and short video shooting of the birds were carried out, which were used to confirm the correct species identification and obtain additional data on the number of individuals.

During the summer 2020, autumn 2020 and spring 2021 surveys Cliffs and ledges on the Northern sides of the Western Kuldzhuktau mountain range were examined for nests of large birds of prey to identify nesting species and collect data on their nesting ecology and behaviour.

Nest locations were recorded and mapped. During the survey optical devices such as binoculars and telescopes were used. Local residents and shepherds were interviewed for information on the presence of bird predator nests in the area. Due to the lack of large trees and shrubs, nesting birds in trees was excluded. Surveys were conducted both in the project area and in the surrounding area.

Specialized Houbara surveys were undertaken during the peak Houbara mating season, which is one of the only times that Houbara can readily be viewed, due to the specie's intensively secretive and shy nature.

Figure 4-23 Vantage Points at Dzhankeldy Wind Farm Site

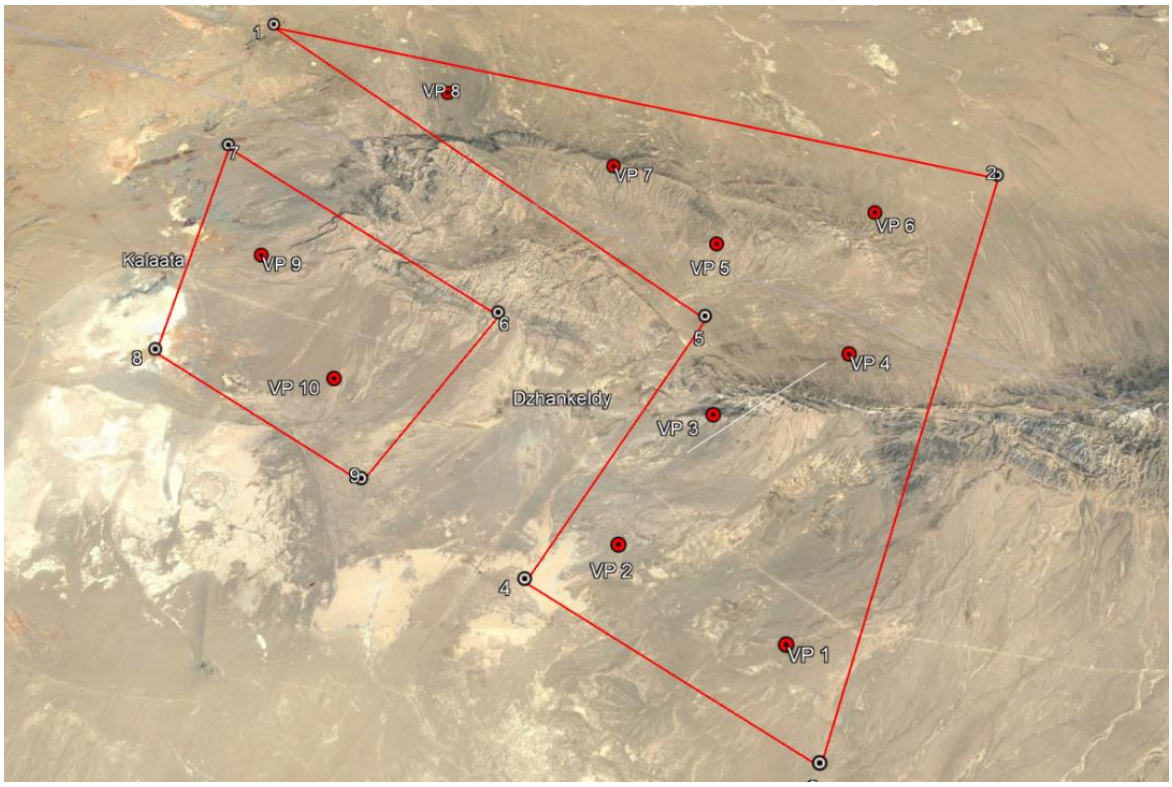


Figure 4-24 Nest Survey Routes during Summer

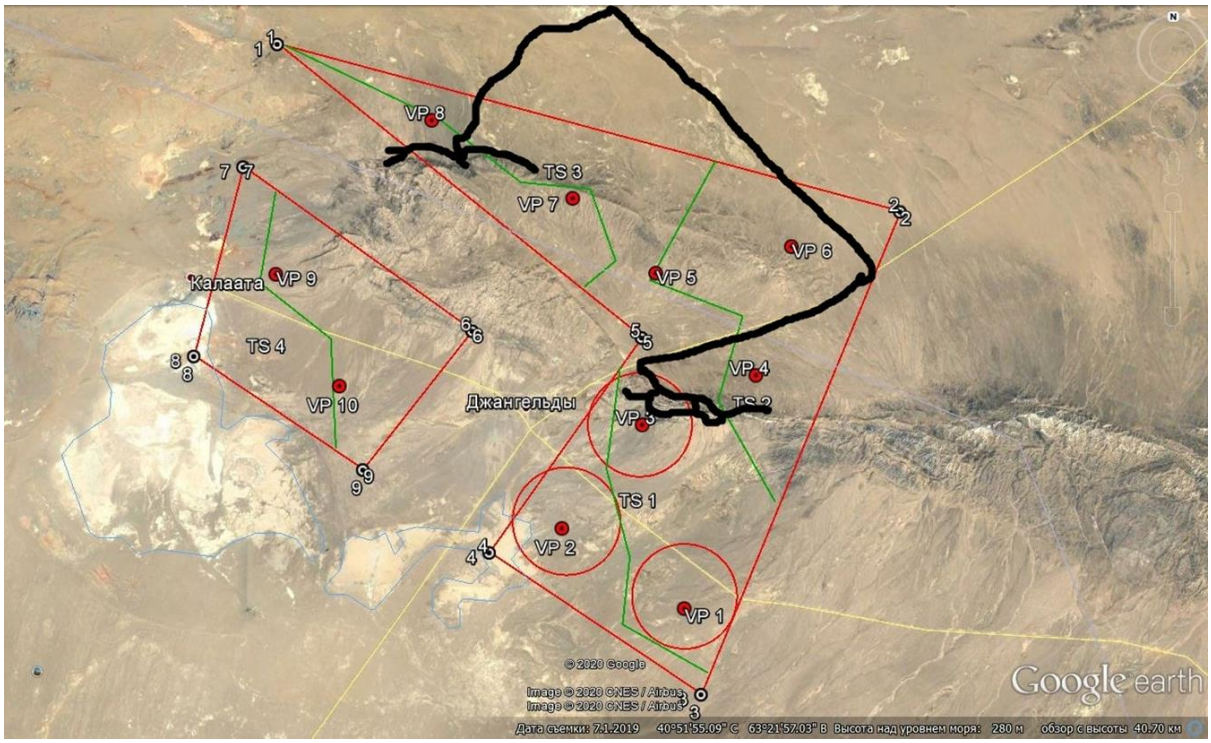
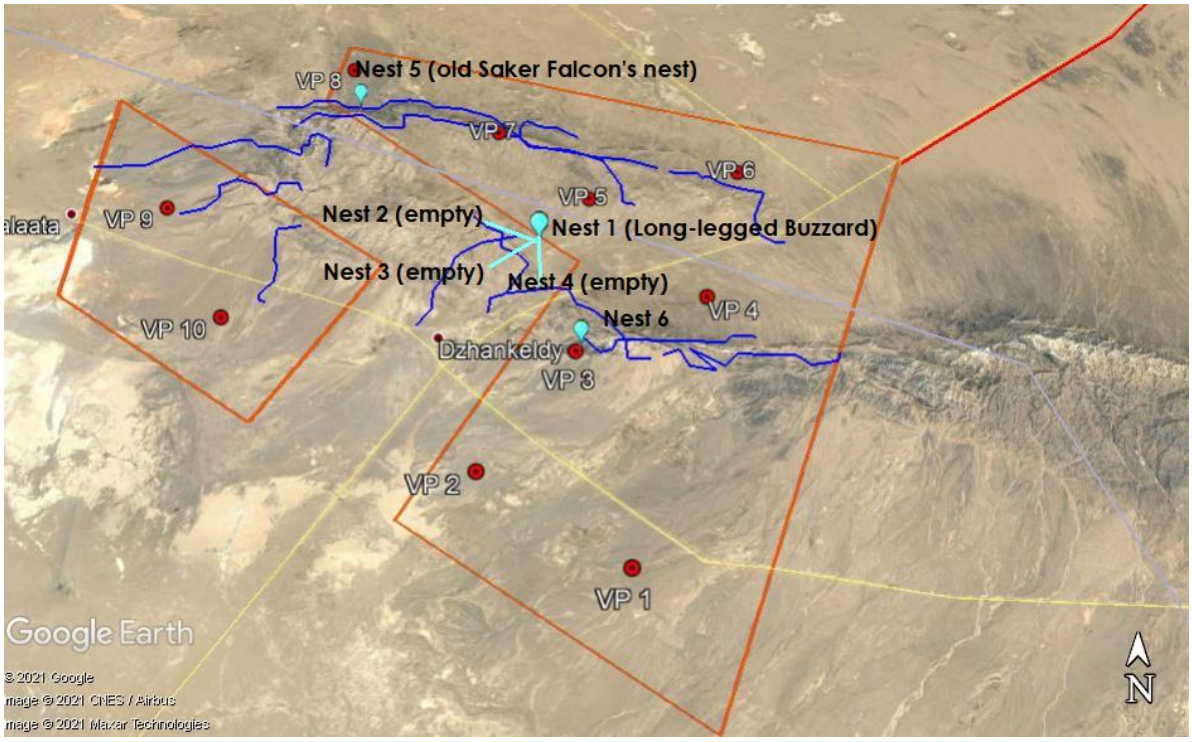


Figure 4-25 Nest Survey Routes during Spring



4.2.1.1.2 Dzhankeldy-Bash OHTL

The survey along the planned Dzhankeldy-Bash OHTL was carried out May and June 2021 at selected vantage points (VP). The points were places directly along the route of the transmission line or near it depending on the availability of access roads. The distance from the route in some places was generally not more than 1-2 km.

Given the homogenous landscape of the surveyed section, analogies were drawn between the surveyed area adjacent to the route and the route itself.

Visual observations of birds were made during the route survey. Bird sighting points were also marked using GPS. Bird species membership was determined visually using field binoculars with 8x magnification and Nikon and Fujifilm XT-20 digital cameras as well as audio recordings of bird voices (Xeno-canto Asia) and field bird identifiers (Mullarney, Svensson, Zetterstrom, Grant, 1999; Aye, Schweizer, Roth 2012).

Surveys were conducted at 11 selected points, in 1 km radius sections. Duration of observations was not less than 40 minutes at each vantage point. A survey of operating power lines within the project area was also carried out to assess bird mortality on operating OHTL.

Figure 4-26 Vantage points of the projected OHTL route in May 2021

Figure 4-27 Vantage points of the projected OHTL route in June 2021

Due to change of the route in June, the number of vantage points was reduced to 10.

4.2.1.2 Results

4.2.1.2.1 Dzhankeldy Wind Farm

During the VP surveys, birds were categorized into four 'groupings' which are based on threat status and sensitivity to wind turbine impacts. The following table summarizes the bird species recorded throughout all three seasons of VP surveys within each grouping of Tier 1 (most sensitive), 2, and Tier 3 (less sensitive). All other bird species were deemed least sensitive and although are recorded in data annexes, have not been summarized here.

Table 4-6 Dzhankeldy Wind Farm – VP Surveys Results

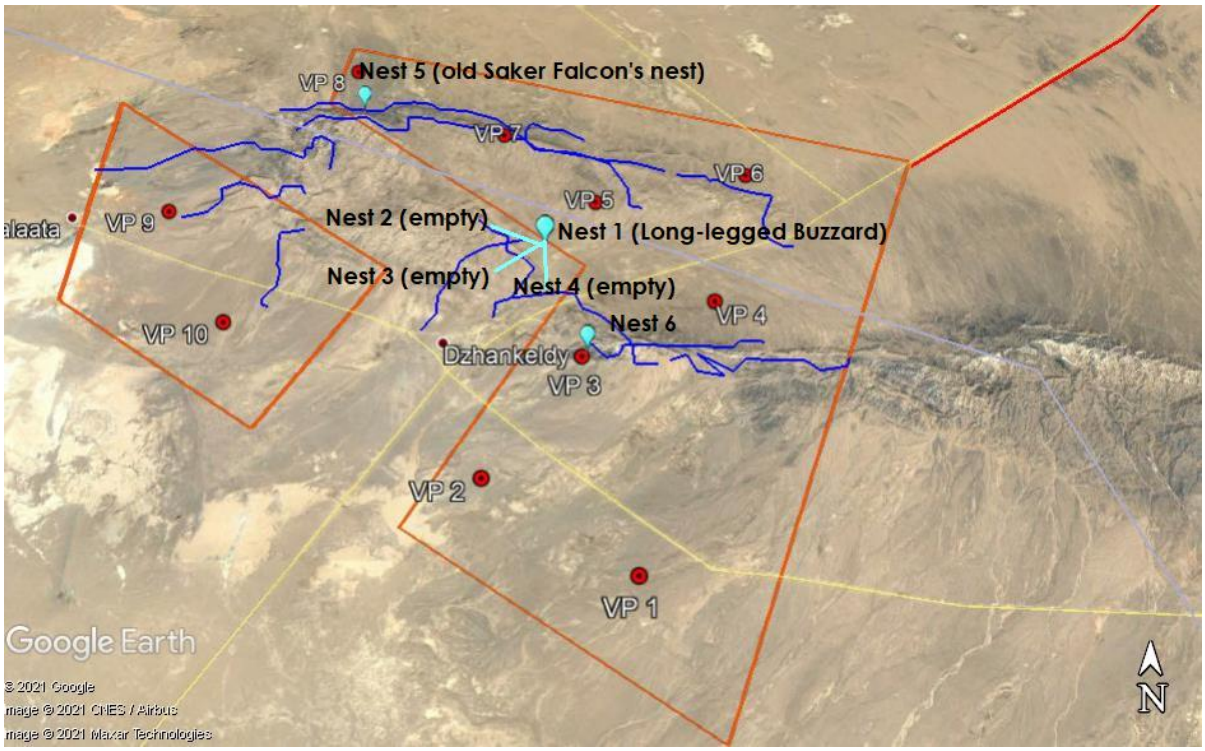
Scientific Name	English Common Name	Uzbek status	IUCN status	VP Observations			
				Spring	Summer	Autumn	Winter
Tier 1							
Chlamydotis macqueenii	Houbara Bustard	VU	VU	1			
Microcarbo pygmaeus	Pygmy Cormorant	NT		17		22	7
Pelecanus onocrotalus	Great White Pelican	VU				16	
Neophron percnopterus	Egyptian Vulture	VU	EN	12	31	1	
Aegypius monachus	Cinereous Vulture	NT	NT	3	3	14	6
Gyps fulvus	Eurasian Griffon	VU	NT		4		

Scientific Name	English Common Name	Uzbek status	IUCN status	VP Observations			
				Spring	Summer	Autumn	Winter
Circaetus gallicus	Short-toed Snake-Eagle	VU				1	
Aquila nipalensis	Steppe Eagle	NT	EN		2	9	6
Aquila heliaca	Imperial Eagle	VU	VU			8	1
Aquila chrysaetos	Golden Eagle	VU		6			3
Haliaeetus albicilla	White-tailed Eagle	VU		1			8
Falco naumanni	Lesser Kestrel	NT			5	1	
Falco cherrug	Saker Falcon	NT	EN				
Tier 2							
Grus grus	Common Crane			11			
Circus aeruginosus	Eurasian Marsh-Harrier			11	12	16	2
Circus cyaneus	Hen Harrier			19	7	16	21
Milvus migrans	Black Kite			2		4	
Accipiter nisus	Eurasian Sparrowhawk				3		
Buteo buteo	Common Buzzard			6	6	27	3
Buteo rufinus	Long-legged Buzzard			37	15	51	11
Falco tinnunculus	Eurasian Kestrel			51	19	54	47
Tier 3							
Tadorna ferruginea	Ruddy Shelduck					30	
Anas strepera	Gadwall			27		31	
Anas platyrhynchos	Mallard					110	
Anas crecca	Green-winged Teal			42		7	6
Chroicocephalus ridibundus	Black-headed Gull			18		23	6
Larus cachinnans	Caspian Gull			31			6
Phalacrocorax carbo	Great Cormorant					24	
Ardea cinerea	Gray Heron			13		5	6
Ardea purpurea	Purple Heron			1			
Ardea alba	Great Egret					2	
Nycticorax nycticorax	Black-crowned Night-Heron					6	

Nest Searches

A number of cliffs and exposed rock ledges on the northern face of the Kuldzhuktau mountain range present suitable habitat for nesting birds of prey. Nest searches were undertaken to establish if there was past or present breeding activity in the area.

Figure 4-28 Nests Found in Spring 2021



4.2.1.2.2 Dzhankeldy-Bash OHTL

23 species were recorded in May and June. The number of observed birds was much higher in June, which could be explained by the end of the nesting period in small passerines, appearance of juveniles and less hidden way of life. Desert finches and typical bee-eaters had begun migration following the breeding season.

The Egyptian Vulture was recorded at VP 1. The species was also recorded during the survey of existing power lines within the project boundary.

Houbara Bustard is the most vulnerable, as there are nesting sites for this species in the immediate vicinity of the proposed OHTL.

The location of the Egyptian Vulture and Houbara bustard sightings along the OHTL are denoted in the map below as NP and ChU/UhU respectively.

Figure 4-29 Bird survey point along the Dzhankeldy-Bash OHTL Route

4.2.2 Stakeholder Engagement

The Institute of Zoology, Uzbekistan Academy of Sciences were consulted as part of the stakeholder engagement exercises of the CHA stage 2 process. The passages below are an excerpt from the response received from the institute.

- The second project site-the Dzhankeldy Wind Farm is located on the low-mountain ridge of Kuldzhuktau, which is a nesting place for birds of prey and the passage of many other representatives of avifauna

The State Committee on Ecology and Environmental Protection of The Republic Of Uzbekistan were consulted as part of the stakeholder engagement exercises of the CHA stage 2 process.

The following table outlines water bird counts collected by the Department of Biology of the Bukhara State University and the Bukhara State Medical Institute, employees of the Bukhara Regional Department of Ecology and Environmental Protection, the Bukhara regional branch of the Sports Association of Hunters and Fishermen of Uzbekistan. The surveys were conducted in March 2020 and March 2021.

Table 4-7 Bird Survey Results 2020 and 2021 - State Committee on Ecology

Species	Ayakagytma (14172 ha)	Karakir (18175ha)	Karakir (30000 ha)	Shurkul 2498г ha
	March 2020	March 2020	March 2021	March 2020
Mallard	*5 000*	7 500	22 000	3 500
Greylag goose	*6 000*	5 000	18 000	3 200

Species	Ayakagytma (14172 ha)	Karakir (18175ha)	Karakir (30000 ha)	Shurkul 2498г ha
	March 2020	March 2020	March 2021	March 2020
Eurasian teal	*5 500*	6 000	5 000	3 000
Red-crested pochard	*7 000*	7 000	7 000	3 000
Common pochard	*4 500*	5 000	14 000	2 000
Other ducks	*8 000*	7 000	18 000	3 500
Eurasian coot	*9 000*	15 000	25 000	4 000
Great cormorant	*5 000*	4 000	6 000	3 000
Black-bellied sandgrouse	*4 000*	4 000	4 000	3 000

The State Committee on Ecology and Environmental Protection also provided results of winter surveys of near-water and waterfowl at Ayakagytma in 2021.

Table 4-8 Winter Survey Results 2021 - State Committee on Ecology

Species	Common Name	Month	Year	Number
Haliaeetus albicilla	White-tailed eagle	1	2021	35
Fulica atra Linnaeus	Eurasian coot	1	2021	174
Tadorna ferruginea	Ruddy shelduck	1	2021	11
Anas platyrhynchos	mallard	1	2021	160
Cygnus Cygnus	Whooper/common swan	1	2021	71
Cygnus olor	Mute swan	1	2021	536
Aythya fuligula	Tufted duck	1	2021	30
Mergellus albellus	Smew	1	2021	4
Mergus merganster	Common merganser	1	2021	14
Circus aeruginosus	Western marsh-harrier	1	2021	1
Circus cyaneus	Hen harrier	1	2021	2
Netta rufina	Red-crested pochard	1	2021	123
Calandrella rufescens	Med short-toed lark	1	2021	numerous
Panurus biarmicus	Bearded reedling	1	2021	50-70
Scotocerca inquieta	Streaked scrub warbler	1	2021	2
Schoeniclus schoeniclus	Common reed bunting	1	2021	1
Prunella atrogularis	Black-throated accenter	1	2021	1
Bucephala clangula	Common golden eye	1	2021	2
Anas strepera	Gadwall	1	2021	1

Species	Common Name	Month	Year	Number
Melanocorypha leucoptera	White-winged lark	1	2021	1
Falco linnunculus	Common kestrel	1	2021	1

The passages below are an excerpted from the response received from the State Committee on Ecology and Environmental Protection.

- Lake Ayakagytma and the surrounding desert is an Important Ornithological Area (IBA) and is of international importance for wintering waterfowls.
- The extensive salt marshes adjacent to the lake attract many waders. This makes the lake a very valuable resting place for the migratory birds of the wetlands. In total, about 200 bird species have been recorded on the lake, 22 of which are listed in the Red Book of Uzbekistan, and 11 in the IUCN Red List.
- Karakyr lakes are the most important ornithological territory, part of the territory is protected by the state sanctuary "Karakyr", part of the territory is a hunting and fishing farm.
- The avifauna includes about 200 species, of which 122 species are waterbirds

Maxim Mitropolskiy, Chairman of the Coordination Committee for the Ramsar Regional Initiative of Central Asia was also contacted as part of the stakeholder engagement exercises.

The passages below are an excerpted from the response received from him.

- ..it should be remembered that the lake Ayak-agitma plays an important role for birds during migration and wintering. Up to 35,000 birds gather here in winter, and during the migration period (especially in autumn) up to 115,000 birds fly by..

Anna Ten, expert ornithologist who has conducted bird surveys in the area in 2011, 2018 and most recently in the summer of 2021 shared the following information on nesting and migrating water fowl in the project area. The passages below are an excerpted from the response received from her.

- Both territories (Kuldzhuktau and Ayakagitma), as well as the territory where the power line is planned, are of great importance for migratory bird species.
- The geographical location of Dzhangeldy between the western edge of the Kuldzhuktau ridge (at its highest point) and the Beltau rock formations create a kind of gateway for migrating species. Probably, all birds of predator, especially those that hunt during the flight, primarily harriers, buzzards, and falcons, will use the flight along the landscape depression.

- In turn, Ayakagitma is rich not only in birds of predator, but also in waterfowl and near-water birds. The air corridors along which waterfowl fly have not been studied. The IBA criteria are shown in Table 2 (Table 4-9).

Table 4-9 (Table 2) IBA criteria Lake Ayakagytma and the adjacent desert Критерии IBA (Ten et al. 2012)b

Key types	Comments	
	Nesting	Migration
A1 – globally threatened species		
Pelecanus crispus[1/2]		from 1 to 130 (2011); ordinary
Oxyura leucocephala[1/2]		4 (2009); rare
Neophron percnopterus[1]	from 3 to 4 pairs (2011); ordinary	
A3 – Biome species "Eurasian desert and semi-desert"		
Charadrius leschenaultia	35 (2006)	
Calandrella (rufescens) cheleensis	14 (2008)	
Iduna rama	from 2 to 14 (2011)	
Sylvia nana	14 (2008); ordinary	
Scotocerca inquieta	1 (2011); rare	
Rhodospiza obsolete	from 3 to 90 (2011); ordinary	
A4i - >1% biogeographic population of nearwater and waterfowls		
Netta rufina		4016 (2000)
Ardea alba		451 (2000)
Microcarbo pygmeus	31 (2006)	827 (2000)
Pelecanus onocrotalus[2]		from 28 to 482 (2011); ordinary
Pelecanus crispus[1/2]		from 1 to 130 (2011); ordinary
A4iii – >20 000 waterfowl and near-water birds		
waterfowl and near-water birds		23281 (2000)
Rare species		
Cygnus olor[2]	36 (2006)	от 8 до 16 (2008-2011)
Cygnus cygnus[2]		2 (20078 and 2011)
Ferruginous Duck *Aythya nyroca*[1/2]	2 (2006)	3 (May 2007) and 1 (2011)
Phoenicopterus roseus[2]		from 20 to 115 (2011)
Ciconia nigra[2]		2 (2008)
Plegadis falcinellus[2]		from 30 to 106 (2007)
Platalea leucorodia[2]		from 2 to 4 (2008 and 2011)

Key types	Comments	
	Nesting	Migration
Egretta garzetta[2]	3 (2006)	from 1 to 13 (2011)
Pandion haliaetus[2]		Single birds (2007-2011)
Gyps fulvus[2]		1 (2008)
Circaetus gallicus[2]		1 (2011)
Circus macrourus [1/2]		2 single birds (2008 and 2011)
Aquila nipalensis[2]		8 (2008) and 6 (2011)
Falco cherrug[1/2]	1 pair (2011); rare	
Falco peregrinus[12]		1 (2008)
Chlamydotis macqueenii[1/2]	1 (2008); rare	
Limosa limosa[1]		from 17 to 36 (2011); ordinary
Numenius arquata[1]		from 1 to 93 (2011); ordinary
Glareola nordmanni[1/2]		3 (2007)
Larus ichthyaetus[2]	8 (2006)	2 (2011)

Notes: [1]- Species included in the IUCN Red List of Species

[2]- Species included in the Red Book of Uzbekistan (2009)

5 Conclusion

This report has put forth the detailed baseline surveying efforts and results in relation to species with the potential to trigger criticality. Further, any relevant and applicable results obtained during stakeholder engagement has been provided as well. It has been assessed that there is robust and comprehensive data available to assess the criticality of all potential species of concern.

5.1 Stage 3 – Determining Critical Habitat

The CHA at its essence is an exercise undertaken to determine whether the habitat(s) present within the study area -inclusive of the project site, Area of Influence (AoI) and/or Ecologically Appropriate Area of Analysis (EAAA)- are to be considered as 'critical', for which one of several criteria must be met.

There are several international lending organizations that have produced varying criterion for which critical habitat is defined by; however, they are generally aligned with the EBRD PS6 six criterion with some institutions adding additional criterion. The below provides an overview of all applicable criteria as per EBRD, IFC, and ADB:

- EBRD PR6 Criterion(i): Highly threatened or unique ecosystems /// IFC PS6 Criterion 4: Highly Threatened or Unique Ecosystems
- EBRD PR6 Criterion (ii): Habitats of significant importance to endangered or critically endangered species /// IFC PS6 Criterion 1: Critically Endangered and Endangered Species /// ADB criterion "habitat required for the survival of critically endangered or endangered species";
- EBRD PR6 Criterion (iii) Habitats of significant importance to endemic or geographically restricted species and sub-species /// IFC PS6 Criterion 2: Endemic and Restricted-range Species /// ADB criterion "areas with special significance for endemic or restricted-range species";
- EBRD PR6 Criterion (iv) Habitats supporting globally significant concentrations of migratory or congregatory species /// IFC PS6 Criterion 3: Migratory and Congregatory Species /// ADB criteria "sites that are critical for the survival of migratory species" and "areas supporting globally significant concentrations or numbers of individuals of congregatory species";
- EBRD PR6 Criterion (v) Areas associated with key evolutionary processes /// IFC PS6 Criterion 5: Key Evolutionary Processes /// ADB criterion "areas with unique assemblages of species that are associated with key evolutionary processes or provide key ecosystem services";
- EBRD PR6 Criterion (vi) Ecological functions that are vital to maintaining the viability of critical biodiversity features;

- ADB criterion "areas with biodiversity that has significant social, cultural or economic importance to local communities"; and

Some features of the study area that may be affected by the project may be considered "priority biodiversity features". Priority biodiversity features (PBF) are defined by the EBRD as a sub-set of biodiversity that is particularly irreplaceable or vulnerable, but at a lower priority level than critical habitats. These features as identified as species or issue that do not merit critical status but remain a concern from a conservation perspective and require careful consideration during project assessment and impact mitigation.

EBRD have outlined several applicable criteria for the classification of a PBH:

- PBF Criterion (i): Threatened habitats
- PBF Criterion (ii): Vulnerable species
- PBF Criterion (iii): Significant biodiversity features identified by a broad set of stakeholders or governments (such as Key Biodiversity Areas or Important Bird Areas)
- PBF Criterion (iv): Ecological structure and functions needed to maintain the viability of priority biodiversity features

The findings of the desktop assessment and field survey data results shall be assessed against these criteria to assess whether the habitat(s) of the study area are to be considered as Critical Habitat.

The CHA will culminate in the preparation of a CHA Stage 3 Report, which shall:

- Provide a summary of the findings of the desktop assessment and field surveys results;
- Provide the narrative assessment of the study area against each criterion;
- Make a final statement for the project which identifies if any habitat within the study area is to be considered Critical Habitat; and
- If Critical Habitat has been designated, provide a "Next Steps" section which outlines the project requirements relating to biodiversity that would then be in place, based on the confirmed designation of Critical Habitat.