# Samarkand II
# Solar PV and BESS Project
# Republic of Uzbekistan

## Critical Habitat Assessment (CHA)

## – Volume III (Karakul Sites)

October 2024, v1.4

# Document Information

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|---|---|
| 1 | Financial Capital |
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# LIST OF ABBREVIATIONS

| ABBREVIATION | MEANING |
|---|---|
| ADB | Asian Development Bank |
| AoI | Area of Influence |
| AZE | Alliance for Zero Extinction |
| BMEP | Biodiversity Monitoring and Evaluation Programme |
| 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 |
| 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 |
| NG | Net Gain |
| NNL | No Net Loss |
| NT | Near Threatened, IUCN Red List of Threatened Species Category |
| OHTL | Overhead Transmission Line |
| PR | Performance Requirement |
| PS | Performance Standard |
| RDB | Red Data Book |
| SAC | Special Areas of Conservation |
| SBV | Significant Biodiversity Value |
| SPA | Special Protection Areas |
| VP | Vantage Point |
| VU | Vulnerable, IUCN Red List of Threatened Species Category |

# 1 INTRODUCTION

## 1.1 Project Background

Uzbekistan is amongst the fastest growing economies in the Central Asian region, with a steady demand for energy. In 2018, the country's power consumption reached 50 million TWh, and the domestic demand for power is projected to rise at an annual rate of 4%, due to continued population growth and industrial expansion. In 2019, the installed capacity of electricity generation in Uzbekistan totalled 63 TWh, with natural gas fired thermal power plants accounting for 85% of this production. The emergence of a dire energy crisis at the height of recent peak-demand periods in Uzbekistan has been met with urgent measures to augment the country's installed power capacity. This agenda will largely involve the establishment of additional renewable energy sources, with a view to attaining a solar power capacity of 10,000 MW by 2030, amongst other targets.

On 19 March 2023, the Ministry of Energy and National Electric Grid Joint Stock Company of Uzbekistan (NEGU) entered into a Power Purchase Agreement (PPA) with ACWA Power (hereinafter Project Developer), for the implementation of the Samarkand II Solar PV and BESS Project, which includes the development and operation of the following project facilities:

- 500 MW PV power plant
- Nurobod sub-station
- 70-km OTL
- 350-km OTL
- Karakul (500 MWh) BESS with underground interconnection cable (220 kV)

In the same period, a parallel PPA was established with the Project Developer, for the implementation of the Samarkand I Solar PV and BESS Project, which includes the development and operation of the following project facilities:

- 100 MW Photo-Voltaic (PV) power plant
- 400 MW PV power plant
- Nurobod (500 MWh) Battery Energy Storage System (BESS) with underground interconnection cable
- 4.9-km Overhead Transmission Line (OTL)
- 70-km OTL
- Two 11-km OTLs constituting a Loop-In-Loop-Out (LILO) interconnection

- Two 19-km OTLs constituting a Loop-In-Loop-Out (LILO) interconnection

As shown in the maps below, the majority of the power generation and storage facilities planned under the projects are located in Nurobod District, Samarkand Region, with the exception of the Karakul BESS, which is located in Karakul District, Bukhara Region.

The interconnection facilities constituting the projects, which include an electrical sub-station and multiple overhead and underground powerlines are also concentrated in Nurobod District. The OTLs largely radiate from the Nurobod sub-station, towards the grid.

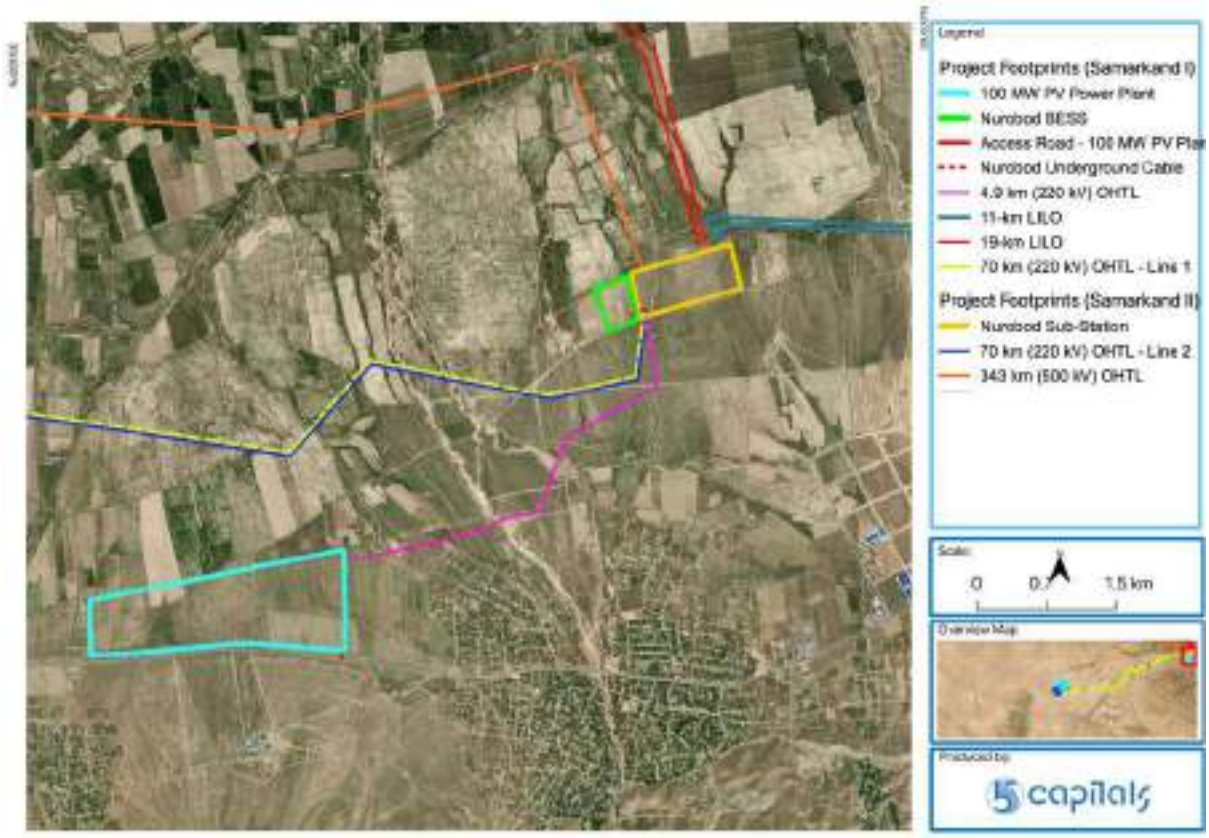



**Figure 1-1 First cluster of facilities planned under the Samarkand I and II solar projects in Nurobod District**

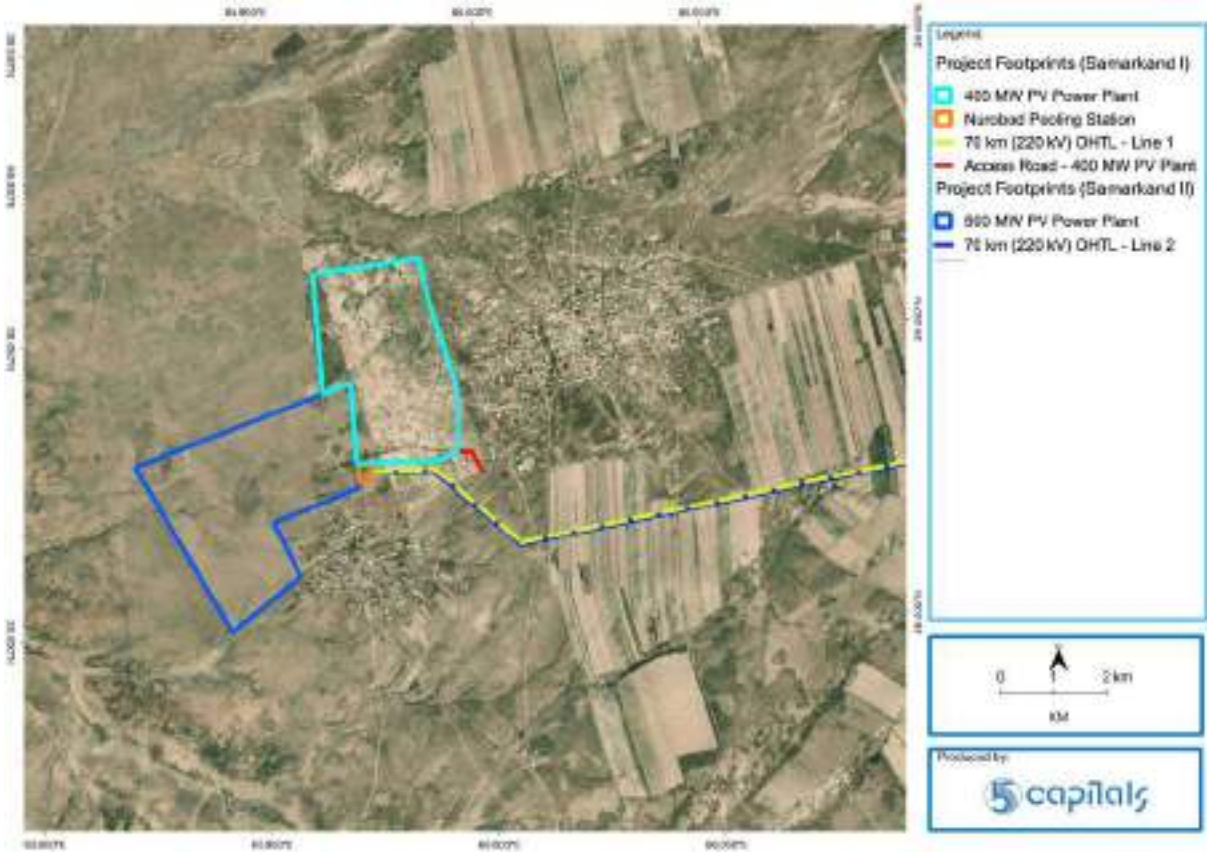



**Figure 1-2 Second cluster of facilities planned under the Samarkand I and II solar projects**

In preparation for the Project, the Project Developer is seeking international financing from Development Finance Institutions (DFIs) including the Asian Development Bank (ADB), European Bank for Reconstruction and Development (EBRD), International Finance Corporation (IFC), and Japan Bank for International Cooperation (JBIC) (hereinafter Project Lenders).

Accordingly, 5 Capitals (hereinafter the Consultant) has been assigned to undertake an Environmental and Social Impact Assessment (ESIA) study for the Project, in line with E&S performance standards stipulated by the Project Lenders. With regard to the identification, assessment and management of potential impacts on biodiversity, the ESIA process includes a Critical Habitat Assessment (CHA).

## 1.2 Purpose and Scope of Report

This CHA Report presents the process used to conduct the critical habitat assessment, the findings of which inform the **CHA – Volume III** for the **BESS and underground powerline in Karakul District for the Samarkand II Solar PV and BESS Project**, in line with E&S performance

standards stipulated by the Project Lenders, including but not limited to the IFC PS 6 and ADB Environmental Safeguards.

The general purpose of the CHA is the identification habitats that are subject to elevated conservation concern (i.e., critical habitats or significant biodiversity values), in relation to the project's potential impacts on threatened, resident species.

This report provides the results of detailed baseline studies (encompassing desktop review, relevant stakeholder engagement, and field survey work) to assess the conservation status of species against IFC criteria and associated thresholds for critical habitats resulting from the Project's potential impacts on biodiversity.

Due to the large scale of the project footprint in the context of Ecologically Appropriate Areas of Analyses (EAAAs), the CHA study has been split into the following three components, which are covered in separate volumes of the CHA report:

- CHA report for the PV power plants, substation and powerlines in Nurobod District, Samarkand Region (Volume I).
- CHA report for the 350-km OTL in Samarkand, Jizzakh, Syrdarya and Tashkent Regions (Volume II).
- CHA report for the BESS and underground powerline in Karakul District, Samarkand Region (Volume III).

The introduction, analyses and outcomes of the CHA study pertaining to the project components located in Karakul District are presented in this report (CHA – Volume III).

## 1.3 Critical Habitat

### 1.3.1 Habitat Designations

As per IFC PS 6 (2012) and associated GN (2019):

Habitats can be divided into natural habitats (which are land and water areas where the biological communities are formed largely by native plant and animal species, and where human activity has not essentially modified the area's primary ecological functions) and modified habitats (where there has been apparent alteration of the natural habitat, often with the introduction of alien species of plants and animals, such as agricultural areas). Both types of habitat can support important biodiversity at all levels, including endemic or threatened species.

Critical habitat is a subset of both natural and modified habitat that deserves particular attention. Critical habitat includes areas with high biodiversity value3, including habitat required for the survival of critically endangered or endangered species;4 areas having

special significance for endemic or restricted-range species; sites that are critical for the survival of migratory species; areas supporting globally significant concentrations or numbers of individuals of congregatory species; areas with unique assemblages of species or which are associated with key evolutionary processes or provide key ecosystem services; and areas having biodiversity of significant social, economic or cultural importance to local communities.

### 1.3.2 Determining Critical Habitat

As per IFC PS 6 (2012) and associated GN (2019):

Critical habitats are areas of high biodiversity value that include at least one or more of the five values specified in paragraph 16 of Performance Standard 6 and/or other recognized high biodiversity values. There is no one criterion that is more important than any other for making critical habitat designations or for determining compliance with Performance Standard 6. For ease of reference, these values are referred to as "critical habitat criteria" for the remainder of this document. Each criterion is described in detail in paragraphs GN70–GN83. Critical habitat criteria are as follows and should form the basis of any critical habitat assessment:

The below provides an overview of all applicable criteria as per IFC and ADB:

- IFC PS6 Criterion 1: Critically Endangered and Endangered Species /// ADB criterion "habitat required for the survival of critically endangered or endangered species";
- IFC PS6 Criterion 2: Endemic and Restricted-range Species /// ADB criterion "areas with special significance for endemic or restricted-range 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";
- IFC PS6 Criterion 4: Highly Threatened or Unique Ecosystems
- 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(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
- 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

- EBRD PR6 Criterion (iv) Habitats supporting globally significant concentrations of migratory or congregatory species /// IFC PS6 Criterion 3: Migratory and Congregatory Species
- EBRD PR6 Criterion (v) Areas associated with key evolutionary processes /// IFC PS6 Criterion 5: Key Evolutionary Processes
- Additionally, ADB criterion "areas with biodiversity that has significant social, cultural or economic importance to local communities"; and
- ADB criterion "Critical habitat is a subset of both natural and modified habitat. Critical habitat includes areas with high biodiversity value, including habitat required for the survival of critically endangered or endangered species; areas having special significance for endemic or restricted-range species; sites that are critical for the survival of migratory species; areas supporting globally significant concentrations or numbers of individuals of congregatory species; areas with unique assemblages of species or that are associated with key evolutionary processes or provide key ecosystem services; and areas having biodiversity of significant social, economic, or cultural importance to local communities. Critical habitats include those areas either legally protected or officially proposed for protection, such as areas that meet the criteria of the World Conservation Union classification, the Ramsar List of Wetlands of International Importance, and the United Nations Educational, Scientific, and Cultural Organization's world natural heritage sites"

Projects that are located within internationally and/or nationally recognized areas of high biodiversity value may require a critical habitat assessment. Examples include the following:

- Areas that meet the criteria of the IUCN's Protected Area Categories Ia, Ib and II.
- Key Biodiversity Areas (KBAs), GN10 which encompass Important Bird and Biodiversity Areas (IBAs).

Quantitative and qualitative thresholds are provided in IFC PS 6 which determine if criticality is met for any particular criterion.

### 1.3.3 Critical Habitat Assessment Process

On the broad scale, the overall process of a CHA can be distributed into three main stages:

1. CHA Screening – identify the study area (potentially affected landscape/seascape/ecosystem) & conduct a desktop study of literature review and stakeholder consultation to obtain an understanding of biodiversity within the

landscape from the perspective of all relevant stakeholders. This also informs the scoping of primary data collection (surveys and monitoring) requirements.

2. Data Collection – physical field data collection as well as engagement with relevant expert stakeholders to collate all the requisite data that will support the assessment.
3. Critical Habitat Assessment – biodiversity values of the site assessed against critical habitat criteria and thresholds at an appropriate ecological scale, as defined in GN59. By carrying out these steps, the client should be in a position to determine if the project is located in a critical habitat based on identified high biodiversity values. This determination is independent of the project type, impacts or its mitigation strategy.

The following chapter presents the methodology and findings of the CHA Screening Stage.

## 1.4 Purpose of Report

A CHA Screening exercise was undertaken to inform the Scoping process of the UZB-ACWA-Samarkand Solar Project, which identified species of concern which have the potential to trigger criticality for the project's area of influence.

This report provides the results of detailed baseline studies (encompassing desktop review, relevant stakeholder engagement, and field survey work) and will assess the status of species against the IFC criteria and associated thresholds.

# 2 CHA SCREENING

## 2.1 Methodology

A desktop-based screening exercise was undertaken as the initial step to identify a preliminary list of potentially sensitive biodiversity features.

The outcome of the CHA Screening will narrow down the species/features of concern that will need further assessment, both in the ESIA as well as in the CHA against thresholds. This step also allows for the determination of the appropriate level of field survey effort that may be required to provide sufficient information for the ESIA and CHA, and thus should be undertaken during the ESIA Scoping phase (or as early as possible).

### 2.1.1 Define the Study Area

An overarching Study Area was first defined, looking from a regional scale. A buffer of approximately 20 km was added around the project footprint to generate the study area polygon below. It is considered that this study area should prove sufficient to encompass any potential biodiversity elements that may be affected, directly or indirectly, by the project.

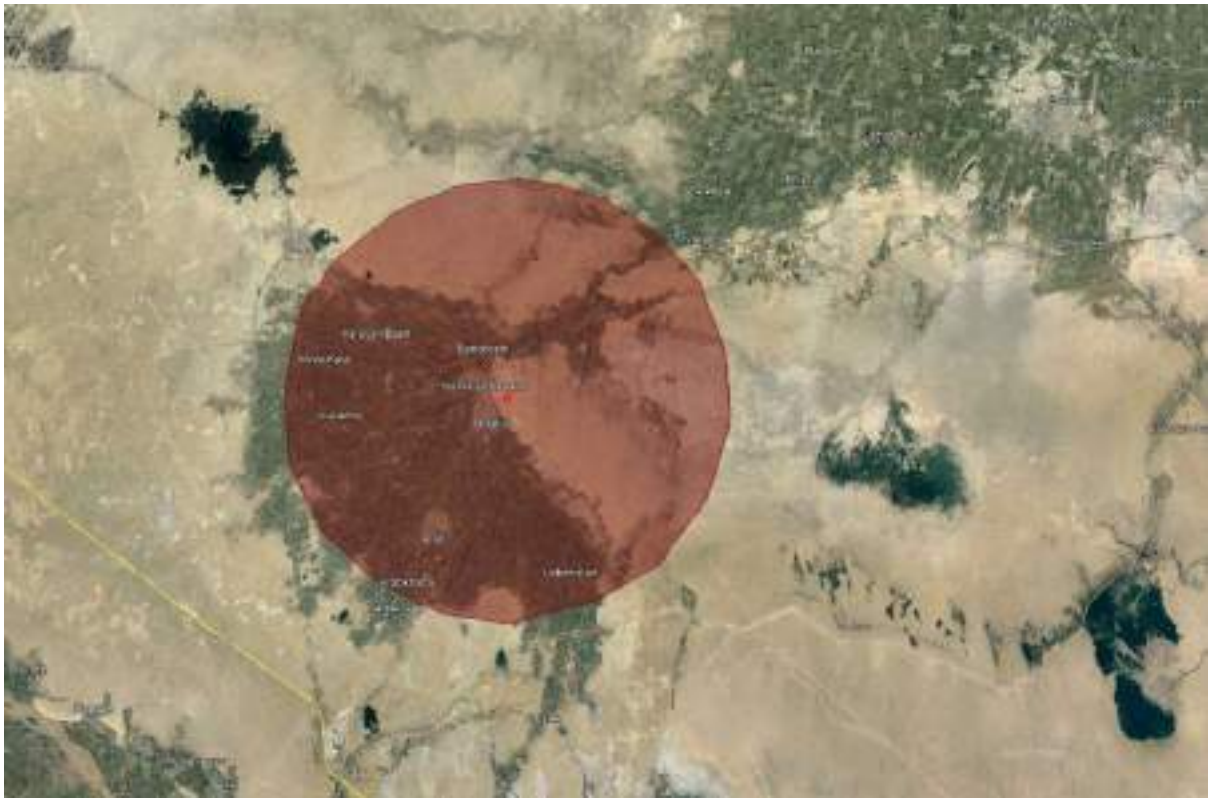


**Figure 2-1 Study Area**

### 2.1.2 Desktop Review and Scoping

Once the study area is delineated, the scoping process begins.

A list of all species from the IUCN Red List and, where relevant, categorized ecosystems from the Red List of Ecosystems is generated by cross-referencing the Study Area with known spatial distributions from the IUCN Global database. This list of all possible species/ecosystems (biodiversity features) is then supplemented by a review of Key Biodiversity Areas (and other recognised biodiversity areas of importance), national or regional level Red Lists / Red Data Books, contextual connectivity of flyways and habitats across the landscape, and any other verified sources of available existing ecological information. Migratory bird species lists are obtained from Birdlife International and other reputable public sources and databases.

At this stage, a set of **CHA Screening Tables** has been created with a full list of species who should be further investigated under specific criterion, and whose known range may overlap with the project AoI. Each species is assessed to determine the likelihood of its presence based on habitat requirements compared to the known habitat types within the Project AoI.

As a precautionary stance, even if a species is screened out, it may be deemed necessary to later consult expert stakeholders and survey results and revisit those species before the CHA is completed, especially if a species is recorded during field surveys.

The final **CHA Screening Tables** list all identified species/elements as to why it was screened in for further assessment or screened out due to unsuitable habitat or other available information indicating lack of regular presence.

The culmination of Scoping results in an understanding of the biodiversity elements of concern, current gaps in knowledge, and the appropriate field surveying methods (and/or secondary information gathering from stakeholders, etc) that will be required in order to:

(i) provide appropriate levels of detail to ascertain if any CH or SBV thresholds are surpassed and;

(ii) allow the biodiversity impact assessment within the ESIA to be conducted accordingly.

## 2.2 Results

### 2.2.1 Desktop Screening

As part of the Samarkand Solar PV project, the proposed Karakal BESS substation will be located approximately 200km from the main facilities. Karakul BESS has an associated access road as well as an interconnection cable that connects the BESS to an existing Substation. All

these facilities were considered under a polygon with a radius of 100 km, and the results of the CHA screening are presented below.

A desktop-based screening exercise was undertaken as the preliminary step to a Critical Habitat Assessment to review what is considered as potentially sensitive biodiversity features. Scoping visits of the site and desktop derived secondary data of biodiversity elements of concern were used to scope biodiversity elements in or out depending on likelihood of occurrence in the study area and potential for triggering criticality as per IFC PS6 Critical Habitat criteria. Furthermore, local experts were engaged to ensure that the screening exercises were tailored to the project area.

The applicable study area includes all features within a 100 km radius of the project site. A review of the Key Biodiversity Areas (KBA) and Protected Areas (PA) on IBAT.org, there are six KBAs and 5 PAs located within an estimated 100km radius of the proposed Project and associated structures. The KBAS are Soltandag - Gyzylburun, Dengizkul Lake, Zekyr Lake, Tudakul and Karakyr Lakes, Nargyz, Dzheiran Ecocentre, Kanrabchul Steppe. The PAs are Kumsultan State Wildlife Sanctuary, Ierdjinskaya of Amudaria Z, Dengizkul State Wildlife Sanctuary, Khadicha State Wildlife Sanctuary and Bukhara specialized Nursey. No protected areas and Important Bird Areas (IBAs) overlap with the project sites in Karakul District.

The CHA desktop-based screening exercise included all taxa, and identified several species that have the possibility/potential to trigger CH consisting of CR, EN and VU IUCN status fauna.

A total of thirty-two species were identified as potential elements of concern. This included eleven avian species, eighteen insectivorous bat species, one herptile and one flora. With the exclusion of volant mammals i.e., insectivorous bat species, no IUCN Red Listed mammals or insects have been identified as biodiversity features of concern with the potential to trigger criticality under any of the CH criteria.

A complete list of the species that have been screened-in at the culmination of the CHA Screening Exercise is provided in the table below (Table 2-1). Refer to the CHA Screening Table for a comprehensive database, including species-specific rationale to descoping prior to the CHA.

**Table 2-1 Species screened in for further investigation in the CHA**

| No. | FAMILY | SPECIES | COMMON NAME | IUCN RED LIST | NATIONAL UzRDB | CRITERION |
|---|---|---|---|---|---|---|
| 1 | Aves | *Anser erythropus* | Lesser White-fronted Goose | VU | VU | Criteria 1 & 3 |
| 2 | Aves | *Aythya ferina* | Common Pochard | VU | - | Criteria 1 & 3 |

| No. | FAMILY | SPECIES | COMMON NAME | IUCN RED LIST | NATIONAL UzRDB | CRITERION |
|---|---|---|---|---|---|---|
| 3 | Aves | *Columba eversmanni* | Yellow-eyed Pigeon | VU | VU | Criterion 1 |
| 4 | Aves | *Falco cherrug* | Saker Falcon | EN | EN | Criteria 1 & 3 |
| 6 | Aves | *Marmaronetta angustirostris* | Marbled Teal | NT | EN | Criteria 1 & 3 |
| 7 | Aves | *Neophron percnopterus* | Egyptian Vulture | EN | VU | Criterion 1 |
| 8 | Aves | *Oxyura leucocephala* | White-headed Duck | EN | EN | Criteria 1 & 3 |
| 9 | Aves | *Pelecanus crispus* | Dalmatian Pelican | NT | EN | Criteria 1 & 3 |
| 10 | Aves | *Streptopelia turtur* | European Turtle-Dove | VU | VU | Criterion 1 & 3 |
| 11 | Aves | *Vanellus gregarius* | Sociable Lapwing | CR | - | Criteria 1 & 3 |
| 12 | Chiroptera | *Barbastella leucomelas* | Asian (Eastern) Barbastelle | LC | - | Criterion 3 |
| 13 | Chiroptera | *Eptesicus ognevi* | Ognev's Serotine | LC | - | Criterion 3 |
| 14 | Chiroptera | *Eptesicus serotinus* | Serotine Bat | LC | - | Criterion 3 |
| 15 | Chiroptera | *Eptesicus gobiensis* | Gobi Big Brown Bat | LC | - | Criterion 3 |
| 16 | Chiroptera | *Hypsugo savii* | Savi's Pipistrelle | LC | - | Criterion 3 |
| 17 | Chiroptera | *Myotis blythii* | Lesser Mouse-eared Myotis | LC | - | Criterion 3 |
| 18 | Chiroptera | *Myotis bucharensis* | Bokhara Whiskered Bat | DD | CR | Criteria 1, 2 and 3 |
| 19 | Chiroptera | *Myotis emarginatus* | Geoffroy's Bat | LC | - | Criterion 3 |
| 20 | Chiroptera | *Myotis nipalensis* | Nepal Myotis | LC | | Criterion 3 |
| 21 | Chiroptera | *Nyctalus noctula* | Common Noctule | LC | - | Criterion 3 |
| 22 | Chiroptera | *Otonycteris leucophaea* | Turkestani Long-eared Bat | LC | 2(VU:R) | Criterion 3 |
| 23 | Chiroptera | *Pipistrellus aladdin* | Turkestan Pipistrelle | DD | - | Criterion 3 |
| 24 | Chiroptera | *Pipistrellus pipistrellus* | Common Pipistrelle | LC | - | Criterion 3 |
| 25 | Chiroptera | *Plecotus strelkovi* | Strelkov's Long-eared Bat | LC | - | Criterion 3 |

| No. | FAMILY | SPECIES | COMMON NAME | IUCN RED LIST | NATIONAL UzRDB | CRITERION |
|---|---|---|---|---|---|---|
| 26 | Chiroptera | *Rhinolophus bocharicus* | Bokhara horseshoe bat | LC | - | Criterion 3 |
| 27 | Chiroptera | *Rhinolophus ferrumequinum* | Greater Horseshoe Bat | LC | - | Criterion 3 |
| 28 | Chiroptera | *Rhinolophus hipposideros* | Lesser Horseshoe Bat | LC | 2(VU:D) | Criterion 3 |
| 29 | Chiroptera | Tadarida teniotis | European Free-tailed Bat | LC | 2(VU:R) | Criterion 3 |
| 30 | Chiroptera | *Vespertilio murinus* | Particoloured Bat | LC | - | Criterion 3 |
| 31 | Herpetofauna | *Testudo horsfieldii* | Central Asian Tortoise/Russian Tortoise | VU | VU | Criterion 1 |
| 32 | Plant | *Tulipa micheliana* | | VU | - | Criterion 1 |

In order to assess if any of the aforementioned species trigger critical habitat under the IFC P.S. 6, baseline surveys should be carried out in order to quantify the population density of the above species in their respective Ecologically Appropriate Area of Analyses (EAAA).

# 3 CHA METHODOLOGY

## 3.1 CHA Criteria

The concept of Critical Habitat is widely utilized and the principles for protection of critical habitat widely applied by DFIs. A specific screening and assessment process is undertaken to identify if any CH criteria are triggered by the project. This requires scoping to assess potential species candidates for triggering CH, and subsequently using information obtained from surveys, secondary sources, and stakeholders to extrapolate a population estimate for the individual species/species group's "Ecologically Appropriate Area of Analysis" which may in many cases be overlapping but not 100% aligned with a project impacts' Area of Influence. If any extrapolated population estimates (extrapolated from existing information across the qualified EAAA) meet the appropriate CH thresholds, then CH will have been triggered.

The below provides an overview of all applicable criteria as per IFC and ADB:

- IFC PS6 Criterion 1: Critically Endangered and Endangered Species /// ADB criterion "habitat required for the survival of critically endangered or endangered species";
- IFC PS6 Criterion 2: Endemic and Restricted-range Species /// ADB criterion "areas with special significance for endemic or restricted-range 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";
- IFC PS6 Criterion 4: Highly Threatened or Unique Ecosystems
- 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(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
- 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
- EBRD PR6 Criterion (iv) Habitats supporting globally significant concentrations of migratory or congregatory species /// IFC PS6 Criterion 3: Migratory and Congregatory Species

- EBRD PR6 Criterion (v) Areas associated with key evolutionary processes /// IFC PS6 Criterion 5: Key Evolutionary Processes
- Additionally, ADB criterion "areas with biodiversity that has significant social, cultural or economic importance to local communities"; and
- ADB criterion "Critical habitat is a subset of both natural and modified habitat. Critical habitat includes areas with high biodiversity value, including habitat required for the survival of critically endangered or endangered species; areas having special significance for endemic or restricted-range species; sites that are critical for the survival of migratory species; areas supporting globally significant concentrations or numbers of individuals of congregatory species; areas with unique assemblages of species or that are associated with key evolutionary processes or provide key ecosystem services; and areas having biodiversity of significant social, economic, or cultural importance to local communities. Critical habitats include those areas either legally protected or officially proposed for protection, such as areas that meet the criteria of the World Conservation Union classification, the Ramsar List of Wetlands of International Importance, and the United Nations Educational, Scientific, and Cultural Organization's world natural heritage sites"

Some of the CH criteria listed above have quantitative thresholds associated with them, defined in lender policy, while others can only be assessed using more qualitative evaluation of the criterion.

### 3.1.1 Critical Habitat Criteria and Associated Thresholds

Some of the CH criteria listed above have quantitative thresholds associated with them, defined in lender policy, while others can only be assessed using more qualitative evaluation of the criterion. Refer to the IFC PS 6 2019 for the quantitative thresholds for each criterion.

### 3.1.2 Significant Biodiversity Values

Natural habitat and species may still be of elevated concern even if critical thresholds are not met. Significant Biodiversity Values (SBVs) may include species of conservation concern (for example, species that are threatened, legally protected, or otherwise identified as important by stakeholders) and ecological features in the landscape that are important to stakeholders. SBVs may occur in natural or modified habitat.

### 3.1.3 Priority Biodiversity Features

Even if they do not meet any of the CH criteria, some sensitive ecological features of the study area that may be affected by the project may be considered "Priority Biodiversity Features," defined by EBRD as biodiversity elements (habitats, features or species) that are considered sensitive, but not as much as those triggering CH.

CH triggers a Net Gain requirement while PBF trigger a No Net Loss mitigation standard under EBRD PR6, and hence require careful consideration during project assessment and mitigation planning. The scope of the present analysis was to identify not only any biodiversity features triggering criticality under any of the pertinent CH criteria, but also to identify all PBF potentially impacted by the Project as well.

EBRD have outlined the following criteria for the classification of PBF:

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 KBA or IBA)

PBF Criterion (iv): Ecological structure and functions needed to maintain the viability of priority biodiversity features.

### 3.1.4 Critical Habitat Criteria and Associated Thresholds

Some of the CH criteria listed above have quantitative thresholds associated with them, defined in lender policy, while others can only be assessed using more qualitative evaluation of the criterion. In the present section, biodiversity features potentially affected by the Project are assessed against the quantitative thresholds associated with some of the CH criteria.

The specific criteria and associated quantitative thresholds evaluated (where applicable) consist of the following:

Thresholds for EBRD CH Criterion i (Highly threatened or unique ecosystems) are the following:

a) EAAA[1] that is ≥5% of global extent of an ecosystem type with IUCN status of Endangered (EN) or Critically Endangered (CR); and
b) EAAA that is an ecosystem determined to be of high priority for conservation by national or regional systematic conservation planning.

Thresholds for EBRD CH Criterion ii (Habitats of significant importance to endangered or critically endangered species) are the following:

a) Areas that support globally important concentrations of an IUCN Red-listed EN or CR species (≥ 0.5% of the global population AND ≥ 5 reproductive units of a CR or EN species);
b) Areas that support globally significant population of an IUCN Red-listed Vulnerable (VU) species, the loss of which would result in the change of the IUCN Red List status to EN or CR, meets the threshold (a) above; and

[1] The Ecologically Appropriate Area of Analysis is an area defined on a species-specific (or feature-specific) basis. The concept of an EAAA is to ensure that when the thresholds are being applied, the full extent of the species population is being considered / full area of a connected ecosystem, and not only an approximation of the number that may be found within the project area itself or direct area of influence.

c) EAAA that contains important concentrations of a nationally or regionally listed EN or CR species.

Thresholds for EBRD CH Criterion iii (Habitats of significant importance to endemic or geographically restricted species and sub-species) is the following:

d) EAAA that regularly holds ≥ 10% of global population AND ≥ 10 reproductive units of a species.

Thresholds for Criterion iv (Habitats supporting globally significant concentrations of migratory or congregatory species) are the following:

e) EAAA that sustains, on a cyclical or otherwise regular basis, ≥ 1 percent of the global population at any point of the species' lifecycle; and
f) EAAA that predictably supports ≥10 percent of global population during periods of environmental stress.

EBRD CH Criterion v (Areas associated with key evolutionary processes) does not have a set of associated quantitative thresholds. The qualitative (expert-based) basis for evaluating this criterion is the following:

g) Areas with landscape features that might be associated with particular evolutionary processes evolutionary processes or populations of species that are especially distinct and may be of special conservation concern given their distinct evolutionary history. For example:
    - Isolated lakes or mountaintops
    - Populations of species listed as priorities by the Edge of Existence Programme.

EBRD CH Criterion vi (Ecological functions that are vital to maintaining the viability of biodiversity features) also does not have a set of associated quantitative thresholds. The qualitative (expert-based) basis for evaluating this criterion is the following:

h) Ecological functions without which critical biodiversity features could not exist. For example:
    - Riparian zones and rivers
    - Dispersal or migration corridors
    - Hydrological regimes
    - Seasonal refuges or food sources
    - Keystone or habitat-forming species

### 3.1.5 Priority Biodiversity Feature Criteria Thresholds

A biodiversity feature will be determined to be a PBF if the minimum thresholds of any single criterion are met. The below are as per EBRD PR 6 and associated Guidance Note 6.

Thresholds for PBF criterion i (Threatened habitats) are the following:

a) EAAA includes habitat type listed in Annex 1 of EU Habitats Directive or Resolution 4 of Bern Convention (for member states)
b) EAAA that is < 5% of the global extent of an ecosystem type with IUCN status of CR or EN

Thresholds for PBF criterion ii (Vulnerable species) are the following:

a) EAAA that supports < 0.5% of global population OR < 5 reproductive units of a CR or EN species.
b) EAAA supports a VU species
c) EAAA that supports regularly occurring nationally or regionally listed EN or CR species
d) EAAA that holds regularly occurring range-restricted species
e) EAAA identified as recognized national or international process as important for migratory birds (esp. wetlands)

PBF Criterion iii and iv do not have quantitative thresholds. As per EBRD PR6 GN6, the assessment for these criteria must rely upon expert judgement.

## 3.2 Ecologically Appropriate Area of Analysis

The Ecologically Appropriate Area of Analysis (EAAA) is a concept that was introduced with the 2019 revision of IFC PS6, and is currently considered by IFC, and ADB as the basis for spatial delimitation of the area of analysis for the purpose of performing CHA.

Unlike other "area of influence" concepts, the EAAA concept is species-specific. Therefore, differently configured EAAA may be drawn for different species for the same project, based on the species' differing ecological characteristics, especially habitat preference and movement patterns. EAAA considered for CHA should not be confused with other spatial delineations of the Project area, or Project's area of influence for other purposes elsewhere within the Project's ESIA and other documentation (for example, the AoI considered for the evaluation of noise impacts)[2].

[2] The Project Study Area as determined during CHA Screening outlines the total spatial area within which potential species distribution overlaps are examined utilizing global databases.

The Area of Influence is specific to impacts. For example, the AoI for noise impacts on fauna may be inclusive of the noise-generating activity footprint and a 500m buffer; whilst the AoI for Habitat Fragmentation impact may be much more broad, encompassing a wider region than the impacting activity itself. The impact-specific AoIs are discussed in relation to impacts and receptors within the ESIA.

The EAAA for a particular species or species group encompasses the total area within which the species or species group may be impacted by the Project. The EAAA is based on habitat configurations, locations of ecological features, and the typical home range of species.

The EAAA has been delineated for species and species-groups for which the possibility of criticality must be examined. The estimated population of the entire EAAA is used as the basis to determine if criticality has been met, in relation to the quantitative thresholds associated with some of the CH criteria, as described above.

### 3.2.1 Defining EAAA

Defining the EAAA is an integral step in determining criticality. The critical thresholds must be measured against the population of the species present within the "EAAA", which on a practical level roughly translates into the full range covered by members of a population regularly utilizing or occurring within a particular area.

Therefore, to determine EAAA and assess criticality, the following steps must be followed:

1. Determine the largest Area of Influence for the species based on the project's identified impacts and the species' ecology (habitat affiliation, dispersal, displacement etc.). This would be considered to encompass all populations of a species expected to potentially interact with the site and be impacted by the project.
2. Determine the likely home range inhabited by members of the species population which utilize the area of influence. This is based on mobility and habitat distribution.
3. Map the EAAA by taking the area of influence, adding the decided buffer, and mapping based on contiguous habitat (if there is a strong habitat preference/need).
4. The next step is calculating the estimated population present within the EAAA (where quantification is possible) and comparing these ratios to the thresholds for determination of criticality status. This can be done using population extrapolations where sufficient baseline data is available and a global population is known; or by using Extent of Occurrence where the size of the EAAA is compared to the size of the global EOO.

This is a relatively straight-forward concept when considering residential, sedentary populations. For example, for a terrestrial species with limited mobility and specific habitat requirements, the largest applicable area of influence would amount to the full construction footprint (as the primary concern is direct loss and disturbance during construction). Based on this, the home range regularly occupied by the population probably does not exceed a buffer

around the project boundaries. The size of the most appropriate buffer for a given species can be estimated on the basis of the species' dispersal ecology (home range size). The EAAA would be considered as the project boundaries plus the buffer.

However, the entire project footprint need not be considered as part of the EAAA if a portion of that footprint contains habitat unsuitable for the species. This type of restriction of the EAAA is especially important when areal coverage of a species is used as proxy for population size, as extrapolation of the population of a species occurring within a Project's EAAA based on the entire acreage of the Project footprint would result in a significant exaggeration if only a small portion of the Project's footprint is utilised by the species. The number of individuals making up the population within that EAAA in relation to the global population of the species (or the areal coverage of the species EAAA in relation to the species global Extent of Occurrence (EOO) would then be compared to the critical thresholds.

For species with extremely large home ranges, long-ranging nomadic species, and/or migratory species, this approach is difficult to utilize. For example, migrant waterbirds may be impacted on a large scale by the project as a result of macro-avoidance resulting in habitat fragmentation or migration route impacts, during the operation of the project. Or, long-distance migrant species which are at risk of collision may be on a migratory journey of hundreds of thousands of kilometres.

If we are to apply the concept of ascertaining the entire home range of the species that pass through the area of influence (considering for example a 2km buffer around the PV farm as the AoI – including all migratory birds flying through this area) then this 'EAAA' in this case could easily become an entire geographical region.

It is recognized that the EAAA is intended as a project specific concept, and therefore it is not intended to span multiple continents, or very large regional scale area, e.g., to cover the entire ranges of individual long-distance migratory birds. With migratory birds, CHA generally follows the IUCN KBA standard, emphasizing areas that function as significant migratory stopover sites and/or bottleneck, with EAAA delineated to include the Project footprint plus a reasonable buffer based on the scale of the species' typical daily foraging movements, rather than its entire migratory route,

Each species analysis section includes the reasoning followed to ascertain the EAAA, the likely population within the EAAA, and the final assessment of criticality.

<u>The following summarizes the general framework followed to assign EAAA for various taxa:</u>

- For bats, (unless otherwise specified for a species-specific rationale) the EAAA has been set as the footprint of the project site, including a buffer of up to 5km. This would be considered to encompass the area regularly traversed by the majority of sedentary bats that may utilize the site.

- For flora, (unless otherwise specified for a species-specific rationale) the EAAA has been defined on the basis of suitable substrate/ habitat conditions where it has been recorded in the footprint of the project site, including a buffer of up to 10km.
- For tortoises and reptiles, the EAAA has been set as the footprint of the project site, including a buffer of up to 10km. This would be considered to encompass the area regularly traversed by the majority of tortoises that may utilize the site.
- For migratory birds: The EAAA is a difficult concept to apply to long-range migratory species, as encompassing the full geographic range of such species would result in extremely large population extrapolations. Instead, CHA generally follows the IUCN KBA standard, emphasizing areas that function as significant migratory stopover sites and/or bottlenecks with EAAAs delineated to include the Project footprint plus a reasonable buffer based on the scale of the species' typical daily or foraging movements, rather than its entire migratory route.
- For breeding/resident birds: The total EAAA for breeding birds has been applied as all connected suitable habitat overlapping with the project footprint as well as within a reasonable buffer (the buffer is based on the breeding ecology or typical localized home range of the species and may include recognition of localized foraging or hunting movements). This should provide an adequate accounting of birds likely to regularly utilize the project area during respective breeding seasons.

## 3.3 Analyzing and Assessing

The final stage of the CHA process is the analysis of the collated data to prepare a rationale for why or why not a species population within the EAAA would qualify as triggering criticality under any of the relevant criteria. This can include a review of information such as baseline findings, habitat preferences, distribution, seasonality, reported population, previous records, known migration routes, known stopover or otherwise important locations within the region, and any information known about breeding and migratory behaviour relevant to the area.

# 4 ASSESSMENT

## 4.1 Overview of Study Area

### 4.1.1 Geographical and climatic overview

Eastern Uzbekistan, where the project is primarily located, contrasts sharply with the arid deserts of the country's western and central parts. The area is predominantly characterized by its semi-arid climate, with significant seasonal variations that influence the ecological dynamics of the region. Summers are typically hot and dry, with temperatures soaring up to 40°C, making it the driest period of the year. In contrast, the winter months from November to January see temperatures dipping below freezing, accompanied by higher precipitation levels, which are crucial for maintaining the local ecosystems during the dry spells.

### 4.1.2 Recognized Biodiversity Areas

A number of state-declared reserves/protected areas are located within a 100km radius of the project site.


**Figure 4-1 Map of Key Biodiversity Areas**

Dengizkul Lake This is an IBA in Danger! UZ021

Summary | Text account | Data table and detailed info | Map | References and further resources

IBA Justification

The site was identified as important in 2016 because it was regularly supporting significant populations of the species listed below, meeting (triggering) IBA criteria.

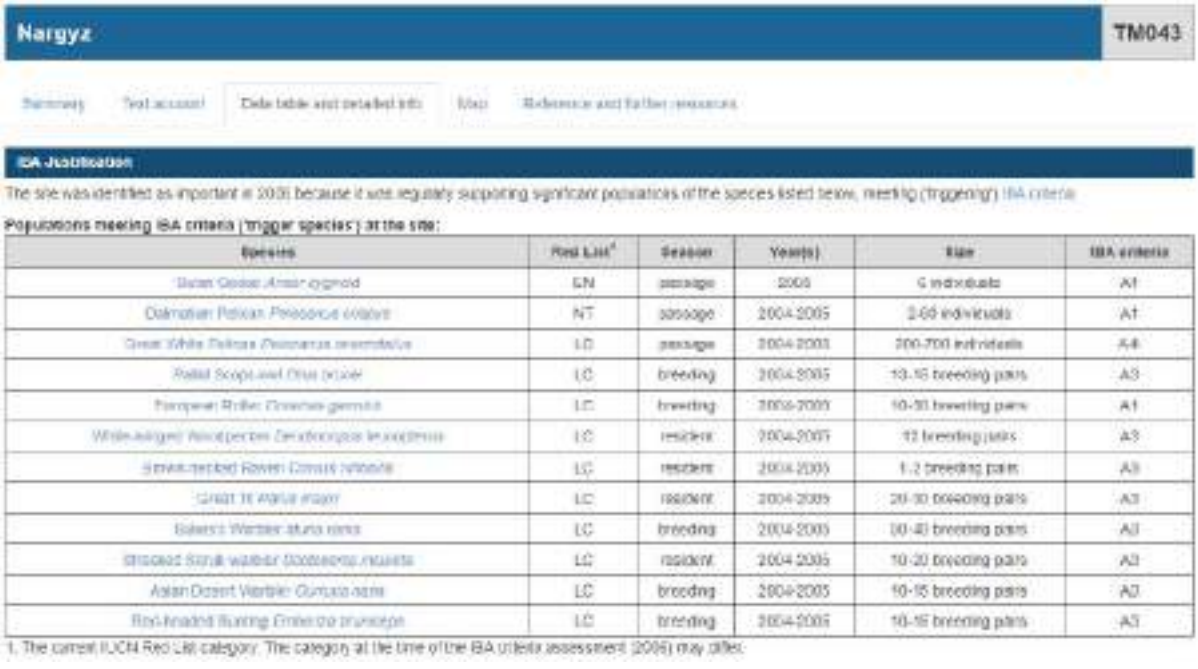
Populations meeting IBA criteria (‘trigger species’) at the site:

| Species | Red List[1] | Season | Year(s) | Size | IBA criteria |
|---|---|---|---|---|---|
| White-headed Duck Oxyura leucocephala | EN | passage | 2012-2016 | 320-3,167 individuals | A1, A4i |
| Common Pochard Aythya ferina | VU | breeding | 2012-2016 | 1,194-6,716 individuals | A1 |
| Dalmatian Pelican Pelecanus crispus | NT | passage | 2012-2016 | 20-900 individuals | A1, A4i |
| [illegible] | NT | passage | 2012-2016 | 1-49 individuals | A1 |
| [illegible] | n/a | - | 2012-2016 | 20,000-43,999 individuals | A4iii |

1. The current IUCN Red List category. The category at the time of the IBA criteria assessment (2016) may differ.

**Figure 4-2 BirdLife International (2024) Important Bird Area factsheet: Dengizkul Lake. Downloaded from https://datazone.birdlife.org/site/factsheet/dengizkul-lake-iba-uzbekistan on 08/08/2024.**

Dengizkul Lake IBA/KBA is of note as records of Dalmatian Pelican are listed as trigger species, which will be assessed. Given the lack of suitable habitat near the project area White-headed Duck and Common Pochard will not be assessed.



Nargyz TM043

Summary | Text account | Data table and detailed info | Map | References and further resources

IBA Justification

The site was identified as important in 2016 because it was regularly supporting significant populations of the species listed below, meeting (triggering) IBA criteria.

Populations meeting IBA criteria (‘trigger species’) at the site:

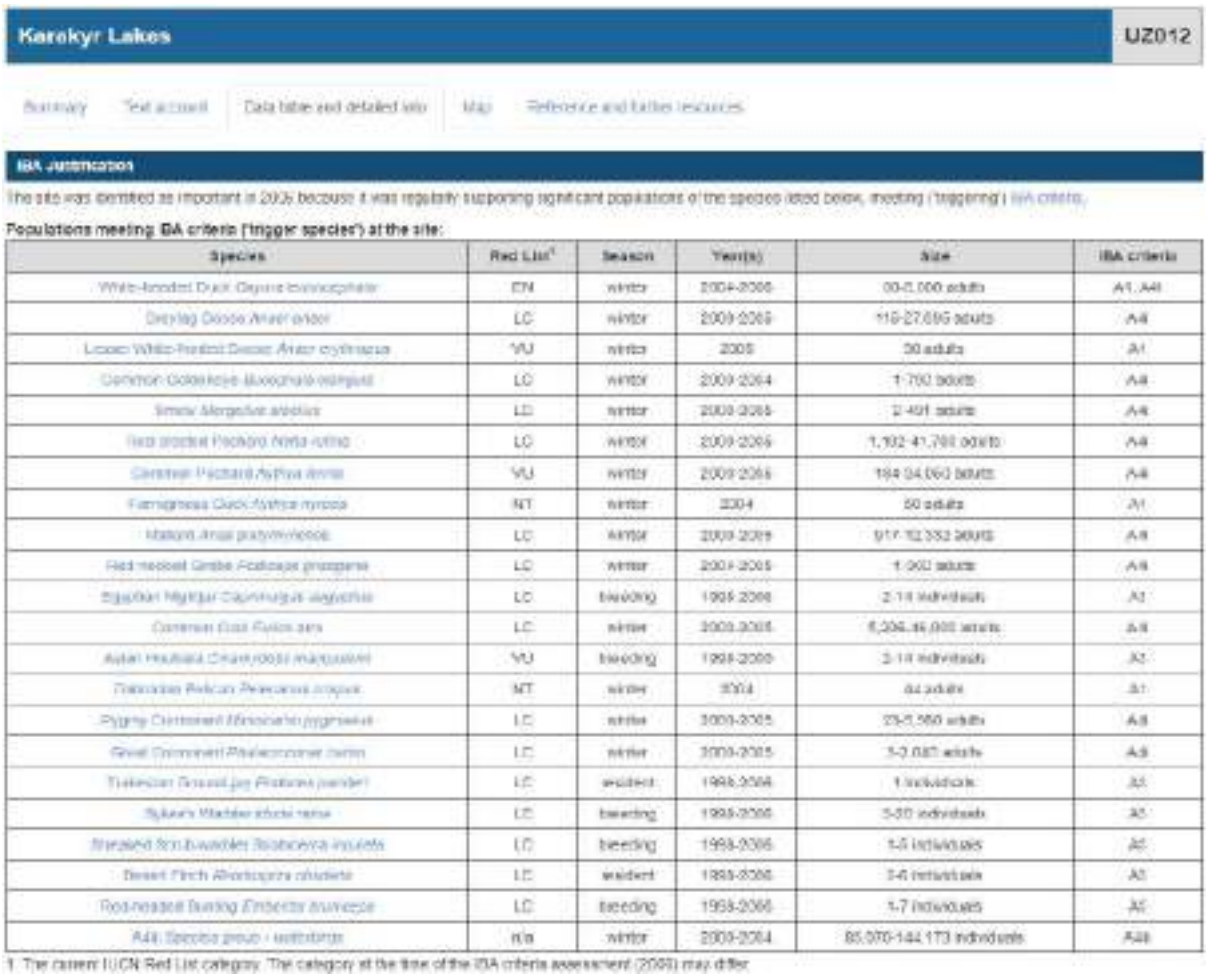
| Species | Red List[1] | Season | Year(s) | Size | IBA criteria |
|---|---|---|---|---|---|
| Swan Goose Anser cygnoid | EN | passage | 2005 | 6 individuals | A1 |
| Dalmatian Pelican Pelecanus crispus | NT | passage | 2004-2005 | 2-60 individuals | A1 |
| Great White Pelican Pelecanus onocrotalus | LC | passage | 2004-2005 | 200-700 individuals | A4i |
| Pallid Scops-owl Otus brucei | LC | breeding | 2004-2005 | 10-15 breeding pairs | A3 |
| European Roller Coracias garrulus | LC | breeding | 2004-2005 | 10-30 breeding pairs | A1 |
| White-winged Woodpecker Dendrocopos leucopterus | LC | resident | 2004-2005 | 10 breeding pairs | A3 |
| Streak-necked Bulbul Ixocincla striata | LC | resident | 2004-2005 | 1-2 breeding pairs | A3 |
| Great Tit Parus major | LC | resident | 2004-2005 | 20-30 breeding pairs | A3 |
| Eastern Wheatear Oenanthe oenanthe | LC | breeding | 2004-2005 | 30-40 breeding pairs | A3 |
| Striated Scrub Warbler Scotocerca inquieta | LC | resident | 2004-2005 | 10-20 breeding pairs | A3 |
| Asian Desert Warbler Curruca nana | LC | breeding | 2004-2005 | 10-15 breeding pairs | A3 |
| Rock Bunting Emberiza cia godlewskii | LC | breeding | 2004-2005 | 10-15 breeding pairs | A3 |

1. The current IUCN Red List category. The category at the time of the IBA criteria assessment (2016) may differ.

**Figure 4-3 BirdLife International (2024) Important Bird Area factsheet: Nargyz. Downloaded from https://datazone.birdlife.org/site/factsheet/nargyz-iba-turkmenistan on 08/08/2024.**

Nargyz IBA/KBA is of note as records of Dalmatian Pelican, Swan Goose are listed as trigger species. Dalmatian Pelican will be assessed; however the home range of the Swan Goose is

not generally near the project area based on information from IUCN Red List and thus will not be assessed.



**Karakyr Lakes** UZ012

Summary | Text a count | Data table and detailed info | Map | Reference and further resources

**IBA Justification**

The site was identified as important in 2006 because it was regularly supporting significant populations of the species listed below, meeting (triggering) IBA criteria.

Populations meeting IBA criteria (trigger species*) at the site:

| Species | Red List[1] | Season | Year(s) | Size | IBA criteria |
|---|---|---|---|---|---|
| White-headed Duck *Oxyura leucocephala* | EN | winter | 2004-2006 | 00-5,000 adults | A1, A4i |
| Greylag Goose *Anser anser* | LC | winter | 2009-2013 | 119-27,000 adults | A4i |
| Lesser White-fronted Goose *Anser erythropus* | VU | winter | 2005 | 30 adults | A1 |
| Common Goldeneye *Bucephala clangula* | LC | winter | 2009-2014 | 1-700 adults | A4i |
| Smew *Mergellus albellus* | LC | winter | 2009-2015 | 2-491 adults | A4i |
| Red-crested Pochard *Netta rufina* | LC | winter | 2009-2015 | 1,102-41,700 adults | A4i |
| Common Pochard *Aythya ferina* | VU | winter | 2009-2015 | 184-34,000 adults | A4i |
| Ferruginous Duck *Aythya nyroca* | NT | winter | 2004 | 50 adults | A1 |
| Mallard *Anas platyrhynchos* | LC | winter | 2009-2015 | 917-92,353 adults | A4i |
| Red-necked Grebe *Podiceps grisegena* | LC | winter | 2004-2015 | 1-300 adults | A4i |
| Egyptian Nightjar *Caprimulgus aegyptius* | LC | breeding | 1998-2006 | 2-11 individuals | A1 |
| Common Coot *Fulica atra* | LC | winter | 2009-2015 | 6,000-45,000 adults | A4i |
| Asian Houbara *Chlamydotis macqueenii* | VU | breeding | 1998-2006 | 2-11 individuals | A1 |
| Dalmatian Pelican *Pelecanus crispus* | NT | winter | 2004 | 44 adults | A1 |
| Pygmy Cormorant *Microcarbo pygmaeus* | LC | winter | 2009-2015 | 25-5,550 adults | A4i |
| Great Cormorant *Phalacrocorax carbo* | LC | winter | 2009-2015 | 1-2,087 adults | A4i |
| Turkestan Ground Jay *Podoces panderi* | LC | resident | 1998-2006 | 1 individuals | A1 |
| Sykes's Warbler *Iduna rama* | LC | breeding | 1998-2006 | 5-50 individuals | A1 |
| Barnard's Scrub-warbler *Scotocerca inquieta* | LC | breeding | 1998-2006 | 1-5 individuals | A1 |
| Desert Finch *Rhodopechys obsoleta* | LC | resident | 1998-2006 | 3-6 individuals | A1 |
| Rosy-headed Bunting *Emberiza aureola* | LC | breeding | 1998-2006 | 1-7 individuals | A1 |
| A4i Species group - waterbirds | n/a | winter | 2009-2014 | 85,070-144,173 individuals | A4i |

1. The current IUCN Red List category. The category at the time of the IBA criteria assessment (2006) may differ.

**Figure 4-4 BirdLife International (2024) Important Bird Area factsheet: Karakyr Lakes. Downloaded from https://datazone.birdlife.org/site/factsheet/karakyr-lakes-iba-uzbekistan on 08/08/2024.**

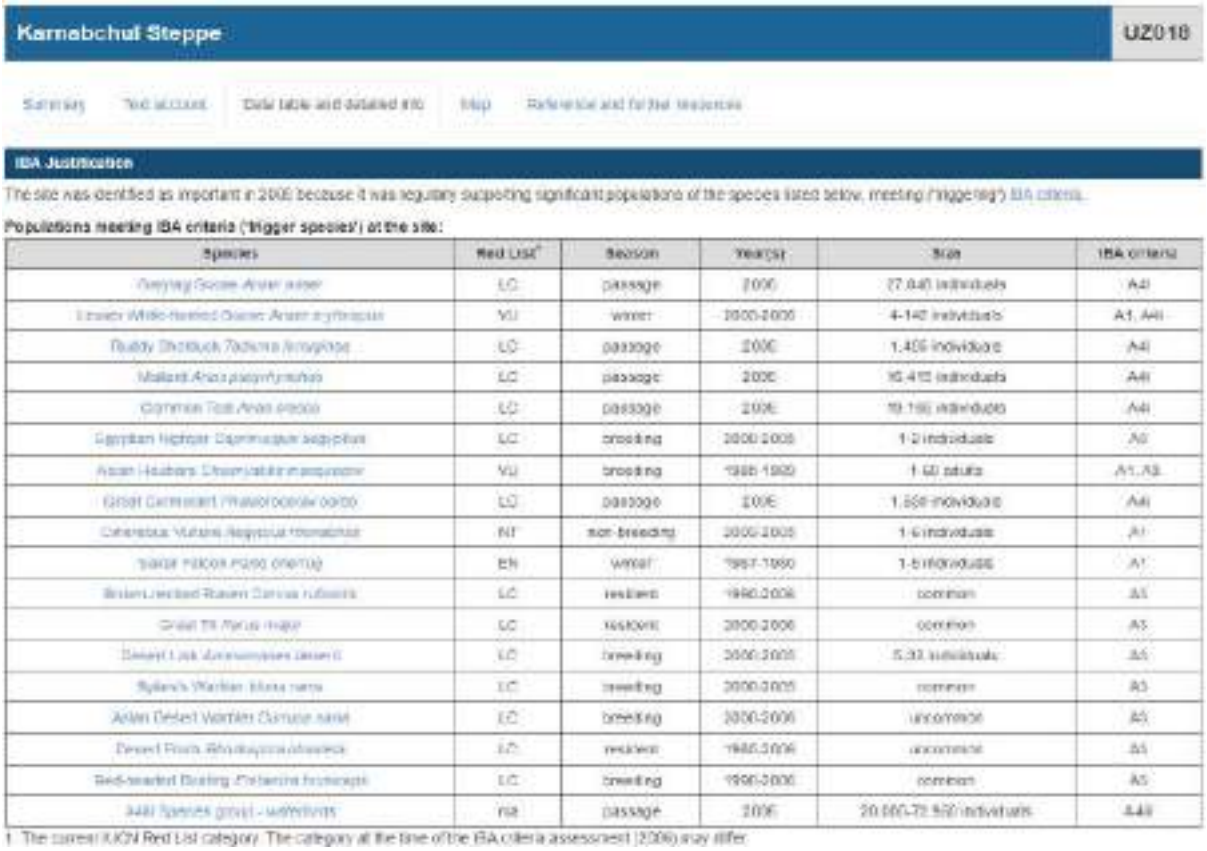
Karakyr Lakes IBA/KBA is of note as records of Lesser White-fronted Goose, Dalmatian Pelican are listed as trigger species. Given that the project area lacks suitable habitat Asian Houbara, Common Pochard, Ferruginous Duck, White-headed Duck will not be assessed.


**Figure 4-5 BirdLife International (2024) Important Bird Area factsheet: Dzheiran Ecocentre. Downloaded from https://datazone.birdlife.org/site/factsheet/dzheiran-ecocentre-iba-uzbekistan on 08/08/2024**

Dzheiran Ecocentre IBA/KBA is of note as records of Dalmatian Pelican, Common Pochard are listed as trigger species; given the lack of suitable habitat near the project area – Common Pochard will not be assessed.


**Figure 4-6 BirdLife International (2024) Important Bird Area factsheet: Tudakul and Kuymazar Reservoirs. Downloaded from https://datazone.birdlife.org/site/factsheet/tudakul-and-kuymazar-reservoirs-iba-uzbekistan on 08/08/2024.**

Tudakul and Kuymazar Reservoirs IBA/KBA is of note as records of Northern Lapwing, Eurasian Curlew are listed as trigger species however given the lack of suitable habitat these species will not be assessed.



**Karnabchul Steppe** UZ018

Summary Text account Data table and detailed info Map Reference and further resources

**IBA Justification**

The site was identified as important in 2006 because it was regularly supporting significant populations of the species listed below, meeting (triggering) IBA criteria.

**Populations meeting IBA criteria ('trigger species') at the site:**

| Species | Red List[1] | Season | Year(s) | Size | IBA criteria |
|---|---|---|---|---|---|
| Anser erythropus | LC | passage | 2006 | 27,640 individuals | A4i |
| Anser erythropus | VU | winter | 2000-2006 | 4-140 individuals | A1, A4i |
| Tadorna ferruginea | LC | passage | 2006 | 1,405 individuals | A4i |
| Anas platyrhynchos | LC | passage | 2006 | 16,415 individuals | A4i |
| Anas crecca | LC | passage | 2006 | 19,190 individuals | A4i |
| Falco cherrug | EN | winter | 1997-1999 | 1-5 individuals | A1 |
| Passer ammodendri | LC | resident | 1990-2006 | common | A3 |
| Parus major | LC | resident | 2000-2006 | common | A3 |
| Calandrella cheleensis | LC | breeding | 2000-2006 | 5-33 individuals | A3 |
| Sylvia nana | LC | breeding | 2000-2006 | common | A3 |
| Anthus campestris | LC | breeding | 2000-2006 | uncommon | A3 |
| Passer ammodendri | LC | resident | 1990-2006 | uncommon | A3 |
| Merops persicus | LC | breeding | 1990-2006 | common | A3 |
| Additional species group - waterbirds | n/a | passage | 2006 | 20,000-72,500 individuals | A4iii |

1. The current IUCN Red List category. The category at the time of the IBA criteria assessment (2006) may differ.

**Figure 4-7 BirdLife International (2024) Important Bird Area factsheet: Karnabchul Steppe. Downloaded from https://datazone.birdlife.org/site/factsheet/karnabchul-steppe-iba-uzbekistan on 08/08/2024.**

Karnabchul Steppe IBA/KBA is of note as records of Lesser White-fronted Goose and Saker Falcon are listed as trigger species and will be assessed. However given that there is no suitable habitat near the project area Asian Houbara, Cinereous Vulture are will not be assessed.

Zekyr Lake does not have species listed that trigger the criteria for KBA.

**Soltandag - Gyzylburun** TM047

Summary Text account Data table and detailed info Map Reference and further resources

**IBA Justification**

The site was identified as important in 2007 because it was regularly supporting significant populations of the species listed below, meeting (triggering) IBA criteria.

**Populations meeting IBA criteria ('trigger species') at the site:**

| Species | Red List[1] | Season | Year(s) | Size | IBA criteria |
|---|---|---|---|---|---|
| Tadorna ferruginea | LC | winter | 2007 | 79-11,076 individuals | A4i |
| Anas platyrhynchos | LC | winter | 2007 | 630-14,206 individuals | A4i |
| Calandrella cheleensis | NT | winter | 2007 | 32 individuals | A1 |
| Additional species group - waterbirds | n/a | winter | 2007 | 20,000-30,681 individuals | A4iii |

1. The current IUCN Red List category. The category at the time of the IBA criteria assessment (2007) may differ.

**Figure 4-8 BirdLife International (2024) Important Bird Area factsheet: Soltandag - Gyzylburun. Downloaded from**

**https://datazone.birdlife.org/site/factsheet/soltandag--gyzylburun-iba-turkmenistan on 08/08/2024.**

Soltandag – Gyzylburun IBA/KBA is of note as records Dalmatian Pelican is listed as trigger species; this will be assessed.

Further details will be discussed in the assessment and analysis portion of the report where data of the IBAs/KBAs are utilized in the decision-making process of determining criticality. This section serves to provide an overview only.

## 4.2 Approach to CHA

The CHA was undertaken in accordance with the methodology outlined in preceding sections. We have separated the analysis narrative by taxa instead of by criteria because both CH and SBV criteria have been examined.

Criteria pertaining to ecosystems, key evolutionary processes, and ecosystem function are not mentioned in the subsequent sections, as the CHA Screening did not find any potential features/elements that needed to be further investigated (no habitats/ecosystems on the Red List or otherwise considered as extremely sensitive).

# 5 AVIFAUNA

Four bird species were identified during CHA Screening that pertain to the CH and SBV criteria for threatened species, and potentially migratory/congregating species:

- IFC PS6 Criterion 1: Critically Endangered and Endangered Species
- IFC PS6 Criterion 3: Migratory and Congregatory Species

EBRD PR6 Criterion (ii): Habitats of significant importance to endangered or critically endangered species /// IFC PS6 Criterion 1: Critically Endangered and Endangered Species

- EBRD PR6 Criterion (iv) Habitats supporting globally significant concentrations of migratory or congregatory species /// IFC PS6 Criterion 3: Migratory and Congregatory Species

## 5.1 Bird Baseline Survey Method

Avifauna surveys consisted of the following elements to fully assess the avifauna communities that are resident, breeding or visiting the project site:

- Avifauna Point-count Surveys

### 5.1.1 Point-Count Surveys

Point-count surveys were conducted in Spring to capture key avifauna migration periods in the region. The surveys were conducted on March 13 and April 4, 2024.

Two VPs were selected within the Karakal BESS project area (VP1 and VP2). Each location was surveyed for three hours per visit, giving a total survey effort of six hours.

The VP survey methods followed standardized ornithological guidelines, aimed at monitoring bird species within the survey area, gathering data on their presence, behavior, and abundance. A Nikon 8x30 binocular was used to observe and document avifauna species.

The VP locations are outlined in the following table.

**Table 5-1 Locations of vantage points used in the spring 2024 avifauna survey at Karakal BESS**

| № | VP | PROJECT PART | N | E | LOCATION |
|---|---|---|---|---|---|
| 1 | VP01 | Karakal BESS Station | 39.51731 | 63.87002 | BESS station area |
| 2 | VP02 | Karakal BESS Access Road | 39.51205 | 63.86071 | Access road |

The surveys were conducted by Juru biodiversity specialist Elizaveta Ignatieva. Bird counting took place for three hours during the day, from 13:10 to 16:10 on March 13, and from 11:50 to 14:50 on April 4. Observations during the first two hours were focused within the BESS station area (Vantage Point 1), while the third hour was spent monitoring the access road (Vantage Point 2).

The figures below shows the locations of the VPs at Karakal BESS.

**Figure 5-1 Tracks of the spring 2024 avifauna survey at Karakal BESS**

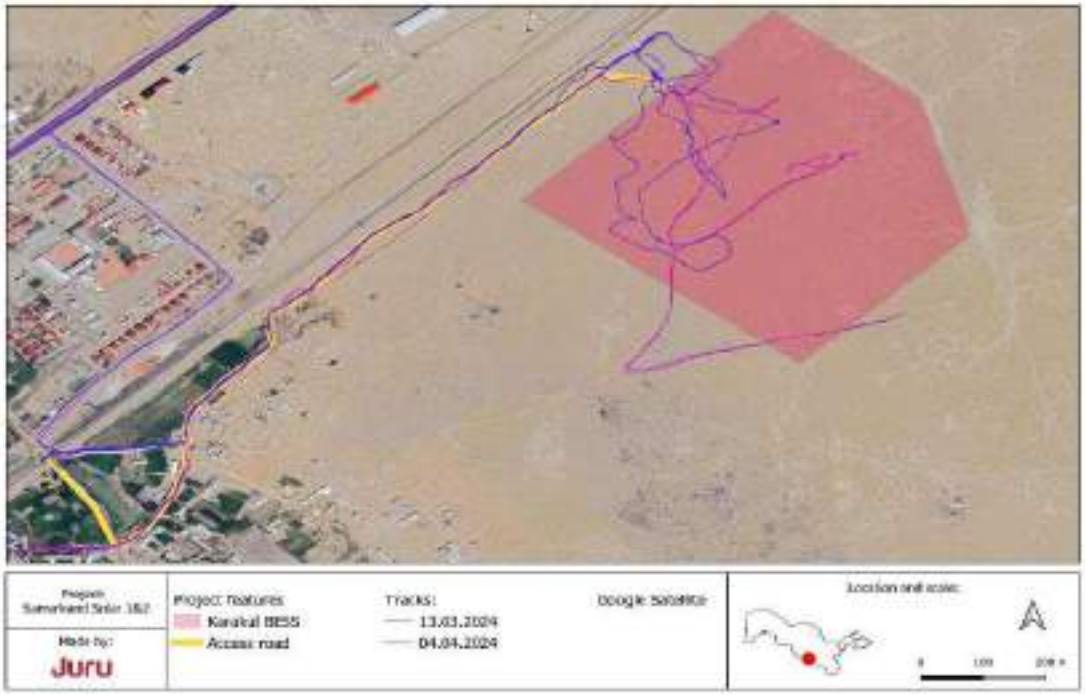
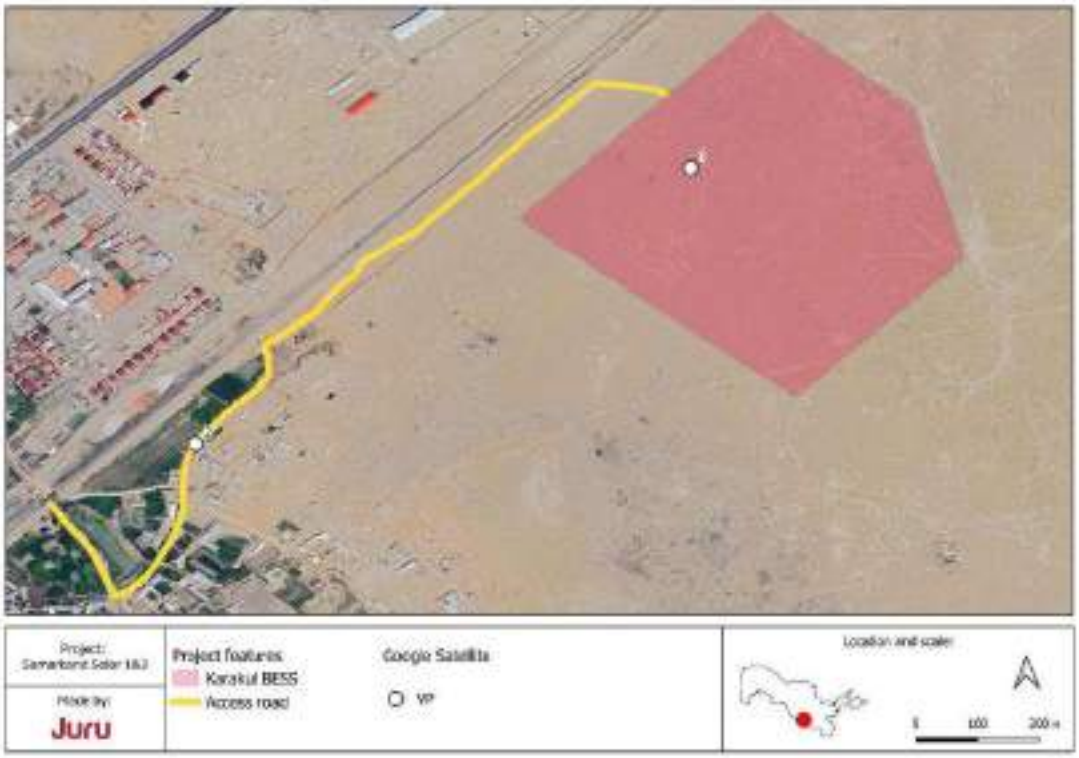



**Figure 5-2 Location of the Vantage Points used for the spring 2024 avifauna survey at Karakal BESS**




## 5.2 Species Assessments

### 5.2.1 Saker Falcon

The Saker Falcon (*Falco cherrug*) is listed as Endangered (EN) on the Global IUCN Red List and Endangered (EN) in the national Uzbekistan Red Data Book, due to a rapid population decline.

The CHA Screening exercise found that this species should be further investigated in the CHA against **Criteria 1 & 3**.

#### 5.2.1.1 Ecology

The Saker Falcon is typically found in a variety of open landscapes including grasslands, semi-deserts, and agricultural fields, extending across Eastern Europe and Central Asia. It often prefers flat or rolling terrains with sparse vegetation, which facilitates hunting. Suitable habitats also include river valleys and rocky outcrops when available (R. N. Dixon in litt. 2020).

Saker Falcons generally breed from March to May, depending on the geographical location. They exhibit a preference for nesting on cliffs, rocky ledges, or even old nests of other large birds. In regions lacking natural elevations, they might also utilize human-made structures. A typical clutch consists of 3-4 eggs, which are incubated primarily by the female for about 28-32 days (J. P. Smith in litt. 2019).

Their diet is diverse, primarily consisting of birds and small mammals, which they capture in flight. Saker Falcons may also hunt reptiles, insects, and occasionally fish, adapting their diet based on local prey availability. This adaptability in diet is crucial for their survival across varied environments (A. T. Peterson 2018).

Threats to the Saker Falcon include habitat degradation due to agricultural expansion and urbanization. Additionally, they face risks from direct persecution and collision with power lines. Illegal wildlife trade, particularly for falconry, poses a significant threat, leading to declines in certain populations. Conservation efforts are critical to mitigate these threats and ensure the species' survival (Conservation Action Trust 2021).

#### 5.2.1.2 DISTRIBUTION

The Saker Falcon is primarily recognized as a passage migrant in Uzbekistan, traversing southward during the autumn months and returning northward in the spring to breeding areas further north. Despite being predominantly migratory within the region, some breeding activity has been recorded in the country, suggesting that a number of Saker Falcons may establish temporary breeding territories. Particularly in the Tashkent region, however, the falcons are strictly observed as passage migrants. These birds typically vacate their breeding grounds in September and October, and make the return journey between February and May.

In Uzbekistan, Saker Falcons are found in open steppes, semi-desert areas, and along agricultural landscapes that align with their hunting habits. The presence of these habitats across the country supports their migratory patterns, providing necessary resources during their transit. This adaptability helps sustain their population despite threats from habitat alteration and illegal hunting pressures

The EOO of resident/breeding population of Saker Falcon is 19,100,000 km$^2$ (Birdlife Datazone, 2024).

The following figures shows the geographical range of this species.

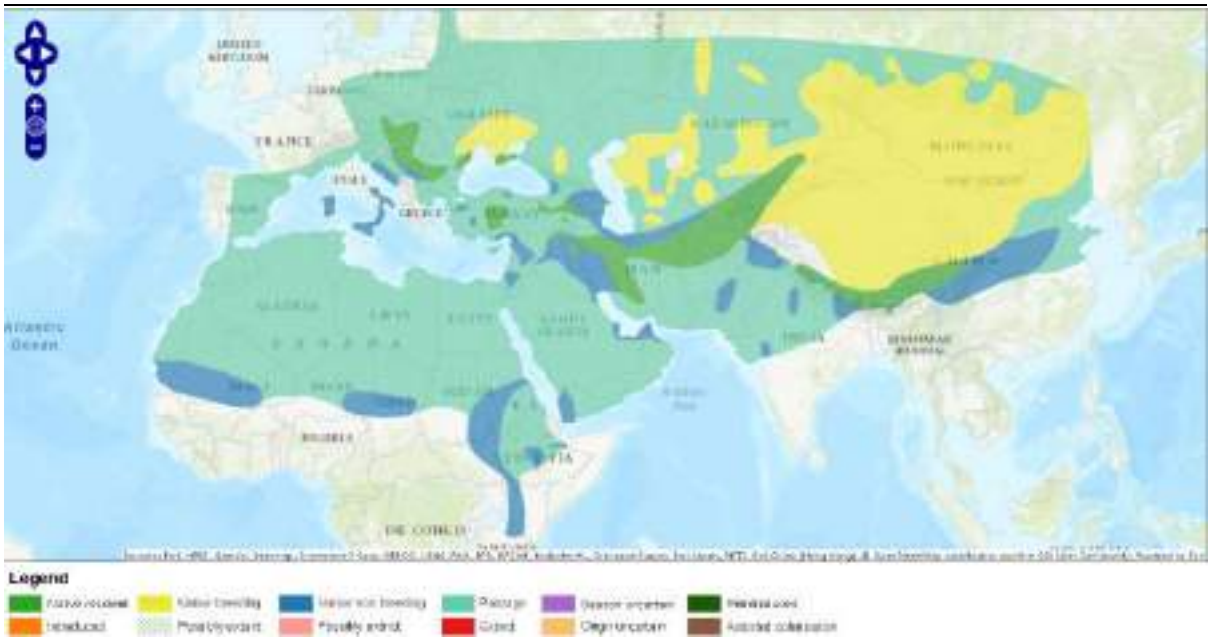



**Figure 5-3 Distribution Map of the Saker Falcon**

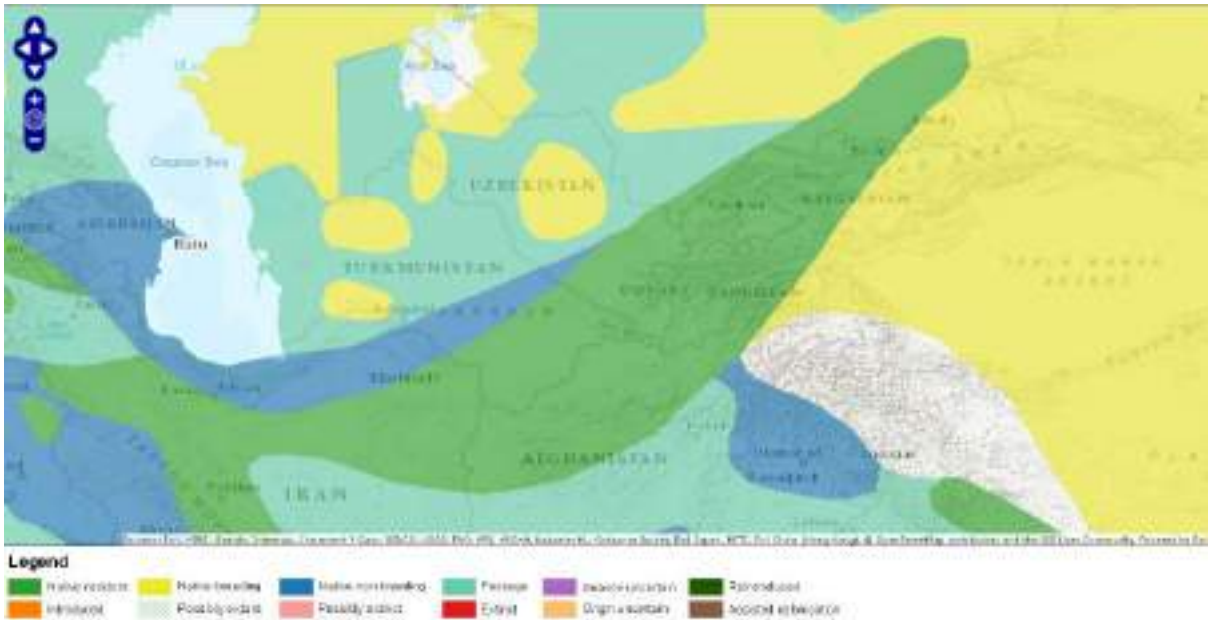



**Figure 5-3 Distribution Map of the Saker Falcon[3]**

Birds exhibit varying migratory behaviors—sedentary, part-migratory, or fully migratory—largely influenced by the availability of food in their breeding territories during winter (Snow and Perrins 1998). Migrant birds typically winter in East Africa, southern Europe, and southern Asia. Notably, between 25-50% of the global population winters on the Qinghai-Tibetan Plateau (Dixon et al. 2015b). These migratory birds generally depart their breeding grounds in September and October and return between February and May (del Hoyo et al. 1994).

[3] BirdLife International (2024) Species factsheet: Saker Falcon Falco cherrug. Downloaded from https://datazone.birdlife.org/species/factsheet/saker-falcon-falco-cherrug on 27/06/2024.

Migration is the biannual movement of Sakers between their breeding and wintering areas. Saker Falcons are partial migrants, meaning that while some individuals within a population migrate, others do not. Adult territory holders often show less inclination to migrate than younger individuals, especially juveniles. The factors influencing variations in migration behavior within and between populations remain unclear, though they are likely influenced by a combination of genetic and environmental factors.

The following figures provide detailed visualizations related to the migration and distribution of Saker Falcons. The first figure maps the general direction of the autumn migration routes of the Saker Falcon, illustrating the paths these birds take as they migrate southward. The second figure presents the general distribution of Saker Falcons, showing their widespread presence across their range. Each figure aims to offer insights into the migration behaviors and habitat utilization of this species, which are crucial for targeted conservation efforts.

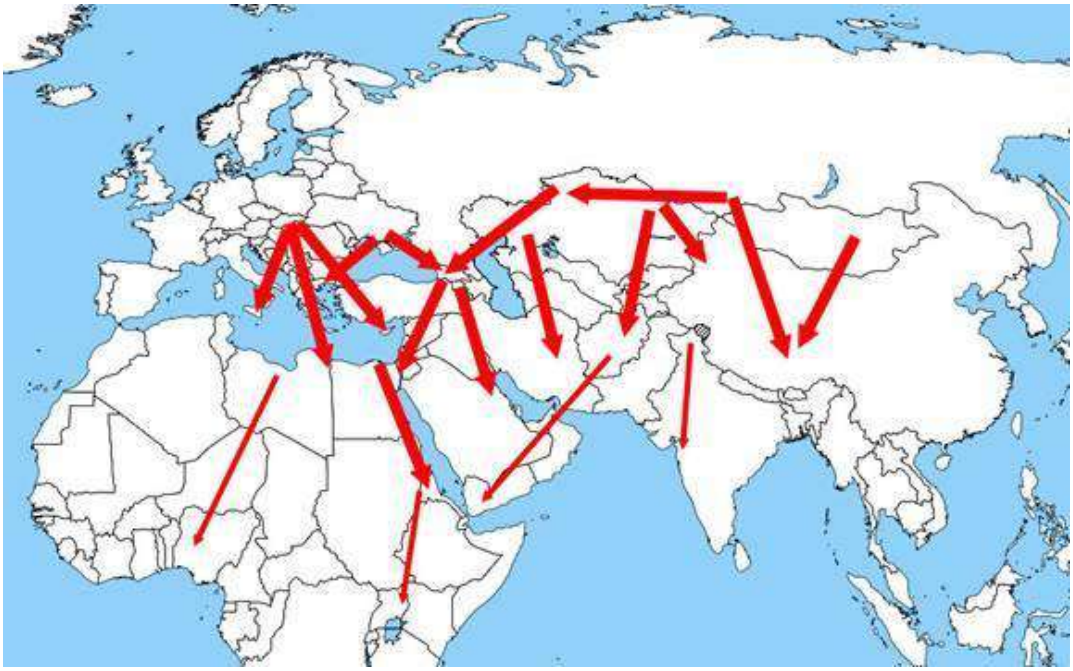


**Figure 5-4 General direction of autumn migration routes of the Saker Falcon[4]**

#### 5.2.1.3 BASELINE SURVEY RESULTS

This species was not recorded during the spring 2024 avifauna survey at Karakal BESS site.

[4] International Wildlife Consultants (IWC) 2024. Available at: https://www.falcons.co.uk/conservation-research-and-welfare/the-saker-falcon/migration/

#### 5.2.1.4 ANALYSIS

5.2.1.4.1 EAAA

The total EAAA for breeding birds has been applied as all connected suitable breeding habitat that overlaps the project footprint as well as exists within a reasonable buffer, determined by species specific ecology.

The Saker Falcon nests on cliffs, in tree hollows, and may also use old nests of other large birds. It forages in grassy landscapes, including desert edges, semi-deserts, steppes, agricultural fields, and arid montane areas. Its ability to adapt to modified landscapes is notable, provided there are adequate hunting grounds available.

A 20 km buffer from the project footprint was applied based on the largest known home range of a breeding population in Hungary. [5] This area was then further extended to encompass the abovementioned surrounding suitable foraging habitats. This should provide an adequate accounting of the population of birds likely to regularly utilize the project area.

The resulting EAAA encompasses an area of 560km$^2$ and has been mapped in the following figure.

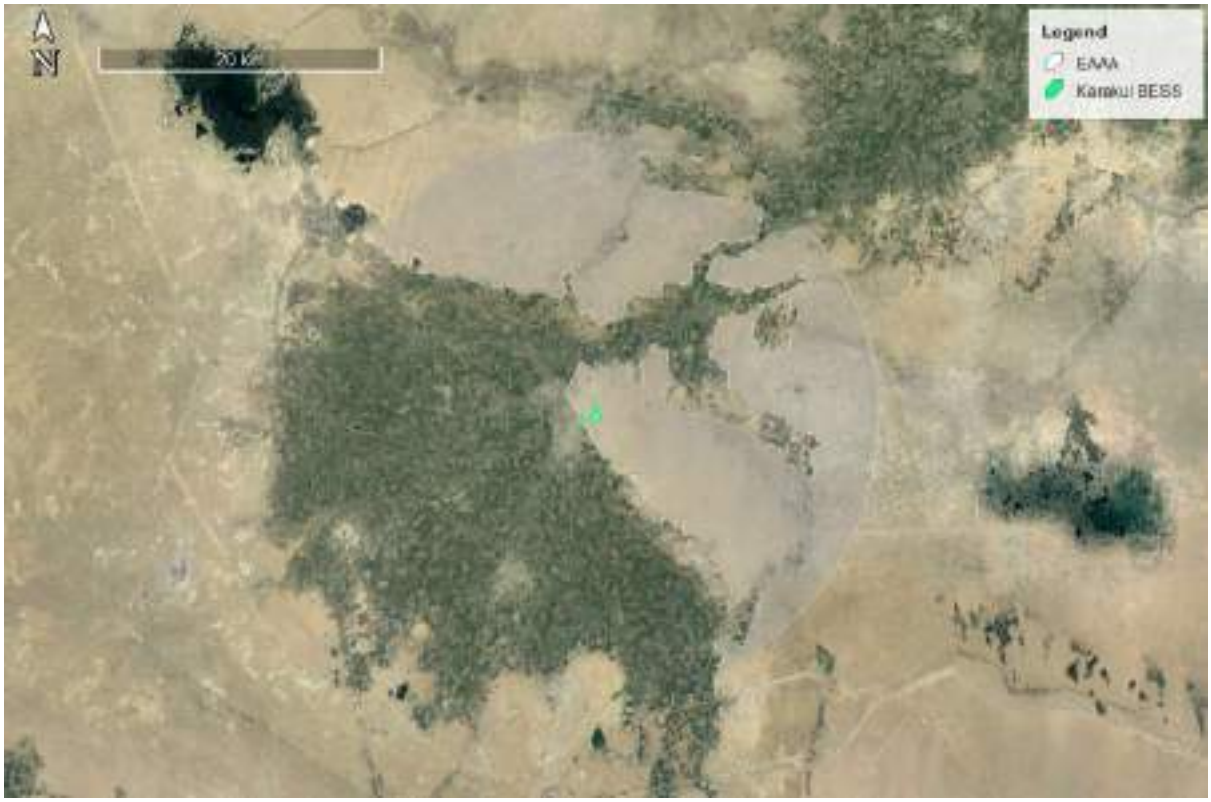



**Figure 5-6 Estimated EAAA for the Saker Falcon species**

[5] Prommer, Matyas & János, Bagyura & Fehérvári, Péter & Miklós, Váczi. (2018). Home Range Size and Habitat Use of Adult Saker Falcons Falco cherrug in the Breeding Season in Hungary. 10.13140/RG.2.2.19501.95204.

5.2.1.4.2 Criticality

The global population of this species is estimated to range from 12,200-29,800 mature individuals. Taking a precautionary approach, the lower range is used to apply the thresholds.

Under **Criteria 1**, the threshold for Endangered (EN) species is 0.5% of the global population, therefore the 0.5% criticality threshold would be 61 individuals.

Under **Criteria 3**, the threshold is 1% of the global population using the EAAA on a regular/cyclical basis during migrations. This would amount to 122 individuals.

The nearest KBA for which Saker Falcon is listed as a trigger is Karnabchul Steppe, which is roughly 80 km from the project area. Zero observations of this species were made during the spring 2024 avifauna survey however, due to the presence of suitable foraging habitat it is probable that this species occurs in the project AoI which is considered as a 20km buffer from the project footprint to account for habitat displacement. Given there are no known areas mapped as IBAs/KBAs for which Saker Falcon is a trigger species within the EAAA, it is considered unlikely that the EAAA has suitable habitat to support a population comprising of more than 61 individuals. Therefore, CH is not triggered under **Criteria 1 or Criterion 3**.

Although this species does not trigger CH status, it is considered a Significant Biodiversity Value due to its Endangered (EN) designated conservation status on IUCN and in the National Uzbekistan Red Data Book.

The ESIA will address impacts on this species as a Sensitive Receptor, via the biodiversity impact assessment, mitigation program and residual significance analysis.

## 5.2.2 Egyptian Vulture

The Egyptian Vulture (*Neophron percnopterus*) is a breeding resident and possible passage migrant in much of Uzbekistan and is listed as Endangered (EN) on the Global IUCN Red List. It is also listed as Vulnerable (VU) in the National Uzbekistan Red Data Book.

The CHA Screening exercise found that this species should be further investigated in the CHA against **Criteria 1 and 3**.

### 5.2.2.1 Ecology & Conservation

The species inhabits extensive open areas mainly in dry or arid regions, although sometimes around fringe areas of wet or cold climates; steppe, desert, scrub, pastures and fields of cereals; requires rocky sites for nesting. Range greatly affected by species' dependence on livestock and human waste for food.

Northern breeders conduct long-distance intercontinental migrations, leaving breeding grounds in mid Sept to mid Oct/Nov, returning in Feb–Apr/May (Botha et al 2017). Numbers passing migration watchpoints are usually small.

This species typically nests on ledges or in caves on cliffs (Sarà and Di Vittorio 2003), crags and rocky outcrops, but occasionally in large trees, electricity pylons (Naoroji 2006) and exceptionally on the ground (Gangoso and Palacios 2005).

It forages in lowland and montane regions over open, often arid, country, and also scavenges at human settlements. It has a broad diet including carrion, tortoises, organic waste, insects, young vertebrates, eggs and even faeces (Margalida et al. 2012, Dobrev et al. 2015, 2016).

Usually solitary, individuals congregate at feeding sites, such as rubbish tips, or vulture restaurants (i.e. supplementary feeding stations), and form roosts of non-breeding birds (Ceballos and Donázar 1990).

Poisoning is the most important threat to this species. This is usually accidental through the ingestion of wildlife that have been intentionally poisoned. Hunting and electrocution/collision with powerlines are also significant threats to the species.

#### 5.2.2.2 DISTRIBUTION

Egyptian Vultures have a broad distribution across Central Asia, Europe and Africa. The species is a breeding resident in Uzbekistan but may also occur as a passage migrant (Burnside et al 2023).

It has an extremely large EOO of 50,100,000 km$^2$.

A very preliminary estimate of the global population size is 12,400-36,000 mature individuals (BirdLife, 2021). In 2010 it was estimated that the population in Uzbekistan numbers 135 breeding pairs (Kashkarov & Lanovenko 2011).

Satellite tracking has been carried out to assess migratory routes of Egyptian Vultures in Uzbekistan. These have shown individuals tracked from breeding sites in the Qashqadaryo region, south of Samarkand, moving South to India.


**Figure 5-7 Autumn 2022 migration routes of 6 sub-adult Egyptian Vultures from Central Asia to India[6]**

The following figures show the distribution of Egyptian Vultures in Uzbekistan and globally.

[6] Burnside, R. J., Ten, A., Soldatov, V. and Dobrev, V. 2023. Identifying migration routes and wintering sites of Egyptian Vultures breeding in Uzbekistan. Project Report 2022/23.

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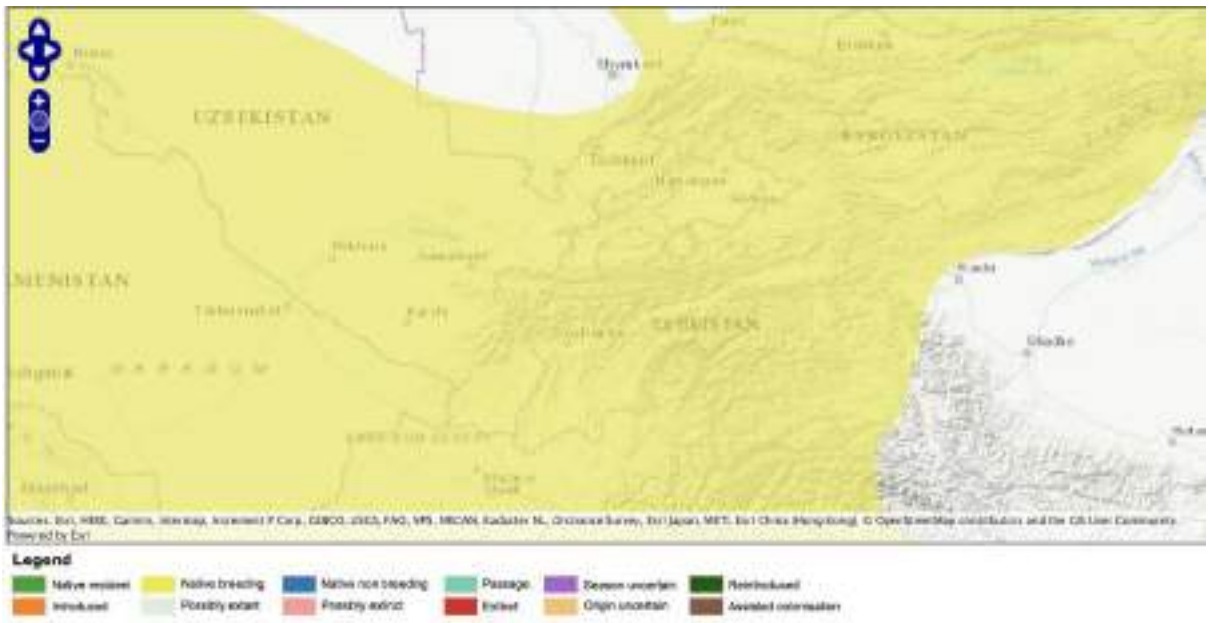



**Figure 5-8 Geographic Distribution of Egyptian Vulture within Uzbekistan[12]**

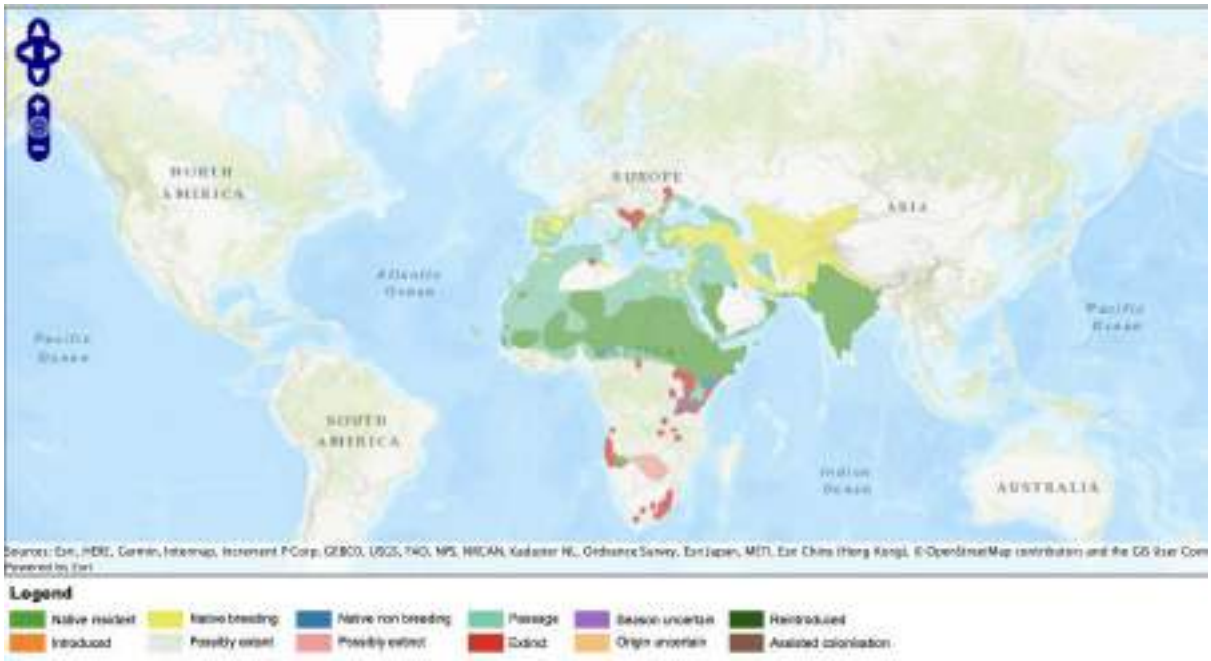



**Figure 5-9 Geographic Distribution of the Egyptian Vulture[7]**

7 BirdLife International (2024) Species factsheet: *Neophron percnopterus*. Downloaded from https://datazone.birdlife.org/species/factsheet/egyptian-vulture-neophron-percnopterus on 02/05/2024

### 5.2.2.3 Baseline Survey Results

5.2.2.3.1 Survey Findings

This species was not recorded during the spring 2024 avifauna survey at Karakal BESS site.

### 5.2.2.4 Analysis

5.2.2.4.1 EAAA

The total EAAA for resident breeding birds is applied as all suitable breeding habitat that overlaps the project footprint and exists within a reasonable buffer, determined by species specific ecology.

The Egyptian Vulture requires rocky sites for nesting, typically nesting on ledges or in caves on cliffs crags and rocky outcrops, but occasionally in large trees and electricity pylons. It forages in lowland and montane regions over open, often arid, country, although sometimes around fringe areas of wet or cold climates; steppe, desert, scrub, pastures and fields of cereals; and also scavenges at human settlements.

A 20 km buffer from the project footprint was applied based on the known home range of a breeding populations in Spain.[8] This area was then further extended to encompass the abovementioned surrounding suitable foraging habitats. This should provide an adequate accounting of the population of birds likely to regularly utilize the project area.

[8] López-López, P., García-Ripollés, C. and Urios, V. (2014), Food predictability determines space use of endangered vultures: implications for management of supplementary feeding. Ecological Applications, 24: 938-949. https://doi.org/10.1890/13-2000.1

The resulting EAAA encompasses an area of 560km² and has been mapped in the following figure.

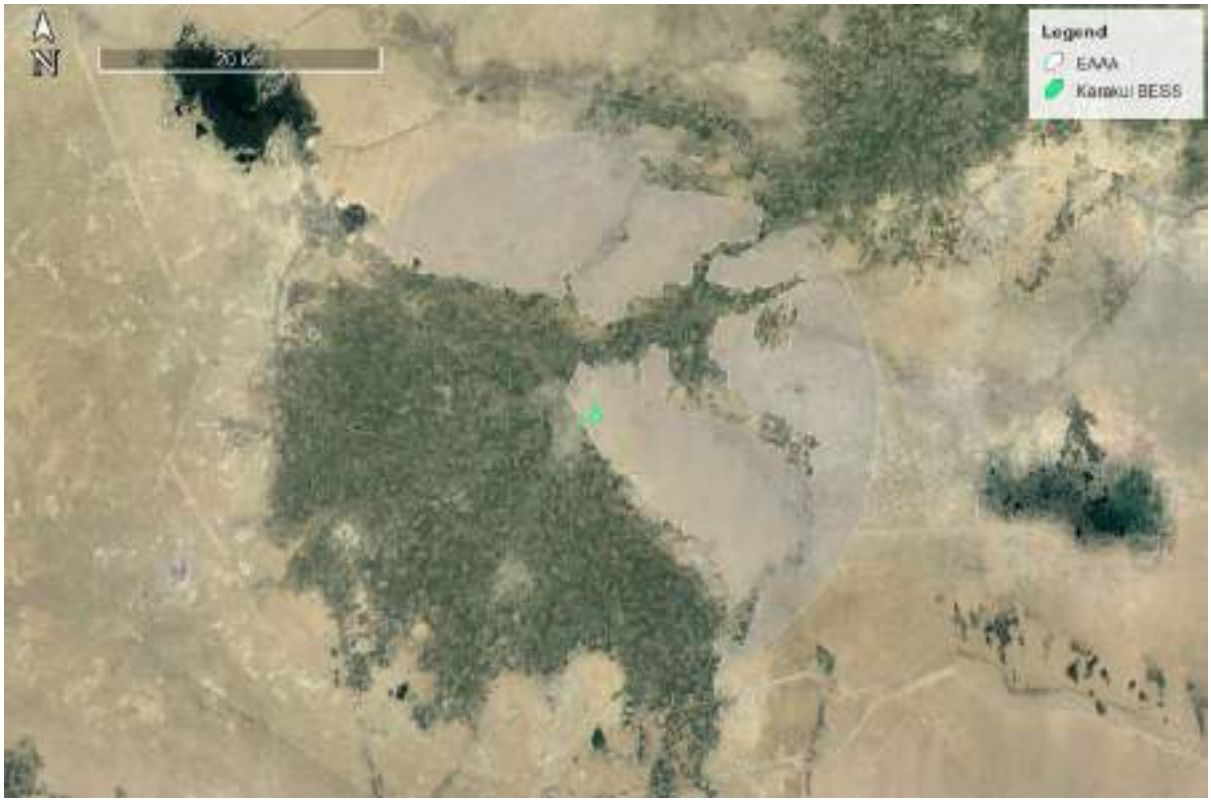



**Figure 5-6 Estimated EAAA for the Egyptian Vulture species**

5.2.2.4.2 Criticality

The global population of this species is estimated to range from 12,400-36,000 mature individuals. Taking a precautionary approach, the lower range is used to apply the thresholds.

Under **Criteria 1**, the threshold for Endangered (EN) species is 0.5% of the global population, therefore the 0.5% criticality threshold would be 62 individuals.

Under **Criteria 3**, the threshold is 1% of the global population using the EAAA on a regular/cyclical basis during migrations. This would amount to 124 individuals.

To date, zero observations of this species was made during the spring 2024 avifauna survey.

Egyptian Vulture is not listed as a breeding species or a trigger species in the surrounding IBAs. There are no records of breeding hotspots I the EAAA. Although this is not a quantitative extrapolation, the context and the relatively low number of observations indicates that this species likely does not have an EAAA population comprising of more than 62 individuals and therefore does not trigger criticality under **Criteria 1 or 3**.

Although this species does not trigger CH status, it is considered a Significant Biodiversity Value and Priority Biodiversity Feature (PBF) due to its Vulnerable (VU) designated conservation status on IUCN and in the National Uzbekistan Red Data Book.

The ESIA will address impacts on this species as a Sensitive Receptor, via the biodiversity impact assessment, mitigation program and residual significance analysis.

### 5.2.3 Lesser White-fronted Goose

The Lesser White-fronted Goose (*Anser erythropus*) is a passage migrant in Uzbekistan, listed as Vulnerable (VU) species on the IUCN Global Red List, and Vulnerable (VU) in the Uzbekistan National Red Data Book.

The CHA Screening exercise found that this species should be further investigated in the CHA against **Criteria 1 & 3**.

#### 5.2.3.1 Ecology & Conservation

During winter and on migration, this species frequents open short grassland in the steppe and semi-arid zones, particularly in sodic (e.g. seashore) pastures, arable farmland, pastures and meadows (Cramp and Simmons 1977, Madsen 1996, Kear 2005). Winter roosting colonies are also formed on large lakes and rivers, or in reedbeds and rushes (Cramp and Simmons 1977, Madge and Burn 1988).

Breeding generally occurs in late May/June and depart breeding grounds in mid-August to mid-September (Kear, 2005). Young remain with parents throughout most of first winter (Kear, 2005).

Feeds mostly by grazing on land, primarily on green parts of grasses, plants and small bushes. During winter it will supplement feeding with agricultural grains (Kear, 2005).

Climate change and associated habitat shifts are expected to impact negatively on this species. Illegal hunting, particularly in wintering sites, is also a major threat.

#### 5.2.3.2 Distribution

The species breeds in a discontinuous narrow band across Arctic Eurasia from Norway to Eastern Siberia. There are four subpopulations recognised, where the Western Asian main population is known to winter around the Black and Caspian Seas, mainly in Azerbaijan, Iraq, Iran and Uzbekistan (V. Morozov in litt. 2016, N. Mikander, I. Øien and T. Aarvak in litt. 2016).

The figure below shows the mapped migratory routes across the Western Palearctic.

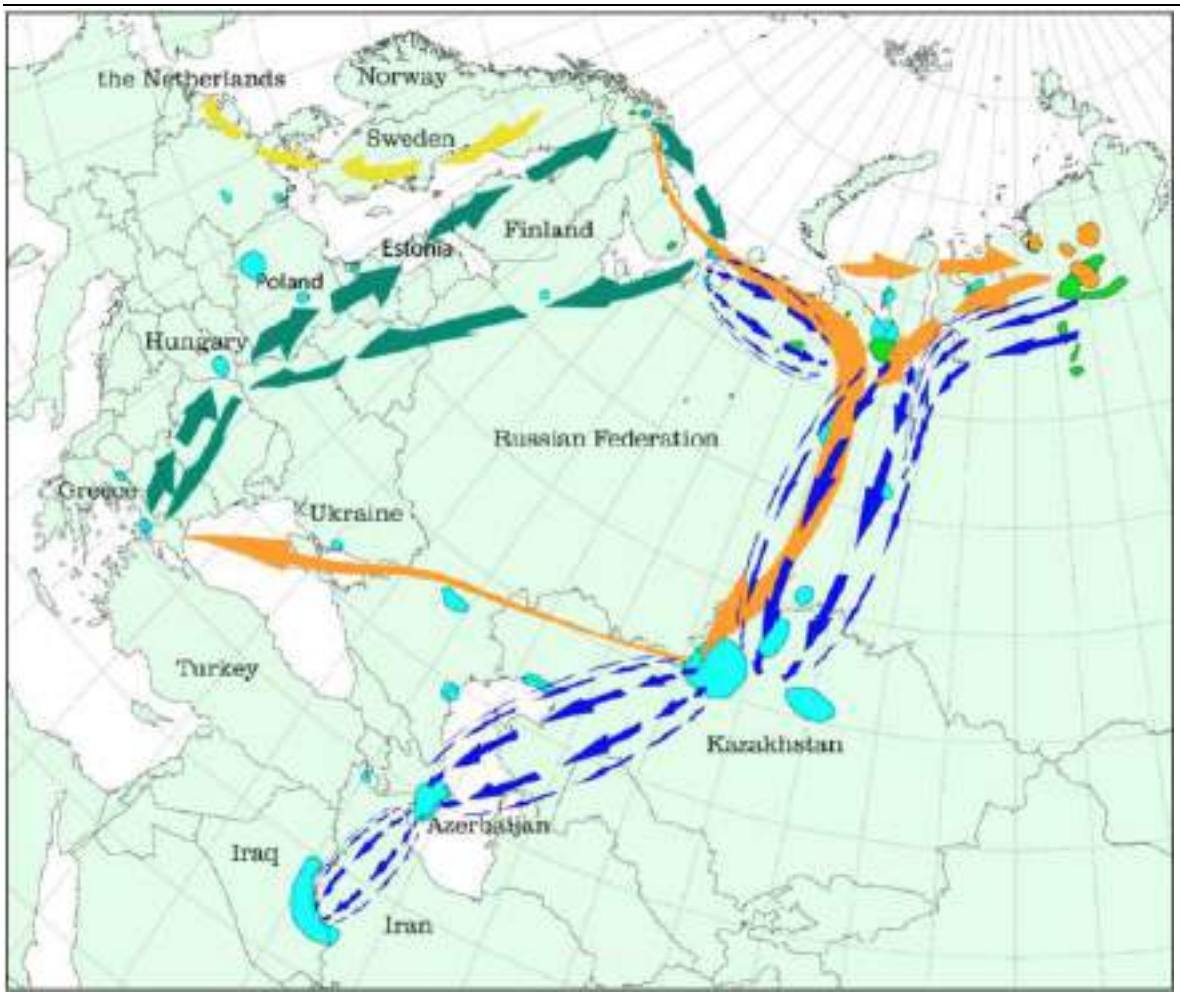



**Figure 5-7 Mapped Migratory Routes of the Lesser White-fronted Goose in the Western Palearctic [9]**

The species has a large EOO of 7,060,000km$^2$.

The global population is estimated at 24,000 – 40,000 individuals, which includes 14,000 – 19,000 individuals from the East Asian Flyway (Jia et al 2016; Lei per A. Fox *in litt.* 2016).

The figures below show the species distribution.

[9] Aarvak, Tomas & Øien, Ingar & Shimmings, Paul. (2016). A critical review of Lesser White-fronted Goose release projects. NOF-BirdLife Norway. Report 6.


**Figure 5-8 Geographic Distribution of Lesser White-fronted Goose within Uzbekistan[12]**


**Figure 5-9 Geographic Distribution of the Lesser White-fronted Goose [10]**

[10] BirdLife International (2024) Species factsheet: *Anser erythropus*. Downloaded from https://datazone.birdlife.org/species/factsheet/lesser-white-fronted-goose-anser-erythropuson 24/04/2024.

### 5.2.3.3 Baseline Survey Results

5.2.3.3.1 Survey Findings

This species was not recorded during the spring 2024 avifauna survey at Karakal BESS site.

### 5.2.3.4 Analysis

During winter and at stopover sites, the Lesser White-fronted Goose, roosts on lakes and frequents adjacent open short grassland in the steppe and semi-arid zones, particularly in sodic (e.g. seashore) pastures, arable farmland, pastures and meadows. Such habitats i.e. lakes with adjacent grassland, farmland, pastures and meadows are not present within the project footprint nor within AoI (considered as a 20km buffer from the project footprint due to habitat displacement for birds).

The closest known records of Lesser White-fronted Goose is the Karnachabul Steppe IBA for which it is a trigger species. The IBA located approximately 80km from the project area. This may suggest the lack of suitable habitat within project footprint and AoI (considered as a 20km buffer from the project footprint due to habitat displacement for birds). Therefore, due to the unlikelihood of presence in the project AoI, an EAAA cannot be applied as a result of which CH will be not further assessed for this species.

However, given the status of this species, if were to be observed during future monitoring efforts it would be assessed under the framework of adaptive management.

Therefore, this species does not trigger CH status and is not considered a Significant Biodiversity Value.

## 5.2.4 White-headed Duck

The White-Headed Duck (*Oxyura leucocephala*) is a resident (possibly breeding) and a passage migrant in Eastern Uzbekistan and has been noted to winter in some regions. It is listed as Endangered (EN) species on the IUCN Global Red List, and Endangered (EN) in the Uzbekistan National Red Data Book.

The CHA Screening exercise found that this species should be further investigated in the CHA against **Criteria 1 & 3.**

### 5.2.4.1 Ecology & Conservation

The White-headed Duck is a highly aquatic species that is found in a variety of wetlands throughout the year, including natural and man-made habitats (Salvador 2023). During passage migration, they have been recorded in a variety of habitats, including sea bays and

rivers (Anstey, 1998). In Uzbekistan during spring migration, the species was recorded in the Syrdaria and Zeravshan rivers, and during autumn migration on lakes (Kreuzberg-Mukhina et al 2001). Whilst wintering the species inhabits larger, deeper alkaline or saline waters which often have less emergent vegetation than in the breeding season, but still support algae and pondweeds (Johnsgard and Carbonell 1996). White-headed Ducks were observed wintering during 2020–2021 in a reservoir (Tudakul) and in lakes (Dengizkul, Karakir, Xadicha, and Zikri) of Bukhara Region, Uzbekistan (Yorkulov & Azimov 2021).

Migrating birds breed from April to July (Sánchez et al. 2000, Kear 2005). After breeding it begins migration to its wintering grounds in late August to arrive September-October, and the return journey occurs between February and early May (Johnsgard and Carbonell 1996, Kear 2005).

In Uzbekistan, breeding birds were observed in July on the Sudochye Wetland (Kreuzberg-Mukhina, in press; Lanovenko et al., in press). It breeds on small, enclosed, semi-permanent or temporary freshwater, brackish or eutrophic lakes with a fringe of dense emergent vegetation. The nest is constructed over water in emergent vegetation (usually *Phragmites* spp. or *Typha* spp.) ((Sánchez et al. 2000, Sebastián-González et al. submitted; Kear 2005).

This is a diving duck. Its diet consists predominantly of midge (chironomid) larvae and other aquatic invertebrates, but seeds and aquatic plants may also be taken (Johnsgard and Carbonell 1996; Sánchez *et al.* 2000; Kear 2005).

The greatest long-term threat to the species is competition and introgressive hybridisation with the non-native North American Ruddy Duck Oxyura jamaicensis (Green and Hughes 1996, Green and Hughes 2001, Muñoz-Fuentes et al. 2007). Both male Ruddy Ducks and male hybrids are socially dominant over male White-headed Ducks during courtship (Johnsgard and Carbonell 1996). Droughts in Kazakhstan and Uzbekistan may have caused poor breeding seasons in 2002 and 2003 (Li and Mundkur 1993, B. Hughes *in litt*. 1999).

#### 5.2.4.2 DISTRIBUTION

This species is distributed across Central Asia, parts of Europe and the middle east. Across much of Uzbekistan it is noted as a resident but breeds in some localities primarily in the West. Important passage concentrations also occur in Uzbekistan (E. Kreuzberg-Mukhina *in litt*. 1999), particularly near Jizzkah and Tashkent. It has also been recorded to overwinter in recent years, although no regular wintering sites have been found (Li and Mundkur 2003).

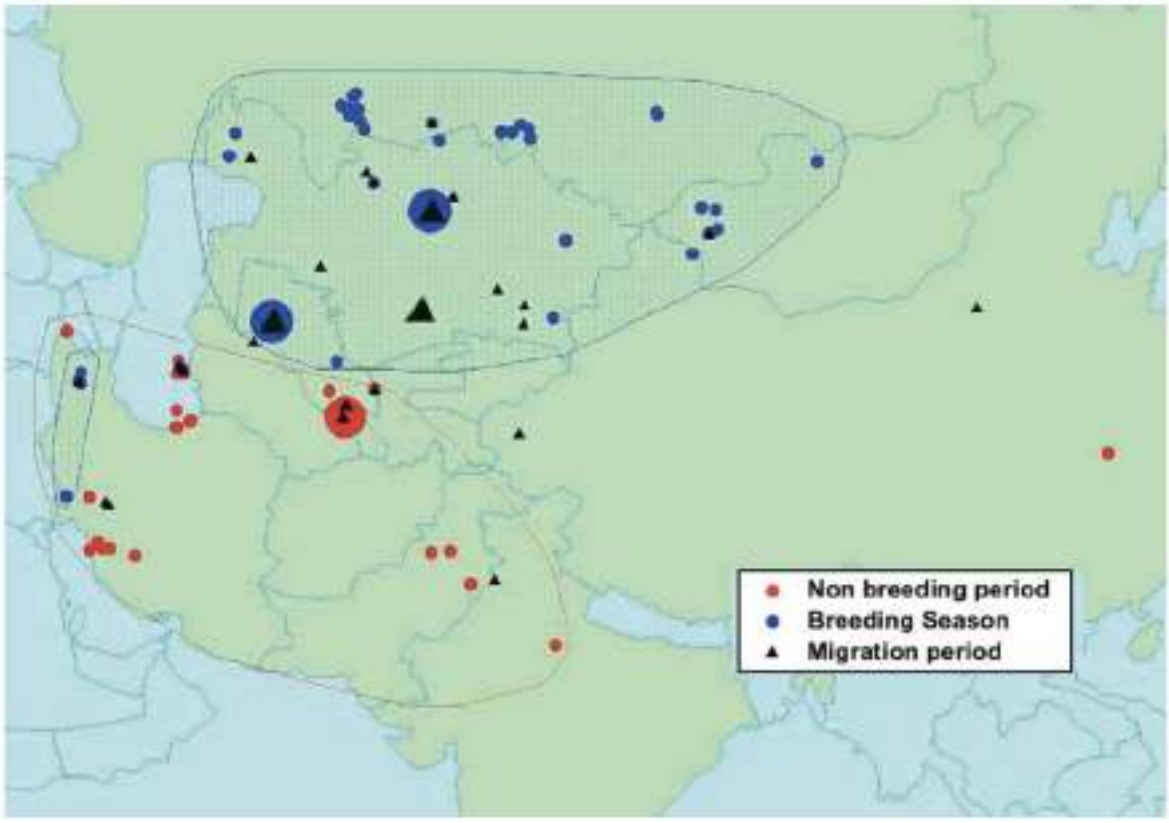



**Figure 5-27 Distribution of White-headed duck in Central and South Asia in 1990-2004**[11]

It's EOO is 14,100,000km$^2$.

The global population is estimated to number 7,900-13,100 individuals. In Uzbekistan the breeding populations in Sudochye Wetlands numbered 2,835 and 1,149 in 2001 and 2002 respectively. Numbers of non-breeding individuals may increase in Autumn. Migrating and wintering populations are more common in Eastern Uzbekistan, near the project AoI for example, 1,192 individuals were recorded at several wetlands in Bukhara Province in Uzbekistan in 2004 (Li and Mundkur 2003; Li et al 2006)

The following figures show the species distribution.

[11] Li, Z.W.D., Mundkur, T., Kreuzberg-Mukhina, E.A., Yerokhov, S., Solokha, A., Ali, Z. & Chaudhry, A.A. 2006. Conservation of the White-headed Duck *Oxyura leucocephala* in Central and South Asia. *Waterbirds around the world.* Eds. G.C. Boere, C.A. Galbraith & D.A. Stroud. The Stationery Office, Edinburgh, UK. pp. 624-628.

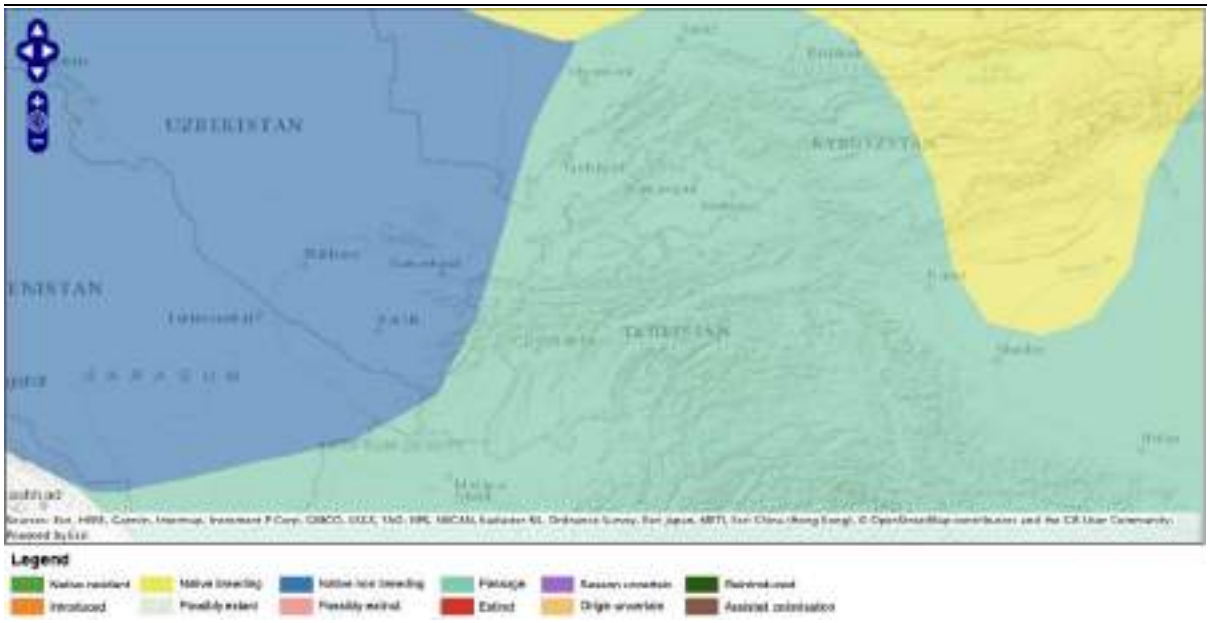



**Figure 5-8 Geographic Distribution of White-headed Duck within Uzbekistan[12]**

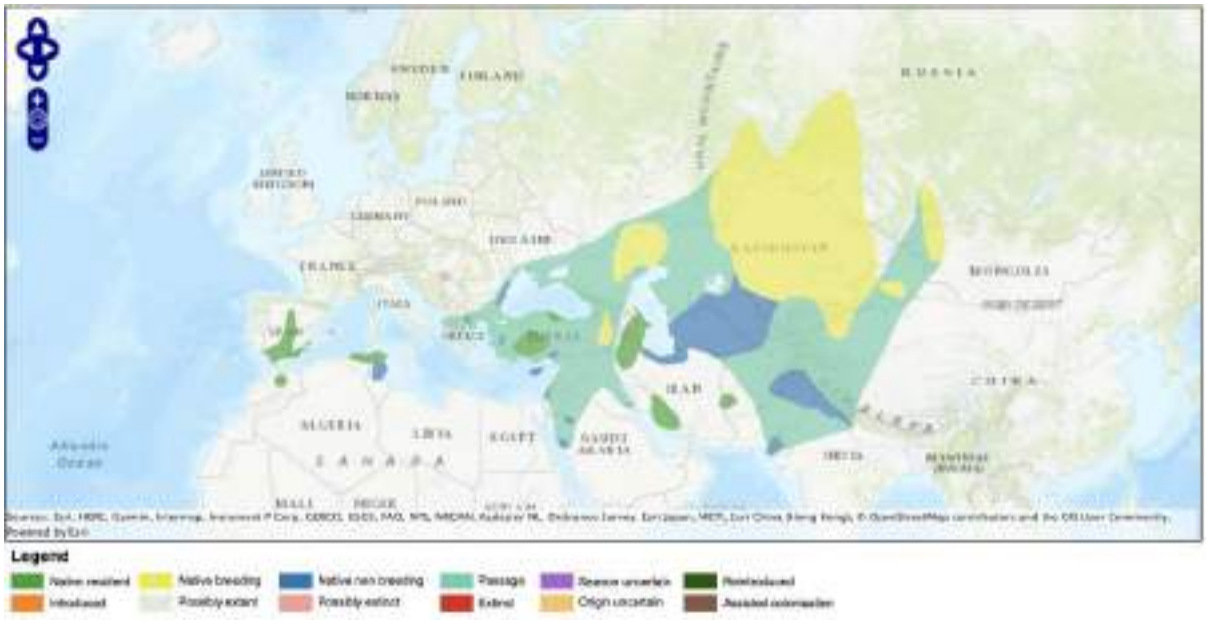



**Figure 5-9 Geographic Distribution of the White-headed Duck [12]**

### 5.2.4.3 Baseline Survey Results

5.2.4.3.1 Survey Findings

This species was not recorded during the spring 2024 avifauna survey at Karakal BESS site.

[12] BirdLife International (2024) Species factsheet: *Anser erythropus*. Downloaded from https://datazone.birdlife.org/species/factsheet/lesser-white-fronted-goose-anser-erythropuson 24/04/2024.

#### 5.2.4.4 Analysis

During the wintering season, the species inhabits larger, deeper alkaline or saline waters such as Karakyr Lakes, Dengikul Lake and the northern shore of Ayadarkul Lake all of which are IBAs, for which White-headed duck is a trigger species, located more than 33km from the project footprint.

The closest known record of White-headed Duck is the Dengizkul Lake IBA. The IBA located approximately 33km from the project area. There are no known wintering or passage areas mapped as IBAs within the project footprint and AoI (considered as a 20km buffer from the project footprint due to habitat displacement for birds). This may suggest the lack of suitable habitat within project footprint and AoI.

Therefore, due to the unlikelihood of presence in the project AoI, an EAAA cannot be applied as a result of which CH will be not further assessed for this species. However, given the status of this species, if were to be observed during future monitoring efforts it would be assessed under the framework of adaptive management.

Therefore, this species does not trigger CH status and is not considered a Significant Biodiversity Value.

### 5.2.5 Dalmatian Pelican

The Dalmatian Pelican (*Pelecanus crispus*) is a passage migrant in much of Uzbekistan and is listed as Near Threatened (NT) on the Global IUCN Red List. It is also listed as Vulnerable (VU) in the National Uzbekistan Red Data Book.

The CHA Screening exercise found that this species should be further investigated in the CHA against **Criteria 1 & 3**.

#### 5.2.5.1 Ecology & Conservation

This species inhabits rivers, lakes, deltas and estuaries. It occurs mainly at inland, freshwater wetlands as well as coastal lagoons, river deltas and estuaries. During migration, large lakes form important stop-over sites.

This species feed mainly on fish, especially carp, perch, rudd, pike and eels.

Adults form monogamous pairs. It departs from the colonies between the end of July and September, although a few remain until November. On migration, large lakes form important stop-over sites. It is gregarious during the winter, often occurring in large flocks and foraging communally and cooperatively in small groups, although occasionally singly. The birds return to their breeding sites in late-January to April, depending on the region. Immature birds and

non-breeders may remain in the wintering grounds year round, or may stay with the breeding colonies. They are often nomadic, especially in the Caspian Sea.

#### 5.2.5.2 DISTRIBUTION

This species breeds in Southeast Europe, to the east they breed in Asia to Kazakhstan and in the west to Mongolia. The Asian populations of this species tend to migrate and arrive in the Danube Delta during March and depart again in August.

The estimates global population is 11,400 to 13,400 mature individuals, with an estimated EOO of 12,600,000 km$^2$.

The following figures show the distribution of Dalmatian Pelican in Uzbekistan and globally.

**Figure 5-8 Geographic Distribution of Dalmatian Pelican within Uzbekistan[12]**


**Figure 5-9 Geographic Distribution of the Dalmatian Pelican [13]**

### 5.2.5.3 Baseline Survey Results

5.2.5.3.1 Survey Findings

This species was not recorded during the spring 2024 avifauna survey at Karakal BESS site.

### 5.2.5.4 Analysis

Large lakes present important stopover sites during migration. The closest known stopover sites of Dalmatian Pelican is the Dengizkul Lake and Dzheiran Ecocentre IBAs for which it is a trigger species. These IBAs are located approximately 33km and 54km from the project site respectively.

No such habitats exist within the project footprint and AoI (considered as a 20km buffer from the project footprint due to habitat displacement for birds). Therefore, due to the absence of suitable habitat and subsequent unlikelihood of presence in the project AoI, an EAAA cannot be applied as a result of which CH will be not further assessed for this species. However, given the nationally important status of this species, if were to be observed during future monitoring efforts it would be assessed under the framework of adaptive management.

[13] BirdLife International (2024) Species factsheet: Dalmatian Pelican *Pelecanus crispus*. Downloaded from https://datazone.birdlife.org/species/factsheet/dalmatian-pelican-pelecanus-crispus on 07/08/2024.

Therefore, this species does not trigger CH status and is not considered a Significant Biodiversity Value.

### 5.2.6 Pallas's Fish-Eagle

The Pallas's Fish-eagle (*Haliaeetus leucoryphus*) is a migrant in much of Uzbekistan. It is listed as Endangered (EN) on the Global IUCN Red List and Endangered (EN) in the National Uzbekistan Red Data Book.

The CHA Screening exercise found that this species should be further investigated in the CHA against **Criterion 1 & 3**.

#### 5.2.6.1 Ecology & Conservation

Pallas's Fish-Eagle favors extensive wetland habitats, including lakes, rivers, and floodplains, from lowlands to areas around 5,000m altitude. These areas provide ample fishing opportunities and suitable conditions for nesting. The species is often found in environments that maintain a balance between open water and vegetative cover, which is crucial for both feeding and breeding.

The breeding season for the Pallas's Fish-Eagle typically begins in early spring, with nesting sites commonly located in large trees near water bodies. During this period, the species lays 1-3 eggs per breeding season, with both parents actively involved in incubation and caring for the young. Breeding occurs from September to February in northern India and Myanmar (BirdLife International 2001), while in Bangladesh, the species returns to nest sites in late August (Sourav et al. 2011).

As its name suggests, the Pallas's Fish-Eagle predominantly feeds on fish. However, its diet can also include waterfowl and small mammals, adapting based on availability and environmental conditions. The eagle employs a powerful and skilled hunting technique, often swooping down to snatch prey directly from the water.

This eagle species is territorial during the breeding season, often seen patrolling water bodies to defend its fishing grounds. Outside of breeding, Pallas's Fish-Eagles may be observed either alone or in pairs, rarely forming larger groups.

Major threats to the Pallas's Fish-Eagle include habitat degradation through the alteration of wetland areas, pollution of water bodies which impacts fish populations, and direct disturbance from human activity. Additionally, the illegal trade of birds and their eggs poses a significant risk to population stability.

Conservation efforts for the Pallas's Fish-Eagle focus on protecting wetland habitats and ensuring sustainable fish populations. Environmental education and stricter enforcement of

wildlife protection laws are also critical to mitigating the impacts of human disturbance and illegal trade.

#### 5.2.6.2 DISTRIBUTION

The Pallas's Fish-Eagle is distributed across a broad area, stretching from Kazakhstan and Mongolia through to parts of South Asia, including Bangladesh and Northern India. The species is largely resident throughout its range, though some northern populations may move short distances southward during the harshest winter months.

The EOO of resident/breeding population of Pallas's Fish-eagle is 1,740,000 km$^2$ (Birdlife Datazone, 2024).

Based on available surveys and data, the population of this species is estimated to be below 2,500 mature individuals (M. Steele, 2017), placing it within the range of 1,000 to 2,499 mature individuals. It is regarded as a single migratory population rather than consisting of isolated subpopulations (M. Steele, 2017).

The following figures shows the geographical range of this species.

**Figure 5-8 Geographic Distribution of Pallas's Fish-eagle within Uzbekistan[12]**

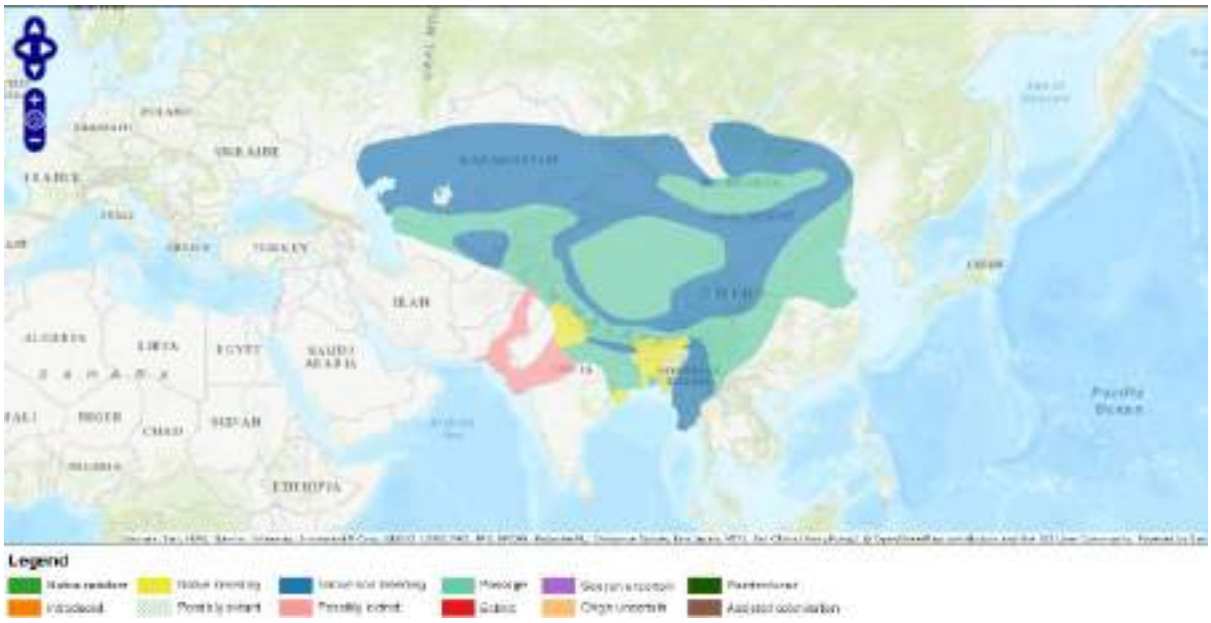



**Figure 5-9 Geographic Distribution of the Pallas's Fish-eagle [14]**

Recent studies and re-evaluations of historical data have significantly reshaped our understanding of the breeding patterns of this species. Previously believed to be a migratory breeder north of the Himalayas, especially in Mongolia, with a resident population in the Indian subcontinent, recent surveys in Mongolia from 2005 to 2009 and subsequent studies from 2012 to 2015 found no evidence of breeding at 13 of 21 historically known sites (Gilbert et al. 2014)[15]. Current evidence suggests a shift in breeding range, with the species primarily breeding in northern India, particularly in Assam and Uttarakhand, as well as in Bangladesh and Myanmar. During the non-breeding season (May to September), the species disperses north of the Himalayas to Kazakhstan, Russia, and Mongolia. The breeding status in Afghanistan is uncertain, and historical breeding in central China is questioned due to incongruent records with the breeding season and lack of nest documentation. Telemetry studies corroborate these findings, demonstrating connectivity between populations in India and Mongolia (M. Steele, 2017).

Furthermore, recent satellite tracking of three individuals unveiled extensive seasonal migrations spanning over 4,000 km from India to Mongolia and Russia. Notably, these tracked birds exhibited the remarkable ability to fly directly over the Himalayas at altitudes surpassing 6,000 m (M. Steele, 2017).

[14] BirdLife International (2024) Species factsheet: Haliaeetus leucoryphus. Downloaded from https://datazone.birdlife.org/species/factsheet/pallass-fish-eagle-haliaeetus-leucoryphus on 29/04/2024.

[15] Gilbert, M., Tingay, R., Losolmaa, J,. Sureda, N., Gilbert, C., Batmunkh, D. and Gombobaatar, S. 2014. Distribution and status of the Pallas's Fish Eagle Haliaeetus leucoryphus in Mongolia: a cause for conservation concern? Bird Conservation International 24: 379-388.

#### 5.2.6.3 Baseline Survey Results

5.2.6.3.1 Survey Findings

This species was not recorded during the spring 2024 avifauna survey at Karakal BESS site.

#### 5.2.6.4 Analysis

The Pallas's Fish-Eagle favors extensive wetland habitats, including lakes, rivers, and floodplains which present ample feeding opportunities. Pallas's Fish Eagle is not listed as a trigger species for IBA/KBAs within 100km from the project footprint. Habitat suitability for this species specifically indicate requirement for extensive wetlands of which there are none within the project AoI (considered as areas within a 20km buffer from the project footprint for birds). Furthermore, consultations with regional ornithologists confirm that it is unlikely to observe this species in the project AoI due to lack of suitable habitat.

Therefore, due to the absence of suitable habitat and subsequent unlikelihood of presence in the project AoI, an EAAA cannot be applied as a result of which CH will be not further assessed for this species. However, given the nationally important status of this species, if were to be observed during future monitoring efforts it would be assessed under the framework of adaptive management.

Therefore, this species does not trigger CH status and is not considered a Significant Biodiversity Value.

### 5.2.7 Marbled Teal

The Marbled Teal (*Marmaronetta angustirostris*) is a breeding resident and possible passage migrant in much of Uzbekistan and is listed as Near Threatened (NT) on the Global IUCN Red List. It is also listed as Vulnerable (VU) in the National Uzbekistan Red Data Book.

The CHA Screening exercise found that this species should be further investigated in the CHA against **Criteria 1& 3**.

#### 5.2.7.1 Ecology & Conservation

This species inhabits temporary or semi-permanent wetlands although it is tolerant of many types of wetland provided there are shallow areas.

Marbled Ducks are omnivorous and feeds on aquatic plant seeds and also invertebrates.

This species is gregarious, non-territorial and non-aggressive and socially monogamous. This species is a late breeder with broods ranging from April to September. Nests are constructed by the female and are sited on the ground, not far from water, under a low shrub or herbaceous cover.

Threats faced by this species include destruction and degradation of wetland habitats, illegal hunting and trapping, lead poisoning and pollution and the spread of invasive species.

#### 5.2.7.2 DISTRIBUTION

The Marbled Teal has a fragmented global population across central and southwest Palearctic, as well as Central Asia in the east to northwest Africa and the Iberian Peninsula in the west.

The estimates global population is 10,000 to 42,0000 mature individuals, with an estimated EOO of 13,500,000 km$^2$.

The following figures show the distribution of Marbled Teal in Uzbekistan and globally.

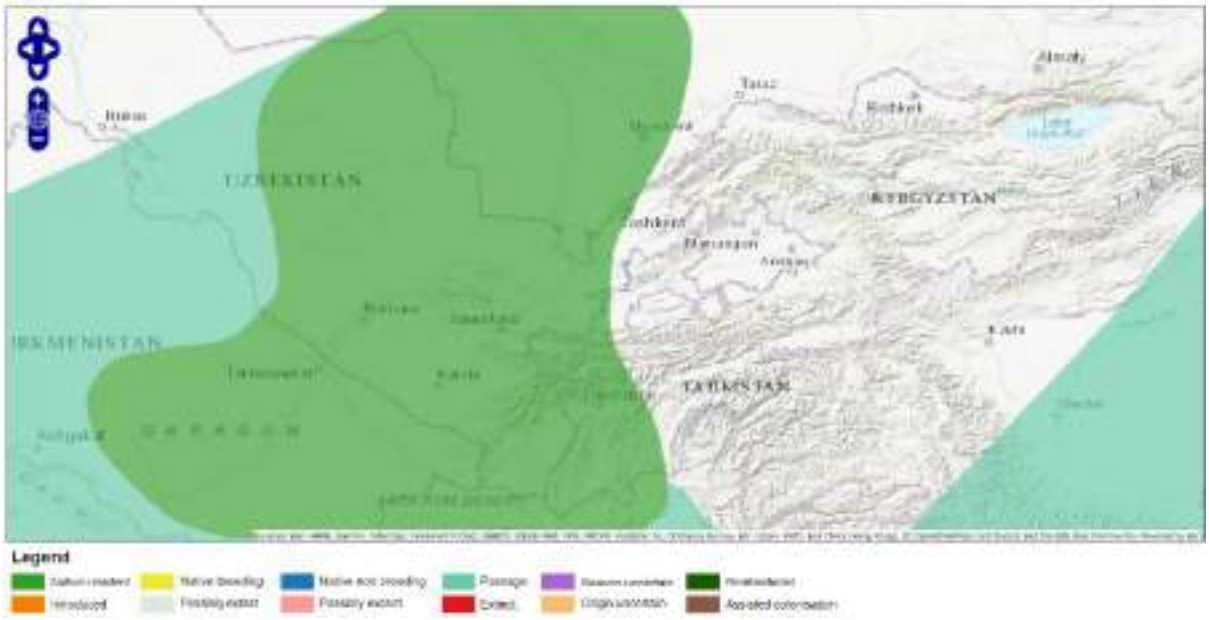


**Figure 5-8 Geographic Distribution of Marbled Teal within Uzbekistan[12]**

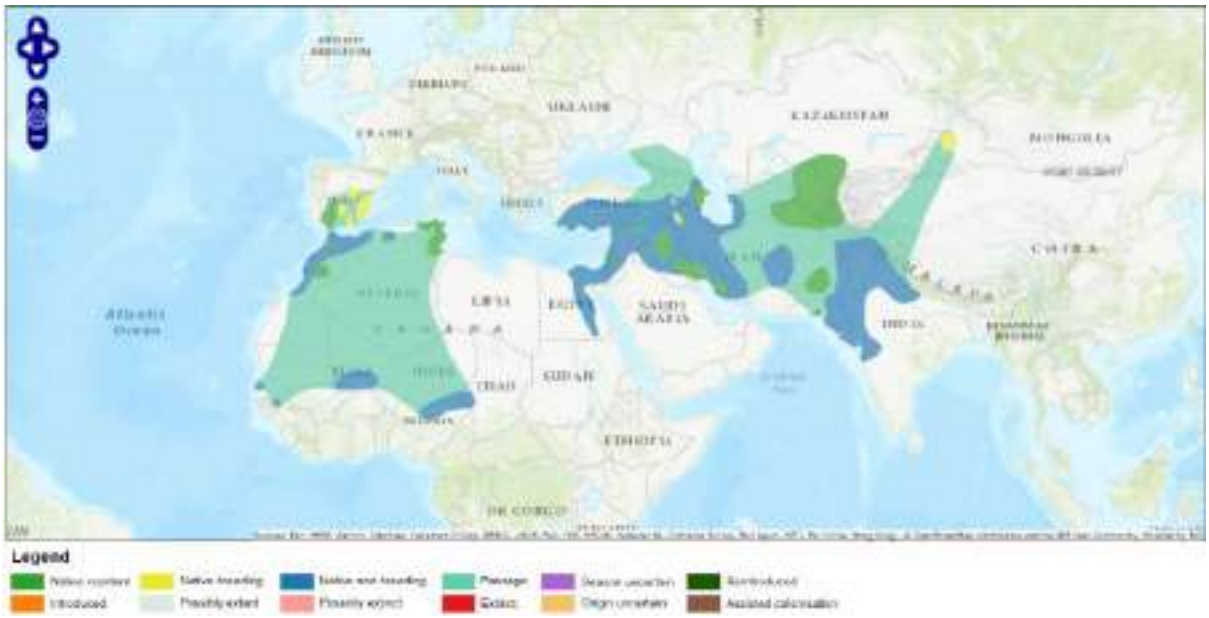



**Figure 5-9 Geographic Distribution of the Pallas's Fish-eagle [16]**

### 5.2.7.3 Baseline Survey Results

5.2.7.3.1 Survey Findings

This species was not recorded during the spring 2024 avifauna survey at Karakal BESS site.

### 5.2.7.4 Analysis

Habitat requirements for this species are temporary or semi-permanent wetlands although it is tolerant of many types of wetlands provided there are shallow areas with emergent vegetation. Marbled Teal is not listed as a trigger species for any IBA/KBA within a 100km buffer of the project footprint. This suggests the lack of suitable habitat within project footprint and AoI (considered as a 20km buffer from the project footprint due to habitat displacement for birds). Therefore, due to the lack of suitable habitat and unlikelihood of presence in the project AoI, an EAAA cannot be applied as a result of which CH will be not further assessed for this species. However, given the nationally important status of this species, if were to be observed during future monitoring efforts it would be assessed under the framework of adaptive management.

[16] BirdLife International (2024) Species factsheet: Haliaeetus leucoryphus. Downloaded from https://datazone.birdlife.org/species/factsheet/pallass-fish-eagle-haliaeetus-leucoryphus on 29/04/2024.

### 5.2.8 Sociable Lapwing

The Sociable Lapwing (*Vanellus gregarius*) is a native resident in Uzbekistan. It is listed as Critically Endangered (CR) on the Global IUCN Red List.

The CHA Screening exercise found that this species should be further investigated in the CHA against **Criterion 1** and **Criterion 3**.

#### 5.2.8.1 Ecology & Conservation

The Sociable Lapwing prefers open steppes and agricultural fields as its breeding habitat, which are found in its breeding range across Kazakhstan and parts of southern Russia. During migration, it uses a variety of stopover sites, including agricultural fields, grasslands, and wetlands, which are crucial for resting and feeding. Significant stopovers have been identified in Turkmenistan and Uzbekistan, particularly at the Tallymarzhan site on the border of these two countries, where large aggregations have been recorded. Its wintering grounds are typically in the grasslands and semi-arid regions of Sudan, northwest India, and Pakistan.

Breeding generally occurs from late April to June. The Sociable Lapwing nests on the ground in shallow scrapes, often forming loose colonies. The reproductive success of this species is highly sensitive to disturbance and predation, which are exacerbated by habitat changes such as land cultivation and increased human activity.

Its diet mainly consists of insects, which are abundant in its steppe habitat, along with seeds and other plant material. During the breeding season, the increased need for protein to rear chicks sees a higher consumption of invertebrates.

The Sociable Lapwing is known for its gregarious nature, often seen in flocks during migration and in its wintering areas. It exhibits strong migratory behavior, traveling long distances between breeding and wintering sites. This species is also characterized by a distinctive loud call, often used to maintain flock cohesion.

Major threats include habitat degradation through the intensification of agriculture, land conversion, and disturbance during breeding. Hunting and trapping at migratory and wintering sites also contribute to their decline. Conservation efforts are focused on habitat protection, management, and raising awareness to mitigate hunting pressures.

The species' population is declining sharply, with current estimates suggesting severe fragmentation and small, isolated groups outside the main breeding areas. Active international cooperation is crucial to monitor and manage the habitats across its migratory routes to improve the species' survival prospects.

#### 5.2.8.2 DISTRIBUTION

The Sociable Lapwing breeds in Kazakhstan and southern Russia, migrates through countries such as Turkey, Syria, and Iran, and winters primarily in Sudan, Pakistan, and northwest India. Its presence varies significantly with the seasons, being primarily a passage migrant in many parts of its range outside the breeding season.

Despite a historical decline—40% from 1930 to 1960 and a further halving by 1987 in northern Kazakhstan—recent surveys suggest a stabilizing, though still vulnerable, population. In 2006, 376 breeding pairs were counted in Kazakhstan, indicating a potential population of 11,200 mature individuals (Sheldon et al. 2006)[17]. Key stopover sites include the Manych depression in south Russia and areas in Turkey such as the Muş Plain and Ceylanpınar, where significant flocks have been recorded (Sheldon 2014)[18].

Significant numbers have also been recorded in Uzbekistan and Turkmenistan as recently as 2015, with counts suggesting these areas may support a substantial portion of the global population (Donald et al. 2016)[19]. In October 2015, the world's largest aggregation of Sociable Lapwings in recent years was discovered at Tallymarzhan (also known as Tallymerjen), a site that straddles the border between eastern Turkmenistan and southwestern Uzbekistan, where 6,000–8,000 birds were recorded (Azimov et al. 2018; Donald et al. 2016)[20].

This finding highlights the significance of the shorter eastern migratory route, which runs south from Kazakhstan through Turkmenistan and Uzbekistan to wintering areas in Pakistan and northwestern India. Despite this, recent surveys noted fewer birds passing through traditional areas in autumn 2015, possibly due to adverse weather conditions. Satellite tracking has revealed new migratory patterns and confirmed the importance of Middle Eastern sites as stopovers en route to Africa. Despite extensive survey work, no birds have been located in Iraq as of the latest reports (Sheldon 2014).

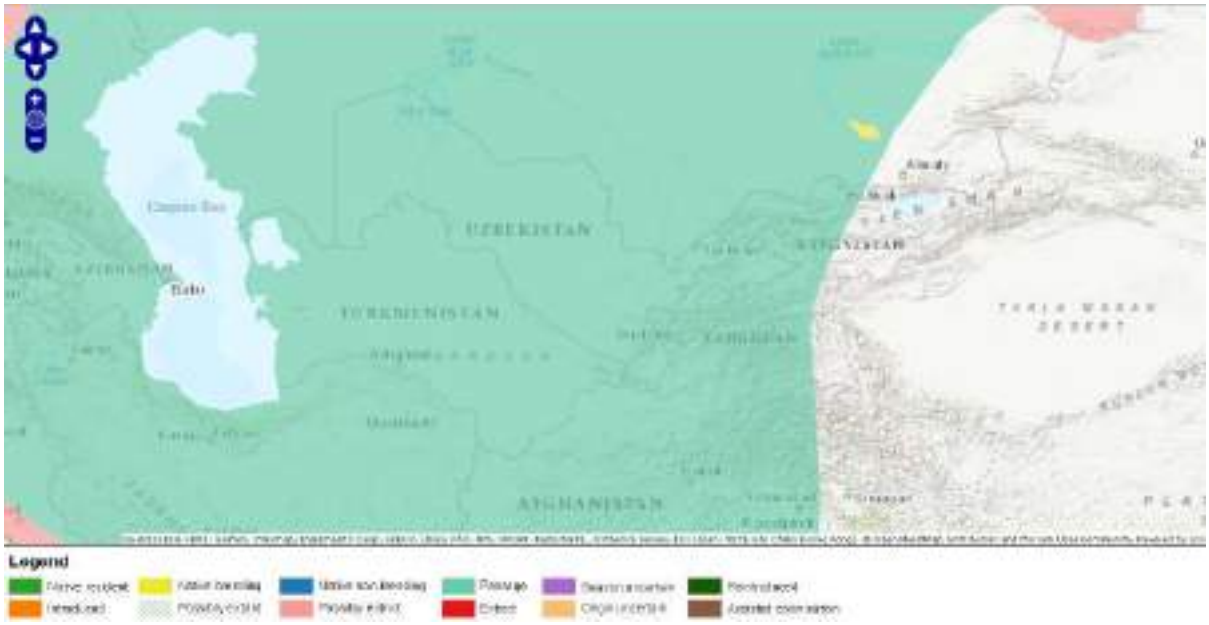
The EOO of resident/breeding population of the Sociable Lapwing is 1,670,000 km$^2$ (Birdlife Datazone, 2024)[21].

[17] Sheldon, R. D.; Grishina, K. V.; Kamp, J.; Khrokov, V. V.; Knight, A.; Kushkin, M. A. 2006. Revising the breeding population estimate and distribution of the Critically Endangered Sociable Lapwing Vanellus gregarius.
[18] Sheldon, R. 2014. The Sociable Lapwing - Final project report to the BirdLife International Preventing Extinctions Programme. BirdLife International Preventing Extinctions Programme.
[19] Donald,P.F., Azimov, N., Ball, E., Green, R.E., Kamp, J., Karryeva, S., Kashkarov, R., Kurbanov, A., Rustamov, E., Saparmuradov, J., Sheldon, R., Soldatov, V., Ten, A., Thorpe, R., Underhill, M., Urazaliyev, R. and Veyisov, A. 2016. A globally important migration staging site for Sociable Lapwings Vanellus gregarius in Turkmenistan and Uzbekistan. Sandgrouse 38: 82-95.
[20] Donald, P. F., Kamp, J., Green, R. E., Urazaliyev, R., Koshkin, M., & Sheldon, R. D. (2021). *Migration strategy, site fidelity and population size of the globally threatened Sociable Lapwing Vanellus gregarius. Journal of Ornithology, 162(2), 349–367.* doi:10.1007/s10336-020-01844-y
[21] BirdLife International (2024) Species factsheet: Vanellus gregarius. Downloaded from https://datazone.birdlife.org/species/factsheet/sociable-lapwing-vanellus-gregarius on 24/04/2024.

Surveys in 2006 within a 145,000 km² area in Kazakhstan recorded 376 breeding pairs of the Sociable Lapwing. Extrapolation of these figures suggests a potential total breeding population of 5,600 pairs, or about 11,200 mature individuals, equivalent to 16,000-17,000 individuals overall. This estimate is under ongoing refinement but aligns with subsequent observations, including a count of 3,200 individuals in Turkey in October 2007 and between 6,000-8,000 individuals on the Uzbekistan/Turkmenistan border in more recent counts (Donald et al. 2016). The European population, however, remains extremely small, estimated at 0-10 pairs, translating to 0-20 mature individuals (BirdLife International 2015)[22].

The Sociable Lapwing has experienced a significant decline and range contraction, particularly noted in northern Kazakhstan with a 40% decline from 1930 to 1960, followed by a further halving from 1960 to 1987. However, more recent fieldwork, particularly in central Kazakhstan around Korgalzhyn and Pavlodar, indicates a potentially stabilizing or even increasing population trend. For instance, nest counts in Korgalzhyn rose from 85 in 2005 to 113 by 2007, and in Pavlodar, numbers increased from 55 in 1991 to 140 in 2007 (Sheldon et al. 2006). Despite these localized signs of recovery, a global decline of over 50% is still suspected for the past 27 years, with a steeper decline anticipated for the next three generations due to ongoing severe threats. In Europe, the population has decreased by more than 80% over the same 27-year period, and by more than 25% in the last nine years alone (BirdLife International 2015). Further fieldwork is needed to confirm these trends and potentially revise these estimates.

The following figures shows the geographical range of this species.




[22] BirdLife International. 2015. European Red List of Birds. Office for Official Publications of the European Communities, Luxembourg.

**Figure 5-8 Geographic Distribution of Sociable Lapwing within Uzbekistan[12]**

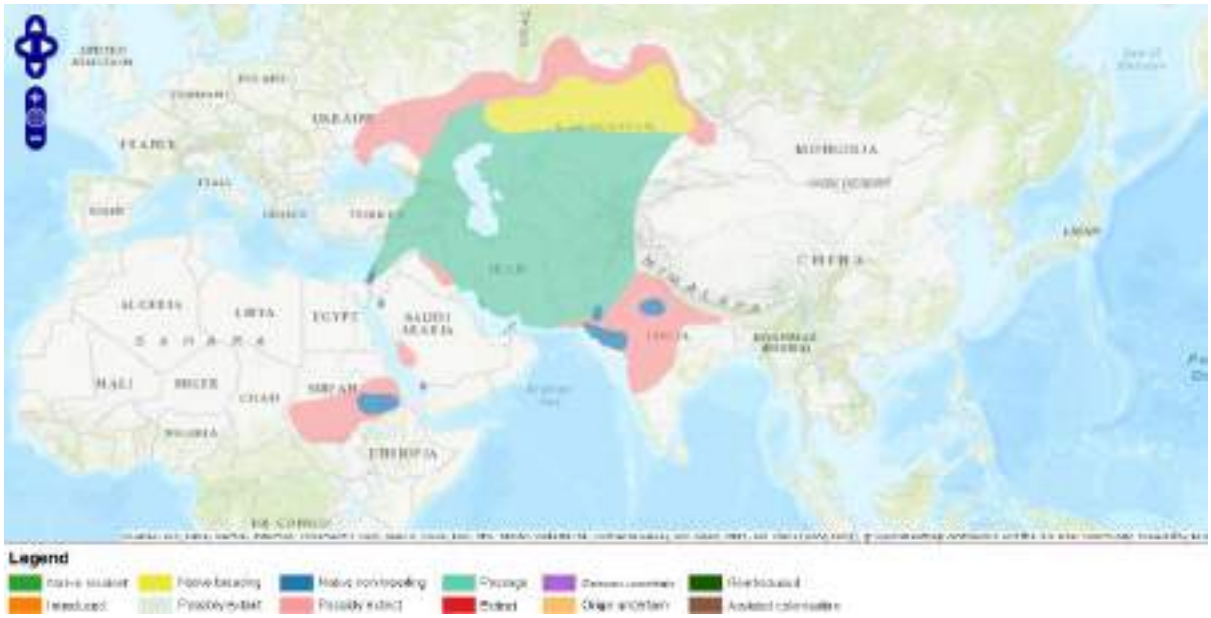



**Figure 5-9 Geographic Distribution of the Pallas's Fish-eagle [23]**

The Sociable Lapwing breeds primarily in northern and central Kazakhstan and south-central Russia, with historical records from western China (Kamp et al. 2010). After breeding, it disperses widely across Central Asia, the Middle East, and into key wintering sites in Sudan, Pakistan, and north-west India. Notable recent sightings include a flock of 28 birds near Ahmedabad village, Pakistan in 2015, and several large flocks in India between 2007 and 2012, with up to 90 birds observed (Sheldon 2013[24]; Deomurari 2007[25]). Smaller numbers winter regularly in Saudi Arabia, Oman, and the UAE, with vagrant records across Europe and potential overwintering in Iberia (de Juana 2011)[26].

The figures below illustrate the migration pathways of the Sociable Lapwing from Central Kazakhstan, showcasing two primary routes: the western route, which extends west across Kazakhstan to the Arabian Peninsula and northeastern Africa, and the eastern route, which heads directly south through Central Asia to the Indian subcontinent. The data highlight the distances travelled, key stopover sites, and differences in migration strategies between the two routes.

[23] BirdLife International (2024) Species factsheet: Haliaeetus leucoryphus. Downloaded from https://datazone.birdlife.org/species/factsheet/pallass-fish-eagle-haliaeetus-leucoryphus on 29/04/2024.

[24] Sheldon, R. 2013. The Sociable Lapwing - Interim short report to the BirdLife International Preventing Extinctions Programme. BirdLife International Preventing Extinctions Programme.

[25] Deomurari, A. 2007. Western India: Gujarat Kutch Birding and Wildlife Tour, November 2007..

[26] de Juana, E. 2011. The Sociable Lapwing in Europe. British Birds 104(2): 84-90.

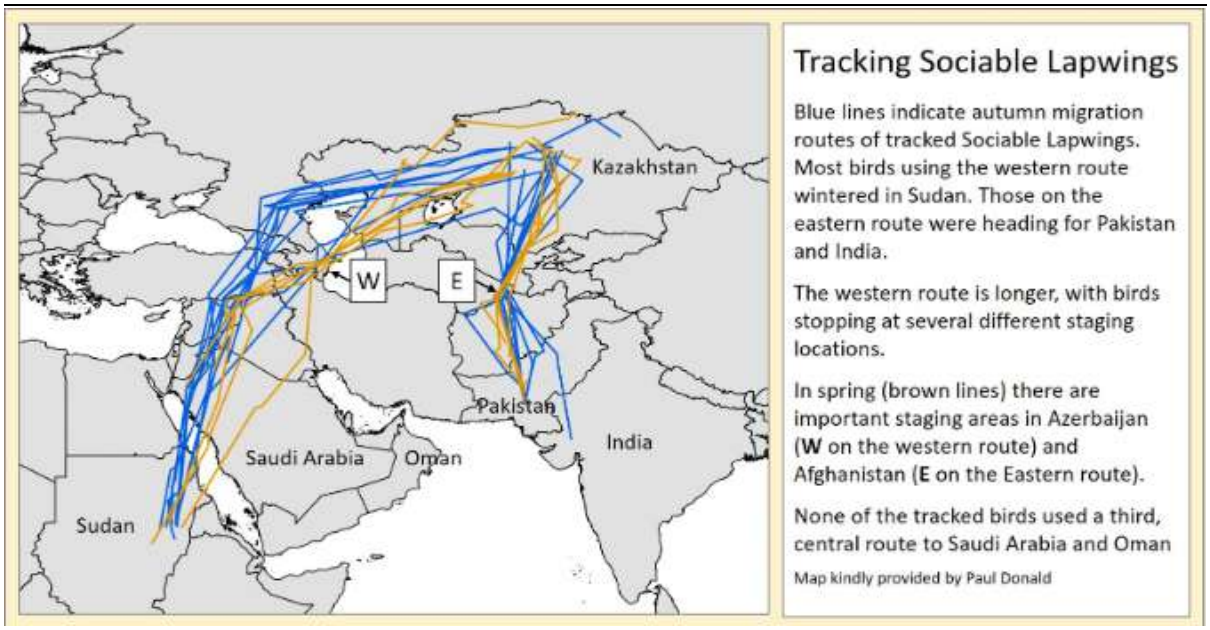



**Figure 5-31 Migration Routes of the Sociable Lapwing: Western and Eastern Pathways from Central Kazakhstan.[27]**


**Figure 5-32 Identified Migration Routes of Sociable Lapwing Based on Historical and GPS Tracking Data (Graham, A., (2021))**

[27] Graham, A., (2021) Following Sociable Lapwings, *Watertales*, Available at: https://wadertales.wordpress.com/2021/01/03/following-sociable-lapwings/ Accessed 24 April, 2024.

### 5.2.8.3 Baseline Survey Results

5.2.8.3.1 Survey Findings

This species was not recorded during the spring 2024 avifauna survey at Karakal BESS site.

### 5.2.8.4 Analysis

A long-term study of the species movements using satellite tagging shows that the migration strategy of this species is characterised by infrequent long-distance movements followed by lengthy stopovers in a small number of staging areas that are used consistently across years. The daily migratory movement has been measured at an approximate average of 534km per day and may use the project airspace on migration to the stopover site, at Lake Talimarzhan located 193km to the southeast[28]. Records on eBird data also show that a number of observations have been noted in Karnachabul located 105km east from the project in 2020 and 2021 [29].

During migration, the species appears to be strongly associated with areas of agriculture, particularly along rivers. Though such habitats are present, to date no known observations of this species have been made within project footprint and AoI (considered as a 20km buffer from the project footprint due to habitat displacement for birds) which possibly suggests a lack of interaction with the project site. Consults with the regional ornithologist imply that this species is unlikely to be observed in the AoI. Moreover, the presence of this species over 100 km east from the project footprint potentially indicate a preference for these areas over the habitat conditions found within the project AoI.

Therefore, due to the unlikelihood of presence in the project AoI, an EAAA cannot be applied as a result of which CH will be not further assessed for this species. However, given the status of this species, if were to be observed during future monitoring efforts it would be assessed under the framework of adaptive management.

[28] Donald, Paul & Kamp, Johannes & Green, Rhys & Urazaliyev, Ruslan & Koshkin, Maxim & Sheldon, Rob. (2021). Migration strategy, site fidelity and population size of the globally threatened Sociable Lapwing Vanellus gregarius. Journal of Ornithology. 162. 10.1007/s10336-020-01844-y.
[29] Wiersma, P., G. M. Kirwan, and C. J. Sharpe (2020). Sociable Lapwing (*Vanellus gregarius*), version 1.0. In Birds of the World (J. del Hoyo, A. Elliott, J. Sargatal, D. A. Christie, and E. de Juana, Editors). Cornell Lab of Ornithology, Ithaca, NY, USA. https://doi.org/10.2173/bow.soclap1.01

## 5.2.9 Common Pochard

The Common Pochard (*Aythya ferina*) is a native breeding bird in much of Uzbekistan and is listed as Vulnerable (VU) on the Global IUCN Red List. It is not listed in the National Uzbekistan Red Data Book.

The CHA Screening exercise found that this species should be further investigated in the CHA against **Criteria 1 & 3**.

### 5.2.9.1 Ecology & Conservation

This species can be found in well-vegetated neutral swamps, marshes, lakes and slow-flowing rivers with areas of open water and abundant emergent fringing vegetation but also breeds on saline, brackish and soda lakes, occasionally even in sheltered coastal bays.

This species feeds on seeds, roots, grasses, sedged and aquatic plants as well as small invertebrates, amphibians, small fish and potatoes. This species is sometimes associated with sewage outfalls in winter due to the abundance of Tubifex. It is a crepuscular species that may also feed during the night. It gathers in large flocks, particularly during post-breeding moult.

Breeding starts in April or May. The nest is a shallow depression in thick heaps of grass, reed stems and leaves, lined with down, on the ground or over water and is usually concealed in thick vegetation.

Despite its abundant global population, this species is affected by pressures such as hunting and habitat alteration and destruction. In particular, eutrophication is an important factor of loss o some suitable habitats. The Comon Pochard is sensitive to disturbance during breeding season.

### 5.2.9.2 DISTRIBUTION

This species breeds in western Europe through to central Asia to Siberia and China. It winters in north and east Africa, India and south and east Asia.

This species is partially migratory with northern populations being highly migratory whereas those breeding in the milder parts of western or southern Europe are sedentary or only make short distance movements. Males generally depart earlier than females in late September – November. Most birds leave the wintering grounds in March and early April.

The estimated EOO of this species is 548,000 km$^2$, and the approximated global population is 760,000-790,000 mature individuals.

The following figures show the distribution of Common Pochard in Uzbekistan and globally.


**Figure 5-8 Geographic Distribution of Common Pochard within Uzbekistan[12]**

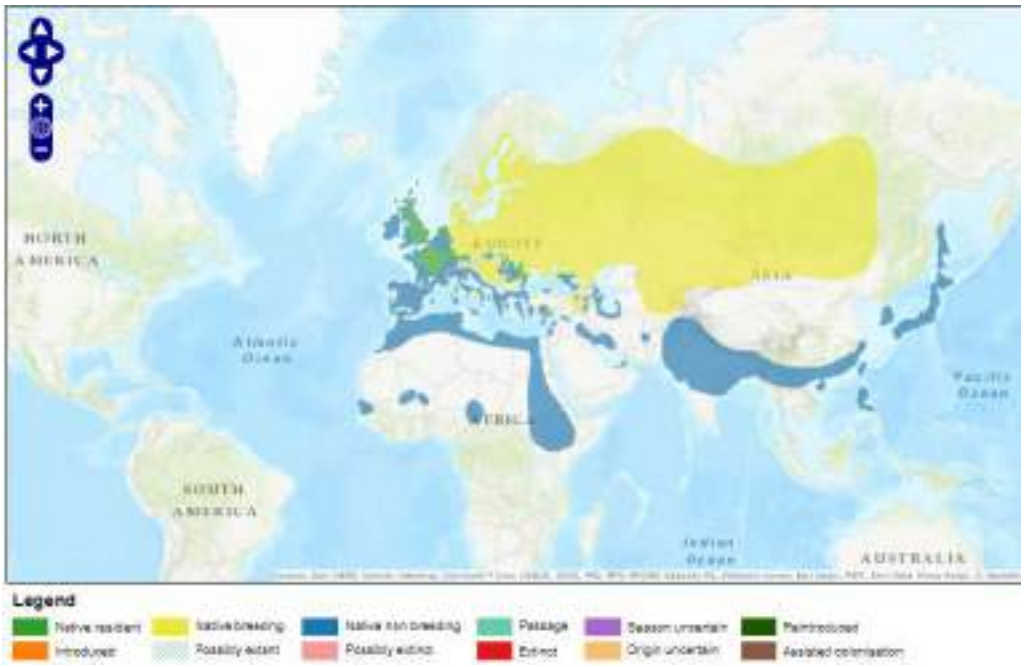



**Figure 5-9 Geographic Distribution of the Common Pochard [30]**

### 5.2.9.3 Baseline Survey Results

5.2.9.3.1 Survey Findings

This species was not recorded during the spring 2024 avifauna survey at Karakal BESS site.

[30] BirdLife International (2024) Species factsheet: Haliaeetus leucoryphus. Downloaded from https://datazone.birdlife.org/species/factsheet/pallass-fish-eagle-haliaeetus-leucoryphus on 29/04/2024.

#### 5.2.9.4 Analysis

Common pochard is listed as a trigger species for Dengizkul Lake (~33 km), Dzheiran (~54 km) and Karakyr Lakes (~82 km from project). Habitat requirements for this species are swamps, marshes, lakes and slow-flowing rivers, which are not present in the project AoI (considers as a 20km buffer from the project footprint due to habitat displacement for birds).

Therefore, due to the lack of suitable habitat and unlikelihood of presence in the project AoI (described as 20km measured as the impact of habitat displacement for birds), an EAAA cannot be applied as a result of which CH will be not further assessed for this species. However, given the nationally important status of this species, if were to be observed during future monitoring efforts it would be assessed under the framework of adaptive management.

### 5.2.10 Yellow-eyed Pigeon

The Yellow-eyed Pigeon (*Columba eversmanni*) is a native resident in Uzbekistan. It is listed as Vulnerable (VU) on the Global IUCN Red List and Vulnerable (VU) in the National Uzbekistan Red Data Book.

The CHA Screening exercise found that this species should be further investigated in the CHA against **Criterion 1**.

#### 5.2.10.1 Ecology & Conservation

The Yellow-eyed Pigeon primarily inhabits open, semi-desert regions with sparse vegetation and scattered trees, essential for breeding. The species nests in trees and occasionally on abandoned buildings, thriving at various elevations but predominantly at lower altitudes. It prefers areas minimally affected by human activities, though it sometimes ventures into agricultural lands to forage. During winter, the pigeon is found in open areas with scattered trees, often amid agricultural crops or near fruiting trees where it feeds and roosts in groups. Notably, its population is on the rise in the western Thar Desert, characterized by extreme temperatures and sparse thorny vegetation and grasses (D. L. Bohra, 2014).

The breeding season of Yellow-eyed Pigeon typically spans from late April to July. These birds are monogamous, frequently returning to the same nesting sites each year, where they usually lay 1-2 eggs per clutch. Both parents contribute to incubating the eggs and raising the young (Baptista et al. 2020). They exhibit a broad range of nesting preferences, utilizing holes in trees, buildings, cliffs, earth banks, and potentially power lines. The species is found in diverse habitats including steppe, semi-arid and desert areas, often near human settlements and, in regions like Kazakhstan, within woodland environments. They are also known to breed in mountain valleys close to water sources (D. L. Bohra, 2014; Baptista et al. 2020).

Primarily granivorous, the Yellow-eyed Pigeon's diet consists mostly of seeds collected from the ground, including grass seeds, arable crop seeds and the fruit of trees and shrubs, including *Zizyphus* and mulberry *Morus alba*. During the breeding season, they may also consume insects and small invertebrates to meet the increased nutritional demands.

Yellow-eyed Pigeons are gregarious outside of the breeding season, often forming large flocks that can include other pigeon species. Their flight is fast and direct, with regular glides and the characteristic sharp wing claps typical of pigeons when taking off.

Key threats to Yellow-eyed Pigeon include habitat degradation due to agricultural expansion and intensification, which reduces their feeding and nesting sites. Hunting and trapping for sport and food also significantly impact their populations. Environmental pollutants and the use of pesticides in agriculture pose additional risks by contaminating their food sources.

#### 5.2.10.2 DISTRIBUTION

The Yellow-eyed Pigeon primarily resides within its range but exhibits migratory behaviour, moving southward to Pakistan and northwestern India during the colder months from breeding grounds in Kazakhstan, Turkmenistan, and Uzbekistan. Although the species is considered rare throughout most of its range, it has historically faced declines due to hunting pressure and habitat loss in both breeding and wintering areas. While there have been reports of local population increases (Bohra and Vyas 2014[31]; D. L. Bohra, 2014), it is unclear if these reflect global population trends. Consequently, the species is suspected to be experiencing a rapid decline over the past decade (Baptista et al. 2020).

The EOO of resident/breeding population of Yellow-eyed Pigeon is 3,080,000 km2 (Birdlife Datazone, 2024).

The following figures shows the geographical range of this species.

[31] Bohra, D. L.; Vyas, S. 2014. Large wintering flocks of Yellow-eyed Pigeon Columba eversmanni at Jorbeer, Bikaner District Rajasthan, India. BirdingASIA 21: 64-65.


**Figure 5-8 Geographic Distribution of Yellow-eyed Pigeon within Uzbekistan[12]**


**Figure 5-9 Geographic Distribution of the Yellow-eyed Pigeon [32]**

### 5.2.10.3 Baseline Survey Results

5.2.10.3.1 Survey Findings

This species was not recorded during the spring 2024 avifauna survey at Karakal BESS site.

[32] BirdLife International (2024) Species factsheet: Columba eversmanni. Downloaded from https://datazone.birdlife.org/species/factsheet/yellow-eyed-pigeon-columba-eversmanni on 29/04/2024.

#### 5.2.10.4 ANALYSIS

5.2.10.4.1 EAAA

The total EAAA for breeding birds is applied as all suitable breeding habitat that overlaps the project footprint and exists within a reasonable buffer from the project footprint, determined by species specific ecology.

The Yellow-eyed Pigeon uses open semi-desert region with spare vegetation and scattered trees which are required for breeding. This species also occasionally nests in abandoned buildings and may fly 5-10km from nesting site to forage.[33] Therefore, EAAA is applied as all of the above-mentioned suitable habitats within the project boundaries as well as within a buffer of 10km around the project footprint. This should provide an adequate accounting of the population of birds likely to regularly utilize the project area.


**Figure 5-6 Estimated EAAA for the Yellow-eyed Pigeon species**

5.2.10.4.2 Criticality

The global population of this species is estimated to range from 10,000-19,999 mature individuals. Taking a precautionary approach, the lower range is used to apply the thresholds.

[33] Baptista, L. F., P. W. Trail, H. M. Horblit, E. de Juana, P. F. D. Boesman, and E. F. J. Garcia (2020). Yellow-eyed Pigeon (*Columba eversmanni*), version 1.0. In Birds of the World (J. del Hoyo, A. Elliott, J. Sargatal, D. A. Christie, and E. de Juana, Editors). Cornell Lab of Ornithology, Ithaca, NY, USA. https://doi.org/10.2173/bow.pabpig1.01

Under **Criteria 1**, the threshold for VU species is EAAAs that support a globally important concentration of the global population such that the loss of the EAAA population would result in uplisting to CR/EN status and meet the quantitative thresholds of Criterion 1.

To date, zero observations of this species was made during baseline studies spanning across Autumn and Spring migration seasons.

There are no IBAs within the EAAA for which the Yellow-eyed Pigeon is a trigger species. There are no records of breeding hotspots in the EAAA. It can be deduced that any existing habitat within the EAAA may be of poor quality and unable to support significant concentrations of this species. Therefore, this species does not trigger criticality under **Criteria 1**.

Due to the VU status on the IUCN Red List and Uzbekistan Red Data Book , it is considered as an SBV for the Main Facilities component(s) of the Samarkand 1 project. The ESIA will address this via the biodiversity impact assessment, mitigation program and residual significance analysis.

### 5.2.11 European Turtle-Dove

The European Turtle-dove (*Streptopelia turtur*) is a native breeding bird and migrant in Uzbekistan, listed as Vulnerable (VU) species on the IUCN Global Red List, and Vulnerable (VU) in the Uzbekistan National Red Data Book.[34]

The CHA Screening exercise found that this species should be further investigated in the CHA against **Criterion 1 & 3**.

#### 5.2.11.1 Ecology & Conservation

The European Turtle-Dove thrives in a varied landscape that includes arable fields, open woodlands, hedgerows, and diverse woodland types, as well as steppe and semi-desert regions. These environments offer critical resources such as nesting sites and a diverse diet, which are essential during the breeding season (Baptista et al. 2015). Additionally, the species relies heavily on agricultural lands for feeding and utilizes a range of other habitats including forest borders, groves, spinneys, coppices, young tree plantations, scrubby wastelands, and woody marshes (Tucker and Heath 1994). Non-breeding habitats are located primarily in sub-Saharan Africa, where they inhabit wooded savannas and similar open wooded areas.

The European Turtle-Dove's breeding season typically spans from late April to July, during which it produces one to two broods per season, with each clutch containing usually two eggs. This species prefers breeding at low altitudes, generally not exceeding 500 meters in temperate zones and up to 1,000-1,300 meters in Mediterranean areas (Tucker and Heath 1994). The nests,

[34] Red Book of Uzbekistan (2019) Animal World Red Book of the Republic of Uzbekistan. Available at: https://drive.google.com/file/d/19wwTZ6Ubk2zut9xwjG0dMRdSbBZKMJv0/view Accessed on 24 April, 2024.

small platforms of twigs lined with plant material, are strategically placed in the lower parts of trees and in shrubs and hedges. While the species tolerates human presence, it avoids breeding near towns or villages (Baptista et al. 2015). The nesting and parental care phases, extending potentially until September, are critical periods when the birds are particularly vulnerable to disturbances.

The European Turtle-Dove primarily feeds on seeds from grasses, cereals, and occasionally herbaceous plants, focusing significantly on small invertebrates during the breeding season to satisfy the heightened nutritional needs for chick rearing. Additionally, the species commonly forages on the ground, consuming seeds and fruits from weeds and cereals, and less frequently berries, fungi, and invertebrates. This diet supports their energy needs throughout their lifecycle, particularly during critical breeding periods.

The European Turtle-Dove is strongly migratory, undertaking extensive journeys between its breeding grounds in Europe and wintering sites in sub-Saharan Africa, from Senegal east to Eritrea and Ethiopia. This migration is critical to its lifecycle but comes with risks such as hunting and habitat degradation along the routes (Baptista et al. 2015; Tucker and Heath 1994). Socially, the species typically forms pairs or small flocks, with a tendency towards more solitary or paired behavior during the breeding season. The distinctive soft, purring coo of the doves is a characteristic sound in rural European landscapes during early summer. Their survival during the winter is closely linked to cereal production, highlighting the impact of agricultural practices on their habitats (Eraud et al. 2009) .

Major threats include intensive farming and the consequent reduction of food resources and nesting sites. Hunting during migration also significantly impacts populations, with millions estimated to be harvested annually. Furthermore, drought conditions in wintering areas exacerbate the decline by reducing available resources and habitat quality.

The species' populations are showing increasingly patchy distributions, particularly in Western Europe, where declines have been most notable. Conservation efforts focus on habitat management, legal protection, and reducing hunting pressures along migratory pathways to stabilize and eventually increase the population numbers.

#### 5.2.11.2 DISTRIBUTION

The European Turtle-Dove, a breeding visitor throughout Europe, migrates annually to winter in Africa south of the Sahara. During its breeding season, it frequents suitable habitats like lightly wooded landscapes, traditional orchards, and areas scattered with trees and shrubs. However, significant population declines have been noted in various regions.

In Central Asia, including countries like Afghanistan, Kazakhstan, and Uzbekistan, the species has shown moderate to severe declines over the past few decades, with Uzbekistan experiencing a particularly drastic reduction. Similarly, the once large population in European

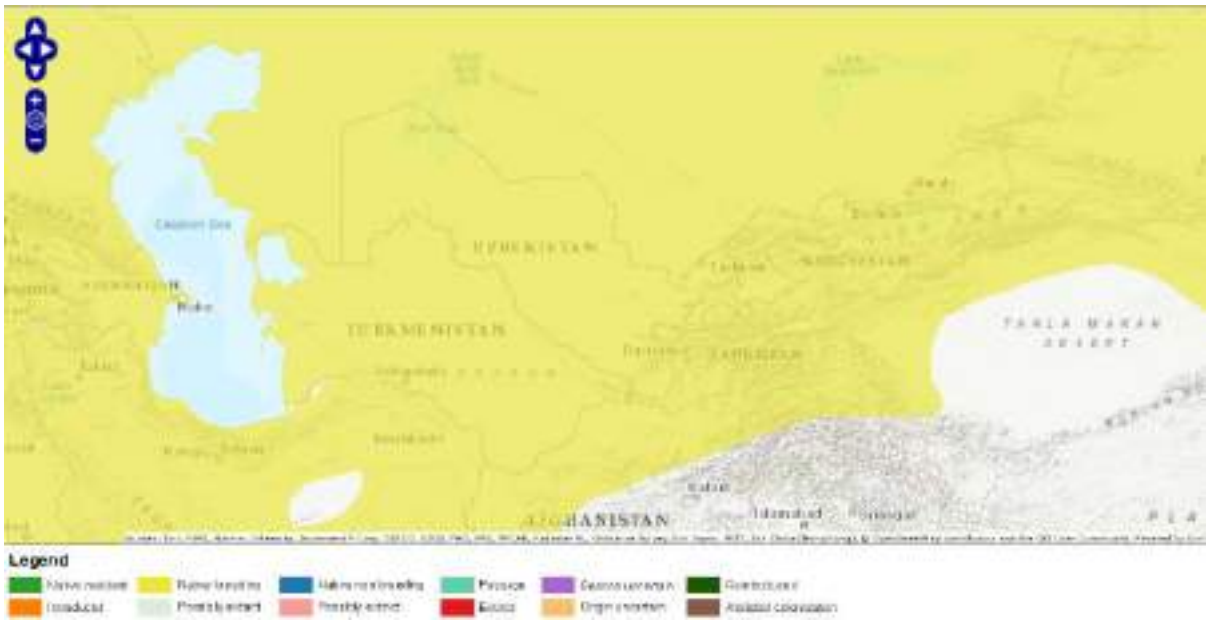
Russia has plummeted by more than 80% since 2000 and more than 90% since 1980 (BirdLife International 2015)[35]. Declines have also been observed in east and southeast Kazakhstan, notably in the Manrak Mountains where the species is now rare or absent (Wassink and Oreel 2008). These declines underscore the vulnerability of this species across its range.

The EOO of resident/breeding population of the European Turtle-dove is 35,700,000 km2 (Birdlife Datazone, 2024)[36].

The estimated European population of the species stands at approximately 3.15 to 5.94 million pairs, translating to between 6.31 and 11.9 million mature individuals. This accounts for 25-49% of the species' global range, leading to a preliminary global population estimate of 19.3 to 71.4 million individuals, or about 12.8 to 47.6 million mature individuals. However, this estimate requires further validation.

The European Turtle-Dove is a widespread found across central and southern Europe, Central Asia, the Middle East, and North Africa, predominantly wintering in the Sahel zone of Africa. Despite its extensive range, the species has experienced significant declines, particularly in northwest Europe, including the Netherlands and the U.K., where large range declines have been documented (e.g., Balmer et al. 2013). Overall, the population continues to decrease across Europe, indicating ongoing conservation challenges (BirdLife International 2015).

The following figures shows the geographical range of this species.




[35] BirdLife International. 2015. European Red List of Birds. Office for Official Publications of the European Communities, Luxembourg.
[36] BirdLife International (2024) Species factsheet: Streptopelia turtur. Downloaded from https://datazone.birdlife.org/species/factsheet/european-turtle-dove-streptopelia-turtur on 24/04/2024.

**Figure 5-8 Geographic Distribution of European Turtle-Dove within Uzbekistan[12]**


**Figure 5-9 Geographic Distribution of the European Turtle-Dove [37]**

### 5.2.11.3 Baseline Survey Results

5.2.11.3.1 Survey Findings

This species was not recorded during the spring 2024 avifauna survey at Karakal BESS site.

### 5.2.11.4 ANALYSIS

5.2.11.4.1 EAAA

The total EAAA for breeding birds is applied as all suitable breeding habitat that overlaps the project footprint and exists within a reasonable buffer from the project footprint, determined by species specific ecology.

The European-turtle Dove uses varied landscapes that includes arable fields, open woodlands, hedgerows, and diverse woodland types, as well as steppe and semi-desert regions. This species relies heavily on agricultural lands for foraging.

Assuming that this species has a similar home range size as the Yellow-eyed Pigeon, the EAAA is applied as all of the above-mentioned suitable habitats within the project boundaries as well as within a buffer of 10km around the project footprint. This should provide an adequate accounting of the population of birds likely to regularly utilize the project area.

[37] BirdLife International (2024) Species factsheet: Streptopelia turtur. Downloaded from https://datazone.birdlife.org/species/factsheet/european-turtle-dove-streptopelia-turtur on 24/04/2024.

The resulting EAAA encompasses has been mapped in the following figure.


**Figure 5-6 Estimated EAAA for the European Turtle-Dove species**

5.2.11.4.2 Criticality

The global population of this species is estimated to range from 6,310,000-11,900,000 mature individuals. Taking a precautionary approach, the lower range is used to apply the thresholds.

Under **Criteria 1**, the threshold for VU species is EAAAs that support a globally important concentration of the global population such that the loss of the EAAA population would result in uplisting to CR/EN status and meet the quantitative thresholds of Criterion 1.

Under **Criteria 3**, the threshold is 1% of the global population using the EAAA on a regular/cyclical basis during migrations. This would amount to 63,100 individuals.

To date, zero observations of this species was made during baseline studies spanning across Autumn and Spring migration seasons.

There are no IBAs within the EAAA for which the European Turtle Dove is a trigger species. There are no records of breeding hotspots in the EAAA. It can be deduced that any existing habitat within the EAAA may be of poor quality and unable to support significant concentrations of this species. Therefore, this species does not trigger criticality under **Criteria 1 and 3**.

Due to the VU status on the IUCN Red List and Uzbekistan Red Data Book, it is considered as an SBV for the Main Facilities component(s) of the Samarkand 1 project. The ESIA will address this via the biodiversity impact assessment, mitigation program and residual significance analysis.

# 6 BATS

Two bat species were identified during CHA Screening that pertain to the CH and SBV criteria for threatened species, and potentially migratory/congregating species as well as range-restricted:

- IFC PS6 Criterion 1: Critically Endangered and Endangered Species
- IFC PS6 Criterion 2: Endemic and Restricted-range Species
- IFC PS6 Criterion 3: Migratory and Congregatory Species
- EBRD PR6 Criterion (ii): Habitats of significant importance to endangered or critically endangered species /// IFC PS6 Criterion 1: Critically Endangered and 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
- EBRD PR6 Criterion (iv) Habitats supporting globally significant concentrations of migratory or congregatory species /// IFC PS6 Criterion 3: Migratory and Congregatory Species

## 6.1 Literature Review

The desktop screening exercise described in Section 2.1 identified one bat species that could potentially trigger criticality; the Bokhara Whiskered Bat (*Myotis bucharensis*).

### 6.1.1 Bat Baseline Survey Method

The bat baseline survey for the Karakal BESS facility was conducted using a comprehensive two-stage methodology that included desktop preparation and fieldwork. Initially, detailed topographic maps at scales of 1:100,000 and 1:200,000, along with Google Earth satellite images, were analyzed to identify potential bat roosts, primarily focusing on buildings. These potential roost locations were marked with precise GPS coordinates and transferred to the LocusPro smartphone application for efficient field navigation and data recording.

Field visits were carried out in spring 2024 on March 12 and 13 in Samarkand and Bukhara regions. The main purpose of the survey was to confirm the presence or absence of potential roosting places of bats identified based on maps and a direct survey of the area.

During the fieldwork stage, the survey focused on a 500-meter buffer zone from the transmission line, ensuring thorough coverage of suitable bat habitats within this area. Potential roosts identified during the desktop stage were meticulously examined for the presence of bats and signs of their activity, such as excrement and food remains like insect wings and legs. Each surveyed roost was carefully mapped, photographed, and described, with notes made

on the suitability of each site for bats. Nearby settlements with residential houses were noted but were not included in the survey.

To navigate the terrain and record tracks, a smartphone (BV9900E) with the LocusPro application and preloaded Google Hybrid map was used. This application also facilitated the mapping of surveyed roosts and bat registration locations. Photographs were taken using smartphones (BV9900E), and essential equipment for examining bat roosts included a torch, thick gloves, and a tape measure. All collected information was meticulously recorded in a notebook, and the surveyed roosts and bat registration locations were mapped in the LocusPro smartphone application. This detailed and organized approach ensured a robust dataset for analysis, contributing to a thorough understanding of the local bat ecology and informing conservation efforts for the Karakal BESS project area.

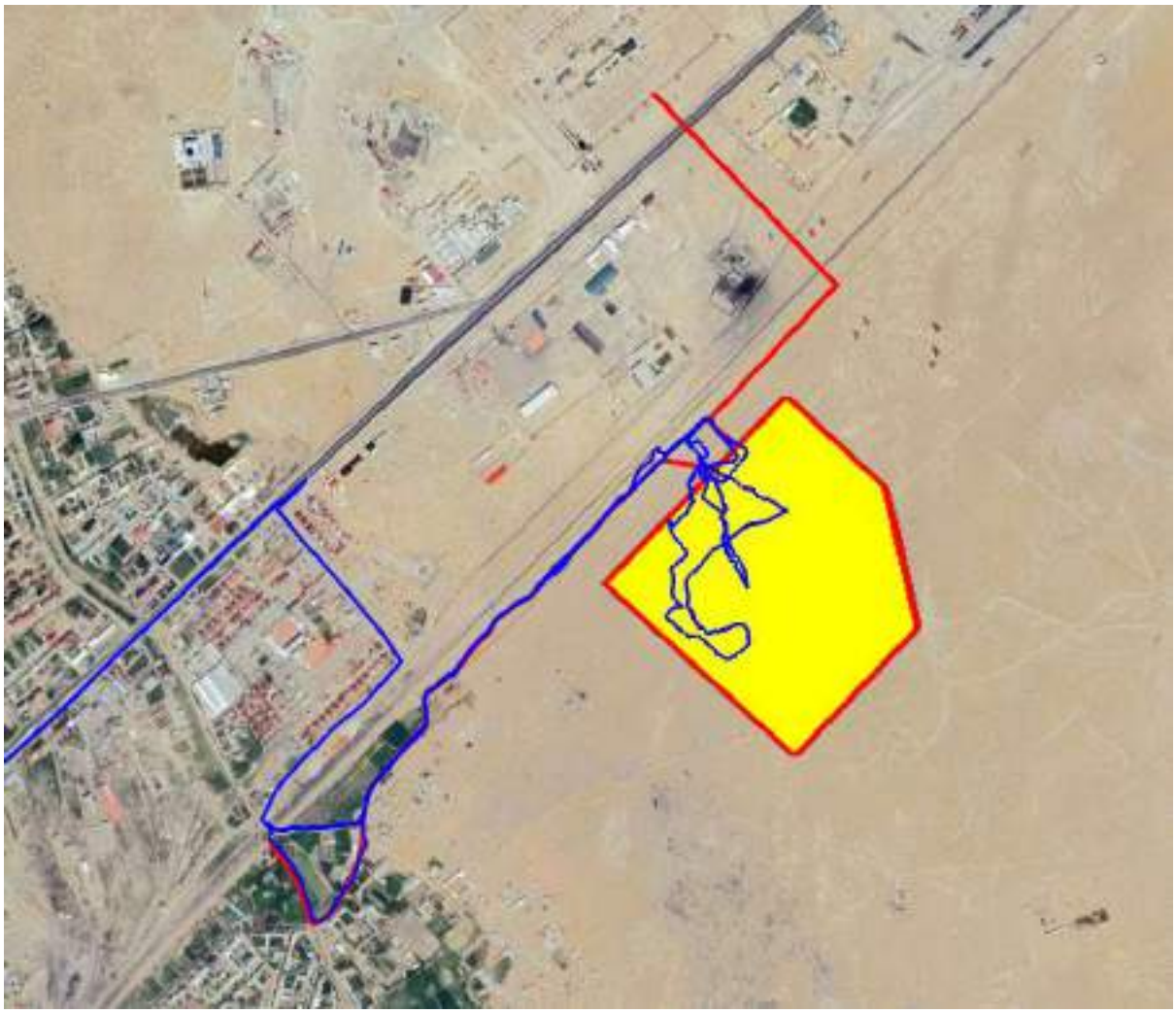


**Figure 6-1 Transects of the roost search survey at Karakal BESS**

Bat activity was monitored using mobile bat detectors Echo Meter Touch (Wildlife Acoustics, USA) along transects were surveyed on May 26th from 20:52 – 22:30.

The transect passed along the route at registration points with a step of about 150-300m. A stop was made at each registration point, during which the bat ultrasonic calls were recorded for approximately 6 minutes. After this, the recording was stopped, and started again at the next point.

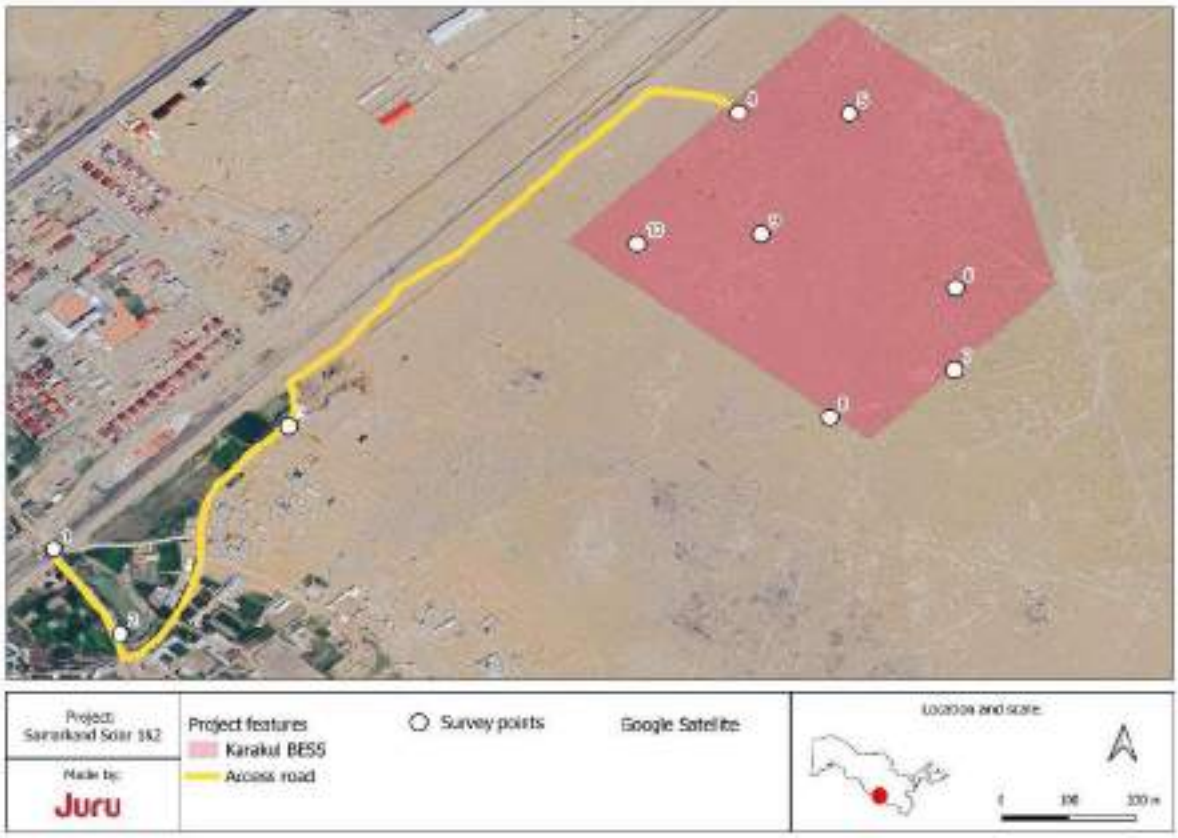



**Figure 6-2 Transects of the acoustic survey**

## 6.2 Species Assessments

### 6.2.1 Bokhara Whiskered Bat

The Bokhara Whiskered Bat (*Myotis bucharensis*) is a congregatory species, with a possibly restricted range within Central Asia, including Uzbekistan. It is listed as Data Deficient (DD) on the Global IUCN Red List but Vulnerable (VU) in the national Uzbekistan Red Data Book.

The CHA Screening exercise found that this species should be further investigated in the CHA against **Criteria 1 & 3**.

#### 6.2.1.1 Ecology & Conservation

The species is found in arid areas and caves.

There is currently no additional information on the ecology of this species.

#### 6.2.1.2 DISTRIBUTION

Known from three locations in Middle Asia (Uzbekistan, Tajikistan). Four specimens of this species were discovered, collected from Samarkand and Tashkent, Uzbekistan between 1959 and 1963 (Benda *et al.* 2011). It was thought to be extinct until a single male specimen was confirmed from the Zerafshan river basin in Tajikistan (Kazakov et al 2020).

May also occur in Kyrgyzstan, however Benda and Gaisler (2015) did not find the presence of this species.

There are no estimates of population available.

The following figure shows the species distribution globally and within Uzbekistan.

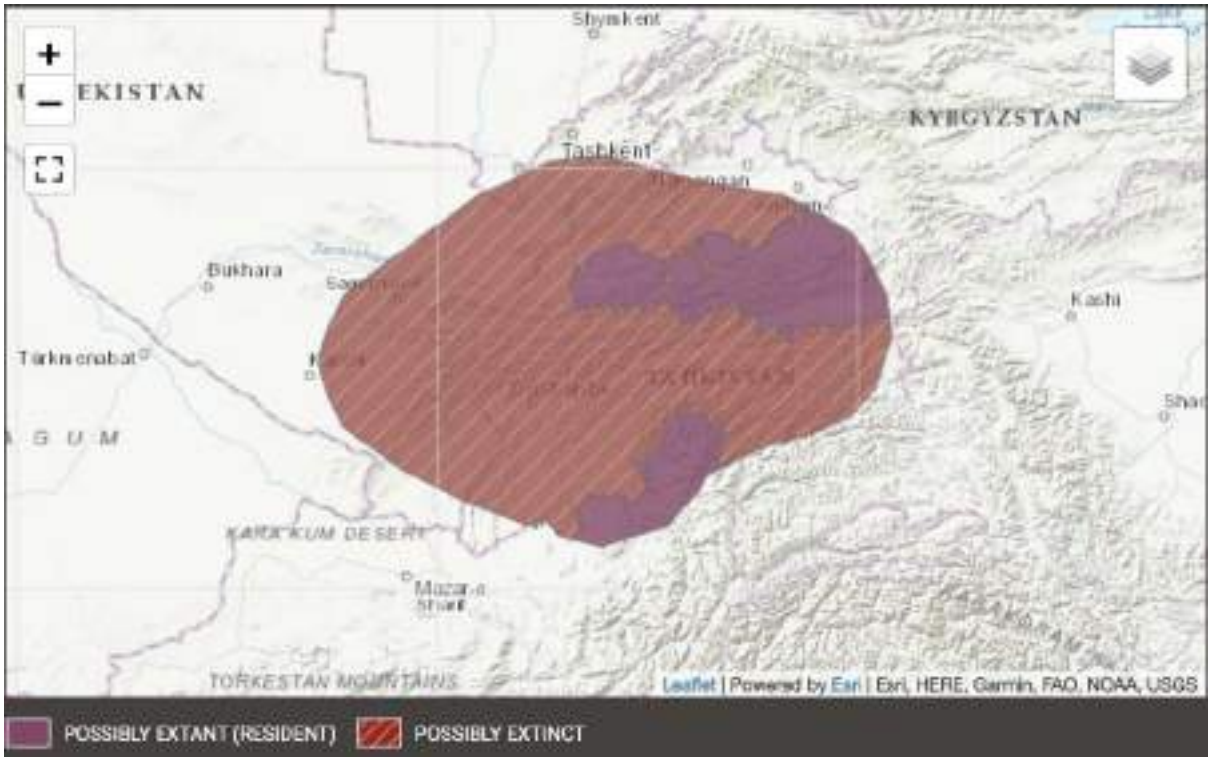



**Figure 6-3 Geographic Distribution of Bokhara Whiskered Bat [38]**

[38] IUCN (International Union for Conservation of Nature) 2019. *Myotis bucharensis*. The IUCN Red List of Threatened Species. Version 2023-1

#### 6.2.1.3 BASELINE SURVEY RESULTS

6.2.1.3.1 Survey Findings

This species was not observed during Bat Roost Searches or recorded during the acoustic surveys conducted at Karakal BESS in spring 2024.

#### 6.2.1.4 ANALYSIS

This species is considered possibly this species has not been reported in Uzbekistan since 1963, it is considered possibly extinct in Uzbekistan as per IUCN. The closest known records of this species are from the Zeravshan River Basin in Tajikistan. Due to the lack of known records in Uzbekistan, an EAAA cannot be applied for this species.

Therefore, due to the unlikelihood of presence in the project AoI (considered as project footprint and a 5km buffer due to potential impacts habitat displacement due to the PV panels), an EAAA cannot be applied as a result of which CH will be not further assessed for this species. However, given the nationally important status of this species, if were to be observed during future monitoring efforts it would be assessed under the framework of adaptive management.

### 6.2.2 All Other Bats

The CHA Screening exercise found that 17 bat species should be further investigated in the CHA against **Criteria 3.** All species are classified as Least Concern by the IUCN Red List and are not listed as protected in the Uzbekistan Red Data Book (UzRDB). The following table gives a summary of these species.

**Table 6-2 Non-priority bat species potentially occurring in the region**

| NO. | SPECIES | ECOLOGY & THREATS | DISTRIBUTION & POPULATION |
|---|---|---|---|
| 1 | Asian (Eastern) Barbastelle (Barbastella leucomelas) | Found in Himalayan moist temperate forest and dry coniferous forest areas in Asia.<br>Insectivorous.<br>It roosts in caves, tunnels, crevices, old buildings, mines, tree hollows, and can be found beneath bark. | The main distribution occurs from the Caucasus eastwards including Iran, Afghanistan and India, and onwards to China. EOO is 24,710,500 km$^2$ and unknown population estimate. |
| 2 | Bokhara horseshoe bat (*Rhinolophus bocharicus*) | Arid and semi-arid regions.<br>Insectivorous.<br>Habitat destruction is a major threat. | Distributed in Central Asia. No EOO or population estimates data. |
| 3 | Common Pipistrelle (*Pipistrellus pipistrellus*) | Adaptable – found in urban centres, arable land and | Widespread western Palearctic species. |

| No. | Species | Ecology & Threats | Distribution & Population |
|---|---|---|---|
| | | woodlands. Migratory behaviour inferred.<br>1-2 offspring.<br>Insectivorous<br>Habitat loss is a major threat. | No population estimates or EOO available. |
| 4 | European Free-tail Bat (Tadarida teniotis) | Forages over temperate to semi-desert habitats, occasionally humid habitats in some areas.<br>Inhabits semi-desert steppe and dry areas.<br>Insectivorous.<br>Threatened by disturbance and loss of roosts in buildings, and by use of pesticides. It is also potentially threatened by wind farms | It is mainly a Palaearctic species, although the south-eastern edge of its range extends into the Indomalayan region.<br>EOO is 18,885,688 km$^2$ and population estimate is not known |
| 5 | Gobi Big Brown Bat (*Eptesicus gobiensis*) | Inhabits semi-desert steppe and dry areas.<br>Low reproductive rate. 1 offspring.<br>Insectivorous.<br>Threatened by droughts. | Subspecies *E. g. gobiensis* likely found in Uzbekistan.<br>No population estimates or EOO. |
| 6 | Geoffroy's Bat (*Myotis emarginatus*) | Arid and semi-arid habitats – lowland steppe and rocky mountains.<br>Insectivorous<br>Lives in large colonies.<br>Thought to be sedentary but may migrate to wintering sites.<br>Threatened by habitat degradation. | Broadly distribution across Europe, Central Asia and Middle East.<br>EOO = 15,654,608 km$^2$<br>No population estimates. |
| 7 | Greater Horseshoe Bat (*Rhinolophus ferrumequinum*) | Forages in pastures, deciduous temperate woodland, and shrubland. Uses caves all year.<br>Insectivorous.<br>Give birth to single pups.<br>Mainly threatened by habitat fragmentation and loss of insects through pesticide use. | The species has a wide range in the Palaearctic. EOO = 31424082 km$^2$.<br>No population estimates available. |
| 8 | Lesser Horseshoe Bat (*Rhinolophus hipposideros*) | A sedentary species, winter and summer roosts are usually found within 5-10km. Roosts are found in natural and artificial underground sites and in attics and buildings in the northern part of it.<br>Foraging activities take place nearly exclusively within woodland areas, while open areas are avoided<br>Threatened by disturbance and loss of underground habitats | Widely distributed in the western and central Palaearctic, from sea level to 2000m.<br>It is found in the Eastern borders of Uzbekistan.<br>EOO = 22,157,273 km2.<br>No population estimates are available. |
| 9 | Lesser Mouse-eared Myotis (*Myotis blythii*) | Favours temperate zones with grassland and agriculture. | Broad range from Europe to China. |

| No. | Species | Ecology & Threats | Distribution & Population |
|---|---|---|---|
| | | Breeding begins in autumn – 2 pups born in late spring.<br>Insectivorous.<br>Threatened by habitat loss. | EOO = is 23,471,950 km$^2$<br>No population estimates available. |
| 10 | Long-eared Bat (*Plecotus strelkovi*) | Inhabits montane and forest-steppe habitats. No other information on the species ecology or threats. | Mountainous regions of Kazakhstan, Kyrgyzstan, Tajikistan, Uzbekistan, China, Afghanistan and Iran.<br>10No available EOO or population estimates. |
| 11 | Nepal Myotis (*Myotis nipalensis*) | Arid or mountainous habitats including forest, shrubland and desert.<br>Single pup once a year.<br>Likely non-migratory.<br>Reproduces once a year.<br>No notable threats. | Widely distributed across Central Asia. The EOO is noted as >20,000 km$^2$.<br>No population estimates. |
| 12 | Noctule Bat (*Nyctalus noctula*) | Forages over wetland, woodland and pasture. Roosts in crevices, caves and occasionally artificial structures.<br>Seasonal migrations to wintering sites in Europe. | Wide Palaearctic distribution.<br>EOO = 24101079 km$^2$<br>No population estimates |
| 13 | Ognev's Serotine (*Eptesicus ognevi*) | Arid and semi-arid habitats – lowland steppe and rocky mountains.<br>Insectivorous<br>Threatened by habitat degradation. | Distributed in Central Asia primarily around the Aral and Caspian Seas.<br>No population estimates or EOO. |
| 14 | Particoloured Bat (*Vespertilio murinus*) | Forages in open areas over various habitat types (forest, semi-desert, urban, steppe, agricultural land)<br>Migratory species (up to 1,780km).<br>1-2 pups born in June/July<br>No major threats. | Widely distributed in North Palearctic.<br>EOO = 25,697,109 km$^2$<br>No population estimates. |
| 15 | Savi's Pipistrelle (*Hypsugo savii*) | Forages in woodland, pasture and wetlands, and often feeds at lights in rural areas.<br>Roosts in crevices, occasionally in buildings or under bark.<br>Migration and breeding unknown.<br>No major threats. | Wide range in the Palaearctic (and marginally in Indomalaya)<br>EOO = 15658670 km$^2$<br>No population estimates are available. |
| 16 | Serotine Bat (*Eptesicus serotinus)* | Varied landscapes from urban centres to woodlands.<br>Breed in autumn. 1 pup born in spring.<br>Insectivorous.<br>Threatened by habitat loss. | Widley distributed across Palearctic. No population estimates or EOO is available. |

| No. | Species | Ecology & Threats | Distribution & Population |
|---|---|---|---|
| 17 | Turkestan Pipistrelle (*Pipistrellus aladdin*) | Inhabits semi-desert areas, rocky landscapes, woodlands, farmlands, rural gardens, and urban areas, as well as water bodies like rivers and lakes.<br>One breeding period a year. 1-2 offspring.<br>Insectivorous.<br>No major threats. | Primarily found in Central Asia.<br>No EOO or population estimates available. |
| 18 | Turkestani Long-eared Bat (*Otonycteris leucophaeai)* | This species is associated with dry steppe to desert zone of sub-montane and lowland areas. Its habitats are xeric, sparsely vegetated, and rocky.<br>If similar to *O. hemprichii*, this species roosts in rock fissures or in human constructions.<br>Insectivorous. This is a ground-gleaning species.<br>No major threats. | This species occurs within dessert and xeric shrubland habitats in Central Asia.<br>This species is DD and no EOO could be derived.<br>No population estimates are available. |

#### 6.2.2.1 Baseline Survey Results

6.2.2.1.1 Survey Findings

None of the bat species listed above were observed during Bat Roost Searches conducted in 2024.

Two species; *Pipistrellus pipistrellus* and *Eptesicus sp.* were recorded during the acoustic surveys of the project site. The following table and map show the number and locations of the calls recorded.

| Location | Project facility | Bat calls | | | |
|---|---|---|---|---|---|
| | | *Pipistrellus pipistrellus* | *Eptesicus sp.* (*E.serotinus* and/or *E.ognevii*) | All calls | All calls, % |
| 1 | Access road | 24 | 0 | 24 | 38.1 |
| 2 | Access road | 8 | 2 | 10 | 15.9 |
| 3 | Access road | 10 | 0 | 10 | 15.9 |
| 4 | BESS | 2 | 3 | 5 | 7.9 |
| 5 | BESS | 5 | 0 | 5 | 7.9 |
| 6 | BESS | 1 | 0 | 1 | 1.6 |
| 7 | BESS | 2 | 1 | 3 | 4.8 |
| 8 | BESS | 3 | 0 | 3 | 4.8 |
| 9 | BESS | 1 | 1 | 2 | 3.2 |
| 10 | BESS | 0 | 0 | 0 | 0.0 |

| Location | Project facility | Bat calls | | | |
|---|---|---|---|---|---|
| | | *Pipistrellus pipistrellus* | *Eptesicus sp. (E.serotinus and/or E.ognevii)* | All calls | All calls, % |
| **Total:** | | **56** | **7** | **63** | 100.0 |
| **Total, %:** | | **88.9** | **11.1** | 100 | |


**Figure 6-4 Location of recorded calls**

### 6.2.2.2 Analysis

6.2.2.2.1 EAAA

The total EAAA for all bats has been applied as all connected suitable habitat that overlaps the project footprint as well as exists within a reasonable buffer from the project footprint, determined by species specific ecology.

The habitat type within the BESS site (sandy and sandy loam soils, with sparse shrub vegetation) and the relatively low levels of activity indicate lack of suitable roosting habitat and potentially poor quality of foraging habitats within the project AoI which is considered as the project footprint and a 50m buffer due to potential impacts of foraging habitat loss.

Habitat loss is considered as the largest AoI for bats for the development of the project considering that operational impacts of the BESS are unlikely to impact insectivorous bats. Furthermore, while the presence of 2 species were confirmed, the BESS site showed low levels of activity compared to areas along the beginning of the existing access road which is adjacent to water canals confirming the poor quality of foraging habitats within the BESS site.

As species presence was confirmed within the AoI, the EAAA is considered as the project footprint and a 5km buffer to account for potential localised movement in and around the project site [39]. This extent measures a total area of 88 km$^2$. The EAAA has been mapped in the following figure.

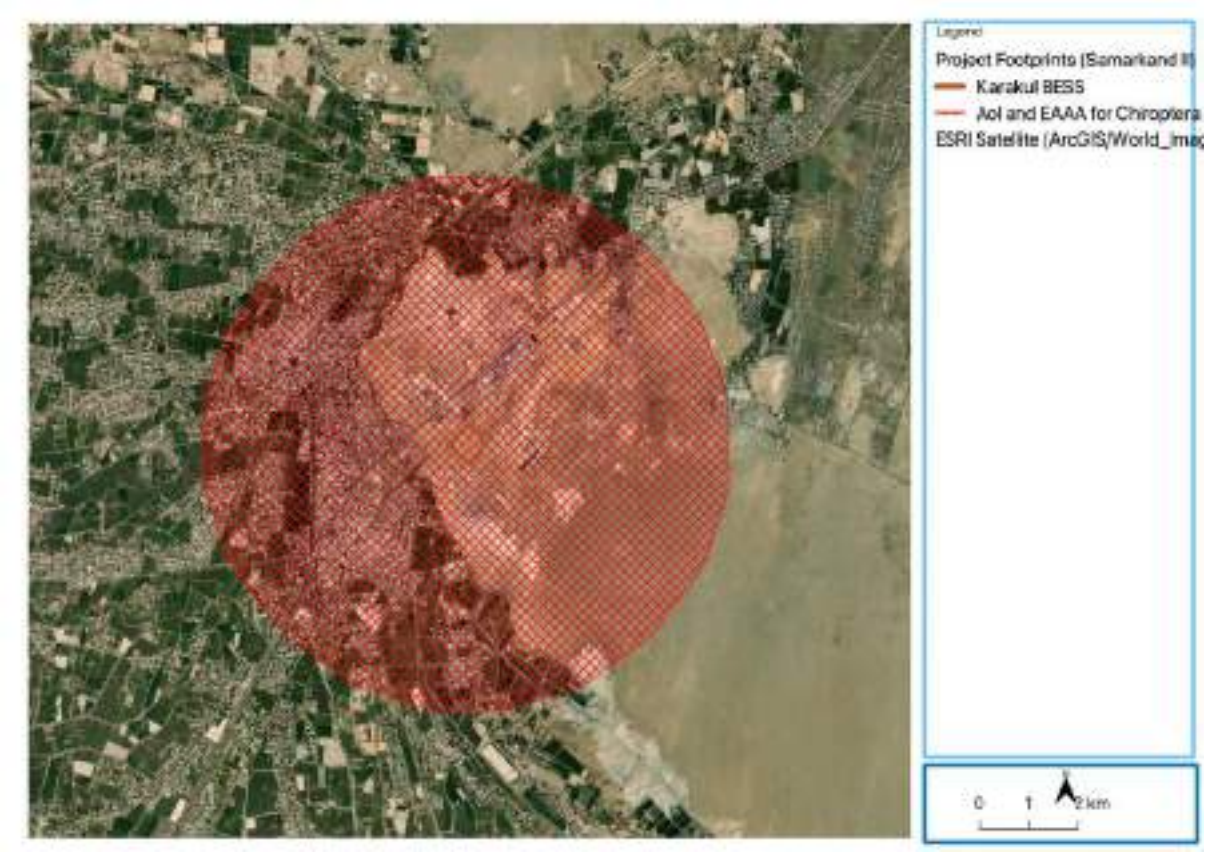



**Figure 6-5 The Project AoI and collective EAAA of potentially resident Chiroptera species**

[39] Rainho A, Palmeirim JM. The importance of distance to resources in the spatial modelling of bat foraging habitat. PLoS One. 2011 Apr 25;6(4):e19227. doi: 10.1371/journal.pone.0019227. PMID: 21547076; PMCID: PMC3081845.

6.2.2.2.2 Criticality

These species are assessed under Criterion 3, as they are considered to be congregatory species. This criterion requires that the project area should support at least 1% of the global population.

The baseline surveys recorded a total of 63 discrete calls from two of the species being assessed. In many cases for the species of microbats listed in the tables above, global population estimates are not available and thus cannot be assessed against the numerical threshold of Criterion 3.

Majority of the species potentially occurring in the region are commonly occurring species with a globally widespread distribution and are of least conservation concern. Given the small size of the EAAA and relatively large geographic distribution of these species, it is unlikely that that EAAA populations of each species would comprise more the 1% of the respective global populations. For example, based on the distribution data provided by IUCN, the Serotine Bat (*Eptesicus serotinus*) has an approximate EOO of 11,200,736 km$^2$. Comparatively, the EAAA makes up 0.0008% of the EOO.

Turkestan Pipistrelle (*Pipistrellus aladdin*) is a DD species among these microbats. Based on the distribution data provided by IUCN, this species has an approximate EOO of 2,111,695 km$^2$. Comparatively, the EAAA makes up 0.004% of the EOO. Therefore EAAA, it is considered unlikely that the EAAA populations would comprise more than 1% of the respective global populations.

The Turkestani long-eared bat (*Otonycteris leucophaeai*) is also categorized as DD on the IUCN red list. While it is known to occur within dessert and xeric shrubland habitats across Afghanistan, Iran, Kazakhstan, Kyrgyzstan, Pakistan, Tajikistan, Turkmenistan and Uzbekistan, its global population and EOO are unknown due to the paucity of research on this species. To date, an indicative map of the global distribution of the Turkestani long-eared bat has therefore not been established in the IUCN database. This level of data deficiency does not allow for a definitive CH and PBF analysis based on the EAAA defined for this species. Nevertheless, as the Turkestani long-eared bat is not endemic to Uzbekistan and occurs in seven other countries, the likelihood of a local population within the 88 km$^2$ EAAA accounting for over 1% of the global population in the aforementioned geographic range is notably low, considering the absence of roosting sites and vocal traces of the species in the least modified section of the EAAA (i.e., within the project site).

Overall, it is considered unlikely that more than 1% of the global populations of the common and widespread DD bat species recorded during the baseline surveys regularly occur in the

EAAA to meet the migratory and congregatory requirements of Criterion 3. Furthermore, given the status of these species they will also not be considered as SBVs, although they will be assessed as Sensitive Receptors in the respective Samarkand project ESIAs.

# 7 HERPTILES

One reptile species was identified during CHA Screening that pertain to the CH and SBV criteria for threatened species, and potentially migratory/congregating species as well as range-restricted:

- IFC PS6 Criterion 1: Critically Endangered and Endangered Species
- EBRD PR6 Criterion (ii): Habitats of significant importance to endangered or critically endangered species /// IFC PS6 Criterion 1: Critically Endangered and Endangered Species

## 7.1 Herptiles Baseline Survey Method

A combination of field surveys and desktop analysis was used to assess the status of Herpetofauna in the study area. Field studies were carried out according to generally accepted zoological methods for identifying species composition. The following methodological guidelines were used in the survey: L. G. Dinesman, M. L. Kaletskaya (1952), V. M. Makeev, A. T. Bozhansky (1988), D.A. Bondarenko, N.G. Chelintsev (1996). Literature sources and statistical data had been processed.

Field surveys were carried out on 26th June 2023 and 13th March 2024 using mixed stationary and transect surveys. Points and transects for conducting research were outlined at the project monitoring stations in accordance with different types of habitats.

The field research methodology reflects the following aspects:

- species composition in the study area;
- distribution across habitats.

The quantitative assessment of reptiles and amphibians was mainly based on the transect survey. The transect method consists of counting individuals on both sides of a fixed long line (transect), with the duration of the survey determined by the known distance, which is selected depending on the type of reptile and the area, but does not exceed 1 km in one way. In this case, all individuals encountered on the transect are registered, regardless of the distance they are identified at. The perpendicular distance is measured between the transect axis and each individual. The results obtained are used to calculate the density of recorded reptiles. The 1 km transect was chosen because heaviest errors arise when long transects are used for species that, like the Central Asian Tortoise, have high density, daily and seasonal activity cycles fluctuations with high peak values, and are caused by incorrect selection of a minimum survey area for a particular species (Vashetko et al, 2001).

The Central Asian tortoise population density (D) was calculated using the following formula:

$$D=n2LB$$

where n – number of animal individuals recorded on the transect; L – length of the transect; B – formula to calculate an effective width of the survey strip:

$$B=W(0,79F+0,21F4)$$

where W – width of the limited strip on both sides of the transect axis; F:

$$F=2yW$$

The details of the transects and point searches conducted in 2023 and 2024 shown in the following tables.

**Table 7-1 Survey points on Karakul BESS in June 2023 and March 2024**

| YEAR | NAME OF POINT | DATE | N (DD FORMAT) | E (DD FORMAT) | LENGTH | BIOTOPE |
|---|---|---|---|---|---|---|
| 2023 | PB-K-1 | 27/06/23 | 39.515641° | 63.872612° | 1km | Fixed sands, significant anthropogenic pressure in the form of a landfill and quarry. |
| 2024 | Karakul_1 | 13/03/2024 | 39.517277 | 63.87006 | 1km | Fixed sands, significant anthropogenic pressure in the form of a landfill and quarry. |
| 2024 | Karakul_2 | 13/03/2024 | 39.512386 | 63.861006 | 1km | Sandy desert with significant anthropogenic pressure in the form of a landfill and quarry. |

**Figure 7-1 Herpetofauna survey map including survey points and transects on Karakul BESS in June 2023**

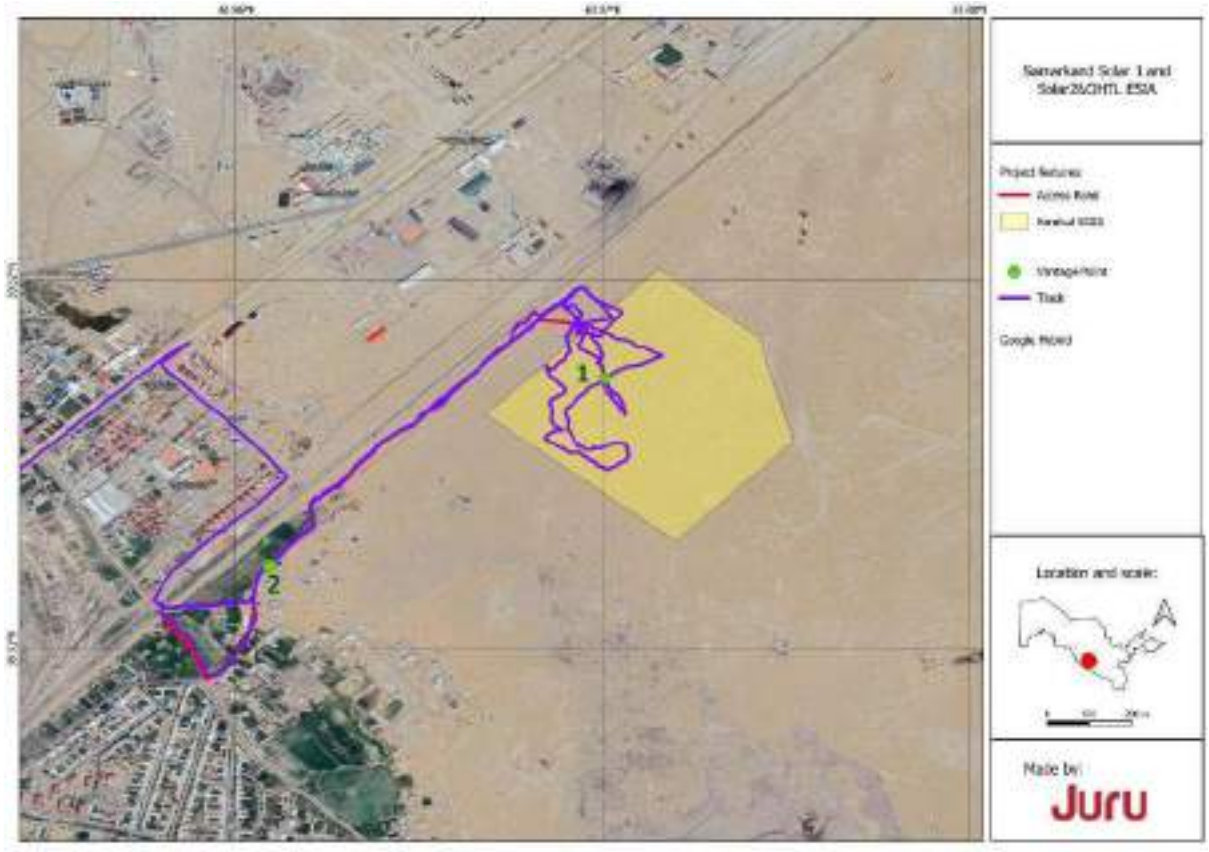



**Figure 7-2 Herpetofauna survey map including survey points and transects on Karakul BESS and access road (March 2024)**

## 7.2 Species Assessments

### 7.2.1 Central Asian/Russian Tortoise

The Central Asian Tortoise (*Testudo horsfieldii)* is a Herptile native to Uzbekistan, listed as Vulnerable (VU) species on the IUCN Global Red List, and Vulnerable (VU) in the Uzbekistan National Red Data Book.

The CHA Screening exercise found that this species should be further investigated in the CHA against **Criteria 1.**

#### 7.2.1.1 ECOLOGY & CONSERVATION

They mostly inhabit arid, dessert regions and sandy steppe landscapes (Ernst & Barbour, 1989; Iverson, 1992).

The ecology of this species in the wild is not well studied, however recent studies have focusing on populations in the Djeiron Ecocenter near Bukhara in Uzbekistan give a good indication of the ecology of these species specific to this region (Lagarde et al 2011).

The species bury themselves in sandy soil for hibernation during much of the year. They are active above ground for just 2- 3 months during Spring when favourable weather conditions permit. Females may remain buried and hibernating from mid-June to March the following year, whilst males, are more likely to emerge from hibernation as soon as climatic conditions are favourable (Naulleau et al. 1987), probably in anticipation of the mating period (Bonnet et al. 2001). Mating immediately follows hibernation and lasts for approximately 3 weeks. The egg-laying period occurred from late April to the end of the active season (Henen et al. 2000), where females lay upto 9 eggs per year across different clutches (Lagarde et al 2011).

They are diurnal. They spend large portions of their short time active feeding. The species is strictly herbivorous, feeding on available annual vegetation (Ataev 1997).

Females have the largest territories (~30Ha) which overlap the territories several males (Lagarde et al 2011).

Its primary threats are habitat destruction and collection for the pet trade (Stubbs 1989; Brushko and Kubykin 1982; Kubykin 1995). Climate change may also pose a threat as this species is sensitive to extreme temperatures and relies on rain fall during active periods for adequate vegetation and food (Lagarde et al 2011).

The distribution of T. horsfieldii in Uzbekistan is extensive, covering various habitats that provide the open, arid environments essential for the species. Despite the large estimated population, there are indications that ongoing pressures, including high levels of legal and potentially

illegal trade, could impact the population over time. However, detailed maps of the species' distribution are now available, offering valuable insights into its range and habitat use across the country.

#### 7.2.1.2 DISTRIBUTION

The Central Asian Tortoise inhabits arid regions from south-eastern Russia, south to northern regions of Iran and Afghanistan, northwest regions of Pakistan and Baluchistan, and western China (Ernst and Barbour, 1989; Iverson, 1992). It is one of the most widespread tortoises.

The Central Asian Tortoise is widely distributed across the steppes and desert regions of Uzbekistan, which is home to one of the largest populations of this species. In Uzbekistan, population densities of this species have been reported to range from 0.5 to 43 tortoises per hectare, leading to an estimated total population of around 20 million individuals. These estimates, provided by the Uzbekistani government in 1997 and reaffirmed in 2011, suggest a robust population, although the data originates from a commercial exporter and remains unpublished, raising concerns about its reliability.

Published literature suggests that the population density has declined markedly through-out the species' range (Stubbs 1989), owing to habitat destruction and extensive collecting for the pet trade (Brushko and Kubykin 1982; Kubykin 1995).

The following maps outlines the distribution of the tortoise species of the genus Testudo.

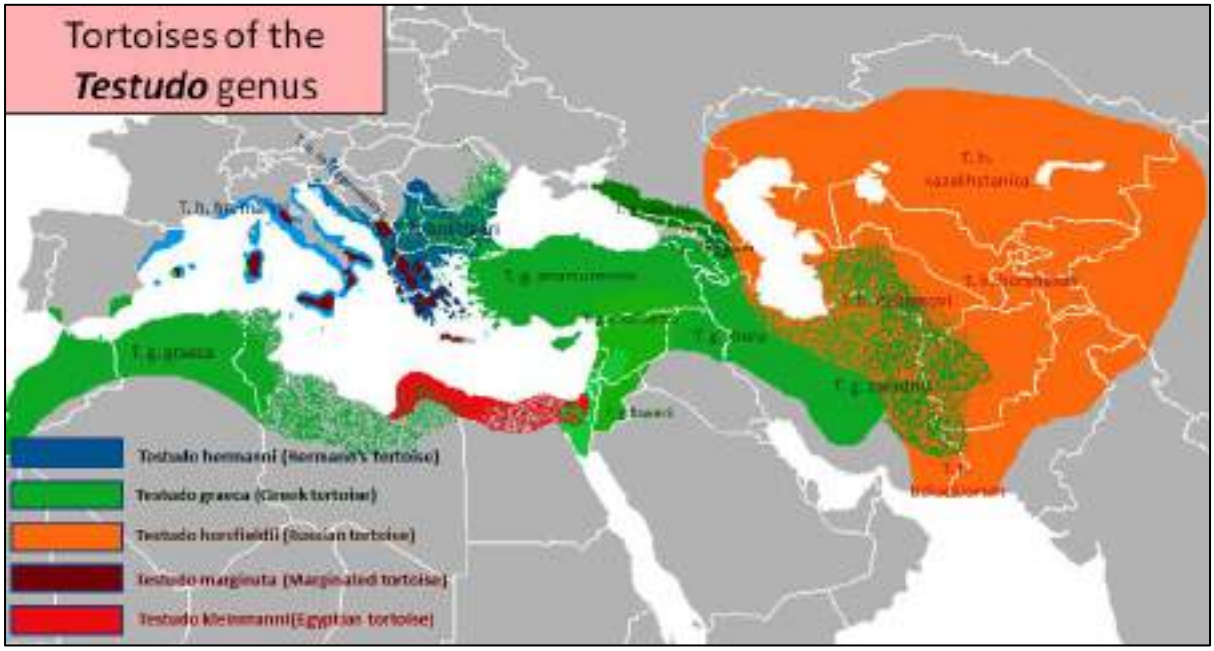



**Figure 7-3 Distribution map of tortoise species of genus Testudo.**

#### 7.2.1.3 BASELINE SURVEY RESULTS

7.2.1.3.1 Survey Findings

No individuals were observed during surveys in 2023; however ecologists noted it was not the optimal period of activity. No observations were recorded during subsequent surveys in 2024. The site at the Karakul BESS component is severely degraded and showed no sign of reptile activity likely due to littering, anthropogenic disturbance and presence of stray dogs. does not have suitable habitat for this species.

#### 7.2.1.4 ANALYSIS

The Central Asian Tortoise prefers open arid habitats with well vegetated sandy substrates. Such habitats are not present within the project footprint and surrounding areas.

Due to the lack of suitable habitats within the Karakal BESS and surrounding areas, an EAAA cannot be applied as a result of which CH will be not further assessed for this species.

Due to the lack of suitable habitat, it is not considered as a SBV for the Karakul BESS component(s) of the Samarkand 2 projects. However, given the status of this species, if were to be observed during future monitoring efforts it would be assessed under the framework of adaptive management.

# 8 BOTANY

There is a gap in the IUCN database when it comes to flora species distributions. In many cases, spatial distributions are not mapped, and therefore species of conservation concern that may otherwise trigger SBV or CH status, might be missed during initial CHA Screening.

A literature review provided by a regional botanist was conducted, which is a typical requirement for setting the botanical baseline and integrating into the ESIA process. The review includes consideration of the Uzbekistan Red Data Book which lists the nationally threatened & endangered flora species. The regional botanist utilizes experience and professional opinion as well as previous study knowledge to determine if any botanical species of concern (from UzRDB or otherwise) could potentially be present.

The findings of the literature review and subsequent botanical surveys found no species which would require consideration under the CHA. The botanical report did not find any species of concern and also did not highlight any potential species of concern that the specialist considered as possibly occurring within the project's area of influence.

One species of flora was identified and screened in for further investigation in this CHA.

## 8.1.1 Tulipa micheliana

*Tulipa micheliana* is a tulip species found in various areas of Uzbekistan. It is listed as Vulnerable (VU) on the Global IUCN Red List. It is not listed in the Uzbekistan Red Data Book.

The CHA Screening exercise found that this species should be further investigated in the CHA against **Criteria 1**.

### 8.1.1.1 Ecology & Conservation

This species grows in the foothills and lowlands across juniper woodlands, stony mountain steppe, and on the edge of cultivated land.

It is unsure exactly what threats this species faces, however this species has decreased in number and large portions of the population occurs in unprotected areas.

#### 8.1.1.2 DISTRIBUTION

This species is quite widespread occurring in multiple regions of southern Uzbekistan, the western Pamir-Alay of Tajikistan, north-eastern Iran and large parts of the Kopet Dag in Turkmenistan (Everett 2013).

The estimates global population is 10,000 mature individuals, with an estimated EOO of 298,410 km$^2$.

The following figures show the distribution of *Tulipa micheliana* in Uzbekistan and globally.

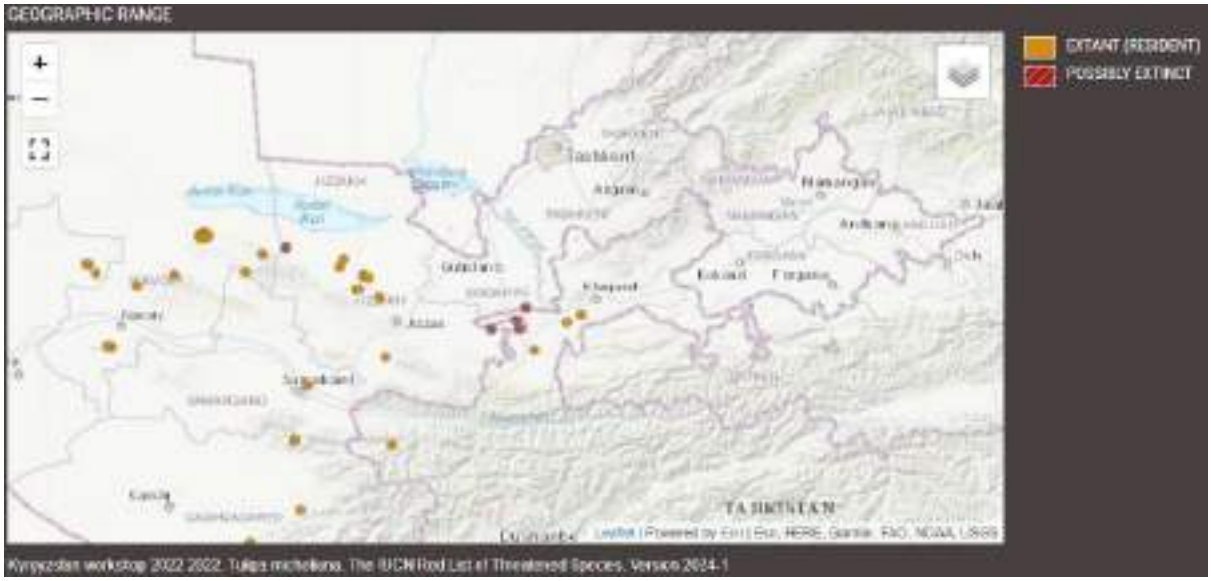



**Figure 5-8 Geographic Distribution of Tulipa micheliana within Uzbekistan[12]**

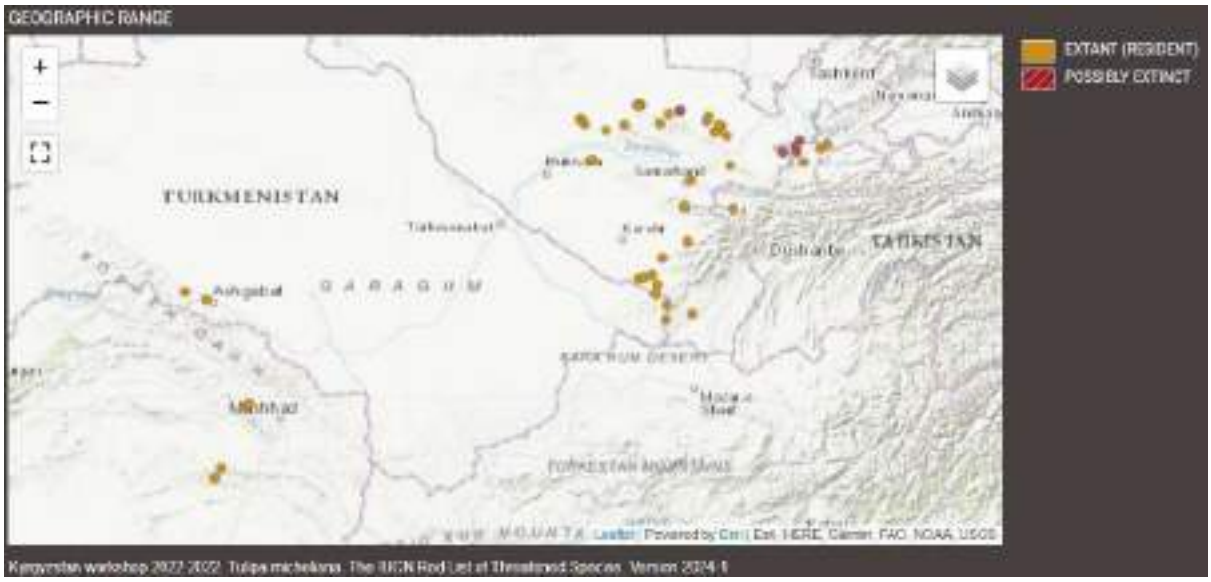



**Figure 5-9 Geographic Distribution of the Tulipa micheliana [40]**

[40] Wilson, B., Sultangaziev, O.E., Boboev, M., Dekhonov, D., Beshko, N. & Turakulov, T. 2022. Tulipa micheliana. The IUCN Red List of Threatened Species 2022: e.T215067974A215336536. https://dx.doi.org/10.2305/IUCN.UK.2022-2.RLTS.T215067974A215336536.en. Accessed on 07 August 2024.

### 8.1.1.3 Baseline Survey Results

8.1.1.3.1 Survey Findings

This species was not recorded during the spring 2024 avifauna survey at Karakal BESS site.

### 8.1.1.4 Analysis

*Tulipa micheliana* grows in the foothills and lowlands across juniper woodlands, stony mountain steppe, and on the edges of cultivated land. Expert consultations confirmed that the habitats within the project AoI are not suitable for this species. Therefore, due to the unlikelihood of presence in the project AoI, an EAAA cannot be applied as a result of which CH will be not further assessed for this species.

Due to the lack of suitable habitat, it is not considered as a SBV for the Karakul BESS component(s) of the Samarkand 2 projects. However, given the status of this species, if were to be observed during future monitoring efforts it would be assessed under the framework of adaptive management.

# 9 CONCLUSION

No species have triggered Critical Habitat for the project.

## 9.1 Final List of SBVs

Some species have been classified as "Significant Biodiversity Values" (SBVs) and Priority Biodiversity Feature (PBFs) which are defined in IFC PS6 as requiring a No Net Loss residual impact if designated as EN or CR under IUCN..

The complete list of SBVs for the project is as per the table below. The table includes SBV species that, though were not recorded during the baseline surveys, may possibly occur in the project area and are hence categorised as SBV as per IFC PS6.

**Table 9-1 SBV Categorized after CHA Process**

| COMMON NAME | GLOBALLY THREATENED | NATIONALLY THREATENED | RANGE-RESTRICTED (REGIONAL ENDEMIC) | MIGRATORY/ CONGREGATORY |
|---|---|---|---|---|
| Egyptian Vulture | ✓ IUCN EN Status triggers SBV | ✓ Listed as VU on RDB | - | Native breeder |
| Saker Falcon | ✓ IUCN EN Status triggers SBV | ✓ Listed as EN on RDB | - | Native Breeding and Passage Migrant in Uzbekistan |
| Yellow-eyed Pigeon | ✓ IUCN VU Status triggers SBV/ PBF | ✓ IUCN VU Status triggers SBV | | Native Breeder |
| European Turtle Dove | ✓ IUCN VU Status triggers SBV/ PBF | ✓ IUCN VU Status triggers SBV | | Native Breeder |

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| |
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# ANNEX A – CRITICAL HABITAT SCREENING MATRICES