Initial Environmental Examination

Project number: 47282-009
October 2020

Afghanistan: Energy Sector Development Investment Program (Tranche 7)

Annex 2: Framework Biodiversity Action Plan

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Framework Biodiversity Action Plan (F-BAP)

Pule Hashimi to Shindand 220 kV transmission line, Shindand and Farah Substations and associated distribution networks

October 2020

1 Introduction

1.1 Overview

Da Afghanistan Breshna Sherkat (DABS), the Afghan national power utility company, is seeking to construct and upgrade the electricity capacity and infrastructure in the Herat and Farah provinces. The project includes construction of 220kV transmission lines from Pul-e-Hashimi to Shindand and Shindand to Farah, as well as new substations at Shindand and Farah, an upgrade to the Pul-e-Hashimi Substation and development of local distribution networks.

The Project is seeking funding from Asian Development Bank (ADB) as part of its "multi-tranche financing facility for the Afghanistan Energy Sector Development Investment Program" and an Initial Environmental Evaluation (IEE) and Critical Habitat Assessment (CHA) have been prepared. These have confirmed that the project will not be located within any areas of Critical Habitat but identified the potential presence of a number of globally endangered (EN) and vulnerable (VU) species within the wider project area.

The IEE includes general mitigation that will help avoid and minimise significant adverse effects to these species. However, and especially given the lack of baseline data in Afghanistan, the project has also adopted a "Precautionary Approach" to biodiversity issues in line with ADB Safeguard Policy Statement 2009 (SPS). The SPS requires that the project put in place a plan to deliver "no net loss" of any globally endangered or critically endangered (CR) species (no net loss). This Framework Biodiversity Action Plan (F-BAP) has been developed as a starting point to meet that requirement, but should be considered a "living document" and updated in a full Biodiversity Action Plan (BAP) once more information is available.

1.2 Scope

The IEE/CHA identified six internationally vulnerable or endangered species that are potentially present within the Project's Area of Influence (AoI) and could be affected by the project construction and operation, namely:

- Saker falcon (*Falco cherrug*: EN),
- Egyptian vulture (*Neophron percnopterus*: EN),
- Asian houbara (*Chlamydotis macqueenii:* VU),
- Great bustard (*Otis tarda* VU),
- Yellow-Eyed Pigeon (*Columba eversmanni* VU),
- Goitered gazelle (*Gazella subgutturosa*: VU).

Birds in particularly are susceptible to the risks associated with transmission lines. High voltage transmission lines typically pose less risk of electrocution to birds than lower voltage power lines (e.g. distribution lines), mainly due to the size and the spacing between the transmission wires. Nonetheless, most size birds are still at risk of electrocution during a short circuit and large birds, birds with poor manoeuvrability, narrow visual field or birds that fly at night are at particularly at risk of collision. Migratory birds such as large water birds and raptors were identified as being at risk of collision and/or electrocution when in passage. Specific mitigation was included in the IEE to address such risks.

Whilst data availability in Afghanistan is generally low for all of the species identified above, the potential risks to **Egyptian Vulture**, an endangered species that may breed in the area, were considered highest as the global population is in steep decline and the species is considered particularly vulnerable to electrocution. This F-BAP therefore prioritises this species and outlines further actions that may be required to better understand the local population size and distribution. Other focus species include:

- **Saker Falcon** for which transmission lines are seen to represent a significant threat (a 2004 study in Mongolia by Gombobaatar *et al*. found that electrocution was responsible for 54% of all adult saker falcon mortality[1]).
- **Asian houbara** and **great bustard** which are both large birds that have poor manoeuvrability and visual when in flight, and are particularly susceptible to collision.

As described in the IEE, risks to the yellow-eyed pigeon (a smaller, more manoeuvrable species) and goitered gazelle are considered much lower and should be effectively mitigated as detailed in the IEE. They are therefore excluded from this F-BAP.

1.3 Purpose

The F-BAP should be read in conjunction with the IEE and provides a framework to help ensure that the Project achieves no net loss for biodiversity in general and (critically) endangered species in particular. This document should be considered a live document and should be developed into a more detailed Biodiversity Action Plan (BAP) as the Project develops, and the knowledge of the conservation context of the target species changes. This F-BAP therefore provides:

- Overview of the Project
- Explanation of how the mitigation hierarchy has been applied
- Summary of the biodiversity present in the area, which specific reference to the target species
- The Project's approach to understanding the population and distribution of the target species
- The measures that maybe required if net loss is recorded during the construction or operation
- Indication of how to develop the full BAP, inclusive of what the conservation targets should be, how will they be measured and costed, and who will be responsible.

1.4 The Mitigation Hierarchy

To help the Project achieve no net biodiversity loss the "Mitigation Hierarchy" is applied to potential impacts identified during the IEE screening and planning process as shown below. Using this approach avoidance is prioritised, followed by reduction and restoration/rehabilitation where necessary, with measurable offsets only applied as a last resort where residual impacts are unavoidable, or as an additional conservation measure. Actions and measures described in this F-BAP have been designed to help achieve no net loss and include monitoring of species populations and distribution and if necessary. This approach is aligned with the ADB Environmental Safeguards: Good Practice Sourcebook (2012) and the mitigation hierarchy itself, which can be summarised as follows:

Figure 1: Applied Mitigation Hierarchy

Avoid	Minimise	Restore	Offset
As a matter of priority, the client should seek to avoid impacts on biodiversity and ecosystem services.	When avoidance of impacts is not possible, measures to minimise impacts to biodiversity and ecosystem services should be implemented	When avoidance and minimisation of impacts is not possible, measures to restore biodiversity and ecosystem services should be implemented	Biodiversity offsets may be considered only after appropriate avoidance, minimisation and restoration measures have been applied. Biodiversity offsets must achieve no net loss

[1] Paper available here: https://www.researchgate.net/publication/259196999_Saker_Falcon_Falco_cherrug_milvipes_Jerdon_mortality_in_Central_Mongolia_and_population_threats

1.5 F-BAP Implementation Process

The project will avoid impacts to notable species and habitats and help ensure no net loss through:

- Use of the mitigation hierarchy involving a sequential approach of impact avoidance, mitigation, restoration and finally offsetting if no other approach is effective.
- Design of the Project to avoid adversely affecting sensitive species.
- Use of good international practice (GIP) during construction works including avoidance measures such as seasonal timings of works (eg to avoid impacts to nesting birds) and other generic mitigation measures as elaborated in the IEE.
- Application of Species Action Plans as outlined below.

The responsibility of implementing these approaches will change as the construction phase finishes and the project becomes operational. Accountabilities and responsibilities are summarised in Table 1:

Table 1: F-BAP Development and Implementation Responsibilities

Organisation	**Role in the F-BAP**
DABS/PMO (Programme Management Office)	Accountable for the development of the F-BAP into a BAP and its implementation during construction. During Operation **DABS** will be ultimately accountability for the F-BAP/BAP and any associated actions, some of which may be outsourced to the O&M Contractor and supporting specialists.
Construction Supervision Consultants (CSC)	***Accountable*** for the correct design and implementation of the generic mitigation (as described in the IEE).
Construction Contractor	***Responsible*** for the correct implementation of the mitigation contained in the IEE and, to the extent applicable, this F-BAP.
Biodiversity Specialists	(National and/or international) responsible for supporting the above as contracted including any additional field research/surveys.

In addition, and in accordance with Good International Practice (GIP) and as part of Contractor's on-boarding, the CSC will ensure everyone working on the project in the field will complete a training and awareness course on the Project's sensitive ecological receptors, and the required management and mitigation commitments.

Training will include explanations of roles and responsibilities, will use photographs as appropriate to identify specific species of note, and will outlined key behaviour expectations including bans on hunting, foraging, trapping, use of firearms and dogs. It will also outline national regulatory and ADB requirements, and specific activities including seasonal (e.g. to avoid impacts to breeding birds) requirements to avoid or minimise the risk of disturbance, injury, or death of the project's sensitive species. The training will be refreshed by the Contractor during daily toolbox talks at construction camps and sites.

2 Project Overview

2.1 Overview

The Project itself will comprise the following components:

- the 220kV double circuit transmission line from the Pul-e-Hashemi substation in the Herat province to the proposed Shindand substation, with a line length of 135 km

- 220kV double circuit transmission line from the proposed 220/20kVShindand substation in the Herat province to the proposed 220/20kV Farah substation with a line length of 176 km; (iii) construction of the 220/20kV Shindand substation and expansion of 220/20kV Pul-e-Hashemi substation in the Herat province; and (iv) construction of the 220/20kV Farah substation in the Farah province

- the design and construction of the distribution network in the Shindand area to provide 7,000 household connections

- The design and construction of the distribution network in the Farah area to provide 20,000 household connections

The project route is shown in figure 2:

Figure 2: Project transmission line alignment and substation locations

The transmission line will follow the major road between Farah and Herat for most of the route, occasionally diverting by a kilometre or two. The exception is the link to the Shindand substation at which point the transmission line diverts significantly from the road.

2.2 Project Biodiversity

The project is located in a generally arid and relatively barren area with farmed areas near the towns. The topography of the route varies between hilly, mountainous, flat and desert areas. The land of the Pule Hashimi substation is hilly and slightly sloped which decreases gradually when moving further south transitioning into a flat agricultural and then desert landscape before becoming hilly again. On reaching the Shawz Mountains the topography gradually changes to low, rocky hills (see Figure 3). No Critical Habitat is present in the project area. The alignment crosses multiple small water channels in villages and 3 larger (highly seasonal) rivers. The overall climate of the project area is cold semi-arid under the Köppen climate classification. No globally or nationally endangered flora were recorded.

Figure 3: General environmental conditions of project area

There are no protected areas within 50km of the project, but the Hari Rud Valley, an "Important Bird Area" (IBA) is located at its closest some 8km from the project's northern end. The site is designated because of historical breeding populations of Yellow-Eyed Pigeon and Lesser Kestrel, although the population estimate for the former was from 1949, and its current status is unknown. The most sensitive ecological receptors that may be affected by the project are the five bird species and gazelle as outlined in section 1 of this F-BAP.

3 Action Plan for Egyptian Vulture

The Egyptian Vulture (*Neophron Percnopterus*) is the smallest species of vulture and is IUCN EN listed with a minimum global population estimated at 12,000 individuals (IUCN). The species typically nests on ledges or in caves on cliffs, crags and rocky outcrops although it will also nest on the tops of transmission towers. It was historically commonly in Afghanistan but the species has declined everywhere and there is little recent data on its population or distribution in the country. (There are however thought to be 150-200 pairs and 60-70 pairs in neighbouring Iran and Turkmenistan respectively). Its preferred territory is the more mountainous regions of Central and Eastern Afghanistan, although it forages in lowland and montane regions over open, often arid, country, and also scavenges at human settlements. As with many other raptor species, Egyptian Vultures have suffered persecution by poisoning in Afghanistan, particularly by shepherds who assume they hunt livestock, and thus kill the birds and destroy their nests.

3.1 Additional Data Collection

Additional field surveys and data collection is required to better understand the Egyptian Vulture population size and distribution in and around the Project corridor. Detailed monitoring will be designed in conjunction with an international specialist (e.g. from IUCN Vulture Specialist Group) and will include both field data gathering and stakeholder engagement (both communities and local experts). Indicative monitoring actions are shown in the table below.

Table 2: Egyptian Vulture Data Additional Collection

Action	Requirement	Aim	Timing	Responsible
1) Further (national) Desk-review	Review national literature and update F-BAP based on latest national population estimations and trends and any observations from within or near the Project corridor.	Understand local population size and local nesting sites	Annually during construction and first three operational years	CSC/O&M Contractor
2) Stakeholder Engagement	Engage community and local experts to assess population size and nesting sites near Project corridor. To include National and Regional Government Environmental Departments, national bird groups/NGOs, Ecology & Env Information Centre of Herat University, Other local experts			
3) Field Surveys	Undertake surveys of the Project alignment to look for birds and nest sites, collect primary data and/or confirm desk/ stakeholder information. Surveys seek to confirm presence, population estimate and nesting sites.	Identify presence/nest sites/ population size along transmission corridor and any changes.	Quarterly during construction and first 3 years of operation. Monthly surveys of nests during breeding season if identified.	CSC

Field surveys will be undertaken (after confirmation that proposed survey route is safe) by experienced and competent persons with experience of identifying Egyptian Vulture. Surveyors to stop and make records whenever they see birds whilst driving the route and also stop every 20km for a 15 min "scan" of the area. All sightings to be mapped and recorded. If breeding pairs are located longer-term surveys will be put in place to identify trends in population size (both increases and decreases) and nesting behaviour. Any nests to be checked from distance. Frequency of operational surveys to be confirmed with stakeholders and biodiversity specialist, as will any requirement for adaptive management (e.g. should nests be found).

Direct persecution is one of the biggest threats to this species. To combat this, education and awareness raising of local communities (including shepherds) will be carried out by DABS to prevent deliberate killing of Egyptian vultures and the destruction of their nests as part of the community-supported monitoring programme. This will include informing them about the species sensitivity and characteristics (i.e. a scavenger, not a hunter) and to encourage local community reporting to the DABS team. This work should be put in place to both reduce risks of poaching/killing of birds and increase local reporting frequency and will be ongoing during construction.

3.2 Nesting

If nests are identified in the Project AoI during construction, the following decision tree must be followed:

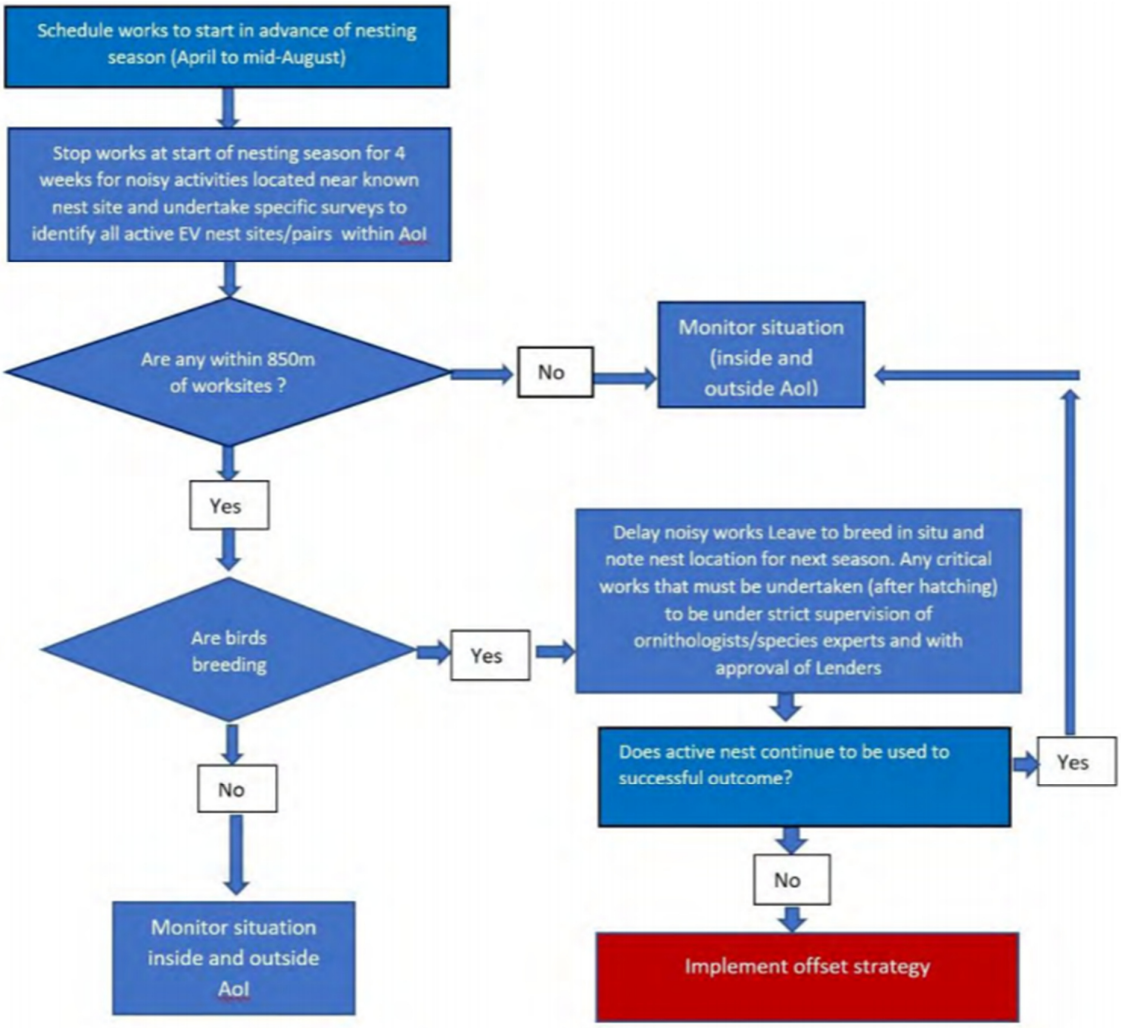


Figure 4: Egyptian vulture nest decision tree

3.3 Adaptive Management

If monitoring indicates that populations are declining and/or nesting success falls and/or dead birds found, the Project will adopt an adaptive management approach as shown in the table below. The final response will be developed with national and international vulture experts and approved by the ADB (e.g. use of further awareness raising/supplementary feeding stations).

Table 3: Potential changes in the baseline data that maybe recorded and proposed responses

Observation	Approach	Proposed Response (see more below)
• Monitoring determines increases in population size	Net Gain	No response required unless increases approach 60 breeding pairs which may trigger Critical Habitat (consult international biodiversity specialist)
• Nest (s) identified but attempted nesting site is abandoned or fails during construction operation • An individual is killed as a result of the Project (i.e. electrocution or collision)	No net loss	Efficacy of mitigation is evaluated. First stage of offsetting initiated.
• Multiple nesting sites are abandoned or fail during construction or operation • More than one bird is killed as result of the Project	No net loss	First and second stage offsetting measures implemented
• No nesting sites recorded near the Project during the construction or operation period, • No recorded increase or decrease in population size	None required	No offsets are proposed any later changes unlikely to be attributable to the Project.
• Species has continuous breeding success within the Project AoI during construction and operation	None required	No offsetting would be needed as non-significant residual impacts will have been confirmed.

3.4 Offsets

Should offsets be required, the following should be applied:

Stage 1 Offset
The Project will develop a detailed Biodiversity/Species Action Plan including the options outlined above to support the long-term conservation of Egyptian vultures. This will include further research on the use of the area by vultures, reproductive success and current threats; "guarding" of nest sites found within the broad Project Corridor; awareness raising of the importance of the species through a 3-year campaign in the local and national media (newspapers, television and internet); consideration of development of artificial feeding or breeding sites in more secluded locations. These actions could be contracted to competent professionals or NGO experts and audited by independently qualified ecologists. The Biodiversity Action plan must include the following information as a minimum:

- What the conservation targets will be
- How the conservation targets will be measured
- Exactly what that actions to ensure no net loss will involve
- How any additional desk of field surveys will be completed, by who, when and why.
- When will the actions be assessed?
- Who will be responsible?
- How much the actions will cost

Stage 2 Offset
If required, the detailed Biodiveristy/Species Action Plan will be implemented.

3.5 Other Actions

To further minimise project-related impacts on this species line markings will be provided along the length of the transmission lines as per the IEE and the following actions will also be considered as part of an adaptive management approach:

- Retro-fitting of insultation to key infrastructure near areas used by birds
- Species Information Boards: to decrease disturbance of nests in breeding sites by local people
- Artificial Nest Sites: Assessment will be made as to whether the birds would benefit from the construction of additional (artificial) nest sites, to be located over 850m from active works sites
- Additional conservation actions (ACAs) to enhance the broader understanding of Egyptian vulture in Afghanistan. This may include scientific research, monitoring etc (e.g. help with satellite tracking, population mapping; and/or research into rapid population decline

3.6 Summary of Approach

Table 4: Egyptian vulture Summary of Approach

Species	**Egyptian Vulture (IUCN Endangered)**			
Mitigation Approach	Avoid	Minimise	Restore	Offset
Objectives	No net loss to the species as a result of the project.			
Location	Initially along the entire corridor. Locations to be refined once sufficient surveys have been undertaken.			
Potential Impacts	Electrocution and collision			
Summary of Approach	Adopt a precautionary approach. Understand more about use of the transmission corridor by the species. Avoid impacts to nesting birds. Minimise impacts to fledged birds. Apply an adaptive management approach, including offsets if impacts found.			
Monitoring	Quarterly monitoring for birds (and nests) during construction and first 3 years of operation. Fortnightly monitoring (from distance) if nests found. Monitoring design and results to be reviewed by international specialists.			
Responsibility	DABS (with support from PMO and specialists). Actions may be delegated.			
Timing	From pre-construction to 3 years post completion.			
Additional Information	Numerous references including IUCN Vulture Specialist Group (ww.iucnvsg.org) and the EU EV Program (http://lifeneophron.eu/)			

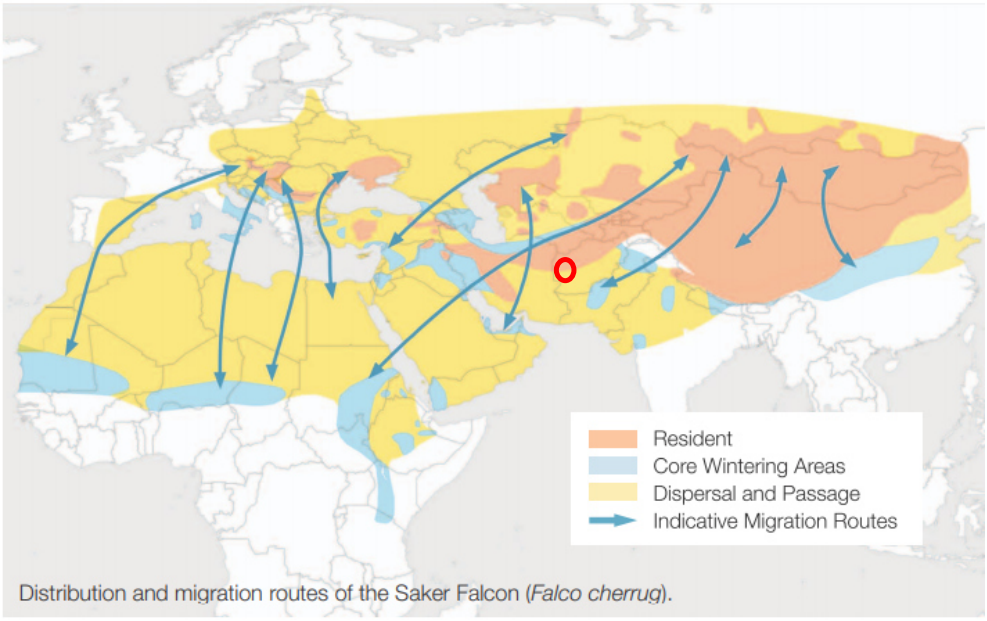
4 Action Plan for Saker Falcon

4.1 Overview

The Saker Falcon is categorised as globally Endangered (IUCN) with an estimated minimum global population of 12,000 individuals. Although relatively widely distributed, it has undergone a very rapid population decline, particularly in and around the key breeding grounds in China, Kazakhstan, Mongolia and Asiatic Russia, which between them hold over 90% of the global breeding population. As a result, and driven in part by uncontrolled capture for the falconry trade, the global population has decreased by over 60% in the last 3 decades,

The species has historically bred commonly in the Pamir foothills of northern Afghanistan and there are also breeding populations in Turkmenistan and Iran. Data from Afghanistan is minimal, but ERWDA (now the Environment Agency Abu Dhabi) has estimated that resident Afghan population as no more than 40 individuals, although other birds are reported on passage to the wintering grounds. The map below (from http://www.sakerfalcon.org/4/reports-and-articles) shows current understanding of key breeding and wintering areas with the approximate Project corridor in western Afghanistan highlighted in red.

Figure 5: Distribution and migration routes of the Saker Falcon



Saker falcon are considered particularly at risk from power distribution projects as the birds often use the distribution poles for perching whilst hunting diurnal rodents given the lack of natural perches in the open grassy landscapes they frequent. Lack of regular monitoring of power lines means that the vast majority of such casualties remain undetected, although where the birds congregate in the steppes after the breeding season (to feed on rodents pre-migration) hundreds of birds can die in a few weeks. This risk, can, however, be significantly reduced by using “bird-friendly” designs as described below.

Given the low national population, the likelihood of the species breeding near the project is considered low, although no data are available to confirm this and the species may also pass through the area on migration. A precautionary approach has therefore been adopted to this species which focuses on the following key elements:

- Data gathering to better understand the potential for the species to be present in and around the project
- Use of "bird friendly" distribution lines
- Working with Saker falcon specialists to support national conservation objectives.

4.2 Data Gathering

Additional field surveys and data collection is required to better understand the Saker falcon population size and distribution in and around the project corridor. Monitoring will be designed in conjunction with an international specialist (e.g. from Saker Falcon Task Force) and will include both field data gathering and stakeholder engagement (both communities and local experts). Indicative survey/monitoring actions are shown in Table 5. Specific attention will be paid to searches for Saker falcon using existing distribution lines within the Project AoI for perching whilst hunting during the spring and autumn migration.

Table 5: Saker Falcon Data Additional Collection

Action	Requirement	Aim	Timing	Responsible
1) Further (national) Desk-review	Review national literature and update F-BAP based on latest national population estimations and trends and any observations from within or near the Project corridor.	Understand local population size and local nesting sites	Annually during construction and first three operational years	CSC/O&M Contractor
2) Stakeholder Engagement	Engage community and local experts to assess resident and migratory population size using Project corridor. To include National and Regional Government Environmental Departments, national bird groups/NGOs, Ecology & Env Information Centre of Herat University, Other local experts.			
3) Field Surveys	Undertake baseline surveys of the Project alignment to look for birds, collect primary data and/or confirm desk/ stakeholder information. Surveys to seek to confirm resident/migratory presence, possible nest present and population estimate.	Identify presence/ population size along transmission corridor and any changes.	Quarterly during construction plus first 3 years of operation. Monthly surveys of nests during breeding season if identified.	CSC

Field surveys will be undertaken (after confirmation that proposed survey route is safe) by experienced and competent persons with experience of identifying saker falcon. It is assumed the surveys will be completed alongside the Egyptian vulture surveys described above. Surveyors to stop and make records whenever they see birds whilst driving the route and also stop every 20km for a 15 min "scan" of the area. All sightings to be mapped and recorded. If breeding pairs are located longer-term surveys will be put in place to identify trends in population size (both increases and decreases) and nesting behaviour. Any nests to be checked from distance. Frequency of operational surveys to be confirmed with stakeholders and biodiversity specialist, as will any requirement for adaptive management (eg should nests be found).

4.3 Distribution Line Design

As outlined above, electrocution on distribution lines can be a major cause of Saker falcon mortality as shown in the diagrams below.

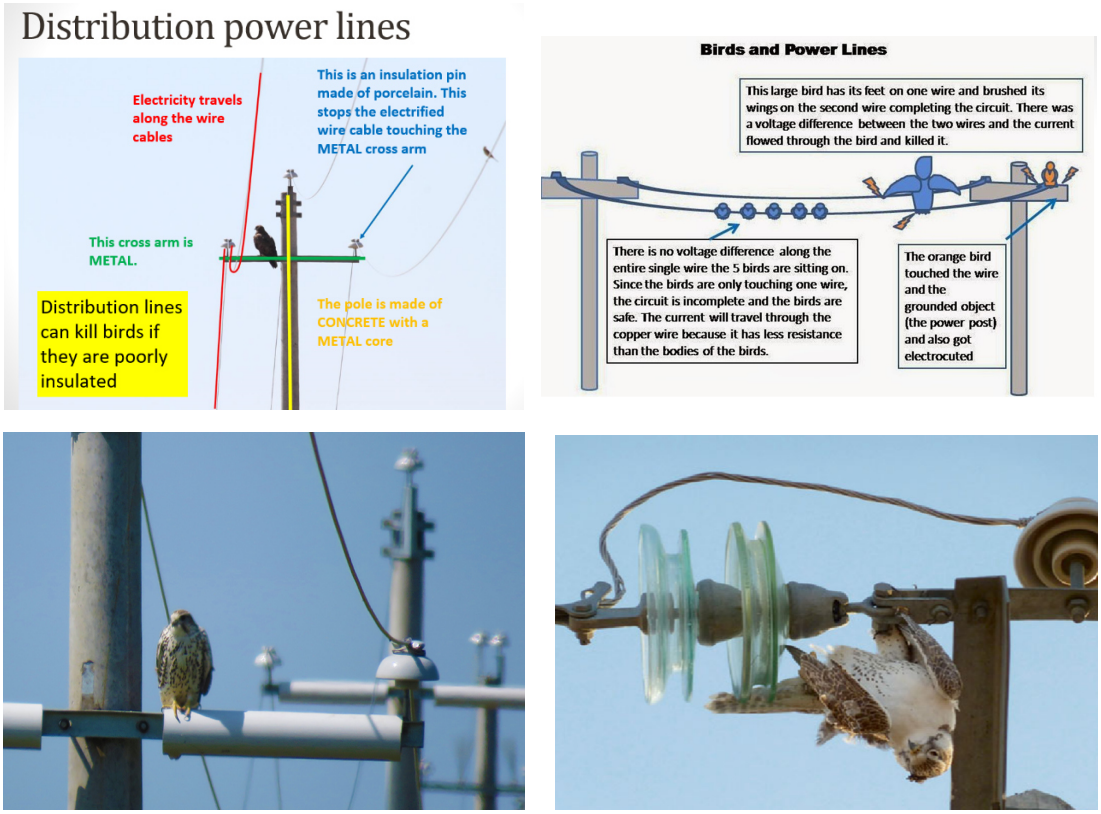


Figure 6: Saker Falcon Distribution Line Mitigation

As part of this F-BAP DABS will work with international Saker Falcon specialists to:

- Better understand the electrocution and collision risks to Saker Falcon in Afghanistan and if there are any areas of particular concern,
- Review national standards for new electric pylons/distribution poles and seek to update them if needed with bird-friendly structures as per the guidelines provided by the Bonn and Bern Conventions,
- Identify areas of greatest risk and seek to replace existing pylons with safer ones, and until replacement can be out in place apply insulators and other bird protection devices on existing unsafe pylons (for example as part of O&M work).

In terms of bird protection devices, DABS should consider the following:

- Changing the configuration of the tops of the poles and adding insulation sleeves to the crossarm (this has been found to reduce the electrocution rate by about 85% for about $25 per pole by deterring the birds from perching on them)
- Using a rotating mirror that flashed reflections from the sun to discourage the birds (although these can be easily broken).
- Use of insulation to cover parts of the pole to prevent grounding (this requires less maintenance and poses less risk to disrupting the power supply).

A number of specific approaches should be considered for the latter including bushing covers on apparatus, heat-shrink insulation, insulated wire, cover-up insulation, insulating paint, pole caps, insulated wire and use of fusing tape on bare conductors and insulating of jumper wires.

4.4 Offset / Additional Conservation Activities (ACA)

If monitoring shows a decline in the resident saker falcon population size or dead saker falcons are recorded, DABS should work with Governmental and non-governmental conservation organisations, and scientific institutions to help ensure no net loss through proactively supporting national efforts to reduce trapping of saker falcon which are still trapped for use in falconry across Central Asia, including in Afghanistan especially on autumn migration/post-breeding dispersal.

A Saker Falcon Task Force has been developed, supported by the Coordinating Unit of the Convention on Migratory Species Raptors MoU, which has brought together government officials from range states with the Sustainable Use Groups of IUCN, falconers, ornithologists and other interested parties to seek to address this and dialogues have been commenced with authorities in Afghanistan on this issue (as well as elsewhere). Conservation management efforts spearheaded by the Environment Agency-Abu Dhabi have also included the provision of artificial nests which appear to have been successful adopted.

DABS should also consider supporting the following ACAs to help the project ensure NNL to the saker falcon and support the long-term conservation of this endangered species:

- Monitor breeding populations and breeding success at any known sites.
- Research the movements of individuals (wintering areas) by applying marking techniques such as colour rings, radio tags, PTTs.
- Carry out research on the habitat use and home range size of the Saker Falcon.

4.5 Summary of Approach

Table 6: Saker Falcon Summary of Approach

Species	Saker Falcon (IUCN Endangered)			
Mitigation Approach	Avoid	Minimise	Restore	Offset
Objectives	No net loss to the species as a result of the project.			
Location	Initially along the entire corridor, notably during migration times.			
Potential Impacts	Electrocution (and to a lesser extent collision)			
Summary of Approach	Adopt a precautionary approach. Understand more about use of the Transmission corridor by the species. Minimise impacts to migrating birds. Apply an adaptive management approach, including offsets if impacts found.			
Monitoring	Quarterly monitoring for birds during construction and first 3 years of operation (especially during migration). Monitoring design and results to be reviewed by international specialists.			
Responsibility	DABS (with support from PMO and specialists). Actions may be delegated.			
Timing	From pre-construction to 3 years post completion. Primarily during migration.			
Additional Information	https://www.cms.int/raptors/en/workinggroup/**saker-falcon-task-force**			

5 Action Plan for Asian Houbara and Great Bustard

5.1 Overview

The Asian Houbara (or Houbara Bustard) is a ground-nesting bird that inhabits open, arid and sparsely vegetated steppe and semi-desert. The Houbara is widely distributed across the Middle East and Central Asia with a minimum global population estimated at 33,000. Birds breeding to the north in Kazakhstan and Mongolia typically migrate south to overwintering sites including in southern Afghanistan, whilst smaller populations in Iran, Turkmenistan and potentially Afghanistan are considered resident all year round. The Asian Houbara is found in Afghanistan year round and although the national breeding population is thought to be small, the country is considered important for overwintering birds as well as birds stopping off in passage. The western and southern edge of the Hindu-Kush, an area of ca. 400,000 km^2 in Southwest Afghanistan/Northern Pakistan is known to host important numbers of wintering houbara originating from Central Kazakhstan, and the vast (3 million Ha) Registan Desert, some 200km south of the project alignment is a designated IBA for the Houbara Bustard for this reason. The wider area overlaps with the southern part of the project corridor, although the majority of tracked birds were found to overwinter further south.

The great bustard is a large ground nesting bird for which Northern Afghanistan represents the southernmost tip of the overwintering range of birds breeding in Central Asia (primarily Russia and Kazakhstan). The global population was estimated in 2010 to be 44–57,000 individuals, of which <5% are believed to overwinter in Central Asia (including Northern Afghanistan). There is no recent data from Afghanistan, but as few birds are thought to overwinter in neighbouring Iran and Turkmenistan, they are not expected to winter in Afghanistan in any significant numbers.

Both species are categorised as IUCN Vulnerable, but are also known to be particularly susceptible to collision with transmission lines as they tend to fly at low altitudes and are heavy with low manoeuvrability in flight. They also find transmission and distribution lines hard to see due to the position of their eyes and constraints in the movement of the head. Impacts from powerlines are especially acute along routes in which migrant birds concentrate for all or part of their journeys ('flyways'), including the Central Asian flyway, and electrocution rates as high as 7.6 birds/km of surveyed powerline have been recorded in Kazakhstan (Lasch et al 2010, Pestov et al 2012, Voronova et al 2012).

5.2 Approach to the Species

The project design will include bird "flappers" and other approaches to reduce collision mortality by making the power lines more visible to these and other species. These will be designed to be robust, will be checked on a regular basis to ensure that they are still functioning effectively and will be replaced during maintenance activities if faulty (this is to be avoided if possible for health and safety/outage reasons). Given this, and the relatively limited known importance of the direct project corridor for the two species (with more important areas located further south for overwintering Houbara or north for

Great Bustard) no specific action plan is proposed. A watching brief will however be put in place with insight and contribution from a recognised independent species expert, and an approach to adaptive management will be adopted should significant bustard mortality be recorded as a result of the Project.

DABS will commission annual drives of the transmission and distribution corridors during the time of the migratory passage to the overwintering sites (and to the extent this is declared safe). The drives will involve two observers and will be under the powerlines at no more than 20 km/h, with an observer scanning either side. Mortalities will be observed either as carcasses or as bundles of feathers within the immediate area under and adjacent to the powerline. For each mortality, the GPS location and species will be logged, along with (if possible) its sex, distance from pylon and scavenged status (no/yes/by what). Mortalities should be collected to prevent double counting. Records of mortalities of other species will also be made. Causes of death will be identified on the basis of circumstantial evidence as follows:

- **Electrocution**—when bodies lie either below or close to the pylon (support structure), and the perpendicular distance from the powerline was small with no scatter of body feathers.
- **Collision**—when bodies lie at some point between the pylons and (due to momentum) have landed some metres beyond the powerline, with considerable loss of feathers. (note these interpretations can be confounded when scavengers move carcasses around).

In the event that significant numbers of dead birds are recorded DABS will work with the national authorities to put in place offsets that support species conservation measures. This could include retrofit of flappers or other visual aids to other power lines where mortality is evident or support with the Registan Desert IBA which is virtually unstudied ornithologically, with species lists based on observations made during the nineteenth century. Approaches to be adopted and trigger mortality levels for the offsets will be agreed with the international specialists as part of the upgrade of this F-BAP to a BAP.

5.3 Summary of Approach

Table 7: Asian Houbara Summary of Approach

Species	Houbara and Great Bustards (IUCN Vulnerable)			
Mitigation Approach	Avoid	Minimise	Restore	Offset
Objectives	No net loss to the species as a result of the project.			
Location	Along the entire transmission and distribution corridors.			
Potential Impacts	Electrocution and collision			
Summary of Approach	Project design to minimise risks. Annual monitoring for species mortality. Use of adaptive management approach with offsets triggered if significant mortality recorded.			
Monitoring	Annual monitoring for dead birds for up to first 3 years of operation.			
Responsibility	DABS (with support from PMO and specialists). Actions may be delegated.			
Timing	From first stringing of power lines to 3 years post operation.			
Additional Information	Numerous references including Houbara Foundation International Pakistan and the International Fund for Houbara Conservation (IFHC) Abu Dhabi. See eg: https://conservationofhoubara.com/			

6 F-BAP Monitoring and Evaluation

6.1 Aim and Objectives

As part of converting this F-BAP into a BAP, should that be required, a **Biodiversity Monitoring and Evaluation Plan (BMP)** will be developed and implemented on behalf of DABS. This will be developed to assess implementation of the F-BAP and confirm that the F-BAP (and subsequent BAP if needed) has:

- been implemented by the responsible parties as expected;
- achieved the desired conservation outcomes.

The monitoring will also seek to confirm that no unexpected impacts are occurring to F-BAP species and associated habitats as a result of the project (including associated cumulative or induced impacts) for which an "adaptive management" approach may be required. The Construction Supervision Contractor (CSC) will be responsible for writing and implementing the BMP, which will build on the tasks previously outlined.

One constraint to the management of the key species included in this F-BAP is a lack of baseline data on the species and their habitats. DABS will share relevant information obtained with the authorities to support the overall understanding of, and management design for, the F-BAP species. The proposed approach will also help consolidate the results of the individual monitoring and survey tasks.

The BMP will be the responsibility of the CSC (reporting to DABS) but elements of it may be tendered out to suitable external organisation(s). As part of the BMP the Project will monitor the nature, extent, quality and spatial configuration of notable habitats and species within both the direct project area, and the wider area. The studies will focus on the key biodiversity elements discussed in this F-BAP and associated sources of threats rather than trends in local biodiversity *per se*.

6.2 Monitoring, Evaluation and Dissemination

The BMP will include monitoring targeted at the Species/Population Level. This will seek to provide further information on species distribution, population size and demographics for the BAP and notable species. Monitoring methodologies and indicators will be developed in consultation with local and international experts as part of this F-BAP. An annual report will be prepared during the monitoring period to include all sets of data, analysis, conclusions and recommendations for management interventions. The monitoring will continue up until the end of the defect liability period. At that point, the CSC will make an assessment of the situation and provide recommendations if necessary.

This F-BAP and its monitoring, including that outlined above, will be periodically evaluated to determine its effectiveness in meeting its objectives and identifying any necessary remediation. The findings of the monitoring programme will be evaluated every year with the Project Lenders and the outcomes used to adapt the management and on-going mitigation measures. Management interventions will need to be identified when there is a negative trend in the areas of F-BAP species. The data and outcomes from this monitoring will be shared to enable local authorities and others in the region to use this information in planning. This may include academic institutions and NGOs in the region.

6.3 Resources

The CSC will prepare the full terms of reference (ToR) for the BMP. Additional local capacity and resources may be received from other bodies as available. Staff and resources required to implement this plan will be assessed at the completion of the BMP ToR. Involvement/engagement of local communities will be considered in the BMP because:

- the plan will be more sustainable if communities are involved;
- local communities have useful information on the relationships between threats and effects; and
- stakeholder involvement can contribute to the development of a sense of ownership of the resource management regime and responsibility for biodiversity health.

The draft and final BMP (and BAP) will need to be approved by the ADB.

7 F-BAP Indicative Costs

The following indicative costs are estimated for completing the requirements of this F-BAP. Additional costs for additional Project measures such as biodiversity offsets, will need to be costed dependent on the relevant follow up actions, agreed alongside the relevant specialists and ADB.

The following costs are indicative only and intended to inform long-term budgeting. Costs include estimates for the as-yet undetermined construction period and for a minimum of 3 years during operation. Final costs to be defined by DABs dependent on final approaches taken for F-BAP requirements.

Table 8: Indicative F-BAP costs

Budget line	Cost	Comments
1. F-BAP Measures		
1.1. Desk review	$1,400 - $2,000	Assumed 4 x desk review for Egyptian vulture: 1 x construction 3 x operation Includes, write-up and report to ADB / other stakeholders
1.2 Stakeholder Engagement	$8,000 - $10,000	Assumed intermittent stakeholder engagement for all 5 species, during construction and operation
1.3 Community Engagement	$2,500 - $3,500	Assumed 1 x community engagement session for Egyptian vulture awareness raising
1.4 Species Monitoring	$80,000 - $120,000	Assumed for 7 x drive-by monitoring by specialists of Project alignment observing all 5 species, including particularly Egyptian vulture: 4 x construction (accounting for quarterly surveys for Egyptian vulture for 1 year) 3 x operation Includes, write-up and report to ADB / relevant other stakeholders (e.g. NGOs, governmental conservation bodies etc)
F-BAP sub-total	**$91,900 - $135,500**	*Consider rounding to $100,000 to $150,000*
2. BAP Measures		
2.1 Additional bird mitigation	Currently unknown	
2.2 Biodiversity offsets	Currently unknown	
2.3 Additional conservation outcomes	Currently unknown	
BAP sub-total	**To be confirmed**	
Total	**To be confirmed**	