Final Biodiversity Action Plan for the Scatec Wind Farm, Egypt

THE BIODIVERSITY CONSULTANCY

Citation: TBC (2025). Final Biodiversity Action Plan for Scatec Wind Farm, Egypt. The Biodiversity Consultancy, Cambridge, UK

This report was prepared for EGH/Scatec.

Document information	
Document title	Final Biodiversity Action Plan for Scatec Wind Farm, Egypt
Document subtitle	
Project No.	RCR01
Date	06 March 2025
Version	3
Author	Daniel Pires, Ricardo Tomé, David Wilson
Client name	EGH/Scatec

Revision no.	Author/s	Reviewer(s)	Date	Comments	Final/draft
1	RT, DP, DW	PB	16 December 2024		Draft
2	DW	NF	18 February 2025	Updated to also align with EIB	Draft final
3	DW		06 March 2025	Updated in response to comments by WSP	Final

Table of contents

Acronym table

Acronym	Definition
ATMP	Active Turbine Management Program
BAP	Biodiversity Action Plan
BMEP	Biodiversity Monitoring and Evaluation Programme
CH	Critical Habitat
CHA	Critical Habitat Assessment
CR	Critically Endangered
EAAA	Ecologically Appropriate Area of Analysis
EBRD	European Bank for Reconstruction and Development
EN	Endangered
ESIA	Environmental and Social Impact Assessment
E&S	Environmental and Social
GIIP	Good International Industry Practice
IBA	Important Bird and Biodiversity Area
IFC	International Finance Corporation
IUCN	International Union for Conservation of Nature
KBA	Key Biodiversity Area
kV	Kilovolt
LC	Least Concern
NT	Near Threatened
MW	Megawatt
NG	Net Gain
NGO	Non-Governmental Organisation
NNL	No Net Loss
OFS	Offset Feasibility Study
PCFM	Post construction fatality monitoring
PR6	Performance Requirement 6
PS6	Performance Standard 6
RIA	Residual Impact Assessment
SOD	Shutdown On-Demand
TBC	The Biodiversity Consultancy
OHTL	Overhead Transmission Line
VU	Vulnerable

Executive Summary

This document is the Biodiversity Action Plan (BAP) for the Egypt Green Hydrogen / Scatec (the Client) 200 MW Wind Farm project (the Project), to be developed in the Gebel el Zeit area of the Red Sea. The purpose of this BAP are to describe the series of actions by which the Project will demonstrate biodiversity Net Gain (NG) for Critical Habitat-qualifying features and No Net Loss (NNL) for Priority Biodiversity Features (PBFs) and other priority Valued Environmental Components (VECs), in line with IFC PS6 and IFC Guidance Note 6, EBRD PR6 and EBRD Guidance Note 6, EIB ESS4 and industry guidance.

This BAP covers 26 priority biodiversity features: 21 migratory soaring birds, three bats, one reptile and one habitat. Potential impacts to these features are primarily from collision of migratory soaring birds and bats with turbine blades and transmission lines during operations, and direct impacts and the loss of habitat during both construction and operation. The primary mitigation action is the implementation of a bird monitoring and shut-down on demand protocol, while impacts to the reptile and habitat can largely be designed out and no significant impacts to bats are predicted. Predicted annual residual impacts for migratory soaring birds ranged from 0 (14 species) to 78 individuals (for White Stork), with a predicted annual total fatalities of 99 individuals for the Project, while no significant residual impacts are predicted to any other feature which would require offsets to reach the Project's NG or NNL target.

Eight offset actions were identified with the potential to deliver the annual gains required by the Project for one or more target species. Four actions, which if sufficiently supported by the Project, would collectively meet the Project's NG / NNL targets for all priority bird species were analysed in detailed, being:

- Retrofitting power lines in Egypt;
- Retrofitting power lines in Jordan;
- Retrofitting power lines in Kazakhstan; and,
- Program against illegal hunting / capture in the Middle East.

All four projects have been evaluated as feasible, although none are without challenges. If all are implemented as outlined in this BAP, then it is likely that the Project will meet its obligations for NG or NNL for all CH-qualifying features and PBFs. Four additional offset actions were identified but not pursued further due to the limited number of species covered or feasibility challenges when compared with other options. These were:

- Implementation of conservation actions in breeding colonies of Sooty Falcon in Egypt/Middle East;
- Habitat improvement and reduction of anthropogenic threats to the Great White Pelican in the Balkans;
- Programme against illegal hunting/capture in Georgia; and,
- Programme against illegal hunting/capture in Malta: BirdLife Malta.

1 Introduction

1.1 Background

This document is the Biodiversity Action Plan (BAP) for the Egypt Green Hydrogen / Scatec (the Client) Wind Farm project (the Project), to be developed in the Gebel el Zeit area of the Red Sea Governorate, approximately 290 km south-east of Cairo, Egypt. The Project is planned to be a 200 MW (Megawatt) wind energy facility with approximately 25 turbines.

The Project plans to align with the International Finance Corporation's (IFC's) Performance Standard 6 (PS6) (IFC 2012, 2019) European Bank for Reconstruction and Development (EBRD) Performance Requirement 6 (PR6) Biodiversity conservation and sustainable management of living natural resources (EBRD 2019a, 2023) and the European Investment Bank (EIB) Environmental and Social Standard (ESS) 4 Biodiversity (EIB 2022) to meet the lenders' requirements.

1.2 Purpose and objectives of a BAP

The purpose of this BAP is to describe the series of actions by which the Project will demonstrate biodiversity Net Gain (NG) for Critical Habitat-qualifying features and No Net Loss (NNL) for Priority Biodiversity Features (PBFs) and priority Valued Environmental Components (VECs). The BAP also sets out the approach for how the mitigation hierarchy will be followed, and the roles and responsibilities for internal staff and external partners.

The objectives of this BAP are to:

- List the priority biodiversity values in the Project area subject to NNL/NG targets;
- Summarise the Project's mitigation measures for implementation during construction and operation phases;
- Estimate residual impacts to priority biodiversity values;
- Set out a framework for biodiversity offsets, and assess their feasibility; and,
- Set a monitoring and evaluation framework to enable the Project to demonstrate achievement of the NNL/NG targets.

This BAP has been prepared in-line with IFC PS6 and IFC Guidance Note 6 (IFC 2012, 2019), EBRD PR6 and EBRD Guidance Note 6 (EBRD 2019a, 2023), ESS4 (EIB 2022), World Bank Group's Environmental Health and Safety (EHS) Industry General and Sectoral Guidelines on Wind Energy (World Bank Group 2015), and other international/ national guidance (e.g. IPIECA 2022). The BAP actions align with the mitigation hierarchy: i.e., avoid, minimise, restore and offset. Biodiversity offsetting measures are identified and developed following IFC PS6 requirements, and guidance published by the Business and Biodiversity Offsets Programme (BBOP 2012).

It is important to note that BAPs are 'living' documents, i.e. intended to be reviewed and updated on a regular basis. Regular review and update will take place as Project implementation progresses, and as more information becomes available on the status and ecology of priority biodiversity values, the impacts on these values from the Project and the effectiveness of

mitigation actions. This adaptive management approach will be informed by the Project's Biodiversity Monitoring and Evaluation Plan (BMEP).

1.3 Spatial and temporal scope of the BAP

The spatial (geographical) scope covered by this BAP includes:

- The Project's Area of Influence, including the Overhead Transmission Line, for which there are three alternatives at the time of developing this BAP;
- The Ecologically Appropriate Areas of Analysis (EAAA) for the threatened ecosystems, as defined in the Critical Habitat Assessment (CHA) for this Project (TBC 2025a); and,
- Other areas beyond the EAAAs, which are considered for offset implementation which include other countries located within the same migration flyway (see Section 8 and Appendix 1).

This BAP includes actions over the proposed lifespan of the Project (i.e., 25 years), with actions ending at different times depending on the priority biodiversity feature and target.

1.4 Stakeholder consultation

PS6, PR6 and ESS4 all strongly recommend projects to develop partnerships with recognised and credible conservation organisations, academic institutes, biodiversity experts and the relevant government agencies, to seek their advice during the development and implementation of a BAP. This is especially important for projects located in NH and CH, or in legally protected and internationally recognised areas (e.g. IFC 2019). Engagement with government, community and any local Non-Governmental Organisation (NGO) representatives early and through the Project will help ensure that potential offsets receive broad support and avoid unplanned costs or delays in progress towards NNL or NG. It will also ensure that the Project can learn and incorporate useful elements from other conservation programmes elsewhere in the region.

A list of stakeholders consulted during the development of the BAP are included in the Offset Feasibility Study (OFS) (Appendix 1).

2 Project description

The Project site is located within the Ras Ghareb City (or District) and therefore administratively under the Ras Ghareb City Council. The closest official (under Ras Ghareb District) community settlements to the Project site include Wadi Dara settlement (less than 1km to the south) and Ras Ghareb City (around 35 km to the north). There is also an unofficial community settlement known as Ras Shukeir around 8 km to the northeast of the Project site (Figure 1). The Project is composed by the following infrastructure:

- 25 8.0 MW wind turbines;
- Medium Voltage Cables connecting the wind turbines to substations;

- A Communications Network consisting of a Supervisory Control and Data Acquisition (SCADA) system for the remote operation of the facilities.
- Substations (to convert the output from the turbines to a higher voltage);
- Building Infrastructure for the daily operation of the Project;
- Road network; and,
- 220 kV (Kilovolt) Overhead Transmission Line (OHTL), with three options under consideration with a length of between 723 m and 2,064 m.

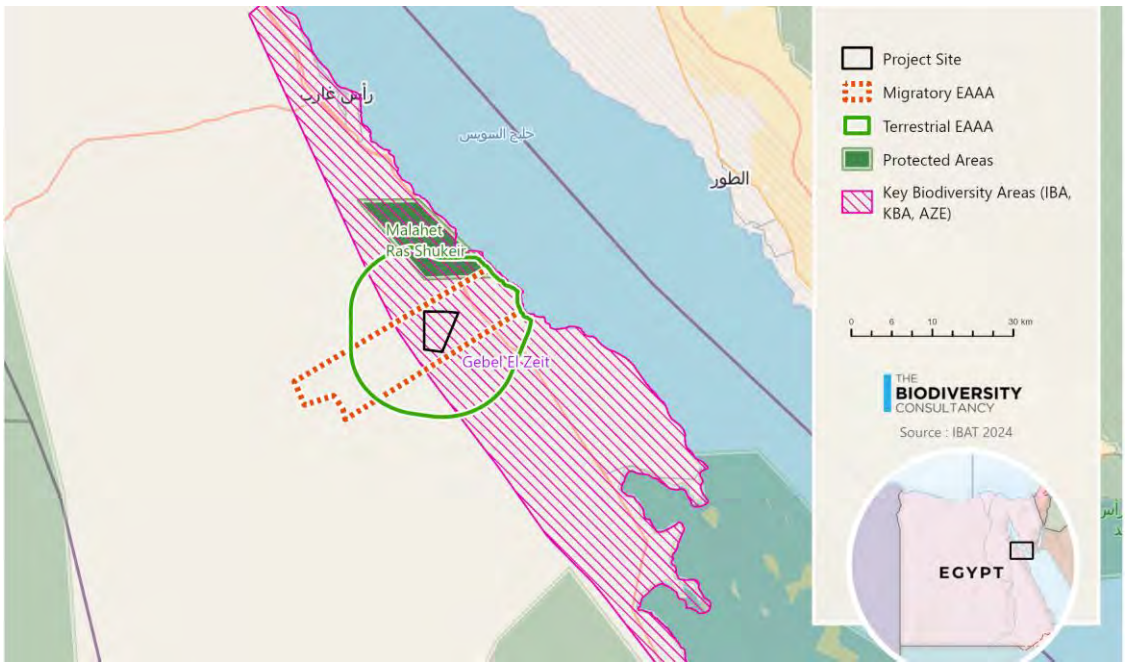

Figure 1. The Project Site, nearby population centres and the Gebel el Zeit Key Biodiversity Area

3 Project policies & commitments

3.1.1 Corporate policy

Scatec has a framework for identifying and managing all environmental and social (E&S) aspects relevant to the business under its Environmental and Social Management System (ESMS). This system guides the management of biodiversity risks throughout the projects lifecycle, starting from the initial project assessment, planning, construction and operations to the project decommissioning phase. Scatec is committed to operating in line with the Equator Principles, IFC's Environmental and Social Performance Standards and OECD Guidelines for Multinational Enterprises to ensure consistent practices across all projects.

3.1.2 Lender requirements

The Project is committed to align with IFC PS6 (IFC 2012, 2019) EBRD PR6 (EBRD 2019a, 2023), EIB ESS4 (EIB 2022) and other good international industry practice (GIIP) guidance such as the World Bank Group's Environmental Health and Safety Industry General and Sectoral Guidelines

on Wind Energy (World Bank Group 2015). Specific PS6, PR6 and ESS4 requirements applicable to this BAP are highlighted in the relevant sections of this document. As part of these requirements, NG is required for those biodiversity values for which the Project is in an area of CH. Gains can either be generated via biodiversity offsets (that achieve measurable, additional outcomes) where the Project has impacts to CH values or via supporting additional conservation activities that are focused on CH values for which the Project has no impact. NNL, at least, for PBFs and VECs is required, and, where feasible, for NH: this may include offsets where there are significant residual impacts to a PBF, VEC or NH.

4 Biodiversity context

The Project is in the Red Sea Coastal Desert Ecoregion (Dinerstein *et al.* 2017) and occurs on a gently sloping sand plain at ~70–130 m above sea level, approximately 8 km inland from the Gulf of Suez coast to the east and 15 km from the edge of the escarpment (northern Red Sea Mountains) to the west. Land cover consists primarily of bare ground with very scattered low-growing vegetation, supporting a low diversity and abundance of terrestrial flora and fauna (EcoConServ *et al.* 2024). Within and around the Project area are several wadis, which drain the escarpment. Most vegetation occurs in these wadis, where the small shrub *Ochradinus baccatus* is frequent (Grontmij & EcoConServ 2010). The local area contains a number of existing wind farms and small oil fields, along with several small agricultural operations (e.g. poultry farms, date palm plantations, some crops) immediately south of the Project area (Grontmij & EcoConServ 2010).

The Project occurs within the Red Sea/Rift Valley flyway (Figure 2) for migratory soaring birds which connects breeding grounds in Europe with wintering areas in Africa (BirdLife International 2015). This flyway is used by over 1.5 million individuals from 37 species of migratory soaring birds, as well as a suite of migratory passerines and other bird groups (BirdLife International 2015). The Project is entirely within the Gebel El Zeit Key Biodiversity Area[1] (KBA) and Important Bird Area[2] (IBA) (see Figure 1). This KBA/IBA is a very important migration corridor for soaring migrants, particularly birds of prey and storks, and forms an important stop-off point in the Red Sea/Rift Valley flyway. This KBA/IBA is the narrowest point in the southern part of the Gulf of Suez and migratory birds using this flyway are funnelled through the area during both spring and autumn journeys. The KBA/IBA is identified as a 'bottleneck' site on the Red Sea/Rift Valley flyway by BirdLife International[3].

[1] https://www.keybiodiversityareas.org/site/factsheet/6217

[2] https://datazone.birdlife.org/site/factsheet/gebel-el-zeit-iba-egypt

[3] https://datazone.birdlife.org/birdlife-is-working-to-mainstream-soaring-bird-conservation-along-the-rift-valley/red-sea-flyway

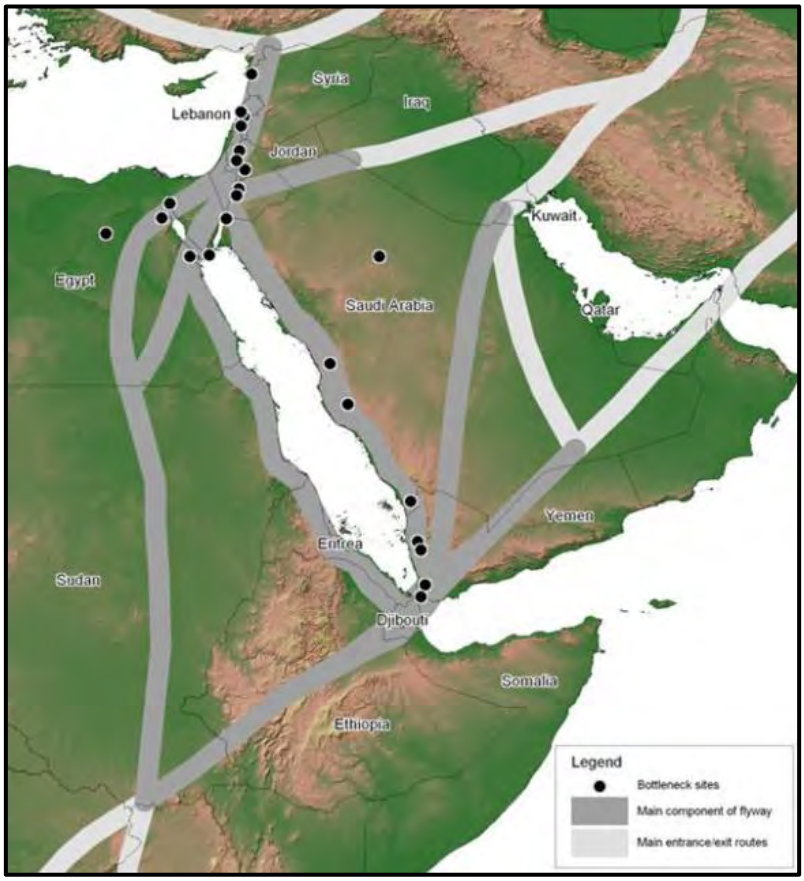

Figure 2: Map of the main elements of the Rift Valley/Red Sea flyway showing key bottleneck sites (Source: BirdLife International).

4.1 Priority biodiversity values

4.1.1 Overview

This BAP focuses on and species that require special management measures rather than all biodiversity. The priority species for this BAP are those within at least one of the categories below (elaborated in subsequent sections), and which are likely to be affected by the Project:

- Potential Critical Habitat-qualifying species under the IFC PS6, EBRD PR6 or EIB ESS4;
- Species classified as Priority Biodiversity Features under EBRD PR6; or
- Species considered as priority VECs.

Note that while IFC PS6 requires NNL of NH, where feasible, the assumption of this BAP is that Project impacts to Natural Habitat are minimised as far as practicable through controls in the Project's ESIA and supporting documents (EcoConServ & EcoConsult 2023), residual impacts are considered to not be significant, and so offsets are not required (following IFC 2012 paragraph 15 and footnote 9).

4.1.2 Critical Habitat values

Areas of "high biodiversity value" are termed Critical Habitat by the IFC, EBRD, and EIB, based on the presence and/or quantity of significant biodiversity (e.g., threatened species, highly threatened ecosystems) and independent of the condition of the habitat or impacts of a project. The Critical Habitat Assessment for the Project (TBC 2025a) identified that the Project is in an area of Critical Habitat for 12 species (Table 1), all of which are migratory soaring birds. For these species the Project is required to demonstrate (e.g. IFC 2012, paragraph 17):

- No other viable alternatives within the region exist for development of the project on modified or natural habitats that are not critical;
- The Project does not lead to measurable adverse impacts on those biodiversity values for which the critical habitat was designated, and on the ecological processes supporting those biodiversity values;
- Stakeholders are consulted in accordance with ESS 2 and 7;
- The Project does not lead to a net reduction in the global and/or national/regional population of any Critically Endangered or Endangered species over a reasonable period of time; and,
- A robust, appropriately designed, and long-term biodiversity monitoring and evaluation program is integrated into the client's management program.

Table 1. Priority biodiversity for the Project.

Taxa	Scientific name	English name	IUCN Category[a]	Critical Habitat species[b]	Priority Biodiversity Feature[b]	Priority VEC[c]
Birds	*Aquila nipalensis*	Steppe Eagle	EN	Yes	No	Yes
	Accipiter brevipes	Levant Sparrowhawk	LC	Yes	No	Yes
	Ciconia ciconia	White Stork	LC	Yes	No	Yes
	Buteo buteo vulpinus	Eurasian (Steppe) Buzzard	LC	Yes	No	Yes
	Ciconia nigra	Black Stork	LC	Yes	No	Yes
	Grus grus	Common Crane	LC	Yes	No	Yes
	Pelecanus onocrotalus	Great White Pelican	LC	Yes	No	Yes
	Pernis apivorus	European Honey-buzzard	LC	Yes	No	Yes
	Aquila heliaca	Eastern Imperial Eagle	VU	Yes	No	Yes
	Neophron percnopterus	Egyptian Vulture	EN	Yes	No	No
	Clanga pomarina	Lesser Spotted Eagle	LC	Yes	No	No
	Clanga clanga	Greater Spotted Eagle	VU	Yes	No	Yes
	Falco concolor	Sooty Falcon	VU	No	Yes	No
	Falco naumanni	Lesser Kestrel	LC	No	Yes	No
	Falco vespertinus	Red-footed Falcon	VU	No	Yes	No
	Falco cherrug	Saker Falcon	EN	No	Yes	No
	Milvus migrans	Black Kite	LC	No	Yes	Yes
	Hieraaetus pennatus	Booted Eagle	LC	No	Yes	Yes
	Buteo rufinus	Long-legged Buzzard	LC	No	Yes	No

Taxa	Scientific name	English name	IUCN Category[a]	Critical Habitat species[b]	Priority Biodiversity Feature[b]	Priority VEC[c]
	Circus macrourus	Pallid Harrier	NT	No	Yes	Yes
	Circaetus gallicus	Short-toed Eagle	LC	No	Yes	No
Reptiles	*Uromastyx aegyptia*	Egyptian Spiny-tailed Lizard	VU	No	Yes	No
Mammals	*Hypsugo ariel*	Desert Pipistrelle	DD	No	No	Yes
	Eptesicus bottae	Botta's Serotine	LC	No	No	Yes
	Pipistrellus rueppellii	Rüppel's Pipistrelle	LC	No	No	Yes
Habitats		Wadis	-	No	No	Yes

[a] LC = Least Concern, DD = Data Deficient, EN = Endangered, VU = Vulnerable and NT = Near Threatened.

[b] As defined in the Critical Habitat Assessment (TBC 2025a).

[c] As defined in the Cumulative Effects Assessment (TBC 2025b)

4.1.3 Priority Biodiversity Features

In addition to CH-qualifying features, EBRD also requires identification of a suite of PBFs which are of lower concern, but still important for a project to consider (EBRD 2019b, 2023). The Project CHA (TBC 2025a) classified nine birds species and the Egyptian Spiny-tailed Lizard (*Uromastyx aegyptia*) as PBFs (Table 1).

Following EBRD PR6, the Project must achieve at least No Net Loss for PBFs. The Project's mitigation strategy to achieve NNL for these features is described in in following sections of this report. Where significant residual impacts on PBFs remain, additional remediation and offset measures are likely to be required to achieve NNL.

4.1.4 Priority VECs

VECs is a concept used in cumulative impact assessment to indicate an environmental or social attribute that is considered important in assessing risk. Priority VECs are those at highest risk of cumulative effects from the Project in the study area, and identification of Priority VECs allows mitigation, monitoring and management measures to be focused on those species of highest risk. Identification of Priority VECs for the Project has been undertaken in a Cumulative Effects Analysis (CEA) (TBC 2025b), which identified 17 priority VECs (Table 1), and, where feasible, an acceptable impact thresholds for each species. The objective of the mitigation strategy for these species is NNL.

5 Potential impacts on priority biodiversity

This section provides an overview of potential biodiversity impacts related to the wind farm and OHTL for the construction and operation phases of the Project. The impacts mentioned below have been compiled and interpreted using the Project ESIA (EcoConServ & EcoConsult 2023) and the sector guidelines impacts checklist (Bennun *et al.* 2021; OCDE 2024).

Mitigation measures for the predicted impacts are presented in Section 6 and a quantitative residual impact assessment, assuming the successful implementation of the mitigation measures, is presented in Section 7 of this BAP.

5.1 Construction impacts

For the wind farm site impacts are associated with the installation of turbines and associated infrastructure (e.g., access roads, hard stands, buildings). These activities will primarily affect the Egyptian Spiny-tailed Lizard trough habitat loss and degradation and direct loss of individuals. Also, the species could be impacted due to disturbance (e.g. due to noise, light, vibration, and human presence), collision with vehicles or hunting pressure by project staff.

5.2 Operational impacts

The main impact of the operational wind farm is the collision of susceptible bird and bat species with moving turbine blades. Turbines may also act as a barrier to the normal movements of some bird and bat species. Electrocutions of birds may also occur at OHTL pylons, while collisions of birds may occur with wires of the OHTL and the OHTL may also act as a barrier to the normal movements of some bird species. Impacts during operation to the Egyptian Spiny-tailed Lizard are:

- Disturbance due to noise, light, vibration, and human presence (e.g. machinery, vehicles);
- Collision with vehicles; and,
- Hunting pressure by project staff.

6 Mitigation Strategy

6.1 Mitigation hierarchy

The mitigation measures adopted by the Project will follow the mitigation hierarchy: avoid, minimise, restore, and compensate/offset (Figure 3). Avoidance entails 'designing out' an impact or risk (e.g., through relocating a project component, avoiding a harmful activity, employing alternative technology), preventing their expected impacts on biodiversity. Minimisation reduces the severity of impacts on biodiversity by controlling or limiting the source of that impact and reduce the likelihood or magnitude of biodiversity impacts, but do not completely prevent them.

Restoration seeks to recreate the original (pre-project) habitat type or to actively enhance the rate of recovery of degraded habitats on the Project site, with a focus on areas affected temporarily during construction. Where significant residual impacts remain, compensation and/or offset actions to achieve an overall NNL for NH, where feasible, and NG for CH-qualifying features will need to be developed.

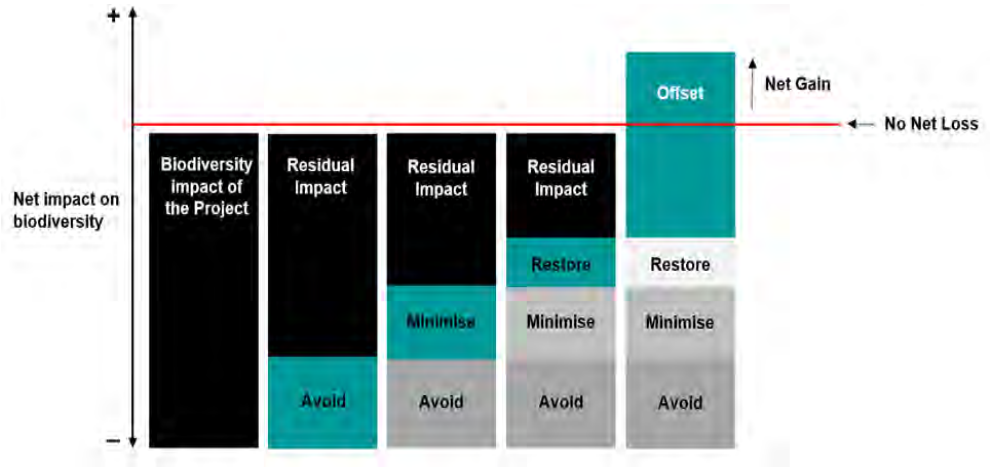

Figure 3. The Mitigation Hierarchy and delivery of net positive impact on biodiversity.

6.2 Mitigation actions

6.2.1 Priority Birds

Avoidance of impacts is not possible without moving the wind farm which is in unfeasible given the existing and planned neighbouring wind farms.

Soaring bird collision mortality has been identified as the main biodiversity risk associated with the Project. **Minimisation** of such impacts on migratory soaring birds will been implemented in the Project from the start of operation, through the adoption of Shut-Down On Demand (SDOD) following the protocols established under the overarching framework of the Active Turbine Management Program (ATMP) for Wind Power Projects in the Gulf of Suez (e.g. GreenPlus 2021, 2022; NREA & SafeSoar 2023). The project will adopt bird monitoring and this SDOD approach during spring and autumn migratory seasons for the life of the Project. The start and end of the monitoring period and the final detailed delineation of the ATMP will be agreed with the ATMP Technical Committee[4] prior to commencement of each migration season.

Based on current information, monitoring must take place during the spring migration season (from 20 February until 15 May) and autumn migration season (from 10 August till 15 November). Throughout these periods, monitoring will take place every day and last for 10 – 12 hours each day, between one hour after sunrise and one hour before sunset. A set of Vantage Points (VPs) for monitoring flight activity and to facilitate effective SDOD will be defined, ensuring all the turbines and a buffer area will be covered by constant observation. The buffer will ensure that enough time is available for turbines to be shut down when birds approach. Observers at vantage points will use walkie-talkies (and mobile phones, as a backup) to

[4] This includes members from Regional Center for Renewable Energy and Energy Efficiency, Egyptian Environmental Affairs Agency and Egyptian Electricity Transmission Company

communicate between each other and the SCADA coordinator (when a shutdown is necessary). Observers will work in pairs and in shifts to ensure a vigilance throughout the daily survey period. During the SDOD monitoring, observers will detect and count all migratory soaring birds in the Project area and map their movements. They also will evaluate collision risk and determine whether one or more wind turbines should be temporarily shut-down, based on pre-determined shut-down criteria, that include:

- *Condition 1 – Threatened species*
  Whenever a targeted soaring bird(s) of a threatened species (according to up-to-date IUCN Red List) is detected in the wind farm area or heading towards it at risky flight altitudes (≤200 m);
- *Condition 2 – Flocks with 10 or more targeted soaring birds*
  Whenever flocks with 10 or more soaring birds are detected in the wind farm area, or heading towards it, at risky flight altitudes (≤200 m);
- *Condition 3 – Imminent risk of collision*
  Even when the previous conditions are not met, one or more turbines should be shut down whenever there is an imminent high risk of collision of migratory soaring bird(s) with turbine(s);
- *Condition 4 – Extreme weather*
  Turbines should be shut down during extreme weather events (e.g., sand/dust storms) or other precarious events that threaten the safety of the monitoring team or the targeted soaring birds, whenever conditions 1 or 2 have been verified in the two hours that preceded the event; and,
- *Condition 5 – Roosting inside or near windfarm area*
  Whenever bird(s) of a threatened species (Condition 1) or flocks with 10 or more soaring birds (Condition 2) are detected roosting or attempting to roost inside or near the windfarm area (≤2000 m), risky turbines should be shut down until the bird(s) depart the risk zone, or until the risk is assessed as low by the Field Coordinator.

Existing and future data on bird monitoring, bird behavioural variables, site specific characteristics and weather data and other relevant data will be used to:

- define/delimit the key flight activity periods at the Project area; and,
- identify high-risk areas and times, and definition of groups of turbines by zones for the SDOD Program and achieve effective coverage throughout the Project.

Onsite **restoration** of habitats is not possible for these species as none are likely to regularly use any terrestrial habitat present.

The requirement for **offsets** for priority birds is discussed in Sections 7 and 8 and Appendix 1.

6.2.1.1 Proposed improvements in mitigation

The mitigation of Project's impacts on birds can be further enhanced if other improvements opportunities, resulting from the acquired knowledge from other projects in the area (e.g. TBC

2023a; Camiña Cardenal *et al.* 2024) are added to the ATMP operation described in the ESIA and presented in the previous section (Table 2).

Table 2. Recommended improvements to mitigation actions and their expected impact in reducing collisions of migratory soaring birds.

Improvement action	Stage	Expected impact in reducing collision fatalities
Standardization of SDOD and PCFM protocols, including details on the chain of responsibility and sequence of actions for successful implementation of shutdowns. Supervision of the SOD and PCFM by a wildlife expert a proper background on data collection and statistical analysis.	Planning	Low
Results from bird monitoring and PCFM will inform on the need to extend the SDOD period for migratory seasons. This extended period may be performed with a reduced number of vantage points, but results obtained will be used to calibrate the ATMP implementation season for future campaigns.	Field work	Low
Development of a Carcass Management Plan to keep the project area and its surroundings free of carcasses. This should be maintained for the life of the project, alone, or in cooperation with other developers, which could be potentially affected. Support the development of a Carcass Management and Social Action Plan to manage the dead chicken from the farms in the surroundings to decrease bird collision risks	Field work	Moderate
Extend the daily observation periods to 12 consecutive hours to cover the full day light period	Field work	Moderate
Reduce the number of turbines monitored by each VP (ideal ratio of 1 VP to 4 WGT) and the average distance between monitored turbines and VPs, as collisions are more likely at turbines at 750 m – 1,500 m from VPs (Camiña Cardenal *et al.* 2024). Adopt an equal monitoring effort among VPs.	Field work	High
Installation of one or more additional radio repeaters in strategic location(s) within the Project, to improve communication between the field coordinators and the SCADA coordinator.	Equipment	Moderate
Use of two radars in both monitoring seasons (spring and autumn) located in optimized locations, that should be operated by experienced radar ornithologists. Additional, radar operators should receive comprehensive training in all aspects of RASOD, including bird migration.	Equipment	High
Installation of Bird Flight Diverters along the entire length of all OHTLs associated with the Project.	Equipment	High

Improvement action	Stage	Expected impact in reducing collision fatalities
All mortality events and observed near misses (turbines not shutting down before birds fly through or not shutting down at all) should be investigated to provide indications for improvement under adaptive management. For each carcass that is found an investigation must be conducted by the ATMP team in order to investigate what likely reasons leading to the failure in the SDOD system (e.g., communication failure, bird was not detected, adverse weather/sand storm, bird disturbed while roosting, SCADA failure). Results of this investigation, along with any resulting changes in protocols, should be included in the ATMP monitoring report.	Data analyses	Moderate

6.2.2 Priority bats

No avoidance or minimisation of impacts to priority bats has been incorporated into Project design, as no bat activity was recorded during ESIA surveys (EcoConServ & EcoConsult 2023) and any impacts are predicted to minimal.

6.2.3 Egyptian Spiny-tailed Lizard

The following measures will be implemented to avoid and minimize the Project's impacts on the species:

- Promote awareness among staff and contractors of the ban on hunting and provide training in appropriate procedures to follow on site during construction and operation;
- If the use of explosives is necessary during construction, precutting techniques and the use of micro-retarders should be used, thus attenuating the intensity of vibrations;
- Map the Egyptian Spiny-tailed Lizard burrows within the project area and identify suitable translocation sites prior to construction;
- Plan construction works to occur 50 m from Egyptian Spiny-tailed Lizard burrows, where possible;
- Establish capture and relocate of individuals protocols burrows based on demonstrated good practice for the relocation of this type of species; and,
- Establish low-speed traffic rules and adequate signposting on the project's roads/access routes to reduce the likelihood of road kills.

6.2.4 Wadi habitat

Impacts to all wadi habitats have been avoided as far as possible through project design due to the associated flood risk and no further mitigation has been proposed.

7 Residual impact assessment

7.1.1 Priority birds

For the purposes of this BAP, predicted residual impacts are mainly based on the Collision Risk Model results provided by the Client, plus additional fatalities from the Project's OHTL based on values estimated for the SWE neighbouring project (TBC 2024) (grey columns in Table 3). The CRM did not provide fatality estimations for three species, Common Crane (*Grus grus*), Red-footed Falcon (*Falco vespertinus*) and Saker Falcon (*Falco cherrug*). For the Common Crane we used the fatality estimate obtained from Post-Construction Fatality Monitoring (PCFM) for a set of wind farms located nearby (TBC 2023a) and for the other two species, which both have low abundance in the Project area, we assumed the lowest species fatality value reported for other species using the CRM approach.

OHTL fatalities estimates were obtained by adjusting the estimated fatalities for the SWE project (49 km OHTL) to the length of the longest OTHL option being considered for the Project. (*c.* 2 km). The estimates for the SWE project were based on the adjusted generalized mortality estimator (GenEst) number of fatalities for eight OHTLs in the immediate vicinity of that Project OHTLs (EcoConsult & Turnstone Ecology 2024).

The effectiveness of shut-down on demand was assumed to be 98% for all species based on the effectiveness estimates from other studies (e.g. 100% for both the Kipeto and Barão de São João wind farms: Tomé *et al.* 2017; Kimani *et al.* 2022).

Annual estimated fatalities for the Project was 99 soaring birds (Table 3), with 78 (~79%) being of the White Stork (*Ciconia ciconia)*. The remaining individuals comprise: seven Great White Pelican (*Pelecanus onocrotalus*); four Levant Sparrowhawk (*Accipiter brevipes*); three Eurasian (Steppe) Buzzard (*Buteo buteo vulpinus*); three European Honey-buzzard (*Pernis apivorus*); one Steppe Eagle (*Aquila nipalensis*) and one Black Kite (*Milvus migrans*) (Table 3).

Apart from the minimisation measures the Project has committed to implement (see Section 6.2.1.), some incremental improvements could be possible to reduce collision risk with the implementation of the actions described in Table 2. If these were implemented by the Project, mitigation effectiveness is assumed to increase 99%. Using this approach the annual estimated fatalities are reduced to 50 (pale blue columns in Table 3), with estimated annual fatalities ranging from ~0 (14 species) to 39 for the White Stork, with all the other impacted six species having predicted annual fatalities between 1 and 3 (Table 3). Therefore, the adoption of this suggested additional mitigation would allow for a reduction in the predicted residual impacts and consequently would reduce the need for offsets and their magnitude.

These are predicted impacts, and PCFM is required to determine the actual fatalities of priority species: such monitoring is essential to update the Project's residual impacts and to allow for adaptive management and mitigation during operation.

Table 3. Estimated annual fatalities from collisions with wind turbines and OHTL at the Project area for priority birds.

Species	Critical Habitat species[a]	Priority Biodiversity Feature[a]	Priority VEC[b]	Fatality threshold[b]	Predicted annual collisions from CRM [c]	Predicted WTG impacts (using data from Blade)[d]	Predicted residual impacts for WTG[e]	Predicted WTG collisions after additional mitigation[f]	Predicted OHTL impacts from SWE wind farm[g]	Predicted OHTL impacts for the Project[h]	Total predicted project residual impacts	Total predicted project residual impacts after additional mitigation
Steppe Eagle	Yes	No	Yes	0	65	-	1	1	0	0	1	1
Levant Sparrowhawk	Yes	No	Yes	0	221	-	4	2	1	0	4	2
White Stork	Yes	No	Yes	0	3895	-	78	39	10	0	78	39
Eurasian (Steppe) Buzzard	Yes	No	Yes	0	158	-	3	2	3	0	3	2
Black Stork	Yes	No	Yes	0	19	-	0	0	0	0	0	0
Common Crane	Yes	No	Yes	0	-	0	0	0	0	0	0	0
Great White Pelican	Yes	No	Yes	0	336	-	7	3	0	0	7	3
European Honey-buzzard	Yes	No	Yes	0	147	-	3	1	7	0	3	2

Species	Critical Habitat species[a]	Priority Biodiversity Feature[a]	Priority VEC[b]	Fatality threshold[b]	Predicted annual collisions from CRM [c]	Predicted WTG impacts (using data from Blade)[d]	Predicted residual impacts for WTG[e]	Predicted WTG collisions after additional mitigation[f]	Predicted OHTL impacts from SWE wind farm[g]	Predicted OHTL impacts for the Project[h]	Total predicted project residual impacts	Total predicted project residual impacts after additional mitigation
Eastern Imperial Eagle	Yes	No	Yes	0	0	-	0	0	0	0	0	0
Egyptian Vulture	Yes	No	No	0	0	-	0	0	0	0	0	0
Lesser Spotted Eagle	Yes	No	No	0	1	-	0	0	0	0	0	0
Greater Spotted Eagle	Yes	No	Yes	0	0	-	0	0	0	0	0	0
Sooty Falcon	No	Yes	No	0	0	-	0	0	0	0	0	0
Lesser Kestrel	No	Yes	No	3	0	-	0	0	0	0	0	0
Red-footed Falcon	No	Yes	No	0	1	-	0	0	0	0	0	0
Saker Falcon	No	Yes	No	0	1	-	0	0	0	0	0	0
Black Kite	No	Yes	Yes	3	61	-	1	1	0	0	1	1

Species	Critical Habitat species[a]	Priority Biodiversity Feature[a]	Priority VEC[b]	Fatality threshold[b]	Predicted annual collisions from CRM [c]	Predicted WTG impacts (using data from Blade)[d]	Predicted residual impacts for WTG[e]	Predicted WTG collisions after additional mitigation[f]	Predicted OHTL impacts from SWE wind farm[g]	Predicted OHTL impacts for the Project[h]	Total predicted project residual impacts	Total predicted project residual impacts after additional mitigation
Booted Eagle	No	Yes	Yes	0	1	-	0	0	0	0	0	0
Long-legged Buzzard	No	Yes	No	0	1	-	0	0	0	0	0	0
Pallid Harrier	No	Yes	Yes	0	0	-	0	0	0	0	0	0
Short-toed Eagle	No	Yes	No	0	2	-	0	0	0	0	0	0

[a] As defined in the Critical Habitat Assessment (TBC 2025a).
[b] As defined in the Cumulative Effects Assessment (TBC 2025b).
[c] Data provided by the Client.
[d] Based on PCFM data from TBC (2023a).
[e] Assuming that the ATMP reduces fatalities by 98%
[f] Assuming that the ATMP reduces fatalities by 99%
[g] Using GenEst (TBC 2024) and considering a 49 km extension of the OHTL.
[h] Adjusted from the SWE wind farm to the 2 km OTHL extension.

7.1.2 Priority bats

No bat activity was recorded during ESIA surveys (EcoConServ & EcoConsult 2023) and no significant impacts to any of the three priority bat VECs are predicted and accordingly no offsetting will be required to reach the Project's NNL requirement for these species. This conclusion is supported by post-construction fatality monitoring at adjacent wind farms in the Gulf of Suez region which have not found any bat carcasses during regular monitoring (e.g. Riad 2019, 2021, 2023).

7.1.3 Egyptian Spiny-tailed Lizard

The devised mitigation actions targeting the Egyptian Spiny-tailed Lizard are considered adequate to ensure that there are no predicted residual impacts for the species associated to the Project area and accordingly no offsetting will be required to reach the Project's NNL target for this species.

7.1.4 Wadi habitat

Impacts to all wadi habitats have been avoided as far as possible through project design due to the associated flood risk, no significant residual impacts are predicted for this feature and accordingly no offsetting will be required to reach the Project's NNL target for this feature.

8 Offset strategy

Biodiversity offsets and/or compensation are required to ensure:

- An overall NG of CH-qualifying features; and,
- NNL for NH, PBFs and priority VECs, where there are significant residual impacts to these features.

Based on available information as summarised elsewhere in this BAP, offsets/compensation is only required for some priority bird species. No other features are predicted to have significant residual impacts, and so no offsets are needed for these features.

8.1 Offset approach

Offsets should be used as the last resource in the mitigation hierarchy if significant residual impacts remain after all previous steps of the mitigation hierarchy (avoidance, minimisation, restoration) have been implemented to the fullest extent possible (e.g. CSBI & TBC 2015; EIB 2022)). Offsets can include off-site habitat restoration and actions that increase a species' survival or productivity (restoration offsets), and/or measures to stop the ongoing degradation and loss of biodiversity in existing designated sites or sites proposed for designation (averted loss offsets).

8.2 Offset principles

The development of potential offset actions should follow good practice (e.g. ICMM & IUCN 2013; Ledec & Johnson 2016) and key offset principles for achieving NNL/NG include:

- **Ecological equivalence:** Biodiversity gains from offsets will be planned as "like-for-like or better" (particularly as emphasised in EIB 2022);
- **Landscape context:** Offsets will be designed accounting for connectivity across the landscape, avoiding fragmentation, and maintaining flows of ecosystem services;
- **Additional:** Conservation gains will be clearly attributable to the Project's actions and will demonstrably be above and beyond results that would have occurred if the offset had not taken place;
- **Transparency:** The design, implementation and monitored outcomes of biodiversity offsets will be transparent and communicated in the public domain;
- **Precautionary approach:** Estimates of gains and losses will be conservative and include a margin of precaution proportional to the risks involved in offset delivery;
- **Long-term outcomes**: Offsets will use an adaptive management approach, incorporating monitoring and evaluation, to secure outcomes that last at least as long as the Project impacts. Securing long-term financing is essential to ensuring permanence of the offset; and,
- **Stakeholder participation**: Offsets will be based upon appropriate, extensive and transparent stakeholder consultation.

8.3 Offset governance

Biodiversity offsets are more likely to be feasible in contexts with clear institutional arrangements, good governance and management responsibility, including a high level of stakeholder involvement throughout. This provides a good basis for long-lasting implementation conservation actions. Important design principles for establishing this type of management system approach are to:

- Use existing governance structures wherever feasible;
- Ensure any new structures that are created are appropriate to the scale and stakeholders involved;
- Develop downward as well as upward accountability (implementation and financial) for all management structures; and,
- Ensure there is sufficient capacity and technical assistance within the governance and management structures to function efficiently.

8.4 Offset requirements and targets

The development of offsets is only necessary to attain the NG and NNL goals for priority bird species: these goals are presented in Table 4.

Table 4. Annual offset goals for biodiversity priority species for the Project (CH species shown in bold, for which NG is required).

Scientific name	English name	Critical Habitat species	Predicted residual impact	Predicted residual impact - additional mitigation	Annual offset target
Accipiter brevipes	**Levant Sparrowhawk**	**Yes**	**4**	**2**	**≥5**
Aquila nipalensis	**Steppe Eagle**	**Yes**	**1**	**1**	**≥2**
Aquila heliaca	**Eastern Imperial Eagle**	**Yes**	**0**	**0**	**≥1**
Buteo buteo vulpinus	**Eurasian (Steppe) Buzzard**	**Yes**	**3**	**2**	**≥4**
Ciconia ciconia	**White Stork**	**Yes**	**78**	**39**	**≥79**
Ciconia nigra	**Black Stork**	**Yes**	**0**	**0**	**≥1**
Circus macrourus	Pallid Harrier	No	0	0	0
Clanga clanga	**Greater Spotted Eagle**	**Yes**	**0**	**0**	**≥1**
Grus grus	**Common Crane**	**Yes**	**0**	**0**	**≥1**
Hieraaetus pennatus	Booted Eagle	No	0	0	0
Milvus migrans	Black Kite	No	1	1	1
Neophron percnopterus	**Egyptian Vulture**	**Yes**	**0**	**0**	**≥1**
Pelecanus onocrotalus	**Great White Pelican**	**Yes**	**7**	**3**	**≥8**
Pernis apivorus	**European Honey-buzzard**	**Yes**	**3**	**2**	**≥4**
Clanga pomarina	**Lesser Spotted Eagle**	**Yes**	**0**	**0**	**≥1**
Falco concolor	Sooty Falcon	No	0	0	0
Falco naumanni	Lesser Kestrel	No	0	0	0
Falco vespertinus	Red-footed Falcon	No	0	0	0
Falco cherrug	Saker Falcon	No	0	0	0
Buteo rufinus	Long-legged Buzzard	No	0	0	0
Circaetus gallicus	Short-toed Eagle	No	0	0	0

8.5 Offset actions

Eight offset actions were identified during discussions with potential implementing partners for their potential to deliver the annual gains required by the Project for one or more target species (Table 5)[5]. Four of these are described in detailed in the Offset Feasibility Study (Appendix 1), and are collectively considered to meet the Project's requirements under this BAP. Four additional options were identified during engagement with stakeholders and are summarised in Table 5: these options could potentially replace one or more of the four main offset actions explored, but these options were not explored in detail.

[5] Note that offset options that have been evaluated as part of disclosure documents for other wind farms in the region have not been considered here (e.g. for the Amunet and Blade wind farm projects: TBC 2022, 2023b), as it is precautionarily assumed that such offsets will have been taken up by the relevant developers.

When considering the level of offset(s) to support, the Project should initially target a potential gain much higher than that specified in Table 4 to account for (i) uncertainty in the predicted fatalities, (ii) the precision in quantification of any gains from an action, and (iii) any lag time between commencement of impacts and gains being accrued.

Once there is an agreed set of offset actions at the level required for the Project to meet its NG or NNL targets, summary information on those actions will be added here.

Table 5. Target species for each offset option. X – main target species; o – secondary target species.

English name	Retrofitting power lines in Kazakhstan	Retrofitting power lines in Egypt	Retrofitting power lines in Jordan	Program against illegal hunting / capture in the Middle East	Conservation actions for Sooty Falcon in Egypt / Middle East	Conservation actions for Great White Pelican in the Balkans	Program against illegal hunting / capture in Georgia	Program against illegal hunting / capture in Malta
Levant Sparrowhawk		o		X			X	
Steppe Eagle	X	o		X			X	
Eastern Imperial Eagle	X	o	X	X			o	
Eurasian (Steppe) Buzzard	X	X		X			X	
White Stork		X	X	X				
Black Stork		X	o	X			o	o
Pallid Harrier		o		X			o	
Greater Spotted Eagle		o		X				
Common Crane		X		X				o
Booted Eagle		o		X			X	o
Black Kite	o	X	X	X			X	o
Egyptian Vulture		o	X	o			o	o
Great White Pelican		X		o		X		
European Honey-buzzard		X		X			X	X
Lesser Spotted Eagle		o	o	o			o	
Sooty Falcon					X			
Lesser Kestrel	o			o			o	o
Red-footed Falcon				X				
Saker Falcon	X			o				
Long-legged Buzzard	X			X				
Short-toed Eagle	o		o	o				

8.6 Additional actions to support conservation

The present version of the BAP does not include specific additional actions to support conservation. However, in compliance with IFC PS6 (IFC 2012 paragraph 20; EIB 2022 paragraph 29) for projects within an Internationally Recognized Area (such as an IBA), the project is required to "implement additional programs, as appropriate, to promote and enhance the conservation aims and effective management of the area". The Project will investigated potential actions, and either include these in updated version of this BAP or include a statement that there has been an agreement reached with the lenders that no additional actions are required.

Should the Project wish to support conservation actions for priority biodiversity with no predicted impacts (e.g. Sooty Falcon; see Table 5) or non-priority biodiversity for the Project, any such actions would represent an additional action until a fatality is recorded, at which time it would automatically become an offset.

9 Next steps

This BAP fulfils the current requirements for the Project to align with relevant lender standards. To maintain alignment with these standards, the Project will:

- Commit to one or more offset actions which collectively meet their NG / NNL requirements under this BAP, and contract delivery partners to implement the such actions. The Project will have all offsets contracted before the first turbine is erected. Relevant information on these offset actions will be incorporated into an updated version of this BAP (e.g. in Section 8.5 etc.). Offset actions may require separate Offset Management Plans or similar, and may also require updates to the BMEP (see below), depending on how offsets are managed; and,
- Investigate potential programs in the Gebel el Zeit IBA to promote and enhance the conservation aims and effective management of that area, and either agree on a set of actions with relevant lender(s) or agree that no actions need to be taken. Any conclusions should be incorporated into an updated version of the BAP.

9.1 Biodiversity Monitoring and Evaluation Plan Framework

The development of a Biodiversity Monitoring and Evaluation Program (BMEP) is also required to demonstrate compliance with PS6, PR6 and ESS4. While the BMEP may be referenced in an updated BAP at a later timeframe, some general guidance relevant for determining the Project's net position (i.e. losses and gains) are highlighted below. The BMEP must include an adaptive management approach, so that monitoring can inform changes to mitigation actions if impacts are shown to be significantly higher or lower than predicted in the ESIA and this BAP.

As indicated in the Project ESIA (EcoConServ & EcoConsult 2023), this BAP assumes that standardized PCFM, in line with current best practice guidance (IFC *et al.* 2023), will be implemented in the wind farm and associated OHTLs for the life of the Project to monitor actual levels of mortality. PCFM must include carcass searching, searcher efficiency trials and carcass

persistence trials, and this information used to estimate annual fatalities using GenEst (Dalthorp *et al.* 2020). PCFM results are essential to evaluate the effectiveness of mitigation measures targeting the minimisation of bird collisions with turbines, allow for adaptive management of the ATMP and refine the Project's need for offsets if fatalities are much less or greater than predicted in this BAP.

Specific monitoring of Project OHTLs should also occur immediately after sandstorms to provide realistic information about the impact of this type of environmental event, assumed to increase the likelihood of collision, when bird visibility is minimal and manoeuvrability may be limited.

Human activities related to poultry management in the surrounding area of the Project, in particular carcass dumping, could also acting as a factor of attraction of priority birds, increasing the collision risk for the Project. A periodic monitoring of the Project area and surroundings to detect carcasses should occur as part of the implementation of the recommended Carcass Management Plan

The success of the translocation of the Egyptian Spiny-tailed Lizard must be monitored, targeting the translocated individuals as well of non-translocated individuals in the receptor area and other 'control' populations with no intervention. This should include details of any translocations, and the long-term survival of translocated individuals compared to resident individuals.

For the agreed set of offset actions, the Project, in consultation with lenders and implementing partners, would need to:

- Agree on the level of quantification for any predicted gain, and define an agreed set of biological monitoring indicators to demonstrate gains to the level required; and
- Agree on process indicators to show that the action is proceeding in a manner to deliver the assumed gain (i.e. process indicators).

For many actions, the cost of quantifying gains may be disproportionately high compared with the cost of implementing the action. A pragmatic solution would be for a collective agreement between the Project, lenders and implementing parties on likely gains from any effort or intervention so that the majority of funding can be allocated to implementation.

10 BAP implementation

10.1 Roles and responsibilities

The principal roles and responsibilities for the implementation of this BAP are outlined below. As the Project moves towards operation, additional plans may be required to operationalise the commitments made in this BAP. The responsibilities for the offset actions (Section 8) will be specified in the BOMP to be developed once the suite of offset actions have been agreed.

The Project Company's Environmental Manager will have overall responsibility for 1) coordinating the implementation of the BAP; 2) coordinate subsequent BAP updates after the

Final BAP; and 3) communicate the BAP requirements to all relevant Project personnel and contractors. The Operations Manager will ensure that all parties comply with the requirements set out in this BAP, and will approve sufficient resources for the implementation of the BAP.

The biodiversity mitigation measures described in the ESIA (EcoConServ & EcoConsult 2023) and summarised in Section 6 of this BAP will be integrated and detailed into the Construction Environmental Management Plan to be developed and implemented by the EPC Contractor. The Environmental Manager of the EPC Contractor will be responsible for the implementation of the construction and site-related mitigation measures, and they will report to the Project Company's Environmental Manager.

The key to a successful BAP is the continuous monitoring of its actions and evaluation of their effectiveness in meeting the BAP objectives. The Project Company will employ a suitably qualified biodiversity specialist to monitor whether the specific actions in the BAP are being implemented and highlight requirements for adaptive management. The actual biodiversity monitoring in the offset areas will be detailed in future versions of the BMEP and BAP, which will be developed once the offset actions are sufficiently advanced.

10.2 Budget considerations

Not included in the BAP – estimates of costs for offset actions have been provided separately.

11 References

BBOP (2012) Principles for Biodiversity Offsets. Business and Biodiversity Offsets Programme, Washington D.C., USA.

Bennun, L., van Bochove, J., Ng, C., Fletcher, C., Wilson, D., Phair, N. & Carbone, G. (2021) *Mitigating biodiversity impacts associated with solar and wind energy development*. IUCN International Union for Conservation of Nature and The Biodiversity Consultancy, Gland, Switzerland and Cambridge, UK.

Bernardino, J., Martins, R., Bispo, R. & Moriera, F. (2019) Re-assessing the effectiveness of wire-marking to mitigate bird collisions with power lines: A meta-analysis and guidelines for field studies. *Journal of Environmental Management* 252: 109651.

BirdLife International (2015) BirdLife is working to mainstream soaring bird conservation along the Rift Valley/Red Sea flyway. https://datazone.birdlife.org/birdlife-is-working-to-mainstream-soaring-bird-conservation-along-the-rift-valley/red-sea-flyway

Brochet, A.-L., Jbour, S., Sheldon, R.D., Porter, R., Jones, V.R., Fazari, W.A., Saghier, O.A., Alkhuzai, S., Al-Obeidi, L.A., Angwin, R., Ararat, K., Pope, M., Shobrak, M.Y., Willson, M.S., Zadegan, S.S. & Butchart, S.H.M. (2019) A preliminary assessment of the scope and scale of illegal killing and taking of wild birds in the Arabian peninsula, Iran and Iraq. *Sandgrouse* 41: 154–174.

Camiña Cardenal, A., Ceballos, P. & Vicente, N. (2024) Migration of Soaring Birds at Gebel el Zeit (IBA) in relation to wind energy developments (Report for EcoConsult on behalf of RCREEE). ACRENASL, Madrid, Spain.

CSBI & TBC (2015) A cross-sector guide to implementing the Mitigation Hierarchy. Cross-Sector Biodiversity Initiative, Cambridge, UK. http://www.csbi.org.uk/our-work/mitigation-hierarchy-guide/

Dalthorp, D., Simonis, J., Madsen, L., Huso, M., Rabie, P., Mintz, J., Wolpert, R. & Korner-Nievergelt, F. (2020) GenEst: generalized mortality estimator.

Dinerstein, E., Olson, D., Joshi, A., Vynne, C., Burgess, N.D., Wikramanayake, E., Hahn, N., Palminteri, S., Hedao, P., Noss, R., Hansen, M., Locke, H., Ellis, E.C., Jones, B., Barber, C.V., Hayes, R., Kormos, C., Martin, V., Crist, E., Sechrest, W., Price, L., Baillie, J.E.M., Weeden, D., Suckling, K., Davis, C., Sizer, N., Moore, R., Thau, D., Birch, T., Potapov, P., Turubanova, S., Tyukavina, A., de Souza, N., Pintea, L., Brito, J.C., Llewellyn, O.A., Miller, A.G., Patzelt, A., Ghazanfar, S.A., Timberlake, J., Klöser, H., Shennan-Farpón, Y., Kindt, R., Lillesø, J.-P.B., van Breugel, P., Graudal, L., Voge, M., Al-Shammari, K.F. & Saleem, M. (2017) An ecoregion-based approach to protecting half the terrestrial realm. *BioScience* 67: 534–545.

Dwyer, J.F., Karyakin, I.V., Garrido López, J.R. & Nikolenko, E.G. (2022) Avian Electrocutions on Power Lines in Kazakhstan and Russia. *Ardeola* 70.

EBRD (2019a) EBRD Performance Requirement 6 - Biodiversity Conservation and Sustainable Management of Living Natural Resources. European Bank for Reconstruction and Development, London, UK.

EBRD (2019b) Environmental and Social Policy. European Bank for Reconstruction and Development. http://www.ebrd.com/downloads/research/policies/esp-final.pdf

EBRD (2023) EBRD Performance Requirement 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources. Guidance Note. European Bank for Reconstruction and Development, London, UK.

EcoConServ & EcoConsult (2023) Infinity Power Holding Wind Power Plant 450 MW at Gulf of Suez - Draft Environmental and Social Impact Assessment (ESIA) (Report for Infinity Power Holdings B.V.). EcoConServ and EcoConsult, Cairo, Egypt and Amman, Jordan.

EcoConServ, EcoConsult & Safe Soar (2024) Critical Habitat Assessment (CHA): Suez Wind Energy BOO Wind Power Plant 1.1 GW - SWE South (Plot 2). RECREEE.

EcoConsult & Turnstone Ecology (2024) Biodiversity Action Plan (BAP): Suez Wind Energy BOO Wind Power Plant 1.1 GW - SWE - SWE Plots 1 & 2. RECREEE, Cairo, Egypt.

EIB (2022) Environmental and Social Sustainability Framework Standards. European Investment Bank.

Eid, E. & Handal, R. (2018) Illegal hunting in Jordan: Using social media to assess impacts on wildlife. *Oryx* 52: 730–735.

GreenPlus (2021) Shutdown on demand and bird monitoring. NREA wind farm complex. Final collective report autumn 2021 (Report for the New and Renewable Energy Agency). GreenPlus Environmental Solutions, Maadi, Egypt.

GreenPlus (2022) Shutdown on demand and bird monitoring. NREA wind farm complex. Final collective report spring 2022 (Report for the New and Renewable Energy Agency). GreenPlus Environmental Solutions, Maadi, Egypt.

Grontmij & EcoConServ (2010) EIA study for a 120-400MW wind farm El Zayt, Egypt (Report for Italgen). Grontmij | Carl Bro and EcoConServ, Aarhus, Denmark and Cairo, Egypt.

Handal, E.N., Amr, Z.S., Basha, W.S. & Qumsiyeh, M.B. (2021) Illegal trade in wildlife vertebrate species in the West Bank, Palestine. *Journal of Asia-Pacific Biodiversity* 14: 636–639.

ICMM & IUCN (2013) Independent report on biodiversity offsets. Prepared by The Biodiversity Consultancy, available at: www.icmm.com/biodiversity-offsets.

IFC (2012) Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources. International Finance Corporation (IFC), Washington DC, USA.

IFC (2019) International Finance Corporation's Guidance Note 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources.

IFC, EBRD & KFW (2023) Post-construction bird and bat fatality monitoring for onshore wind energy facilities in emerging market countries. International Finance Corporation, European Bank for Reconstruction and Development and Kreditanstalt für Wiederaufbau.

IPIECA (2022) A guide to developing biodiversity action plans for the oil, gas and alternative energy sector.

Khoury, F., Makarevicz, C., Al-Hmoud, A.-R. & Mithen, S. (2020) The illegal trapping of large falcons in Jordan. *Sandgrouse* 42: 239–247.

Kimani, D., Warui, M., Gitau, D., Hirshon, L., Wilson, D., Gatere, G. & Bennun, L. (2022) Implementing mitigation measures for collision impacts at a Kenyan wind farm. Oral presentation at the Conference on Wind and Wildlife 2022. Egmond an Zee, Netherlands.

Ledec, G.C. & Johnson, S.D.R. (2016) Biodiversity offsets: a user guide (Working Paper No. 110820). World Bank Group, Washington, D.C.

Leonardi, G., Lopes, L., Gallo Orsi, U., Javed, S. & McGrady, M. (2024) International Single Species Action Plan for the Sooty Falcon 2024 - 2036. CMS Raptors MOU, Abu Dhabi, United Arab Emirates.

Martín Martín, J., Garrido López, J.R., Clavero Sousa, H. & Barrios, V. (Eds.) (2022) *Wildlife and power lines: guidelines for preventing and mitigating wildlife mortality associated with electricity distribution networks*, 1st ed. IUCN, International Union for Conservation of Nature, Gland, Switzerland.

NCE (2018) Hunting and trapping practices in Egypt's northern Mediterranean coast.

NREA & SafeSoar (2023) Active Turbine Management Program at NREA Wind Farms.

OCDE (2024) Mainstreaming Biodiversity into Renewable Power Infrastructure. OECD Publishing, Paris, France.

Pulikova, G.I., Kaptyonkina, A.G., Smelansky, I.E., Zinevich, L.S., Nikolenko, E.G. & Karyakin, I.V. (2023) The present status of the Steppe Eagle in Kazakhstan. *Raptors Conservation* 247–252.

Qaneer, T. & Demerdzhiev, D. (2023) First data on bird electrocution in Jordan, with comments on the undertaken conservation efforts. *Acta Zoologica Bulgarica* Supplement: 59–66.

Raza, H., Fadhel, O., Ararat, K., Kh Haba, M. & Salim, M. (2011) Animal and bird trade and hunting in Iraq.

Riad, S.A. (2019) Post-construction fatality monitoring during operation of observer-led shut-down on demand system for KFW (240 MW) and FIEM (120 MW) windfarms projects at Gabel Al-Zayt (Report for the Egyptian Environmental Affairs Agency (EEAA) & BirdLife International/UNDP/GEF Migratory Soaring Birds Project). Al-Zhar University, Egypt.

Riad, S.A. (2021) Post-construction fatality monitoring during operation of observer-led shutdown on demand system with radar for KFW (240 MW), JICA (220MW) & FIEM (120 MW) windfarms projects at Gabel Al-Zayt (Report for the Egyptian Environmental Affairs Agency (EEAA) & BirdLife International/UNDP/GEF Migratory Soaring Birds Project). Al-Zhar University, Egypt.

Riad, S.A. (2023) Post-construction fatality monitoring for JICA windfarm project (220 MW) at Gabel Al-Zait - spring 2023 (Report for the Egyptian Environmental Affairs Agency (EEAA) & BirdLife International/UNDP/GEF Migratory Soaring Birds Project). Al-Azhar University.

RSCN (2019) The status of illegal trade in wild birds at the local market and online with focus on soaring birds.

RSCN (2020) Mainstreaming migratory soaring birds conservation in the five sectors of agriculture, hunting and tourism, waste management and energy in Jordan.

TBC (2022) AMEA Power Amunet Wind Farm. Biodiversity Action Plan and Offset Feasibility Study (No. Report prepared on behalf of AMEA Power). The Biodiversity Consultancy Ltd, Cambridge, UK.

TBC (2023a) Actis Project Blade. Draft Biodiversity Action Plan and Offset Feasibility Study. Cambridge, UK.

TBC (2023b) Biodiversity Action Plan and Offset Feasibility Study for Project Blade. The Biodiversity Consultancy Ltd, Cambridge, UK.

TBC (2024) Draft Biodiversity Action Plan for SUEZ Wind Energy BOO Wind Power Plant 1.1. GW – SWE South (PLOT 2) Wind Farm, Egypt. Cambridge, U.K.

TBC (2025a) Revised final Critical Habitat Assessment for the Scatec wind farm, Egypt (Report for RCREEE, the Regional Centre for Renewable Energy and Energy Efficiency). The Biodiversity Consultancy Ltd, Cambridge, UK.

TBC (2025b) Draft final Cumulative Effects Analysis for the Scatec wind farm (Report for RCREEE, the Regional Centre for Renewable Energy and Energy Efficiency). The Biodiversity Consultancy Ltd, Cambridge, UK.

Tomé, R., Canário, F., Leitão, A., Pires, N. & Repas, M. (2017) Radar assisted shutdown on demand ensures zero soaring bird mortality at a wind farm located in a migratory flyway. pp. 119–133 in: Köppel, J. (Ed.) *Wind Energy and Wildlife Interactions*. Springer International Publishing AG.

World Bank Group (2015) Environmental, Health, and Safety Guidelines for Wind Energy. World Bank Group, Washington D.C., USA. http://www.ifc.org/ehsguidelines

Appendix 1 Offset feasibility study

IMPORTANT NOTE: the Egypt Green Hydrogen / Scatec Wind Farm (this Project) and the SUEZ Wind Energy BOO Wind Power Plant 1.1. GW – SWE South (Plot 2) Wind Farm Project have agreed to investigate feasibility of a shared set of offset actions, aiming to comply with the respective net gain (NG) and no net loss (NNL) goals for the two neighbouring projects in the Gulf of Suez. While details on the relative levels of gains required for each project still need to be finalized, the offset options analysed in the present Offset Feasibility Study have in considered the cumulative NG or NNL species goals from both projects.

Introduction

This Appendix is the Offset Feasibility Study (OFS) for the Egypt Green Hydrogen / Scatec Wind Farm (the Project), which is being developed in alignment with IFC PS6 (IFC 2012), EBRD PR6 (EBRD 2019a) and EIB ESS4 (EIB 2022).

The Project has previously completed a Critical Habitat Assessment (CHA) (TBC 2025a) which determined that the Project was in an area of Critical Habitat (CH) for 12 species of birds: Levant Sparrowhawk *Accipiter brevipes*, Steppe Eagle *Aquila nipalensis*, Eastern Imperial Eagle *Aquila heliaca*, Eurasian (Steppe) Buzzard *Buteo buteo vulpinus*, White Stork *Ciconia ciconia*, Black Stork *Ciconia nigra*, Common Crane *Grus grus*, Egyptian Vulture *Neophron percnopterus*, Great White Pelican *Pelecanus onocrotalus*, European Honey-buzzard *Pernis apivorus*, Greater Spotted Eagle *Clanga clanga* and Lesser Spotted Eagle *Clanga pomarine*. Additionally, the Project CHA classified ten species, Egyptian Spiny-tailed Lizard *Uromastyx aegyptia*, Sooty Falcon *Falco concolor*, Lesser Kestrel *Falco naumanni*, Red-footed Falcon *Falco vespertinus*, Saker Falcon *Falco cherrug*, Black Kite *Milvus migrans*, Booted Eagle *Hieraaetus pennatus*, Long-legged Buzzard *Buteo rufinus*, Pallid Harrier *Circus macrourus* and Short-toed Eagle *Circaetus gallicus* as Priority Biodiversity Features (PBFs) (TBC 2025a) while a Cumulative Effects Analysis (CEA) (TBC 2025b), identified 13 migratory bird priority Valued Environmental Components (VECs), all of which were also listed as CH or PBF.

The Biodiversity Action Plan (BAP, this document) for the Project determined that offsets would be required to compensate for significant residual impacts to (i) CH-qualifying features with a Net Gain (NG) target in compliance with PS6, PR6 and ESS4; and (ii) PBFs with significant residual impacts to meet a No Net Loss (NNL) target, as required by EBRD PR6. For the remaining three priority bird VECs, the Project's mitigation strategy also has a NNL target. Acceptable impact thresholds for all species have been calculated in the Project CEA (TBC 2025b).

Potential offset options were identified through TBC's knowledge of ongoing or previous conservation projects for the target species, supplemented with informal discussions with experts and a review of regional and national avian conservation organizations (a full list of organisations and individuals consulted is included in Table 6). Four offset options are described in detail, which collectively, meet the Project's NG / NNL requirements for each of the 21 priority

bird species (Table 1, Table 4). Four additional options have also been identified which could also have the potential to meet the Project's NG / NNL requirements for one or more priority bird species, should any options of the recommended group not progress. This OFS assumes that Egypt Green Hydrogen / Scatec will propose, in agreement with Lenders, a final set of offset options and the level of contribution for implementation, and that such a commitment will be incorporated into an updated version of this BAP.

Table 6. Stakeholders contacted relevant to the implementation of offsets and the engagement status for each up to 04 December 2024.

Stakeholder (country)	Contact	Current engagement status	Offset option (countries)
Nature Conservation Egypt - NCE (Egypt)	REDACTED	Exchange of emails since 25/11/2024; waiting for NCE / BirdLife International to resolve their position on whether to engage with wind projects planned within the Gebel el Zeit IBA.	Overhead Transmission Lines (OHTL) retrofitting (Egypt) Anti-illegal hunting/capture program (Egypt)
Raptor and wildlife researcher, author of publications on the impacts of OHTLs (Kazakhstan)	REDACTED	Exchange of emails since 21/11/2024; high-level proposal prepared, including budget estimate	OHTL retrofitting (Kazakhstan)
Royal Society for the Conservation of Nature - RSCN (Jordan)	REDACTED	Exchange of emails since 26/11/2024; meeting on 02/12/2024	OHTL retrofitting (Jordan) Anti-illegal hunting/capture program (Jordan, Middle East)
Raptor and wildlife researcher, author of publications on the impacts of illegal hunting of birds (Jordan)	REDACTED	Contacted through LinkedIn on 26/11/2024, with a response on 3/12/2024; meeting to be scheduled	Anti-illegal hunting/capture program (Jordan, Middle East)
Ornithological Society of the Middle East, the Caucasus and	https://osme.org/	Contacted through OSME website on 27/11/2024; exchange of emails during December 2024; meeting to be scheduled	Anti-illegal hunting/capture program (Middle East)

Stakeholder (country)	Contact	Current engagement status	Offset option (countries)
Central Asia - OSME (Middle East)			
Environment Protection Society - KEPS (Kuwait)	info@keps.org.kw	Contacted on 27/11/2024; no response obtained	Anti-illegal hunting/capture program (Kuwait, Middle East)
Hierofalcon Research Group, Coordinator of International Single Species Action Plan for the Sooty Falcon 2024-2036 (Italy)	REDACTED	Exchange of emails since 27/11/2024; meeting on 03/12/2024	Support to conservation actions identified in the Single Species Action Plan for the Sooty Falcon 2024-2036 (Middle East)
Tour du Valat (France)	secretariat@tourduvalat.org	Contacted on 27/11/2024; no response obtained	Habitat improvement and threat reduction for Great White Pelicans (Balkans)
SABUKO – BirdLife Georgia (Georgia)	REDACTED	Exchange of emails since 28/11/2024; meeting on 06/12/2024	Anti-illegal hunting/capture program (Georgia)
BirdLife Malta (Malta)	REDACTED	Exchange of emails since 28/11/2024; meeting on 04/12/2024	Anti-illegal hunting/capture program (Malta). Not considered a feasible option.

Screening of offset options

Given the number of biodiversity features with either a NG or NNL target commitment, a combination of potential offset projects will likely be required to be supported by the Project to meet its commitments under the BAP. A high-level summary of conceptual offset options are presented in the BAP (Table 5). Four of these options were further in detail for their potential to deliver the required gains and feasibility (both political and technical[6]), through engagement with the Client, key stakeholders, implementation partners and lenders. The different options investigated are described in detail in the sections below. The following aspects are presented under each offset:

[6] Note that financial feasibility was not considered at this stage, as accurate costs are unknown for most projects.

- Target feature(s) or coverage of the action (i.e. how many of the target species the action covers);
- Context;
- Proposed area for the offset;
- Actions to be implemented for the offset;
- Key implementing partners and other relevant stakeholders;
- Demonstrable biodiversity gain (i.e., an assessment of whether the option likely provides an increase to the target species' population, whether there is a clear link between the action and a gain, and the level of quantification possible for the action);
- The political feasibility of the option (i.e., an assessment of whether the option is likely to be credible and acceptable to all stakeholders (the client, Lenders, Government, conservation organisations);
- Implementation risk (i.e., an assessment of whether there are likely to be any technical or other risk to achieving biodiversity gains linked to the option); and,
- Other benefits (i.e. some options will have benefits to only the target species, while others will have broader benefits).

Relevant criteria, chosen to represent the major trade-offs, have been given a score (scale 1-5), with lower scores indicating areas of higher risk that the offset will not deliver the intended outcome of a NG/NNL for the relevant feature. Scores are not summed nor are comparable across options, as actions and desired outcomes are different for each option, and it is likely that the whole set of presented offset options will need to be implemented to attain the overall species goals for the Project.

The additional four offset options were not explored in sufficient detail to undergo any evaluation, but could be considered if one or more of the four explored in detail did not prove to be feasible.

*Table 7. Scoring for each of the four main offset options for the Egypt Green Hydrogen / Scatec Wind Farm (*see text).*

Offset	Target biodiversity	Demonstrable gain	Political feasibility	Implementation risk	Other benefits
Retrofitting power lines in Kazakhstan	4	5	4	5	4
Retrofitting power lines in Egypt	5	4 (3*)	2	4	4
Retrofitting power lines in Jordan	4	5	5	5	4
Program against illegal hunting/capture in the Middle East	5	2	4	2	4

Evaluation of potential offset options

Retrofitting power lines in Kazakhstan

Target biodiversity: *Steppe Eagle, Eastern Imperial Eagle, Steppe Buzzard, secondary benefits to Short-toed Eagle, Black Kite, Long-legged Buzzard, Red-footed Falcon and Saker Falcon.* **Score: 4.**

Context

Electrocutions on 6-10 kV power lines is one the most impactful threats to raptors in Kazakhstan (Dwyer *et al.* 2023). In spite of existing legislation to prevent negative impacts from electricity infrastructure on wild birds, law enforcement to restrict the operation of bird-hazardous power lines is poor (Pulikova *et al.* 2023), and electrocution is seen as one of the main causes of the significant decrease of e.g. Steppe Eagles in the country (Dwyer *et al.* 2023). Surveys conducted recently (2022–202) by ACBK (BirdLife International partner in Kazakhstan) and BRCC (Biodiversity Research and Conservation Center) confirmed the high electrocution rates on several power lines in the main Steppe Eagle breeding population cores in Western and Central Kazakhstan, with up to 44 Steppe Eagles electrocuted per 10 km in some sections (ACBK 2024). Electrocution also affects other soaring birds in Kazakhstan steppes, including Eastern Imperial Eagle, Steppe Buzzard, Short-toed Eagle, Black Kite, Long-legged Buzzard, Red-footed Falcon and Saker Falcon (Dwyer *et al.* 2023). Mortality of the same and/or other raptor species due to collisions with power lines also occurs in the same areas but is probably underestimated or unreported (Dwyer *et al.* 2023).

Offset implementation areas

The areas proposed for implementation of this offset are located in the west Kazakhstan and the Aktobe regions of Kazakhstan, where high numbers of raptors have been found electrocuted and there is relatively good knowledge on the distribution of fatality hotspots (Dwyer *et al.* 2023).

Offset actions

This offset would involve installing bird-protection devices on pre-identified sections of the most dangerous 6-10 kV power lines for birds, where the mortality rate of Steppe Eagles is highest (30-50 individuals/10 km per year). In total, >10 km of power lines would be equipped to achieve the expected required gains for the different target species (see Section 3.1.5 Demonstrable biodiversity gain).

BRCC would collaborate closely with the energy company operating the power lines, purchasing the required bird-protection devices, identifying the implementation sections, and supervising their application. Bird-protection devices may consist of crossarm configurations that minimise electrocution risk, insulating elements and/or deterrent devices (following Martín Martín *et al.* 2022).

Although there are several providers of such bird-protection devices, those manufactured by Russian companies AVIS or Eco-NIOKR are proposed, as the most hazardous power lines in Kazakhstan are those inherited from the USSR times, for which there is no national production of bird-protection devices.

Fatality monitoring of the retrofitted power lines would be conducted during the following years to assess the efficiency of the mitigation measure and quantify the gains generated from the action to the different target species.

Key partners

The key implementation partners for this offset are BRCC and a Kazak researcher, both with wide experience on the power lines-raptor conflict in Kazakhstan. The national companies operating the power lines to be retrofitted would necessarily be involved as well.

Demonstrable biodiversity gain

Retrofitting of power lines through adequate insulation of exposed wiring, or the installation of anti-perching or safe-perching structures can be extremely efficient in avoiding electrocution mortality (Martín Martín *et al.* 2022). Therefore, retrofitting actions in power lines identified as raptor mortality hotspots in Kazakhstan have a great potential to decrease significantly non-natural mortality for several species, with the consequent associated population gains.

The effectiveness of insulation or deterrent devices in reducing bird fatalities by electrocution can be at least 80% (up to 99%; Martín Martín *et al.* 2022), provided that good quality equipment is used, and adequate maintenance and/or replacement is operated. Therefore, the installation of the bird-protection devices along a total of *c.* 10 km of power lines in the proposed implementation area (where Steppe Eagles mortality due to electrocution reaches 30-50 individuals/10 km per year) could avert the loss of up to 24-40 Steppe Eagles per year.

Although the available species-specific fatality rates per km are not so accurate for other species of raptor in the same region, it is very likely that this power line retrofitting offset action would also generate gains for all or some of the following priority species: Eastern Imperial Eagle, Greater Spotted Eagle, Short-toed Eagle, Black Kite, Steppe Buzzard, Long-legged Buzzard and Saker Falcon. It should be noted that fatality rates are lower for many of these species than for Steppe Eagle, and so larger lengths of line would need to be retrofitted to achieve the same amount of gain.

The measurement of resulting gains from this offset action should be based on fatality monitoring along the intervened power lines and the comparison of obtained results with those from pre-retrofitting monitoring.

Score: 5

Politically feasible

Although the Environmental Code of Kazakhstan requires that "when installing, designing, constructing, operating, repairing, reconstructing and modernising electrical networks, measures must be developed and implemented to prevent the death of birds", enforcement of this has been poor to date. Yet, a number of projects and initiatives have been organised by national NGOs – namely by BRCC[7] and ACBK[8] - together with different ministries, energy companies and other stakeholders to define the best approaches to tackle bird fatalities in power lines in Kazakhstan. Therefore, no political opposition or constraints are envisaged respecting a significant expansion of those actions and the implementation of the proposed offset actions.

Score: 4

Implementation risk

No significant implementation risks are identified, as power lines retrofitting procedures are relatively standard and bird-protection equipment is commercially available.

Score: 5

Other benefits

The retrofitting of power lines in the proposed sensitive area would likely result also in moderate benefits for other raptors species that are not listed as priorities in the Project BAP but have also been found electrocuted in the surveys conducted in the area to date, including Golden Eagle, Common Kestrel, and other Falconiformes (falcons) and Strigiformes (owls) (Dwyer *et al.* 2023).

Score: 4

Retrofitting power lines in Egypt

IMPORTANT NOTE: while this option is included in this Appendix, whether it is available to the Project as an offset potentially depends on the outcome of NCE and Birdlife International internal discussions regarding their position on engaging with Projects which occur in IBAs and which have impacts to IBA trigger species.

Target biodiversity: *White Stork, Black Stork, Great White Pelican, Common Crane, European Honey Buzzard, Black Kite, Steppe Buzzard, secondary benefits potentially to all the remaining priority species.* **Score: 5.**

[7] https://www.brcc.kz/en/projects-and-plans/death-of-birds-on-power-lines/

[8] https://www.acbk.kz/article/default/view?id=660

Context

Nature Conservation Egypt (NCE, the BirdLife International partner in Egypt) has conducted fatality surveys along *c.* 276 km of power lines in the Gulf of Suez region between 2019 and 2021, to assess the existing impacts on migratory soaring birds from the existing electricity grid infrastructure. These surveys resulted in the finding of 333 bird carcasses, of at least 28 different species, due to collisions with the power lines. A large majority (87%) of these fatalities involved soaring birds, with storks, particularly the White Stork, representing 47.4% of the total. Black Stork, Great White Pelican, Common Crane and European Honey Buzzard were also amongst the most represented species (NCE *unpub. data*). For the most impacted species, annual bird mortality per 10 km in the surveyed power lines varied between 0.13 individuals (for White Stork, Great White Pelican and Common Crane in the Sinai region) to 3.75 individuals (for White Stork in the western margin of the Gulf of Suez) (NCE *unpub. data*).

With the financial support of BirdLife International, NCE is cooperating with EETC (the Egyptian Electricity Transmission Company) to retrofit 25 km of a hazardous transmission line in Sinai, by installing adequate anti-collision devices (Bird Flight Diverters – BFDs) along the line.

NCE is also working together with EETC for the retrofitting of another 16 km on the western side of the Gulf of Suez, as part of offset targets associated to the development of two wind farms in Gabal el Zeit region. An additional 100 km have been identified by NCE has of high risk for migratory soaring birds collision in the Gulf of Suez, and therefore where retrofitting could significantly decrease fatalities (NCE staff, *pers. comm.*).

Offset implementation areas

The exact location in Egypt of the power line sections where retrofitting should be implemented to attain the Project offset targets would need to be identified in conversation with NCE.

Offset actions

This offset would consist of the installation of BFDs along an appropriate length of transmission power lines to result in the expected reduction of species-specific fatalities needed to attain the offset targets for the Project. This action would be conducted by NCE in close cooperation with EETC and under the same type of existing framework agreement that is associated with the above-mentioned ongoing retrofitting actions.

Fatality monitoring of the retrofitted power lines and appropriate control lines would be conducted during the following years to assess the efficiency of the mitigation measure and the gains generated to the different target species.

Key partners

The key implementation partners for this offset are NCE and EETC. It is not known if the Project could work with EETC directly if NCE / Birdlife decide not to engage.

Demonstrable biodiversity gain

BFDs are commonly recommended as the most important mitigation measure to reduce bird collisions in existing high voltage power lines, with an average effectiveness of 50% (Bernardino *et al.* 2019).

The present fatality rates at the power lines available for retrofitting have not been shared by NCE at this stage. However, it is likely that the retrofitting of sections showing a higher number of fatalities along the pre-identified 100 km would result in a marked decrease in fatalities of several priority species, contributing significantly to the species offsets goals required from the Project.

Quantification of gains from this offset action would be based on fatality monitoring along the retro-fitted lengths of power lines and adjacent non-retrofitted lengths, and then comparison of these results with those from pre-retrofitting monitoring. Given the rapid expansion of the wind industry and associated transmission lines in, particularly, the Gulf of Suez region, it may become increasingly challenging to quantify the level of gains due to (e.g.) changing bird behaviour in response to the large volume of infrastructure lack of appropriate controls (i.e. non-BFD fitted lines) with which to compare against. Given this, there are clear benefits of implementing this offset as early as possible.

Score: 4 (3 if delayed)

Politically feasible

NCE has already been collaborating with EETC in the retrofitting of other power lines where a high number of bird fatalities occurred, and therefore no constraints are envisaged respecting an expansion of those actions.

Importantly, however, NCE, as part of the BirdLife International partnership, shows a deep concern about the expansion of wind energy projects within the Gabal el Zeit Important Bird Area (IBA), where both the Scatec Wind Farm and the SUEZ Wind Energy BOO Wind Power Plant 1.1. GW – SWE South (Plot 2) projects are planned to be installed. Consequently, and until a process of ongoing discussion and evaluation within the BirdLife International partnership is finalised, NCE could not commit to get involved in the implementation of this offset option in the future. It is not known if the Project could work with EETC directly if NCE / Birdlife decide not to engage.

Score: 2.

Implementation risk

No significant implementation risks are identified, as power lines retrofitting using BFDs follows standard procedures, BFDs are commercially available, and this type of actions is already being implemented in different stretches of the Egyptian transmission and distribution grid.

Score: 4.

Other benefits

A significant expansion of the retrofitting of power lines along the Rift Valley/Red Sea Flyway in Egypt would likely result also in moderate benefits for a variety of migratory and non-migratory bird species.

Score: 4.

Retrofitting power lines in Jordan

Target biodiversity: *Egyptian Vulture, Steppe Eagle, White Stork, Black Kite, secondary benefits to Short-toed Eagle, Black Stork and potentially to all the remaining priority species.* **Score: 4.**

Context

A study led by the Royal Society for the Conservation of Nature (RSCN; BirdLife International partner in Jordan) along 161 km of power lines in the north and south of Jordan and with surveys conducted three migratory seasons (spring and autumn 2019 and autumn 2021) revealed 215 electrocuted birds from nine species (Qaneer & Demerdzhiev 2023). The most common victim (197 individuals) was the White Stork, while one to six individuals of other raptor species (Short-toed Eagle, Black Kite, Steppe Eagle, Egyptian Vulture, Peregrine Falcon and Golden Eagle, by decreasing order of importance) were also found. Other incidental observations from the same areas also reported the presence of Black Stork in electrocutions (RSCN 2020).

As a result of these survey efforts, at least 250 poles causing a high number of electrocutions were identified, especially close to stopover sites used by White Storks during migration (RSCN 2020b). RSCN and Irbid Electricity Company (IDECO) signed an MoU aiming at facilitating the cooperation between the two institutions to provide a joint framework that guides the implementation of powerlines and transformers insulation projects along the flyways of migratory birds. Through the EU-funded "Egyptian Vulture New LIFE" project RSCN purchased insulation materials that were used to retrofit the most hazardous poles (RSCN 2022). RSCN also signed MoUs with the remaining electricity companies in the country and cooperates with them to identify the power lines and poles that represent higher electrocution risk to birds and need further retrofitting actions (Tareq Qaneer *pers. comm.*).

Offset implementation areas

The existing information on bird electrocution impacts in Jordan results from relatively limited systematic survey efforts conducted so far (Qaneer & Demerdzhiev 2023). However, in other areas in the country it is likely that impacts of similar magnitude occur in power lines without adequate insulation and poorly designed regarding bird protection. The exact areas/power lines where this offset action should be implemented need to be further assessed with RSCN, aiming to maximize the gains for the Project priority species.

Offset actions

This offset would involve equipping with bird-protection devices (safe crossarm configurations, insulating elements and/or deterrent devices; Martín Martín *et al.* 2022) pre-identified sections associated with a high number of electrocutions. The number of power line poles to be retrofitted would depend on measured current fatality rates, targeting the expected reduction of species-specific fatalities needed to attain the offset targets for the Project.

This action would be conducted by RSCN in close cooperation with the three national electricity companies with whom MoUs have already been established.

Fatality monitoring of the retrofitted power lines would be conducted during the following years to assess the efficiency of the mitigation measure and the gains generated to the different target species.

Key partners

The key implementation partners for this offset are RSCN and the three electricity companies in Jordan.

Demonstrable biodiversity gain

Adequate insulation of exposed wiring, or the installation of anti-perching or safe-perching structures can be extremely efficient in avoiding electrocution mortality (Martín Martín *et al.* 2022). Therefore, the retrofitting of high-risk power line sections/poles can significantly reduce bird mortality. This was also the case in some of the high-fatality poles in northern Jordan, where fatalities were reduced to zero after retrofitting (Tareq Qaaner *pers. comm.*).

Although species-specific fatality rates are not available for the power line sections that would be retrofitted as part of this offset, it is very likely that it would generate significant gains for White Stork and measurable gains also for other priority species, including Egyptian Vulture, Steppe Eagle, Black Kite, Short-toed Eagle and Black Stork.

The measurement of resulting gains from this offset action should be based on fatality monitoring along the intervened power lines and the comparison of obtained results with those from pre-retrofitting monitoring.

Score: 5

Politically feasible

RSCN has established MoUs with the three national electricity companies in Jordan which would facilitate the development of the proposed power line retrofitting in any region of the country. Furthermore, RSCN has developed a national guideline regarding powerlines and bird protection, that was submitted to the Ministry of Environment for legal approval. Also, a regional training curriculum was developed by RSCN to protect birds from the danger of electrocution, and a specialized training was held for electricity companies and relevant stakeholders (RSCN 2022). These previous actions confirm the high reputation that RSCN has

among the relevant national stakeholders and therefore no political opposition or constraints are envisaged respecting the implementation of the offset.

Score: 5

Implementation risk

No significant implementation risks are identified, as power lines retrofitting procedures are relatively standard and bird-protection equipment is commercially available.

Score: 5

Other benefits

The proposed retrofitting of power lines would likely result also in moderate benefits for other raptors species that are not listed as priorities in the Project BAP (e.g. Golden Eagle and Peregrine Falcon), as well as for non-raptor species (e.g. Little Egret, Brown-necked Raven) that have also been found electrocuted in surveys conducted in Jordan to date (Qaneer & Demerdzhiev 2023).

Score: 4

Programme against illegal hunting/capture in the Middle East

Target biodiversity: *Steppe Eagle, Eastern Imperial Eagle, Greater Spotted Eagle, Steppe Buzzard, European Honey Buzzard, Short-toed Eagle, Black Kite, Long-legged Buzzard, Booted Eagle, Pallid Harrier, Levant Sparrowhawk, Red-footed Falcon, Saker Falcon, White stork, Black Stork and Common Crane. Secondary benefits to other non-priority soaring birds.* **Score: 5.**

Context

The hunting and/or capture of migratory birds is a long-lasting tradition in North Africa and the Middle East. Traditionally using basic hunting techniques and minimal tools, hunting practices have become nowadays more widespread and intensive, based on technological developments and a growing market for illegally captured birds (NCE 2018). Illegal hunting impacts a huge number and variety of migratory bird species, including the raptors and other soaring birds which are the targets for this offset action[9]. A study conducted by NCE under the Responsible

[9] E.g. 7 European Honey Buzzards, 7-14 Steppe Buzzards, 18-39 Long-legged Buzzards, up to 4 Black Kites, up to 71 Short-toed Eagles, up to 7 Booted Eagles, up to 4 Levant Sparrowhawks, 4 Pallid Harriers and 56-92 Red-footed Falcons are sold in markets in northern Egypt every autumn (NCE 2018), 10-125 Eastern Imperial Eagles and 100-312 Greater Spotted Eagles are hunted every year in the Arabian Peninsula, especially in Qatar (Brochet et al. 2019), and 1 Steppe Eagle/year, 4 White Storks/year, 1 Black Stork/year and 30 Common

Hunting Programme (RHP) initiative along Egypt's northern Mediterranean coast estimated that more than 13 raptors were captured per day and over 72 raptors were sold per day in markets in the region during the annual autumn migration (NCE 2018).

Brochet *et al.* (2019) also estimated that at least 1.7–4.6 million (best estimate: 3.2 million) birds of at least 413 species, including 3,300–11,700 raptors, may be killed or taken illegally each year in the Arabian Peninsula, Iran and Iraq. Other research conducted in the West Bank/Palestine (Handal *et al.* 2021) and Jordan (Eid & Handal 2018; RSCN 2019) confirmed that several raptors, storks and cranes are regularly hunted or traded in the region.

Offset implementation areas

The programme against illegal hunting/capture in the Middle East would aim to cover several countries in the region, particularly those where well-coordinated partners organisations could support its implementation: Egypt, Jordan and Kuwait, possibly expanding to other countries (e.g. Iraq).

Offset actions

This programme would include the development of a wide range of actions in the different implementation countries across the Middle East region, including:

- Training and support of rangers' teams and law enforcement agencies to increase vigilance and implementation of relevant environmental laws on illegal hunting/trade;
- Development and roll-out of awareness campaigns targeting hunters, local communities involved in illegal hunting and trade, and general public;
- Support of anti-hunting teams and equipment for the seizing and recovery of illegally captured birds; and,
- Development of social support programs to identify and provide alternative income or livelihood options (e.g. ecotourism).

Key partners

Key implementation partners for developing the Programme against illegal hunting/capture would be required in each of the countries involved. This would potentially include: NCE (Egypt), RSCN (Jordan), KEPS (Environment Protection Society, BirdLife International partner in Kuwait) and possibly OSME (Ornithological Society of the Middle East, the Caucasus and Central Asia). Also, the government agencies responsible of law enforcement in the different countries (e.g. EEAA - Egyptian Environmental Affair Agency, in Egypt) would need to be involved.

Crane/year are hunted in Jordan (Eid & Handal 2018) while an undetermined number of Saker Falcons is captured every year in Iraq (Raza, et al. 2011) and Jordan (Khoury *et al.* 2020).

Demonstrable biodiversity gain

The reduction of illegal hunting and trade by local communities or organized groups is very challenging and demands the involvement of multiple stakeholders (e.g. NGOs, Government institutions) and at different levels (national law enforcement agencies, local communities, social media). Yet, an investment in law enforcement, rangers training, monitoring of physical and digital markets and awareness campaigns has already apparently resulted in some reduction of those types of environmental crime in Jordan (Tareq Qaneer *pers. comm.*).

While the overall effectiveness of any program against illegal hunting/capture would be challenging to estimate given its illegal and dispersed nature, it could be expected that even a relatively low success would represent a significant contribution to the offset targets of the Project in terms of number of individuals saved, given the magnitude of the impacts from illegal hunting and trade. Regarding the Project priority species, the available data indicate that, at the very least:

Any resulting gains from this offset action is extremely challenging to measure directly due to the illegal nature of the activity, the potential for hunting to move away from areas where any program is active (rather than being stopped by the program) and confounding socio-economic factors which may make illegal hunting more / less attractive. The most effective demonstration of success will likely be through proxy indicators – e.g. tracking the number of illegal traps found by law enforcement (e.g. (NCE 2018), numbers of violations / prosecutions recorded, and the trend in numbers of birds being sold in physical and digital markets (e.g. Eid & Handal 2018, NCE 2018). There would then need to be a collective agreement (between the implementing partners, the Project and lenders) on the link between absolute gains for different species and any proxy indicators.

Score: 2

Politically feasible

Previous work has been conducted in different countries, that shows an existing collaboration between potential implementation partners for this offset and the national government authorities responsible for law enforcement respecting illegal hunting and trade of birds. This is the case in e.g. Egypt, where NCE conducted surveys on the hunting and trapping of migratory birds along Egypt's Northern Mediterranean coast for 3 years, in cooperation with EEAA and working closely with the involved local communities (it is worth noting that some extent of trapping and capturing of migratory birds is legally permitted in the region, and that a large number of households is involved in this activity) (NCE 2018). Also, in Jordan RSCN has been working closely with the main national environmental and law enforcement agencies, such as the environmental police unit (Rangers), to protect biodiversity and fight illegal hunting (e.g. RSCN 2019b). As such, no political opposition or constraints are envisaged respecting a significant expansion of actions against illegal hunting or trade of birds in the Middle East.

Score: 4

Implementation risk

While this offset seems not to present political challenges, it is likely that the development of the proposed actions would face some degree of social resistance and objection within local communities. The Program implementation requires a high level of engagement with local communities and law enforcement agencies and staff, and the ability to mainstream biodiversity aspects across to uninterested (or opposing) audiences.

Additionally, metrics to measure accurately the effectiveness of the Programme against illegal hunting/capture may be difficult to identify, as impacts from illegal hunting may tend to be increasingly more difficult to assess as the Program implementation progresses.

Score: 2

Other benefits

The proposed Programme against illegal hunting/capture would very likely result in moderate-high benefits for the wide range of other soaring birds and non-soaring birds hunted or captured illegally every year across the Middle East.

Score: 4

Additional offset options

A number of additional offset options have been identified and may be needed for the Project to comply with their NG and NNL requirements (should one of the four main actions not be deemed feasible) or undertaken as additional actions. For most of these options, a meeting with the main lead of the conservation project has already taken place (see Table 6), but additional and more detailed information was not available before this report was finalised. Therefore, a more comprehensive assessment of such options will be required if any of these are progressed. The additional offset options, and respective lead stakeholder (see also Table 6), are:

- Implementation of conservation actions in breeding colonies of Sooty Falcon in Egypt/Middle East (Coordinator of the International Single Species Action Plan for the Sooty Falcon 2024-2036), as identified in the species Action Plan (Leonardi *et al.* 2024). This could include the provision of artificial nests on islands where suitable nesting areas are being occupied by construction, reducing disturbance at active colonies, improve enforcement of existing laws on poaching/disturbance, etc. Although several countries across the species breeding range could accommodate such actions, Egypt stands out as the most appropriate country for implementation;
- Habitat improvement and reduction of anthropogenic threats to the Great White Pelican in the Balkans (Tour du Valat, France), involve the development of actions to protect breeding habitat areas for the Great White Pelican, including reducing human disturbance (e.g. by fishermen and hunters) and other anthropogenic threats (e.g. power

lines). Probably these conservation actions would be conducted in the Mediterranean Basin, as a follow-up of the projects previously implemented by Tour du Valat[10];

- Program against illegal hunting/capture in Georgia (Fauna & Flora). While the contacts maintained with SABUKO (BirdLife Georgia) led to the conclusion that the feasibility of implementing a more general anti-illegal hunting programme in Georgia is doubtful under the present political and social situations, they resulted in the identification of a more feasible option, focused on reducing illegal hunting of Levant Sparrowhawk. This species is captured as a by-catch of mist-net hunting directed at Eurasian Sparrowhawk (*Accipiter nisus*), Goshawk (*Accipiter gentilis*) and Peregrine Falco *(Falco peregrinus*). This activity is permitted under some requirements to falconers, who use the captured raptor species to hunt Quails (*Coturnix coturnix*). Levant Sparrowhawks are not used as falconry birds of prey but can be killed/injured during mist-netting and/or be given as food to other birds of prey caught. Fauna & Flora in Georgia has led a specific education/awareness campaign, involving schools and student's families, aiming at the reduction of this impact on Levant Sparrowhawk. This offset option could target a broader, expanding awareness actions to a wider public and different villages; and,
- Program against illegal hunting/capture in Malta (BirdLife Malta) - although developing effective actions against illegal hunting in Malta is deemed extremely challenging due to likely resistance within the local community and law enforcement (many of whom are involved in such illegal hunting), this option would involve strengthening law enforcement, expanding vigilance over environmental crime, reinforcing awareness/education campaigns and widening collaboration with other BirdLife partners (e.g. NCE, BirdLife Egypt) in the Mediterranean Basin.

[10] https://tourduvalat.org/en/actions/conservation-of-white-and-dalmatian-pelicans/