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Akköy Wind Power Plant (WPP) Project

Supplementary Biodiversity Surveys Final Report

March 2025

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Mott MacDonald
Mesa Koz
Sahrayıcedit District
Atatürk Street No. 69 / 255
34734 Kadıköy
Istanbul
Turkey

T +90 (0) 216 766 3118
mottmac.com

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Mott MacDonald T Danışmanlık Mühendislik Ltd Şti. is a member of the Mott MacDonald Group registered in England and Wales no 1110949. Registered office: 10 Fleet Place, London, EC4M 7RB, United Kingdom

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Definitions and Abbreviations

Abbreviation	Definition
AoI	Area of Influence
AZE	Alliance for Zero Extinction
BAP	Biodiversity Action Plan
BERN	The Convention on the Conservation of European Wildlife and Natural Habitats
BMP	Biodiversity Management Plan
CHA	Critical Habitat Assessment
CITES	Convention for the International Trade in Endangered Species of Wild Fauna and Flora
CR	Critically Endangered
CRM	Collision Risk Model
DD	Data Deficient
DKMP	General Directorate of Nature Conservation and National Park
EBRD	European Bank for Reconstruction and Development
EIA	Environmental Impact Assessment
EN	Endangered
ESIA	Environmental and Social Impact Assessment
ETL	Energy Transmission Line
EU	European Union
EUNIS	European Nature Information System
GIS	Geographic Information Systems
GN	Guidance Notes
IBA	Important Bird Area
IFC	International Finance Cooperation
IUCN	International Union for Conservation of Nature
KBA	Key Biodiversity Area
LC	Least Concern
MoENR	Ministry of Energy and Natural Resources
NP	National Park
NT	Near Threatened
PBF	Priority Biodiversity Features
PCFM	Post-construction Fatality Monitoring
PR	Performance Requirement
PS	Performance Standard
Ramsar	Convention on Wetlands of International Importance Especially as Waterfowl Habitat
SP	Sampling Point for ground static acoustic bat surveys
T	Turbine
TRDB	Turkish Red Data Book
VES	Visual Encounter Survey

VP	Vantage Point
VU	Vulnerable
WPP	Wind Power Plant

Executive summary

Akköy Wind Power Plant (WPP) Project ("the Project") with six turbines and 25.2 MW_m/25.2 MW_e total installed power, was established by Enerjisa Üretim and is currently in operation. As a result of the Environmental and Social Impact Assessment (ESIA) study conducted by the Consultant, biodiversity data gaps were identified for the Project's compliance with the applicable national and international standards. Supplementary biodiversity baseline collection was carried out by the Project Company in 2024. The draft final report presents flora, terrestrial fauna, bird and bat survey results and outcomes for the study period.

For the baseline collection of herpetofauna during the spring, and summer, seasons, fieldwork commenced in the early morning at daylight and continued until dusk to account for nocturnal species. With the exception of *Testudo graeca*, which is classified as Vulnerable (VU) by the IUCN and listed in CITES Annex-II, all other species, including herpetofauna, are classified as Least Concern (LC), indicating no significant extinction risk. There are no endemic herpetofauna species among the identified species.

For the baseline collection of terrestrial mammal species during the spring and summer seasons of 2024, a total of 20 fieldwork days were conducted. In the Project Area of Influence, 6 species are listed in Annex II of the Bern Convention, 7 species in Annex III, and 2 species in Annex II of CITES. According to the IUCN Red List, no species are classified as endangered, with 1 species categorized as Vulnerable (VU). During the 2024 monitoring studies for the project, the jungle cat (*Felis chaus*) was observed at two locations near the project area. The nearest wind turbine to the first observation site is T3, located 4.15 km away, while the closest turbine to the second observation site is T6, situated 3 km from the sighting location.

There is no data different from which was identified in the local EIA process for the ETL and access road, and no rare/regional or endangered plant species are present in these locations. The target species, *Globularia alypum*, was not identified during the 2024 field surveys. Due to seasonal variations observed in 2024, further research should be undertaken in 2025 to verify the absence of this species within the Project area.

For the baseline collection of bird species, NatureScot VP surveys at turbines and ETL and breeding bird surveys via transect and point counts were carried out in spring, summer and autumn by a full-time surveyor. Surveys revealed low migratory rates for 2024 survey period, and low overall collision risk estimations based on this year's results. ETL segment with higher collision hazard was not identified. Additional mitigation and monitoring approaches were recommended for wintering and breeding bird species.

For the baseline collection of bat species, NatureScot ground static acoustic surveys were carried out in spring, summer and autumn, in addition to transect surveys covering turbine areas. Surveys revealed low levels of bat activity including threatened species M. schreibersii and N. lasiopterus. Additional mitigation and monitoring approaches were recommended with regards to fatality migitation.

For post-construction bird and bat fatality monitoring, routine ground carcass searches were carried out during bat active season between April-November covering turbine pads and roads. 4 experimental studies were carried out to determine statistical parameters. The bat fatality rate was estimated at 665 bat fatalities per year or approximately 75–164 bats per turbine annually. Fatality rates are considered high, likely due to the attraction of high-flying bats to the nearby landfill. Additional mitigation and monitoring approaches were recommended.

1 Introduction

1.1 Project Background

Enerjisa Üretim Santralleri Anonim Şirketi has been awarded to invest in the Aydın Connection Region on 30 May 2019 within the scope of "Renewable Energy Resource Areas (YEKA) Regulation" and "Allocation of Wind Energy Based Renewable Energy Resource Areas (YEKA) and Total Connection Capacities"[1]. Upon this award, a "YEKA Use Rights Agreement" was signed between Enerjisa Üretim Santralleri Anonim Şirketi and Ministry of Energy and Natural Resources (MoENR) on 09 March 2020. Subsequently, the "YEKA Use Rights Agreement" signed by Enerjisa Üretim Santralleri Anonim Şirketi for the Aydın Connection Region was transferred to Enerjisa Enerji Üretim Anonim Şirketi ("Enerjisa Üretim" or "the Project Company") with the transfer agreements signed on 03 June 2021.

Akköy Wind Power Plant (WPP) Project ("the Project") with six turbines and 25.2 MWm/25.2 MWe total installed power, was established by Enerjisa Üretim in Aydın Province, Didim District, Akköy and Yeniköy Villages and is in operation phase. The Project components consist of six turbines, a switchyard, Project roads (i.e., access and site roads) and an energy transmission line (ETL) as a Project associated facility. The Project is part of a nine-project wind energy investment package initiated by Enerjisa Üretim which has a 750 MW total installed power from a total of 180 wind turbines located in Aegean and Marmara Regions of western Türkiye; aiming to evaluate and utilize the wind energy potential of the region and contribute to the national strategy and regional economy.

The Enerjisa YEKA Nine Wind Power Plants (WPPs) projects have undergone Environmental and Social Impact Assessment (ESIA) and Critical Habitat Assessment (CHA) studies, conducted by Mott MacDonald ("Consultant"), also including Biodiversity Management Plan (BMP) development. However, due to limitations identified in the baseline data during the ESIA studies, supplementary biodiversity field surveys were deemed necessary. Consequently, Enerjisa Üretim has commissioned Mott MacDonald Türkiye to develop the site-specific baseline collection methodologies and conduct field studies accordingly. Supplementary baseline studies were conducted for each WPP, as details are provided throughout this report, managed by expert teams using relevant methodologies.

1.2 Scope of Study

As a result of the ESIA study conducted by the Consultant, biodiversity data gaps were identified for the Project's compliance with the applicable national and international standards as presented in Section 2. Supplementary biodiversity collection methodologies for flora and fauna were subsequently developed by the Consultant and field surveys were scheduled in 2024 to address biodiversity data gaps which would (1) enhance the Project biodiversity baseline to provide reliable and robust results, (2) enable revisions of CHA and BMP, (3) provide clarifications with regards to implementation of mitigation hierarchy and (4) conduct operation phase monitoring for the Project. The supplementary biodiversity surveys cover the period between March and November 2024, which represents three seasons, spring, summer, and autumn.

[1] Published in the Official Gazette Date/No: 07.11.2018/30588

1.3 Limitations

The following limitations regarding field scheduling, data collection, analysis and interpretation of the results are presented:

- Due to the ongoing ESIA process, the biodiversity baseline field survey was mobilized as fast as possible after methodologies were agreed upon. Full-time surveyor was able to be mobilized by mid-April 2024, which represents a minor data gap for fatality monitoring.
- Since the Project is in operation phase, the flora and fauna baseline collection was conducted in the Area of Influence (as defined in the ESIA) level rather than footprint.
- For bird baseline, access restrictions to the delta area [2]due to complicated permitting processes with local authorities, and to the ETL due to complications with public-private land use was a challenge. The Project Company is taking steps to streamline access in 2025.

[2] Delta area: Büyük Menderes Delta National Park Area

2 Applicable Guidelines and Standards

2.1 National Requirements

The primary framework of the Turkish legislation for environmental legislation is the Environmental Law (Law No: 2872). National laws and regulations regarding protection of the habitats and species are listed in Table 2-1.

Table 2-1 National Legislation on Biodiversity

Legislation (Official Gazette Date/Number - Last Revision Date)	National Strategy Documents
Law on National Parks (11.08.1983/18132 - 09.07.2018) Terrestrial Hunting Law (11.07.2003/25165 - 28.10.2020) Law on Animal Protection (01.07.2004/25509 - 13.12.2010) Regulation on the Protection of Wetlands (04.04.2014/28962 - 23.06.2022) Regulation for Implementing the Convention on International Trade in Endangered Species of Wild Fauna and Flora (27.12.2001/24623 - 20.07.2019) Regulation on Protection of Wildlife and Wildlife Development Areas (08.11.2004/25637) Law on Protection of Cultural and Natural Assets (23.07.1983/18113 - 15.06.2022) Regulation on Collection, Protection and Usage of Plant Genetic Resources (19.07.2012/28358) Law on Fisheries (04.04.1971/ 13799 - 17.02.2021) The Environmental Protection Agency for Special Areas (08.07.2011/ 27988) Environment Law (11.08.1983 / 18132 - 15.06.2022) Forestry Law (08.09.1956 / 9402 - 25.12.2021) Law on Pasture (28.02.1998 / 23272 - 18.01.2019) Law on Coastal Areas Management (17.04.1990 / 20495 - 28.10.2020)	National Plan on on-site Protection of Plant Genetic Diversity (1998) National Environmental Action Plan (1999) National Forestry Program (2004) Climate Change Action Plan (2012) Turkish National Action Plan against Desertification (2015) National Rural Development Strategy (2015) National Biological Diversity Strategy and Action Plan (2019)

2.2 International Requirements

International agreements, conventions, and protocols regarding protection of the habitats and species are listed below:

- The Convention for the Protection of the Mediterranean Sea Against Pollution (Barcelona Convention) (1981)
- The Convention on the Conservation of European Wildlife and Natural Habitats (BERN) (1984)
- United Nations Framework Convention on Climate Change (1994)
- The Convention on Wetlands of International Importance especially as Waterfowl Habitat (RAMSAR) (1994)
- The UN Convention on Biological Diversity (1997) and Cartagena Protocol on Biosafety (2004)
- Kyoto Protocol (2009)
- The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) (1996)
- Paris Agreement (2016)

2.3 Project Standards

The Project Company intends to develop the Project in alignment with the applicable international and national standards, and the policy and requirements of the Lenders (i.e., EP IV, IFC and EBRD standards).

The international lender standards concerning biodiversity for the Project are represented by the IFC Performance Standards (PS6) and related Guidance Note (6), EBRD Performance Requirements (PR6) and Guidance Note (6) as well as Equator Principles IV (EP IV).

The impact assessment and critical habitat assessment are carried out in accordance with the following international requirements:

- IFC Performance Standards on Environmental and Social Sustainability,
- EBRD's Environmental and Social Policy and Performance Requirements
- International Union for Conservation of Nature (IUCN) Red List of Threatened Species
- The Birds Directive (2009/147/EC)
- The Habitats Directive (92/43/EEC10)
- Post-construction Bird and Bat Fatality Monitoring for Onshore Wind Energy Facilities in Emerging Market Countries - Good Practice Handbook (2023)

The IFC PS6 objectives can be listed as:

- To protect and conserve biodiversity,
- To maintain the benefits from ecosystem services,
- To promote the sustainable management of living natural resources through the adoption of practices that integrates conservation needs and development priorities.

Similarly, the EBRD PR6 objectives are as defined below:

- Protect and conserve biodiversity using a precautionary approach,
- Adopt the mitigation hierarchy in the design and implementation of projects with the aim of achieving no net loss, and where appropriate, a net gain of biodiversity,
- Maintain ecosystem services, and
- Promote good international practice in the sustainable management and use of living natural resources.

3 Methodology

3.1 Flora

3.1.1 Flora Methodology

In order to reveal the flora inventory in the study area, the studies were carried out in three steps. These are 1-Desktop studies (Basic Preparation), 2-Field studies, 3-Survey (interview) studies. The flora studies have been specifically concentrated on the ETL and access road area, with research and seed collection efforts directed towards the target plant species found within these designated areas.

Desktop Studies:

- Station selection and literature review were conducted utilizing geographic information systems (GIS).
- As part of the GIS studies, stations for point and transect observations were initially established using satellite images as a preliminary step.
- Previous flora studies near the study area were examined within the scope of literature survey. The Project's well-studied National EIA for flora includes a flora study covering turbine locations.
- For the flora assessment, satellite maps were initially analysed as part of the field study preparations. Subsequently, fieldwork was conducted to survey the terrain and habitats within the designated area.
- Information on the distribution of species was obtained from literature sources and this information was used as a base for further analysis. For flora species, the literature sources given in Section 6.1 were reviewed.
- The synonyms of the species were also taken into consideration in the literature review.
- Within the scope of literature survey, nationally protected and internationally recognized areas were investigated, such as Büyük Menderes Delta KBA.

Field Studies:

- Field studies were carried out in previously not surveyed areas, particularly those with the potential to support target species. As a supplementary component, flora assessments were predominantly focused on the ETL and access road corridors, while turbine locations were taken into account but did not constitute the primary emphasis of the study.
- The first phase of fieldwork was carried out primarily to verify the quality of the stations identified in the desktop studies. If deemed necessary in the preliminary field work, adjustments were made to the stations. Natural and semi-natural habitats in the Project area and its immediate surroundings were taken into consideration in determining the stations.
- Surveys were carried out in 2024 during the vegetation period, with the objective of thoroughly assessing and documenting the various plant species present within the study area. The studies utilized the region's 1:25,000 scale topographic map, satellite images, GPS device, camera, a notebook, and various materials for collecting plant samples in the field, including transparent bags, a hoe, pruning shears, a plant press, and seed envelopes.
- The field studies were primarily conducted along 500-meter transect lines, representing different habitats within the Project's footprint and area of influence.

- During the field studies, the third-level EUNIS habitat types of the study area along each transect line were also identified.

The below steps were followed in the identification process of plant species:

- During the identification of plant specimens, various sources were used; firstly, Flora of Turkey and the East Aegean Islands, as well as the digital version of the Flora of Turkey (Tübives) and other references as given in section 6.1.
- Latin and Turkish names, family information, and taxonomic classification were based on the book “Türkiye Bitkileri Listesi (Damarlı Bitkiler) [List of Plants of Turkey (Vascular Plants)]” published by the Turkish Flora Research Association in 2012.
- Recent publications and newly added taxon records to the Flora of Turkey have also been reviewed, and the study Important Plant Areas of Turkey has been referenced as well.
- References have also been made to The Plant List, Plants of the World Online, and the International Plant Name Index (IPNI), and Bizimbitkiler.org.
- When determining the national IUCN threat categories of the identified species and subspecies, both endemic and non-endemic rare taxa, the primary reference used was the Red Data Book of Turkish Plants. For determining the global IUCN threat categories, the official website of the IUCN Red List was used as the main reference.

3.1.2 Field Schedule

The survey was conducted between June-July 2024.

3.1.3 Survey Locations

For the purpose of evaluating floristic diversity within the scope of the Project, the boundaries of the study area were first defined. The study area was defined with a primary focus on the ETL area, including ongoing operations, energy production activities, solid/liquid waste management, dust, air emissions, noise, electromagnetic impacts, and the environmental effects and spread distances of these emissions. (See Table 3-1 and Figure 3-1)

Table 3-1 Flora Survey Location (Point and Transects)

Flora Point			Transect			
Station No	Survey Point	Nearest Project Element	Transect No	Transect Start Location	Transect End Location	Nearest Project Element
1	37°28'27.72"N - 27°16'29.98"E	T1- Access Road – Site Road	1	37°28'34.68"N- 27°16'28.35"E	37°28'21.66"N- 27°16'30.47"E	T1- Access Road – Site Road
2	37°27'9.51"N - 27°13'44.11"E	Access Road	2	37°27'25.68"N- 27°15'48.30"E	37°27'17.84"N- 27°15'39.24"E	Switch Yard – Site Road- Access Road
3	37°27'25.10"N - 27°15'45.87"E	Switch Yard – Site Road – T4	3	37°26'29.53"N- 27°15'7.29"E	37°26'17.38"N- 27°15'6.93"E	ETL
4	37°26'18.63"N - 27°15'7.14"E	ETL – T6	4	37°25'5.18"N- 27°16'8.11"E	37°24'54.83"N- 27°16'20.57"E	ETL
5	37°24'55.79"N - 27°16'18.22"E	ETL	5	37°27'16.25"N- 27°15'8.16"E	37°27'3.36"N- 27°14'54.41"E	ETL -Site Road
6	37°27'8.07"N - 27°14'58.02"E	Site Road – ETL	6	27°14'54.41"E- 27°16'17.64"E	37°28'9.19"N- 27°16'0.19"E	ETL -Site Road

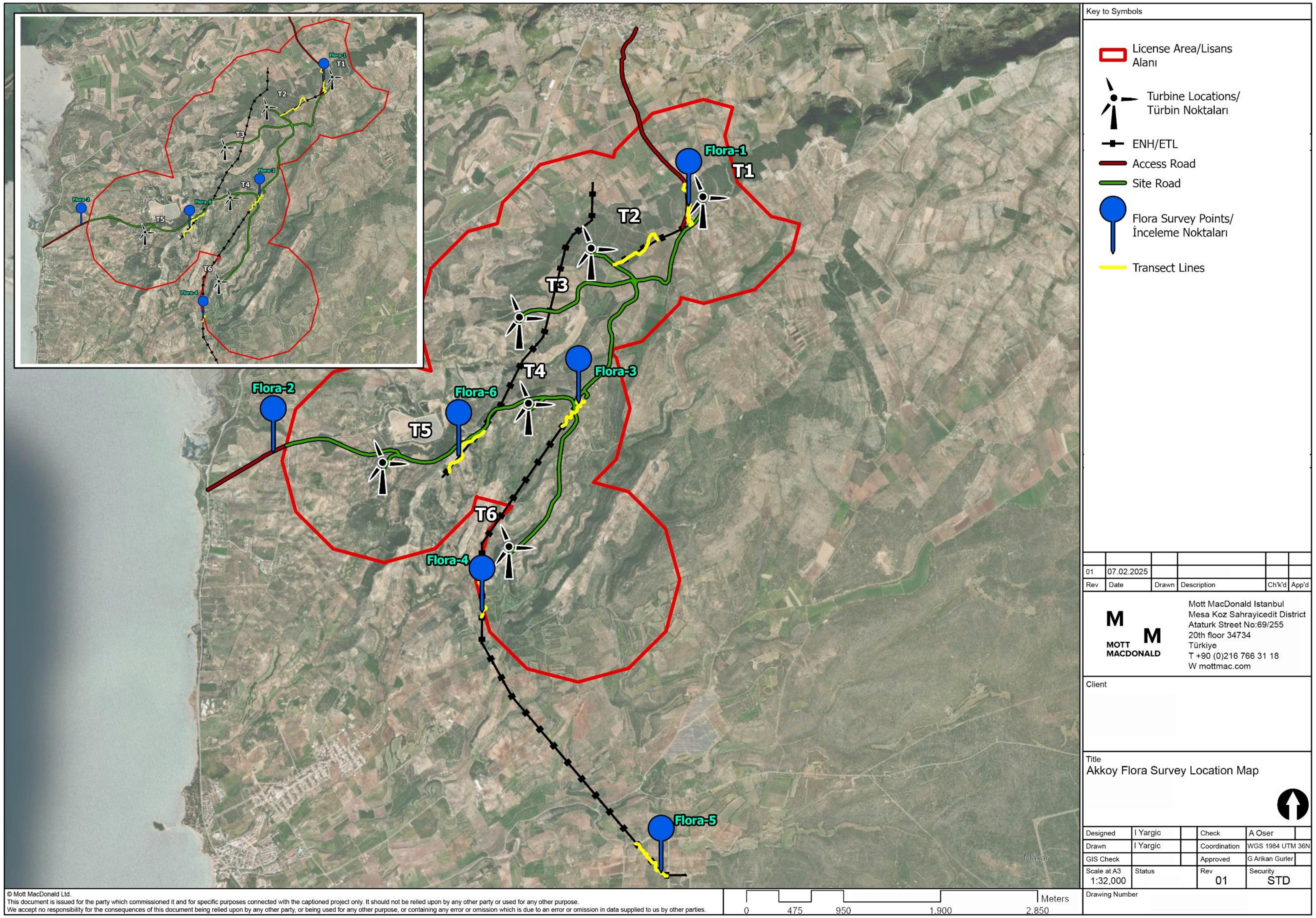


Figure 3-1 Flora Survey Location Map

3.2 Terrestrial Mammal

3.2.1 Terrestrial Mammal Methodology

In order to reveal the mammals inventory in the study area, the studies were carried out in three steps. These are 1-Desktop studies (Basic Preparation), 2-Field studies, 3-Survey (interview) studies. The mammal studies, as a supplementary component, have been specifically concentrated on the ETL areas, with research efforts focused on identifying suitable locations for camera traps and transects, while turbine locations may be considered but are not the primary focus of the study.

Desktop Studies:

- Station selection and literature review were conducted utilizing GIS.
- As part of the GIS studies, point and transect locations were initially determined using satellite imagery for preliminary preparation.
- Previous mammals studies near the study area were examined within the scope of literature review.
- For mammals, firstly, satellite maps were analysed within the scope of field preparation studies.
- As part of the field preparation for terrestrial mammal, satellite maps were initially analysed. Subsequently, fieldwork was conducted to assess the status of the species and their relationship with the habitat. The precise locations of the stations were determined during the fieldwork.
- Information on the distribution of species was obtained from literature sources and this information was used as a base. The literature sources given in Section 6.2 were reviewed.
- The synonyms of the species were also taken into consideration in the literature review.
- Within the scope of literature reviews, nationally protected and internationally recognized areas were investigated and surveyed.

Field Studies:

- Field studies were conducted in areas that were not surveyed previously. The terrestrial mammal studies, as a supplementary component, have been specifically concentrated on the, ETL and access road area. while turbine locations may be considered but are not the primary focus of the study.
- The first phase of field studies for terrestrial mammals aimed to assess the suitability of camera trap and transect locations identified in the desktop studies. Stations were relocated, if necessary, with consideration given to natural and semi-natural habitats in and around the Project area.
- Mammal field studies was conducted in two main parts. Direct observation (camera trap) and Indirect observation (Footprints, faeces, and body hair).
- In the field studies habitats suitable for mammals were identified and observations were made for a total of 20 days according to the size of the habitat.
- Paths that could be the passage routes of medium and large mammals etc. were checked for camera trap installation. Camera traps were installed at points where animal signs (tracks, feces etc.) were seen.
- Indirect observation was made on the existing roads and footpaths within the Area of Influence.
- Camera traps remained in the field for 15 consecutive days at each survey point in April 2024 and 5 consecutive days in June 2024.

3.2.2 Field Schedule

A total of 20 days of survey was conducted in 2024 during the active season (April and June) for mammals to thoroughly assess and document the mammal species present within the study area. The field survey was strategically planned to align with the period of increased mammal activity, ensuring that observation of the mammal species, including both common and rare species, could be accurately recorded. This timing facilitated the identification of potential habitats and the collection of relevant data regarding species distribution and behaviour.

3.2.3 Survey Locations

For the purpose of evaluating mammals diversity within the scope of the Project, the boundaries of the study area were first defined. The study area was defined with a primary focus on the ETL area, including ongoing operations, energy production activities, solid/liquid waste management, dust, air emissions, noise, electromagnetic impacts, and the environmental effects and spread distances of these emissions. (See Table 3-2 and Figure 3-2)

Table 3-2 Terrestrial Mammals Survey Locations (Camera Trap and Transect)

Camera Trap			Transect			
Station No	Camera Trap Point	Nearest Project Element	Transect No	Transect Start Location	Transect End Location	Nearest Project Element
1	37°28'28.07"N - 27°16'30.63"E	Access Road – T1	1	37°28'35.02"N- 27°16'28.76"E	37°28'25.99"N- 27°16'34.46"E	Access Road – T1
2	37°27'13.24"N - 27°15'35.24"E	ETL	2	37°27'24.56"N- 27°15'44.55"E	37°27'6.15"N- 27°15'28.50"E	ETL -Site Road
3	37°26'7.10"N - 27°15'9.01"E	ETL	3	37°26'14.26"N- 27°15'5.12"E	37°25'57.63"N- 27°15'14.79"E	ETL

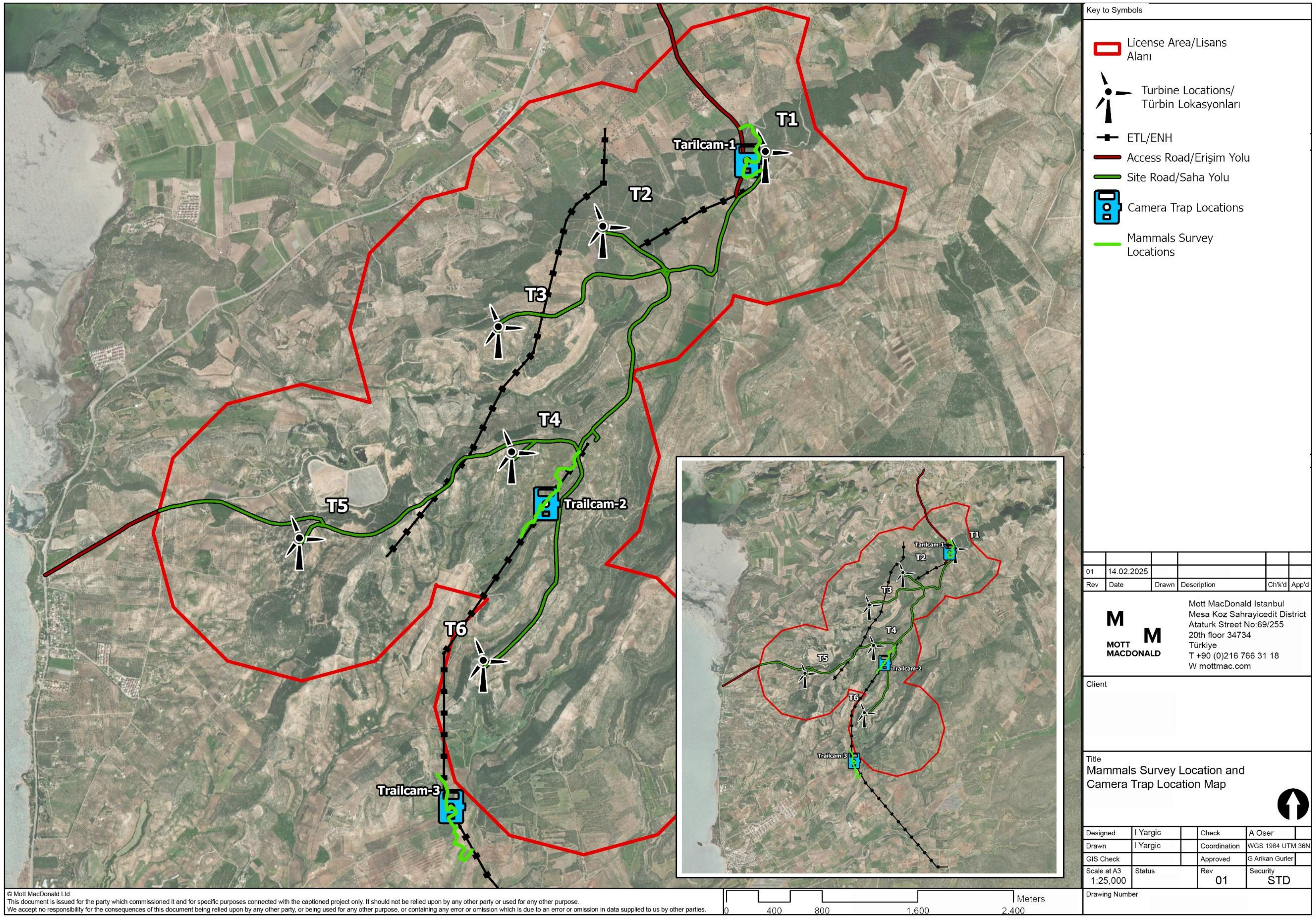


Figure 3-2 Terrestrial Mammal Camera Trap and Transect Survey Locations

3.3 Herpetofauna

3.3.1 Herpetofauna Methodology

In order to reveal the herpetofauna inventory in the study area, the studies were carried out in three steps. These are 1-Desktop studies (Basic Preparation), 2-Field studies, 3-Survey (interview) studies. The herpetofauna studies, as a supplementary component, have been specifically concentrated on the ETL areas, with research efforts focused on identifying suitable locations for sampling points and transects, while turbine locations may be considered but are not the primary focus of the study.

- Station selection and literature review were conducted utilizing GIS.
- As part of the GIS studies, point and transect locations were initially determined using satellite imagery for preliminary preparation.
- Previous herpetofauna studies near the study area were examined within the scope of literature review.
- As part of the field preparation for herpetofauna, satellite maps were initially analysed. Subsequently, fieldwork was conducted to assess the status of the species and their relationship with the habitat. The precise locations of the stations were determined during the fieldwork.
- Information on the distribution of species was obtained from literature reviews and this information was used as a base. The literature sources given in section 6.3 were reviewed.
- The synonyms of the species were also taken into consideration in the literature review.
- Within the scope of literature reviews, nationally protected and internationally recognized areas were investigated and surveyed.

Field Studies:

- Field studies were conducted in areas that were not surveyed previously. The herpetofauna studies, as a supplementary component, have been specifically concentrated on the, ETL and access road area. while turbine locations may be considered but are not the primary focus of the study.
- The first phase of field studies for herpetofauna aimed to assess the suitability of point and transect locations identified in the desktop studies. Stations were relocated, if necessary, with consideration given to natural and semi-natural habitats in and around the Project area.
- In the following studies, habitats suitable for amphibians and reptiles were identified and observations were made for a total of 4 days according to the size of the habitat. Fieldwork started in the morning at daylight and continued until dusk for nocturnal species.
- Observations were conducted at total 7 stations and 7 transects for varying periods of time depending on the size of the habitat.
- In order to identify amphibians and reptiles, water sources, areas close to water sources, under stones and rocks, rock crevices and cracks, tree hollows, etc. were checked in the field work carried out in and around the study area.
- During the observations, 'Visual Encounter Survey (VES)' and Call Survey were used to determine the presence of amphibians and reptile species.

3.3.2 Survey Locations

For the purpose of evaluating herpetofauna diversity within the scope of the Project, the boundaries of the study area were first defined. The study area was defined with a primary focus on the ETL area, including ongoing operations, energy production activities, solid/liquid waste management, dust, air emissions, noise, electromagnetic impacts, and the environmental effects and spread distances of these emissions. (See Table 3-3 and Figure 3-3)

Table 3-3 Herpetofauna Survey Locations

Sampling			Transect			
Station No	Sampling Point	Nearest Project Element	Transect No	Transect Start Location	Transect End Location	Nearest Project Element
1	37°28'19.55"N-27°16'26.00"E	ETL – Access Road – Site Road	1	37°28'26.82"N-27°16'26.45"E	37°28'18.81"N-27°16'17.98"E	ETL – Access Road – Site Road
2	37°27'12.23"N-27°13'48.47"E	Access Road – Site Road	2	37°27'12.48"N-27°13'49.89"E	37°27'7.43"N-27°13'42.62"E	Access Road – Site Road
3	37°28'14.49"N-27°15'41.32"E	ETL -T2	3	37°28'14.96"N-27°15'49.58"E	37°28'12.89"N-27°15'46.36"E	ETL -T2
4	37°27'9.26"N-27°15'31.81"E	ETL - Site Road	4	37°27'10.56"N-27°15'36.80"E	37°27'3.58"N-27°15'28.56"E	ETL - Site Road
5	37°27'13.50"N-27°15'4.76"E	ETL - Site Road	5	37°27'13.50"N-27°15'7.38"E	37°27'8.35"N-27°15'0.32"E	ETL - Site Road
6	37°26'11.00"N-27°15'6.78"E	ETL	6	37°26'14.24"N-27°15'4.49"E	37°26'7.22"N-27°15'13.56"E	ETL
7	37°25'21.10"N-27°15'48.40"E	ETL	7	37°25'25.52"N-27°15'47.21"E	37°25'19.27"N-27°15'54.00"E	ETL

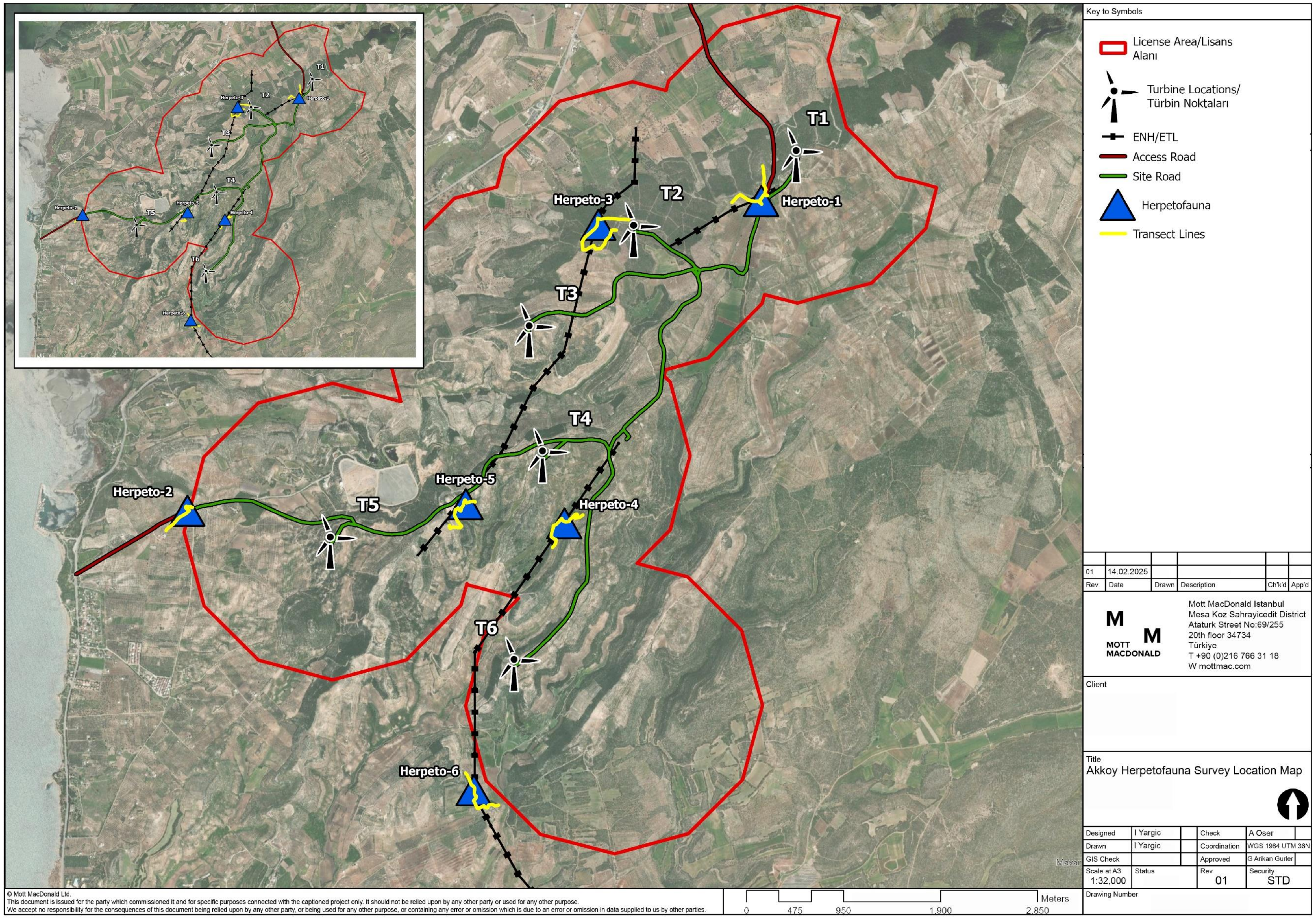


Figure 3-3 Transect and Point Survey Locations of Herpetofauna

3.4 Bird

As previously presented in the standalone methodology reports[3], studies on birds were carried out on 3 main topics: Turbine Vantage Point (VP) survey, ETL VP survey, and Breeding Bird Survey.

No major changes to bird methodology were made, however there have been unforeseen complications with VP implementation which are summarised below, and discussed in further detail under Section 3.4.1, 3.4.2 and 3.4.4;

- Due to the location of VP3 within the Büyük Menderes Delta National Park (NP) in the jurisdiction of DKMP (General Directorate of Nature Conservation and National Parks), and since public access to the NP was restricted by DKMP due to concerns about illegal activity, observations at VP3 were suspended after week 21. Please see Section 3.4.1 for detailed explanation and actions being taken.
- Due to the ETL route, which is on part public and part private land, and the public land is also being utilized for agriculture by local people and being fenced off, VP ETL observations have become complicated. Please see Section 3.4.2 for detailed explanation and actions being taken.
- VPs were renamed (numeration) for field surveyor convenience (see Section 3.4.1, and Section 3.4.2).

Spring season for the Project region was considered as extending to mid-June as confirmed by the local ornithology experts. (see Section 3.4.4).

3.4.1 Vantage Point Methodology

Bird survey is based on a vantage point survey, hereafter VP, on high ground methodology both for migratory and breeding/resident species as defined by NatureScot (formerly known as SNH) guidelines, which are widely used for ecological impact assessment studies on wind farms.

VP involves conducting observations from a fixed location, from where the whole project area can be seen and all the birds flying through the wind farm airspace can be detected. A minimum of 36 hours of observations are required for each season.

The appropriate time of observations is determined as when target species are active which is between 09:00 - 17:00, though changing daylight conditions between seasons are also considered when scheduling observations. The observer scans the area within the main viewing angle every 5 minutes, using the maximum angle if a bird contact moves outside of the main angle. When a bird is detected, the species is identified, total number of birds is noted, minimum and maximum flight height during the course is estimated, first and last time of the sighting is noted. A standard field recording sheet was used (see Appendix 6.12).

The observer pays particular attention to the flight height of the birds. The height levels of a wind turbine can be marked as: (a) below rotor height (<42 m), (b) at rotor height (42-180 m), (c) above rotor height (>180 m). When the birds possibly fly near the turbines, the flight line cross the location of the turbine. On maps specifically designed for each VP, the flight path of each bird is drawn.

Vantage Point Field Schedule

During spring of 2024, a total of 142 hours and 53 minutes of surveys were conducted across four vantage points (VP1, VP2, VP3) as presented Table 3-4. Week number of the year are

[3] Akköy WPP Biodiversity Monitoring Methodology. Mott MacDonald. Issue date 28 March 2024.

denoted with Monday as first day. On average, approximately 47 hours and 37 minutes of surveys were conducted per vantage point.

Since VP3 does not cover turbine swept risk zones, for collision risk modelling, the average effort per VP is assessed as 59 hours 9 minutes.

Due to the location of VP3 within the Büyük Menderes Delta National Park (NP) in the jurisdiction of DKMP (General Directorate of Nature Conservation and National Parks), and since public access to the NP was restricted by DKMP due to concerns about illegal activity (hunting and poaching) and forest fires, observations at VP3 were suspended after 27 May. The Consultant and the Project Company has taken steps to secure a research permit from DKMP, however due to the lengthy permit process, observations have not yet resumed. Since VP3 does not cover turbine swept areas and was mainly established to monitor waterbird movement patterns near the Project, and one season (spring) of data is available, the Consultant is of the opinion that the overall quality of the study results is not impacted to a significant degree. However, the Consultant and the Project Company is continuing to expedite the permit process to their best ability.

Table 3-4 VP survey effort and dates in spring

Week	First Day	VP1	VP2	VP3 (delta)	Total
W16	15/04	03:45	03:45	02:43	10:13
W17	22/04	03:02	03:28	04:42	11:12
W18	29/04	04:51	04:34	04:54	14:19
W19	06/05	05:06	09:20	04:16	18:42
W20	13/05	05:03	04:24	04:56	14:23
W21	20/05	05:16	05:08	03:10	13:34
W22	27/05	11:57	08:36	-	20:33
W23	03/06	07:30	09:12	-	16:42
W24	10/06	10:50	12:25	-	23:15
Total	-	57:20	60:52	24:41	142:53

During Summer 2024, a total of 176 hours and 51 minutes of surveys were conducted across two vantage points (VP1 and VP2) as presented in Table 3-5 Week number of the year are denoted with Monday as first day. The surveys started in mid- June and continued until the end of August. On average, approximately 88 hours and 26 minutes of surveys were conducted per vantage point.

Table 3-5 VP survey effort and dates in summer

Week	First Day	VP1	VP2	Total (h)
W26	24/06	9:00	6:51	15:51
W27	01/07	10:09	11:13	21:22
W28	08/07	10:53	8:20	19:13
W30	22/07	5:22	11:52	17:14
W31	29/07	10:02	14:31	24:33
W32	05/08	9:56	13:46	23:42
W33	12/08	9:33	8:09	17:42
W34	19/08	10:29	9:58	20:27
W35	26/08	9:51	6:56	16:47
Total	-	**85:15**	**91:36**	**176:51**

During Autumn 2024, a total of 205 hours and 39 minutes of surveys were conducted across two vantage points (VP1 and VP2) as presented in Table 3-6. Week number of the year are denoted with Monday as first day. The surveys started in at the beginning of September and continued until mid-November. On average, approximately 102 hours and 50 minutes of surveys were conducted per vantage point.

Table 3-6 VP survey effort and dates in autumn

Week	First Day	VP1	VP2	Total (h)
W36	02/09	9:44	13:16	23:00
W37	09/09	9:29	11:10	20:39
W38	16/09	7:06	13:14	20:20
W39	23/09	12:57	7:32	20:29
W40	30/09	7:55	9:42	17:37
W41	07/10	11:49	7:38	19:27
W42	14/10	7:09	11:44	18:53
W43	21/10	8:54	10:42	19:36
W44	28/10	5:48	2:37	8:25
W45	04/11	12:42	8:26	21:08
W46	11/11	7:44	8:21	16:05
Total	-	**101:17**	**104:22**	**205:39**

VP Locations

2 VPs are used for the best visual coverage of the turbine areas and 1 VP (VP3) covered the delta area. Locations of the VPs are shown on Figure 3-4 and coordinates of the VPs are provided in Table 3-7.

Table 3-7 Locations of the VPs (WGS 84 UTM 35N)

VP	Easting	Northing
VP1	522680	4145527
VP2	524383	4147510
VP3 (delta)	519428	4149111

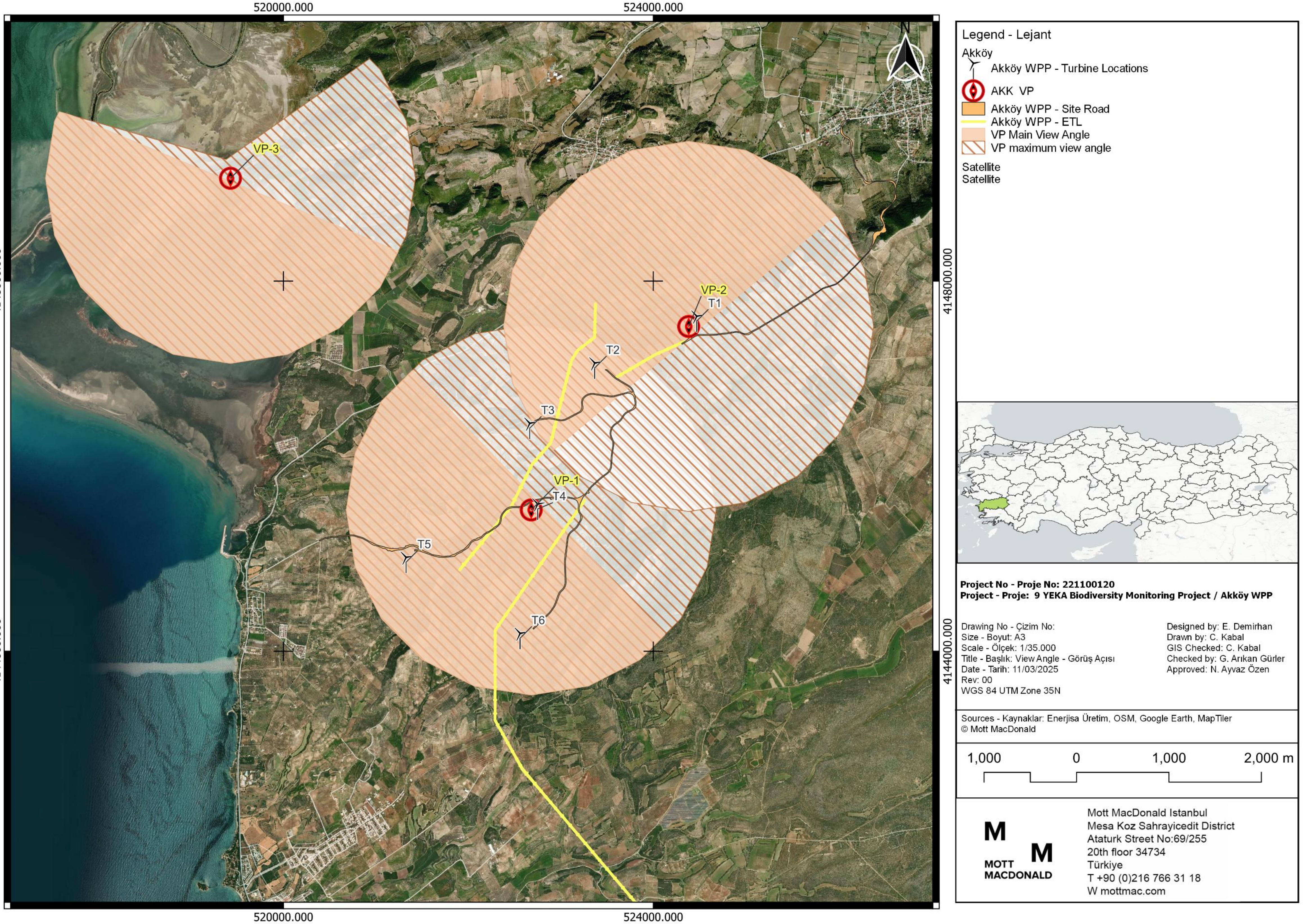


Figure 3-4 Locations of the VPs

3.4.2 ETL Observations

The impact of the wind farm is not complete without considering the related and connected infrastructure. The transmission lines are known to cause death to birds by physical injuries and electrocution. The isolation of the pylons and the installation of the bird diverters are important.

ETL monitoring provides valuable insights into the bird species present at the ETL route and potential environmental considerations related to the observed habitats. In order to assess the potential impact of ETL on the areas it will traverse post-construction, 1 vantage point (VP ETL) were thoughtfully selected (Figure 3-5).

An observer was present at the selected VP ETL and scanned the area each 5 minutes at the maximum possible view angle. When a bird is detected, the species is identified, and the flight height of the bird is recorded as above or below the ETL.

To analyse bird passage rates, the number of bird passages per hour was calculated for each vantage point (TLs) along the ETL. The average passage rate was then determined for three seasons. ETL segments were classified into low, medium, or high-risk categories based on passage rates of target species:

- Low risk: Up to 0.35 bird passages/hour (average value: 0.25 bird passages/hour)
- Medium risk: Between 0.35 and 0.70 bird passages/hour (average value: 0.50 bird passages/hour)
- High risk: Above 0.70 bird passages/hour

These threshold values were established by comparing data from the 9 WPP projects. Current guidelines do not provide explicit thresholds for risk levels; therefore, these classifications were determined based on an arbitrary but consistent decision-making process informed by the comparative dataset.

ETL Observation Field Schedule

A total of 16 hours and 48 minutes of surveys were conducted during spring of 2024. The surveys were carried out at one transmission line point (VP ETL1) as shown in Table 3-8.

The access to the area underneath the ETL became complicated in spring 2024. The land is part public and part private, however the public land is also being utilized for agriculture by local people, and much of the land underneath the ETL has been fenced off to prevent access. Both for concerns of surveyor’s occupational safety, and to avoid reactions from local people and authorities, ETL VP1 observation was suspended until all stakeholders agree about access. VP1 for turbines covers part of the ETL (approx.40%). The Project Company has taken steps to engage the local people and authorities and VP ETL surveys will presume after an agreement is in place.

- Due to a prolonged approval process with local authorities at the project site, the scheduled VP ETL surveys for the summer and autumn seasons were unable to be conducted. Although these surveys could not be conducted during the summer season, a significant portion of the ETL has already been covered from the turbine vantage points.

Table 3-8 ETL survey effort and dates in spring

Week	First Day	VP ETL1	Total
W17	22/04	02:52	02:52
W18	29/04	04:51	04:51

Week	First Day	VP ETL1	Total
W19	06/05	04:51	04:51
W20	13/05	04:14	04:14
Total	-	16:48	16:48

ETL Observation Locations

1 VP is used for the best visual coverage of the ETL. Locations of the ETL VPs are shown on Figure 3-5.

Table 3-9 Locations of the VPs (WGS 84 UTM 35N)

VP	Easting	Northing
VP ETL1	522736	4142283

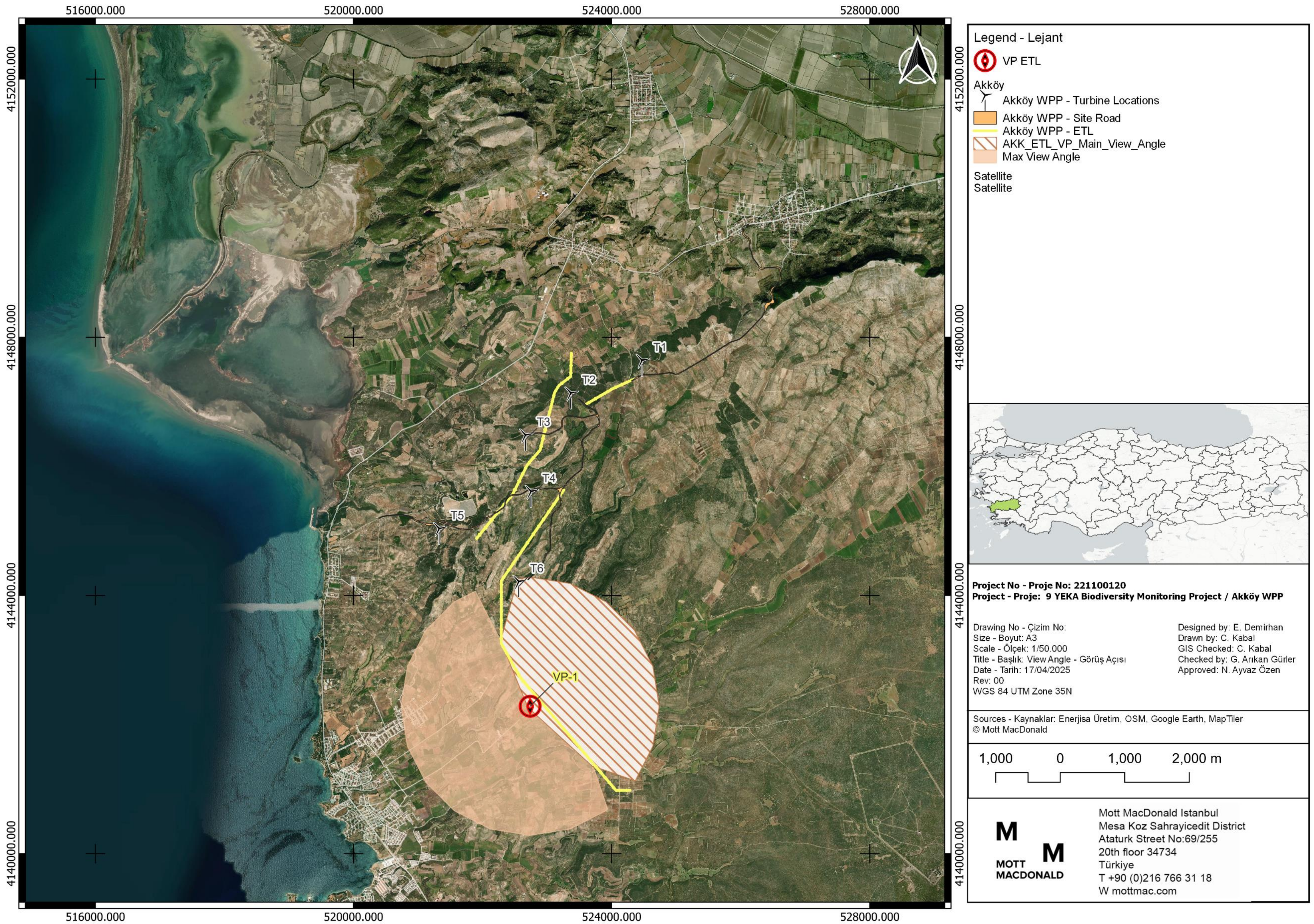


Figure 3-5 Locations of the ETL VPs

3.4.3 Collision Risk Methodology

NatureScot Guidance note describes a methodology for assessing the full impact of wind farms on ornithological interests which includes a two-stage process for the assessment of collision risk (NatureScot 2000). Stage (1) involves the calculation of the number of birds that fly through the rotors, which itself consists of two separate approaches, modified in order to calculate (a) resident bird numbers and (b) migratory bird numbers. Stage (2) involves the calculation of the probability of a bird being hit by a rotor when flying through. Avoidance rates in both approaches are accounted for according to NatureScot (2018), which for raptors is specified as 98% (see Appendix 6.4).

For the purposes of this analysis, a resident bird is defined as individuals of either resident species or migrant species that spend more time at the project site than simply passing by. In other words, any bird that spent more time for feeding, resting, hunting was regarded as resident. A migrant bird was defined as birds that only pass through the area once in a certain direction, typically in order to migrate.

Approach 1: Regular Flights through a Wind Farm

The first approach was designed for cases in which a bird population makes regular flights through the wind farm, possibly in a reasonably defined direction. This is usually applied for species that exhibit regular flights between the feeding and sleeping (roosting) areas, such as wintering geese, gulls and cranes.

In this analysis, approach 1 was modified to be applicable to migrant birds. This approach was utilized to estimate the mortality of birds that only fly through and not sleep (roost), feed or exhibit other behaviour that causes the bird to spend time in the area.

Calculation of the collision risk for the birds during regular flights according to NatureScot is:

1. Identify a 'risk window' i.e. a window of width equal to the width of the wind farm across the general flight direction of the birds, and of height equal to the maximum height of the highest turbine. The cross-sectional area W = width x height.
2. Estimate the number of birds flying through this risk window per annum, i.e. flock size x frequency of flight. Make allowance in the flock size for occasions on which birds which may fly higher than this risk window and for the fact that the risk window may only straddle a proportion of the overall flight corridor used by the birds.
3. Calculate the area A presented by the wind farm rotors. Assume the rotors are aligned in the plane of the risk window as, to a first approximation, any reduction in cross-sectional area because the rotors are at an oblique angle is offset by the increased risk to birds which have to make a longer transit through the rotors. Where rotors overlap when viewed in cross-section, allow for the full cross-sectional area of separate rotors as the risk to birds is doubled if passing through two successive rotors: A = N x πR2 where N is the number of rotors and R is the rotor radius
4. Express the total rotor area as a proportion A / W of the risk window.
5. Number of birds passing through rotors = number of birds through risk window x proportion occupied by rotors = n x (A / W)

Approach 2: Birds using the Wind Farm Airspace

The second approach was designed for birds such as raptors which occupy a recognised territory, and there is a certain level of understanding of the likely distribution of flights within that territory.

In this analysis, Approach 2 was adapted to estimate the mortality of resident birds, i.e. birds that spend a certain amount of time hunting, territory defence, displaying and nesting in the area.

Calculation of the collision risk for the birds using the airspace of the wind farm following NatureScot (2000) is:

1. Identify a 'flight risk volume' Vw which is the area of the wind farm multiplied by the height of the turbines.
2. Calculate the combined volume swept out by the wind farm rotors Vr = N x πR2 x (d + l) where N is the number of wind turbines, d is the depth of the rotor back to front, and l is the length of the bird.
3. Estimate the bird occupancy n within the flight risk volume. This is the number of birds present multiplied by the time spent flying in the flight risk volume, within the period (usually one year) for which the collision estimate is being made.

For good results the data available should be based on actual observations within the area of the wind farm alone (provided the observation is done without disturbance), and the best results will be based on observational data about flight heights, such as will enable informed estimate of the proportion of flights at a level which may collide with the wind farm rotors. However, in the absence of such data, an estimate can be made knowing only the number of birds, and proportion of time flying, within the bird's territory, and using some knowledge of flight behaviour to gauge the proportion of flights at a height to be at risk.

4. The bird occupancy of the volume swept by the rotors is then

n x (Vr / Vw) bird-secs.

5. Calculate the time taken for a bird to make a transit through the rotor and completely clear the rotors:

t = (d + l) / v where v m/sec is the speed of the bird through the rotor

6. To calculate the number of bird transits through the rotors, divide the total occupancy of the volume swept by the rotors in bird-secs by the transit time t:

Number of birds passing through rotors = n x (Vr / Vw) / t

3.4.4 Breeding Bird Methodology

In the region, the breeding season for most bird species is between March and July, according to the Turkish Breeding Bird Atlas (which was incorporated into European Breeding Bird Atlas[4]). Breeding bird surveys were conducted for early and late breeding seasons at the Wind Farm. These surveys utilized points counts (VP ETLs) method since the Project is very small and the terrain and vegetation are very open. For the line transect method, transects were selected adjacent to vantage points. Observer recorded each potential breeding bird observed, along with the species and the highest level of breeding code for each bird species as given in .

Table 3-10 Breeding bird survey atlas codes

Breeding categories and Atlas codes
A Possible breeding
1 Species observed in breeding season in possible nesting habitat
2 Singing male(s) present (or breeding calls heard) in breeding season
B Probable breeding

[4] https://ebba2.info/

3 Pair observed in suitable nesting habitat in breeding season
4 Permanent territory presumed through registration of territorial behaviour (song, etc.) on at least two different days a week or more apart at same place
5 Courtship and display
6 Visiting probable nest site
7 Agitated behaviour or anxiety calls from adults
8 Breed patch on adult examined in the hand
9 Nest building or excavating of nest hole
C Confirmed breeding
10 Distraction display or injury feigning
11 Used nest or eggshells found (occupied or laid within period of survey)
12 Recently fledged young (nidicolous species) or downy young (nidifugous species)
13 Adults entering or leaving nest site in circumstances indicating occupied nest (including high nests or nest holes, the contents of which cannot be seen) or adult seen incubating
14 Adult carrying a faecal sac or food for young
15 Nests containing eggs
16 Nests with young seen or heard

Breeding Bird Field Schedule and Locations

Two transect walks were conducted in July (Table 3-11). The walks lasted an average of 60 minutes and covered 2-3 km. Both walks were conducted at around 09:30 in the morning (Figure 3-6).

Table 3-11 Breeding bird survey dates and nearest VPs.

Transect Location	Date	Month	Time	Duration (min)	Distance (km)
AKK-VP1	23/07	Jul	09:35:00	65	3
AKK-VP2	23/07	Jul	09:38:00	60	2

Figure 3-6 Line transects used for breeding surveys at the project

3.5 Bat

No major changes to the established bat methodology were made and there are no minor changes to mention.

Despite some device recording failures in spring which were intermittent and unpredictable, enough nights of data were collected for analysis due to NatureScot methodology's high consecutive recording requirements. Detector recording success for spring can be seen in Table 4-35, summer in Table 4-40 (no failures) and autumn in Table 4-46 (no failures). Failures resulted in no recordings and show up as blank in table cells for the device.

3.5.1 Ground Static and Mobile Acoustic Survey Methodology

Ground static bat surveys followed NatureScot guidelines which prescribe the following:

- At sites where the proposed turbine locations are known, static detectors should be placed to provide a representative sample of bat activity at or close to these points.
- Detectors should be placed at all known turbine locations at wind farms containing less than ten proposed turbines.
- Where developments have more than ten turbines, detectors should be placed within the developable area at ten potential turbine locations plus a third of additional potential turbine sites up to a maximum of 40 detectors for the largest developments.
- At key-holed woodland/plantation sites (and other proposals involving extensive habitat alteration), pre-application survey data may not represent the situation post-construction, as the habitat available for bats will change following construction. Automated survey locations should therefore also include open areas including existing nearby rides/clearings in the forestry, to provide an indication of how bats may adapt to and use the new habitat created through turbine construction.
- Ideally, surveys should aim for 10 consecutive nights, but in practice weather conditions may preclude this particularly early or late in the year and in more northerly latitudes.

Static and transect acoustic surveys were conducted in order to assess bat activity in the project area. For static surveys, 6 full spectrum bat detectors (Wildlife Acoustic Song Meter Mini Bat 2 AA) used at each selected sampling point for ten nights. For transect surveys, surveyors travelled slowly along a designated route within the project, using a full-spectrum bat detector (Wildlife Acoustics Song Meter Mini Bat 2 AA) to record bat activity. Additionally, geo-tracking was conducted using a mobile phone application (Figure 3-7). Transect surveys were carried out after sundown on the same nights as the static surveys. The detectors were triggered by bat calls. The detectors were located at around 1 m above the ground.

3.5.2 Acoustic Analysis Methodology

Bat recordings obtained from bat detectors were analysed using BatExplorer and Kaleidoscope Pro (produced by Wildlife Acoustics) and species identifications were done by following established scientific literature and industry best practice (Appendix 6.5). Echolocation signal characteristics including signal shape, peak frequency of maximum energy, signal slope, pulse duration, start frequency, end frequency, pulse bandwidth, inter-pulse interval and power spectra are compared to published signal characteristics for local bat species. As the call parameters of some species overlap, in such cases definitive species identification is difficult and their identifications were reported as "possible." Feeding buzzes and social calls were also noted.

Since Auto-ID yields mixed results in sound identification, i.e. performs very well for some species, or shows biases for some over others, or sometimes identifies species which are not even distributed in a particular region, manual analysis was performed in a sampling type approach in order to account for Auto-ID corrections. For each consecutive ten nights of recording, two nights with the highest number of recordings were identified via filters. These nights were then prioritized for detailed manual analysis. Additionally, it was also ensured that the nights selected represented all the bat species identified through Auto-ID. If the two nights with the highest bat activity did not capture all species for some SPs, additional nights were added into the manual analysis set for a more complete representation.

Myotis genus identifications remain some of the most challenging species to differentiate in Turkiye, and experts are often not comfortable providing species level identifications. A through Myotis analysis is very time intensive, with a small percentage of recordings allowing for further species analysis, and even in that case, most efforts can usually narrow it down to 2-3 species clusters, again not resulting in confident species IDs. If Myotis species IDs are of specific concern, targeted methodologies and approaches would be necessary. Usually for Myotis, a mixture of sound and morphology is preferred for species identification, which in some cases may not even be sufficient, and genetic evidence may be necessary. Bat experts often indicate Myotis at genus level and this has become common practice since Myotis species are not defined in literature or carcass studies as especially collision prone at WPPs.

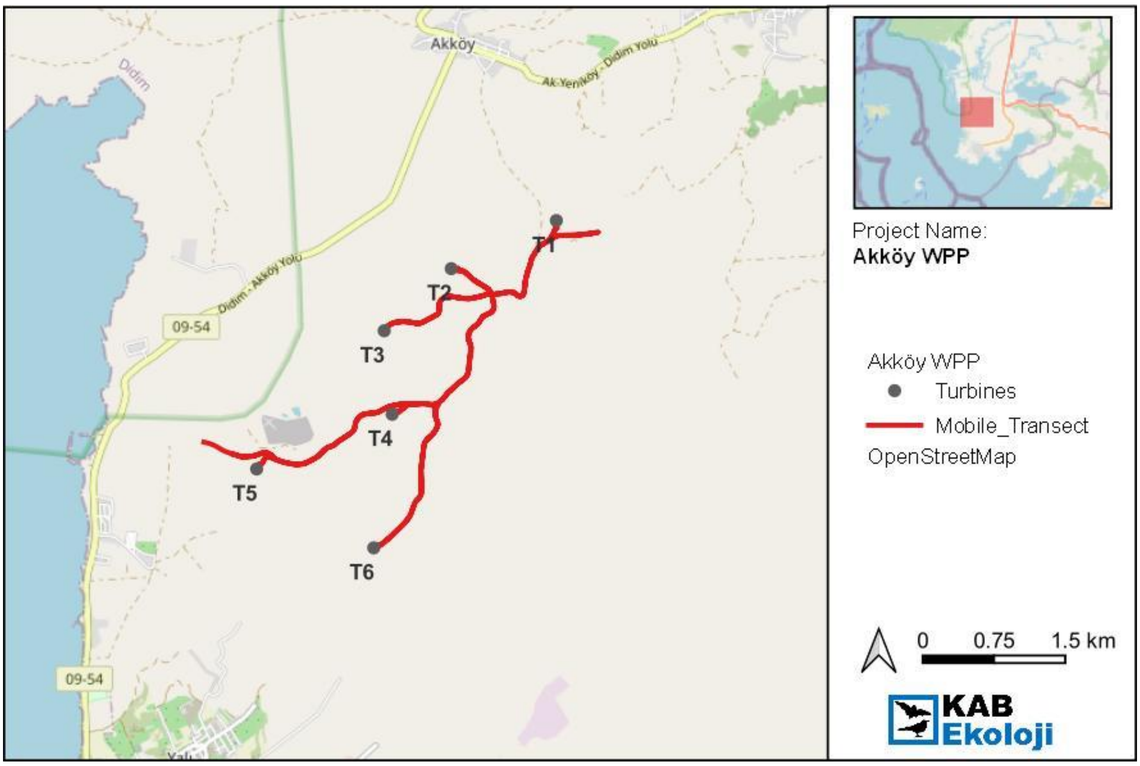


Figure 3-7 Transect survey route at the project

3.5.3 Field Schedule

A set of static and transect acoustic bat surveys were conducted (Table 3-12). Weather conditions during surveys are given in Table 3-13.

Table 3-12 Acoustic bat surveys for 2024 spring, summer, and autumn season

Survey Season	Start Date	Finish Date	Number of Nights	Status
Spring Static Surveys	21 April	2 May	10 nights	Done

Survey Season	Start Date	Finish Date	Number of Nights	Status
Spring Transect Survey 1	21 April	21 April	1 night	Done
Spring Transect Survey 2	1 May	1 May	1 night	Done
Summer Static Surveys	18 July	28 July	10 nights	Done
Summer Transect Survey 1	18 July	18 July	1 night	Done
Summer Transect Survey 2	28 July	28 July	1 night	Done
Autumn Static Surveys	13 September	23 September	10 nights	Done
Autumn Transect Survey 1	13 September	13 September	1 night	Done
Autumn Transect Survey 2	23 September	23 September	1 night	Done

Table 3-13 Weather conditions during the completed surveys

Date	Temperature (°C)	Wind Speed (m/s)	Cloud cover %	Precipitation (mm)
2024-04-21	17	4	20	0
2024-04-22	19	2	90	0
2024-04-23	25	11	50	0
2024-04-24	18	2	80	0
2024-04-25	17	3	20	0
2024-04-26	17	2	0	0
2024-04-27	17	0	0	0
2024-04-28	18	1	0	0
2024-04-29	19	3	20	0
2024-04-30	19	1	0	0
2024-05-01	18	2	0	0
2024-05-02	18	1	10	0
2024-07-18	30	1	0	0
2024-07-19	29	1	0	0
2024-07-20	34	3	0	0
2024-07-21	30	0	0	0
2024-07-22	25	1	0	0
2024-07-23	27	1	20	0
2024-07-24	30	1	0	0
2024-07-25	28	1	0	0
2024-07-26	28	2	0	0
2024-07-27	27	2	0	0
2024-07-28	28	2	0	0
2024-07-29	28	1	0	0
2024-09-13	22	1	0	0
2024-09-14	24	2	10	0
2024-09-15	24	3	70	0
2024-09-16	19	1	0	0
2024-09-17	19	1	0	0
2024-09-18	21	1	20	0
2024-09-19	21	0	0	0
2024-09-20	22	1	30	0
2024-09-21	22	1	60	0
2024-09-22	21	2	0	0

Date	Temperature (°C)	Wind Speed (m/s)	Cloud cover %	Precipitation (mm)
2024-09-23	22	1	0	0
2024-09-24	21	1	0	0

3.5.4 Survey Locations

Ground static bat detector locations (Sampling Point, SP) are provided in (Table 3-14) and shown on (Figure 3-8).

Table 3-14 Ground static bat detector locations (WGS84 UTM35N)

SP	Easting	Northing	Nearest Turbine
SP1	522805	4145581	T4
SP2	521342	4145027	T5
SP3	522586	4144184	T6
SP4	522694	4146467	T3
SP5	523433	4147095	T2
SP6	524476	4147496	T1

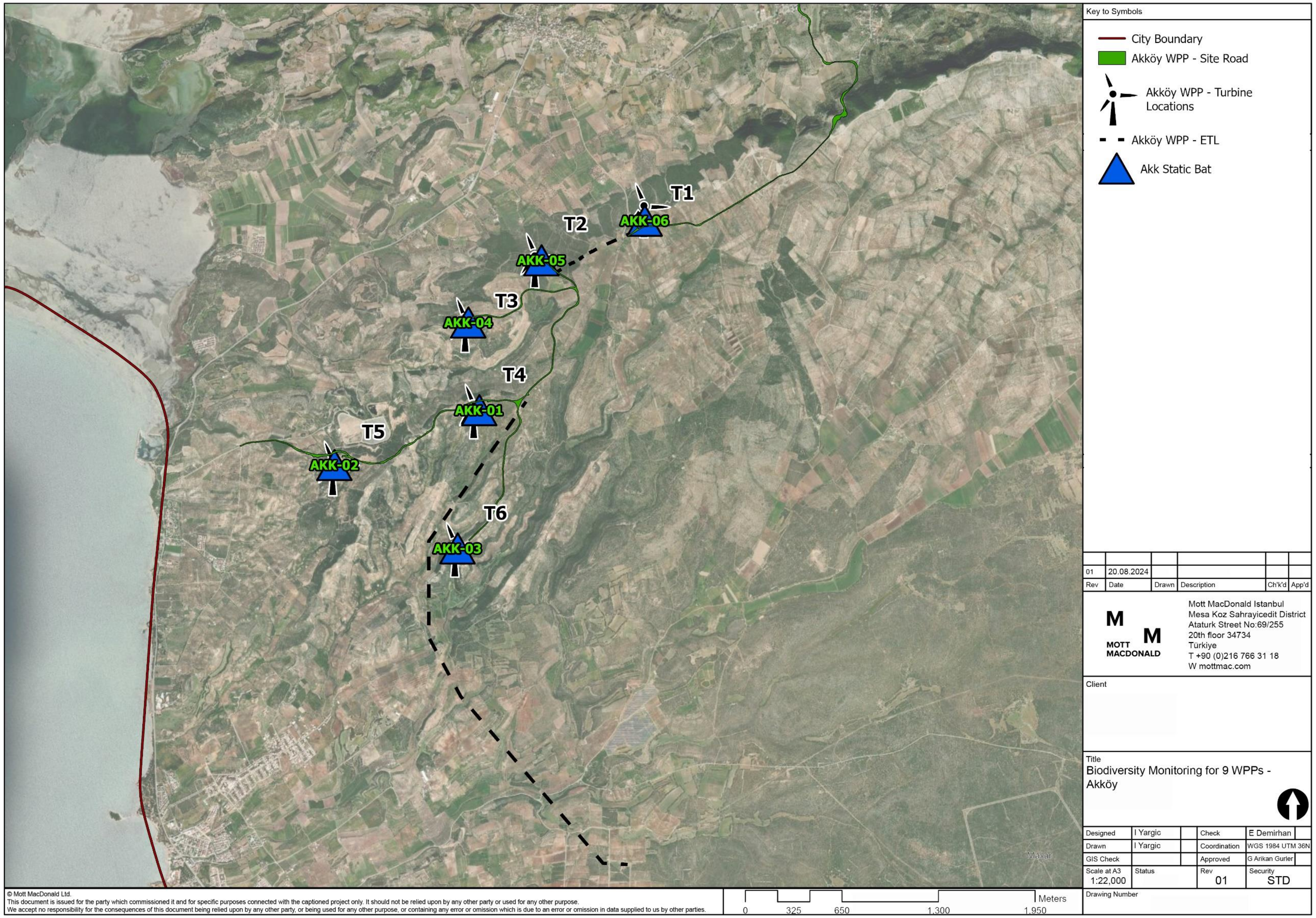


Figure 3-8 Ground static bat detector locations

3.6 Fatality Monitoring

The methodology for monitoring the impact of operation phase wind power plants on bird and bat mortality consists of three steps;

1. In the first step, surveyors monitored under the wind turbines and ETL with **systematic (routine) ground search** for dead birds and bats. Mortality can be monitored by conducting walking ground carcass search targeting bats and birds.
2. The second step incorporates a scientific design of experimental studies in order to determine the adjustment factors to arrive at an estimate of actual mortality rate, where controlled decoy animals are placed on the ground under the turbines. The surveyors searched under the turbines and instructors controlled the animals on a daily basis, to see (1) how many carcasses could be detected by the observer ("*Searcher Efficiency"*) and (2) how long the carcasses remained on the ground before being removed by a scavenger, such as a jackal or crow ("*Carcass Persistence"*).
3. On the third step, an estimator software is utilized to estimate the rate of mortality using the observed number of carcasses.

3.6.1 Step 1: Carcass Searches under the Turbines and the ETL

All active turbines and ETL are included in the surveys that run between March and November 2024 by the one full-time surveyor.

Plot size: The surveyor walked in a straight transect with 5 m distance to each other at a slow pace as examplified in Figure 3-9. The actual boundaries of the searchable areas for each turbine are available in Figure 3.10. The calculated the pad area for each turbine and the scanning duration according to each turbine pad's area are shown on Table 3-15.

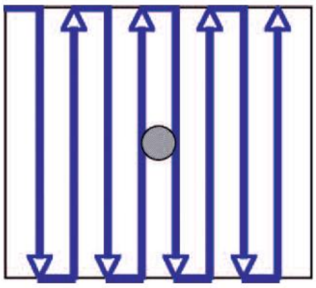


Figure 3-9 Ground search schemes by means of line transects (Atienza et al. 2014)

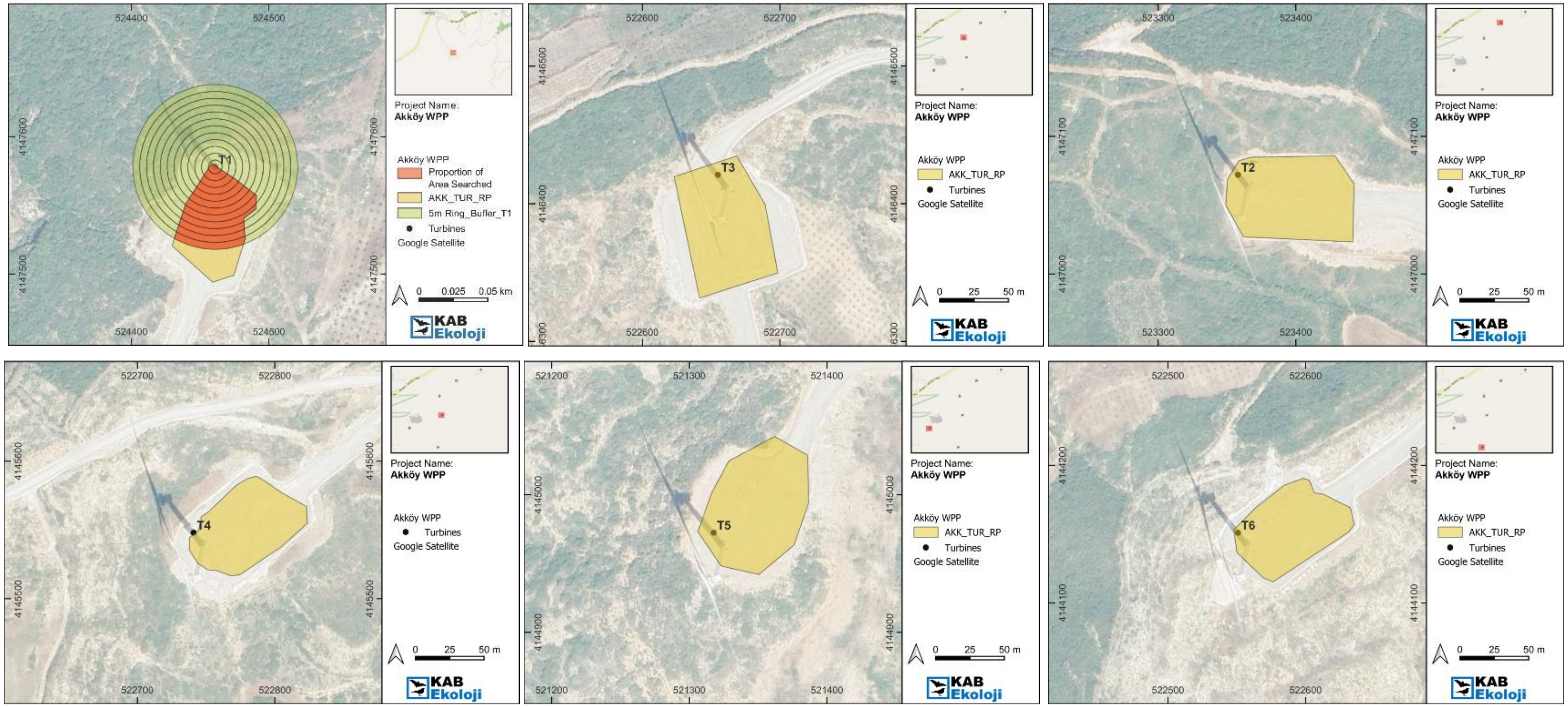


Figure 3.10: Search plots for each turbine at the project.

Table 3-15 Calculated turbine pad areas and scan duration for each turbine

Turbine	Pad Area (m^2)	Scan Duration (min)
1	3222	15
2	5164	25
3	5194	25
4	3848	20
5	5616	30
6	3852	20

At the Project, only turbine pads and roads are included in the search design, as most other areas are inaccessible. Searchable and unsearchable areas were defined according to the IFC's Post Construction Fatality Monitoring guidelines (2023). To ensure accurate analysis, the DWP tool provided in the guideline was used, depending on available carcass data to model numbers in unsearchable areas. Results were compared with the simple ratio of the turbine pad to the search area defined by the rotor length.

For carcass monitoring under the ETL, zig-zag search scheme was followed by the surveyor (Figure 3-11). As a surveyor was available during surveys, a surveyor walked along the transect in one direction once a week. The length of the ETL is approximately 5800 m. However, due to the private lands of locals, the surveyor was not able to cover the most of the transect. The Project Company is actively engaging the local authorities and people to enable access (Figure 3.12).

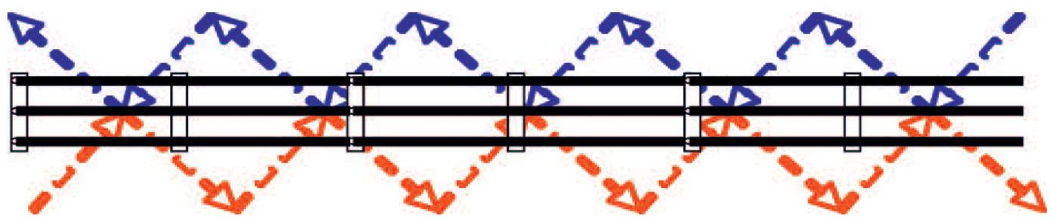


Figure 3-11 Zig-zag power line search scheme for carcass search under the ETL (Atienza et al. 2014)

Figure 3.12: ETL segments which were searchable during 2024 studies (bold lines).

Monitoring schedule: Each turbine area and ETL are searched once a week. The surveys took place in the early hours of the morning, following the first hours upon the arrival to the site, approximately after 08:30 hours.

Data collection and parameters: The searcher noted the following parameter for each carcass finding (also see Appendix 6.11):

- Day, Time, Turbine Number
- Coordinates of the carcass, the distance and the direction from the turbine
- Species (if distinguishable), wing length for bats (to be used for identification)
- Estimated time since death and the status of the carcass
- Weather parameters
- Tissue sample for Sanger sequencing

For individual findings of carcasses, records of the preceding days were always checked to avoid re-sampling. Hence, all carcass records are unique animals.

Identification of bat species from carcass samples can be very difficult (carcass condition at the time of finding can vary a lot) and often requires DNA analysis for accurate results. DNA sequencing is considered the superior method for species identification. To facilitate this process, tissue sampling kits were provided to the surveyors, along with instructions for proper sampling techniques to avoid cross-contamination. However, since carcass tissue collection was restricted by local authorities, species identifications were carried out based on morphological factors (forearm length, nose and ear shape etc). Forearm lengths for common species are:

- 28-40 mm for Pipistrellus spec.
- 42-50 mm for *Nyctalus leiseri*
- 50-60 mm for *Nyctalus noctula*

- 60-70 mm for *Nyctalus lasiopterus*

Monitoring schedule is presented in Table 3-16. The table uses week numbers as defined by Google Calendar, which is shown on Table 3-17.

Table 3-16 Systematic carcass search schedule at the turbines between March and November 2024

Turbine	W16	W17	W18	W19	W20	W21	…	…	…	…	W45	W46
T01	+	+	+	+	+	+	+	+	+	+	+	+
T02	+	+	+	+	+	+	+	+	+	+	+	+
T03	+	+	+	+	+	+	+	+	+	+	+	+
T04	+	+	+	+	+	+	+	+	+	+	+	+
T05	+	+	+	+	+	+	+	+	+	+	+	+
T06	+	+	+	+	+	+	+	+	+	+	+	+
Total	**6**	**6**	**6**	**6**	**6**	**6**	**6**	**6**	**6**	**6**	**6**	**6**

Table 3-17 Week numbers and first days used for the monitoring study

Week	First Day	Week	First Day	Week	First Day	Week	First Day
W16	15 April	W24	10 June	W32	05 August	W40	30 September
W17	22 April	W25	17 June	W33	12 August	W41	7 October
W18	29 April	W26	24 June	W34	19 August	W42	14 October
W19	6 May	W27	1 July	W35	26 August	W43	21 October
W20	13 May	W28	8 July	W36	2 September	W44	28 October
W21	20 May	W29	15 July	W37	9 September	W45	4 November
W22	27 May	W30	22 July	W38	16 September	W46	11 November
W23	3 June	W31	29 July	W39	23 September		

3.6.2 Step 2: Determining the Adjustment Factors (Experimental Trials)

The number of observed carcasses only correspond to a fraction of the bats and birds that collide with the turbine blades. Major reasons are: (1) the majority of the carcasses are removed by the scavenger animals, such as dogs, foxes and insects; (2) the surveys usually cover only a fraction of the surface where animals may fall down; and (3) inevitably, some carcasses may go unnoticed by the surveyor.

"Post-construction carcass searches and evaluation should incorporate current scientific design elements to ensure that the resulting estimates of bird and bat fatality rates at the facility are accurate and robust" (IFC 2016). The aim of this "experimental study" is to determine the adjustment factors which enable more accurate estimation of the expected mortality rate from the observed number of carcasses.

Four sets of experimental studies were carried out for 2024; spring, early summer, late summer and autumn.

- Spring (19 April-23 April)
- Early Summer (27 June-30 June)
- Late Summer (23 August-26 August)
- Autumn (4 October-7 October)

Experimental Decoys

As experimental carcasses under the turbines, 20 carcasses of House Mouse (*Mus musculus*) were used. “Subadult” size mice were chosen due to the similarity in size to the bats usually found at the survey site. As white carcasses could easily be detected in nature, both by observers and scavengers, they were dyed with food colouring (black) to better imitate bat carcasses. This was preferred since bat carcasses are not commercially available and obtaining natural specimens requires special research permits.

As experimental carcasses under the ETL, 20 carcasses of Japanese Quail (*Coturnix japonica*) were used to better represent bird fatality.

The experimental trials were conducted at all turbines (T1, T2, T3, T4, T5, T6). Turbines were selected according to surveyor’s working schedule.

Searcher Efficiency Trials

During the following four days, searcher dedicated its effort to a selected group of turbines. After the visit of the surveyor, the instructor checked each of the carcasses to verify their presence and thus to determine the efficiency rate of each surveyor.

The coordinates of each carcass were noted, along with unique field marks of the position of carcass for the recovery by the instructor.

Carcass Persistency Trials

The decoy carcasses were monitored daily from day 1 to day 8, then on day 15, 22, and 29 if the carcasses were still present (Table 3-18). The study ceased when all experimental carcasses had been removed by the scavengers.

Table 3-18 Searcher efficiency and carcass persistency trials schedule (SE: searcher efficiency, CP: carcass persistency)

Day	Instructor	Searcher	DATA for SE	DATA for CP
1st	Decoy Set-up	Search and Control	yes	yes
2nd	Control	Search and Control	yes	yes
3rd	Control	Search and Control	yes	yes
4th	Control	Search and Control	yes	yes
5th	Leaves Site and Informs Observer	Control		yes
6th		Control		yes
7th		Control		yes
8th		Control		yes
15th		Control		yes
22st		Control		yes
29th		Control		yes

3.6.3 Step 3: Estimate the Actual Rate of Mortality

In this assessment GenEst, a suite of statistical models and software tools for generalized mortality estimation and works in the R programming language, was utilized. It was specifically designed for estimating the expected rate of bird and bat mortality rate at solar and wind power facilities and is recommended by IFC. The experimental studies to determine the adjustment factors were set up to follow the specific requirements of GenEst. For a thorough analysis, GenEst requires following variables as model input:

The results of the ground carcass searches and the results of experimental studies where adjustment factors are analysed together to produce the actual expected rate of mortality.

GenEst requires following variables as model input:

- Searcher Efficiency (SE): The probability that a searcher will observe a carcass that is present in the searched area at the time of the search.
- Carcass Persistence (CP): The probability that a carcass arriving at time 0 will continue to persist until a time t days later.
- Search Schedule (SS): The carcass search dates conducted throughout the survey period.
- Density-Weighted Proportion (DWP): The expected proportion of total carcasses that are present in the searched area within each unit.
- Carcass Observations (CO): The observed carcasses from routine surveys.

DWP for each turbine was calculated using the PCFM methodology, as outlined in Appendix D of the DWP SE Trial Placement Tool from the PCFM Handbook (IFC, EBRD, KfW, 2023).

- First, the proportion of the area searched within defined distance bands around each turbine was determined. This was done by creating 5-meter rings around each turbine. Predefined road and pad areas for each turbine were then incorporated, and the overlap between these areas and the rings was calculated (Step 1).
- Next, carcass count data corresponding to each searched area was integrated (Step 2) (Figure 3-13).
- Finally, the DWP values were derived by combining the proportion of the area searched with the carcass count data (Step 3).

DWP values are listed in Table 3-19. The values varied between 20% and 45%. The sweeping area ranges between 3222 m² and 5616 m² and the average pad area is 4482 m².

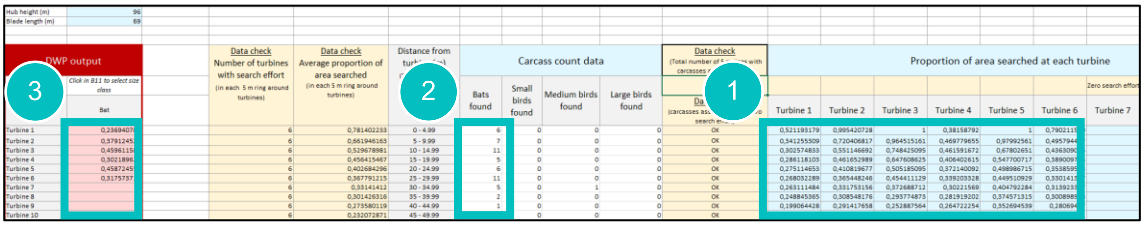


Figure 3-13 DWP calculation from Appendix D DWP SE Trial Placement Tool (IFC, EBRD, KfW 2023)

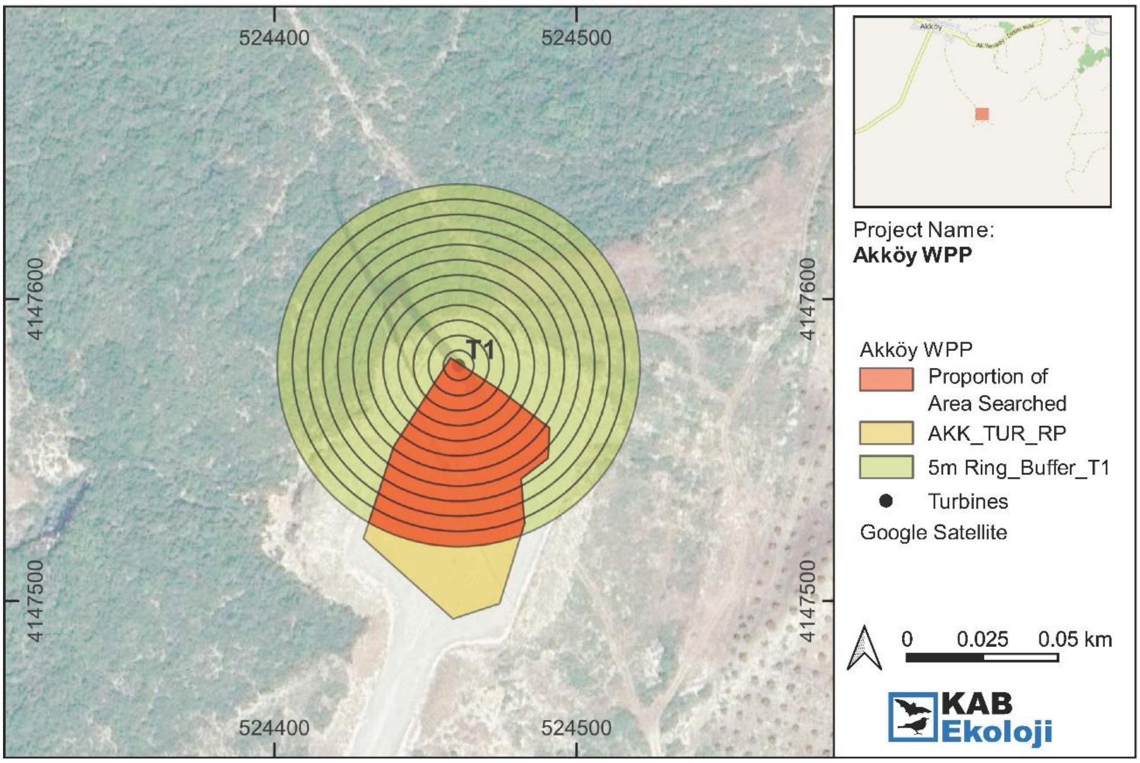


Figure 3-14 The DWP calculation graph for turbine T1

Table 3-19 DWP values for each turbine

Turbine	DWP
T01	0,237
T02	0,379
T03	0,460
T04	0,302
T05	0,459
T06	0,318

3.6.4 Data Analyses

All the analyses were performed in R (version 2023.6.1) using data manipulation libraries (tidyverse, readxl, janitor, xlsx, ggplot2) (Wickham 2016, Wickham et al. 2019, Dragulescu and Arendt 2020, Wickham and Bryan 2023, Firke 2023) and geographical information system libraries (sf, ggmap, leaflet, webshot, magick, mapview) (Kahle and Wickham 2013, Cheng et al. 2023, Chang 2023, Ooms 2023, Pebesma and Bivand 2023, Appelhans et al. 2023). For the publication of the report, quatro.org were used (R: A Language and Environment for Statistical Computing, 2023).

The results were analyzed using GenEst, a statistical package, facilitated through the Shiny app developed by West Inc.

4 Results

4.1 Flora

4.1.1 Büyük Menderes Delta and Bafa Lake Key Biodiversity Area

The boundary of the Project area is partially located within the Büyük Menderes Delta Key Biodiversity Area (KBA). The turbine, switchyard, access road, and ETL components are located outside the boundaries of the Bafa Lake KBA. However, portions of the access road and site roads intersect with the Büyük Menderes Delta KBA.. According to the KBA database, no plant species with KBA triggers are present in the area.

4.1.2 Habitat Types

The classification of habitat types within terrestrial and freshwater ecosystems was carried out using the European Nature Information System (EUNIS) 2012 Habitat Classification.

The recorded habitats are listed in the Table 4-1 below, along with their wide distribution areas within the study area shown on Figure 4-1. The amount of habitat lost due to roads, turbine footprints and switchyard area are given in Table 4-2 through Table 4-5.

Table 4-1 Habitat Types of the Project AoI

Broad habitat type	EUNIS Habitat Type	Extend within Project Footprint (ha)	Percentage (%)
Maquis	F5.2 Maquis	2421.65389	35.884%
Constructed, industrial and other artificial habitats	J1.2 Residential buildings of villages and urban peripheries	127.9471404	1.896%
	J4.2 Road networks	21.96589451	0.325%
	J4.5 Hard-surfaced areas of ports	0.375344245	0.006%
Regularly or recently cultivated agricultural, horticultural and domestic habitats	I1.2 Mixed crops of market gardens and horticulture	4176.530364	61.889%

Table 4-2 Habitat Loss on Site and Access Roads

EUNIS	Area (ha)	Percentage
F5.2 Maquis	10.11	0.41748%
J1.2 Residential buildings of villages and urban peripheries	0.17	0.13209%
J4.2 Road networks	0.13	0.58272%
I1.2 Mixed crops of market gardens and horticulture	4.93	0.11804%
Total	**15.34**	

Table 4-3 Habitat Loss on Turbine Footprint

EUNIS	Area (ha)	Percentage
F5.2 Maquis	9.09	0.4%
J1.2 Residential buildings of villages and urban peripheries	0.0	0.0%

J4.2 Road networks	0.0	0.0%
I1.2 Mixed crops of market gardens and horticulture	0.0	0.0%
Total	**9.09**	

Table 4-4 Habitat Loss on Switchyard Area

EUNIS	Area (ha)	Percentage
F5.2 Maquis	0.67	0.027%
J1.2 Residential buildings of villages and urban peripheries	0.0	0.0%
J4.2 Road networks	0.0	0.0%
I1.2 Mixed crops of market gardens and horticulture	0.0	0.0%
Total	0.67	

Table 4-5 Habitat Loss on ETL

EUNIS	Area (ha)	Percentage
F5.2 Maquis	46.16	1.90619%
J1.2 Residential buildings of villages and urban peripheries	0.0	0.0%
J4.2 Road networks	0.0	0.0%
I1.2 Mixed crops of market gardens and horticulture	21.45	0.51356%
Total	67.61	

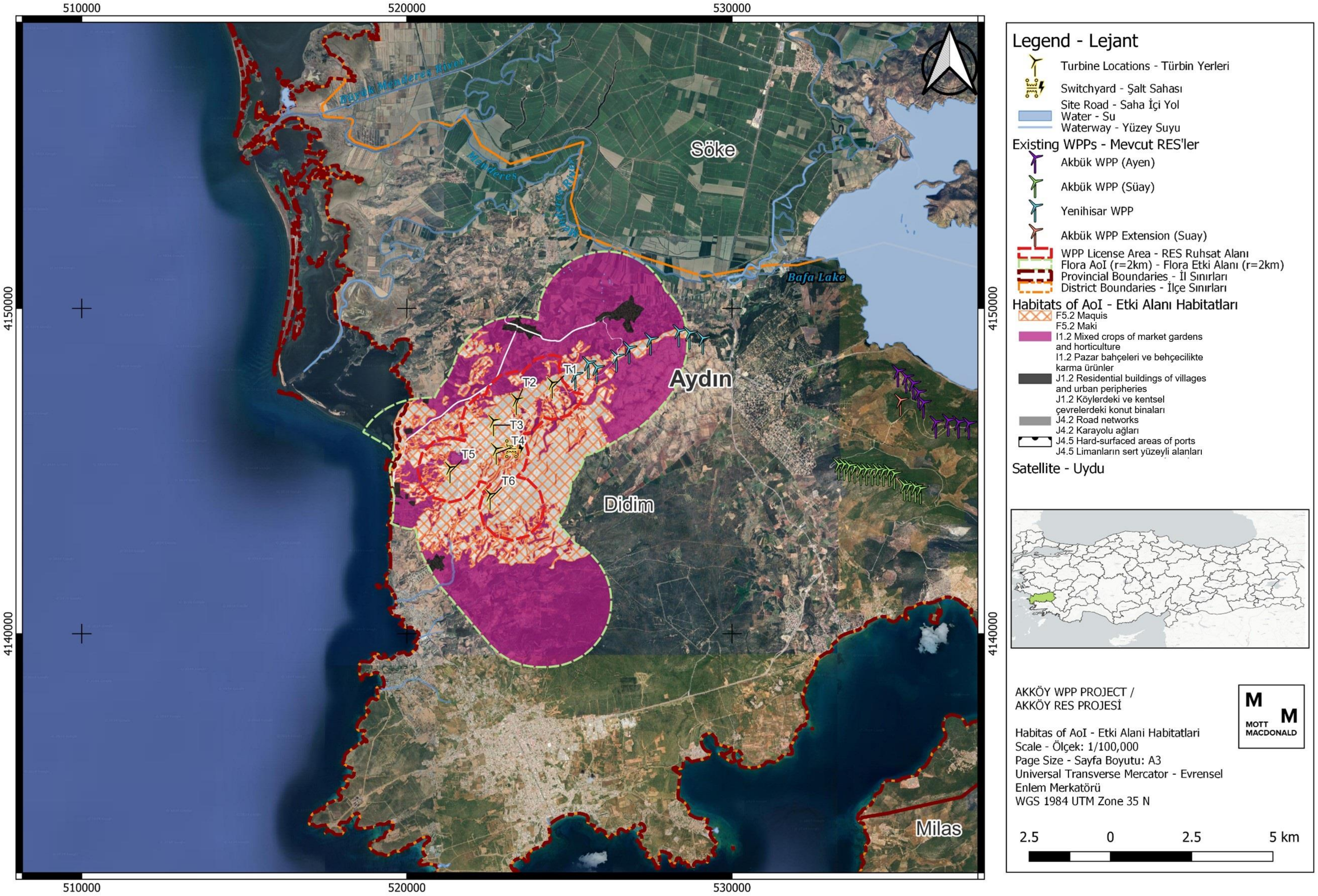


Figure 4-1 EUNIS Habitat Classification of Akköy WPP Area of Influence

4.1.3 Floristic Analyses

As a result of the field studies, 132 plant taxa at the species and subspecies level from 26 families were identified in the Project area. The list of the plant taxa identified in the Project area and its surroundings is provided in Table 4-6.

Table 4-6 Plant Taxa and Threatened Categories Identified in the Project Area of Influence

Family	No	Species	Phytogeographic Region	Endemism		TRDB	Bern	CITES			Habitat					Relative Abundance				
				R	W		App 1	App 1	App 2	App 3	1	2	3	4	5	1	2	3	4	5
ANACARDIACEAE	1	*Pistacia lentiscus L.*	Mediterranean								X							X		
APIACEAE	2	*Bupleurum flavum Forssk.*	Mediterranean								X					X				
	3	*Bunium ferulaceum Sibth. & Sm.*	Mediterranean								X					X				
	4	*Eryngium campestre var. virens Link*	Widespread								X						X			
	5	*Eryngium falcatum F.Delaroche*	Mediterranean								X						X			
	6	*Ferula tingitana L.*	Mediterranean								X					X				
	7	*Hippomarathrum crassilobum Boiss.*	Widespread								X					X				
	8	*Lagoecia cuminoides L*	Mediterranean								X					X				
	9	*Laser trilobum (L.) Borkh.*	Widespread								X					X				
	10	*Orlaya daucoides (L.) Greuter*	Mediterranean								X					X				
	11	***Peucedanum chryseum (Boiss. & Heldr.) D.F.Chamb.***			**X**	**LC**					**X**					**X**				
	12	*Scandix pecten-veneris L.*	Widespread								X					X				
	13	*Thapsia garganica L.*	Widespread								X						X			
	14	*Torilis arvensis subsp. neglecta (Spreng.) Thell.*									X						X			
APOCYNACEAE	15	*Nerium oleander L.*									X						X			
ASTERACEAE	16	*Anthemis cretica L.*	Mediterranean								X						X			
	17	*Anthemis tomentosa subsp. tomentosa L.*	Mediterranean								X	X	X		X		X			
	18	*Cardopatium corymbosum (L.) Pers.*	Mediterranean								X					X				
	19	*Carlina vulgaris L.*									X						X			
	20	***Centaurea polyclada DC.***	**Mediterranean**		**X**	**LC**					**X**						**X**			
	21	*Centaurea solstitialis L.*	Widespread								X		X				X			
	22	*Centaurea urvillei DC.*	Widespread								X		X				X			
	23	*Centaurea virgata Lam.*	Widespread								X		X				X			
	24	*Cichorium intybus L.*	Widespread								X		X				X			
	25	*Cirsium leucocephalum subsp. leucocephalum (Willd.) Spreng.*													X		X			
	26	*Conyza canadensis (L.) Cronquist*	Widespread								X						X			
	27	*Crepis sancta subsp. obovata (Boiss. & Noë) Babc.*	Widespread								X						X			
	28	*Crupina crupinastrum (Moris) Vis.*									X						X			

Family	No	Species	Phytogeographic Region	Endemism		TRDB	Bern	CITES			Habitat					Relative Abundance				
				R	W		App 1	App 1	App 2	App 3	1	2	3	4	5	1	2	3	4	5
	29	*Cyanus segetum Hill*	Widespread								X					X				
	30	*Cyanus triumfettii (All.) Dostál ex Á.Löve & D.Löve*	Widespread								X					X				
	31	*Filago eriocephala Guss.*	Mediterranean								X		X			X				
	32	*Helichrysum italicum (Roth) G.Don*									X							X		
	33	*Inula viscosa (L.) Aiton*	Mediterranean								X						X			
	34	*Lactuca viminea (L.) J.Presl & C.Presl*	Widespread								X		X		X		X			
	35	*Lamyropsis cynaroides (Lam.) Dittrich*	Mediterranean								X				X		X			
	36	*Matricaria chamomilla var. chamomilla L.*									X		X		X		X			
	37	*Notobasis syriaca (L.) Cass.*	Mediterranean										X		X		X			
	38	*Pilosella hoppeana (Schult.) F.W.Schultz & Sch.Bip.*	Widespread								X	X	X		X		X			
	39	*Pulicaria dysenterica (L.) Bernh.*	Widespread								X		X				X			
	40	*Senecio vernalis Waldst. & Kit.*	Widespread								X	X	X		X		X			
	41	*Sonchus asper (L.) Hill*	Widespread								X		X				X			
	42	*Sonchus bulbosus subsp. microcephalus (Rech.f.) N.Kilian & Greuter*	Widespread								X					X				
	43	*Tragopogon porrifolius subsp. longirostris (Sch.Bip.) Greuter*	Widespread								X		X		X		X			
	44	*Urospermum picroides (L.) Scop. ex F.W.Schmidt*	Mediterranean								X		X		X		X			
	45	*Xanthium strumarium L.*									X		X				X			
	46	*Xeranthemum annuum L.*	Widespread								X				X	X				
BORAGINACEAE	47	*Alkanna tinctoria (L.) Tausch*									X							X		
	48	*Neatostema apulum (L.) I.M. Johnst.*	Mediterranean								X						X			
CACTACEAE	49	*Opuntia ficus-barbarica A.Berger*											X		X		X			
CAPRIFOLIACEAE	50	*Scabiosa rotata M.Bieb.*	Irano- Turanian								X							X		
	51	*Valeriana dioscoridis Sm.*	Mediterranean								X						X			
	52	*Valerianella echinata (L.) DC.*	Mediterranean								X					X				
	53	*Valerianella coronata (L.) DC.*									X					X		X		
CISTACEAE	54	*Cistus creticus L.*	Mediterranean								X							X		
	55	*Cistus parviflorus Lam.*	Mediterranean								X							X		
	56	*Cistus salviifolius L.*									X							X		
	57	*Fumana aciphylla Boiss.*									X							X		
	58	*Fumana arabica (L.) Spach*	Irano- Turanian								X						X			
	59	*Fumana thymifolia (L.) Spach*	Widespread								X						X			

Family	No	Species	Phytogeographic Region	Endemism		TRDB	Bern	CITES			Habitat					Relative Abundance				
				R	W		App 1	App 1	App 2	App 3	1	2	3	4	5	1	2	3	4	5
	60	*Helianthemum nummularium (L.) Mill.*									X						X			
CONVOLVULACEAE	61	*Convolvulus elegantissimus Mill.*	Mediterranean								X					X				
	62	*Convolvulus holosericeus M.Bieb.*									X								X	
	63	*Convolvulus lineatus L.*									X							X		
CUCURBITACEAE	64	*Bryonia cretica L.*	Mediterranean								X		X					X		
	65	*Ecballium elaterium (L.) A.Rich.*	Mediterranean										X					X		
ERICACEAE	66	*Arbutus unedo L.*	Widespread								X								X	
	67	*Arbutus andrachne L.*									X							X		
	68	*Erica manipuliflora Salisb.*	Mediterranean								X							X		
FABACEAE	69	*Anthyllis hermanniae L.*									X							X		
	70	*Cytisus eriocarpus Boiss.*	Widespread								X						X			
	71	*Genista acanthoclada DC.*	Mediterranean								X							X		
	72	*Genista sessilifolia DC.*	Irano- Turanian								X						X			
	73	*Hippocrepis ciliata Willd.*									X					X				
	74	*Onobrychis aequidentata (Sibth. & Sm.) d Urv.*	Mediterranean								X					X				
	75	*Ononis mitissima L.*	Mediterranean								X					X				
	76	*Trifolium stellatum L.*									X						X			X
FAGACEAE	77	*Quercus coccifera L.*	Mediterranean								X						**X**			
	78	*Quercus infectoria Oliv.*	Widespread								X						X			
HYPERICACEAE	79	*Hypericum triquetrifolium Turra*									X						X			
LAMIACEAE	80	*Ajuga chamaepitys (L.) Schreb.*									X					X				
	81	*Lamium amplexicaule L.*									X						X			
	82	*Micromeria graeca (L.) Benth. ex Reicbh.*	Widespread								X						X			
	83	*Satureja cuneifolia Ten.*	Mediterranean								X						X			
	84	*Satureja fruticosa Briq.*									X						X			
	85	*Teucrium chamaedrys L.*									X						X			
	86	*Teucrium creticum L.*	Mediterranean								X					X				
	87	*Teucrium polium L.*									X						X			
	88	*Thymbra spicata L.*	Widespread								X						X			
LINACEAE	89	*Linum corymbulosum Rchb.*	Mediterranean								X					X				
MALVACEAE	90	*Althaea hirsuta L.*									X					X				
	91	*Malva cretica Cav.*	Mediterranean								X					X				
	92	*Malva sylvestris L.*									X						X			
LYTHRACEAE	93	*Punica granatum L.*											X		X		X			
OLEACEAE	94	*Olea europaea L.*									X							X		
PAPAVERACEAE	95	*Papaver rhoeas L.*									X	X	X	X			X			

Family	No	Species	Phytogeographic Region	Endemism		TRDB	Bern	CITES			Habitat					Relative Abundance				
				R	W		App 1	App 1	App 2	App 3	1	2	3	4	5	1	2	3	4	5
	96	*Glaucium flavum Crantz*									X				X		X			
PLANTAGINACEAE																				
	98	*Plantago afra L.*									X						X			
	99	*Plantago lanceolata L.*									X					X				
POLYGALACEAE	101	*Polygala venulosa Sibth. & Sm.*	Widespread								X						X			
RANUNCULACEAE	102	*Rubus sanctus Schreb.*	Widespread								X				X		X			
	103	*Anemone coronaria L.*	Mediterranean								X				X		X			
	104	*Consolida orientalis (J.Gay) Schrödinger*	Widespread												X		X			
	105	*Delphinium peregrinum L.*	Mediterranean								X				X	X				
	106	*Ranunculus asiaticus L.*									X				X		X			
	107	*Staphisagria macrosperma Spach*	Mediterranean								X				X		X			
ROSACEAE	108	*Potentilla recta L.*	Widespread								X						X			
	109	*Mespilus germanica L.*											X		X		X			
	110	*Rubus sanctus Schreb.*	Widespread								X						X			
	111	*Sarcopoterium spinosum (L.) Spach*	Mediterranean								X							X		
	112	*Cerasus prostrata (Labill.) Ser.*	Widespread								X						X			
RUBIACEAE	113	*Valantia muralis L.*	Mediterranean								X					X				
SANTALACEAE	114	*Osyris alba L.*	Mediterranean								X						X			
THYMELAEACEAE	115	*Thymelaea tartonraira (L.) All.*	Mediterranean								X					X				
ASPARAGACEAE	116	*Muscari comosum (L.) Mill.*	Mediterranean								X					X				
	117	*Asparagus acutifolius L.*	Mediterranean								X					X				
CYPERACEAE	118	*Cyperus capitatus Vand.*									X					X				
IRIDACEAE	119	*Gladiolus illyricus W.D.J.Koch*	Mediterranean								X					X				
	120	*Gynandriris sisyrinchium (L.) Parl.*	Widespread								X					X				
LILIACEAE	121	*Asphodelus fistulosus L.*	Mediterranean								X						X			
	122	*Gagea graeca (L.) Irmsch.*	Mediterranean								X						X			
ORCHIDACEAE																				
	125	*Orchis tridentata Scop.*	Widespread								X					X				
POACEAE	126	*Andropogon distachyos L.*	Mediterranean								X								X	
	127	*Avena sterilis L.*									X						X			
	128	*Bromus japonicus Thunb.*									X						X			

Family	No	Species	Phytogeographic Region	Endemism		TRDB	Bern	CITES			Habitat					Relative Abundance				
				R	W		App 1	App 1	App 2	App 3	1	2	3	4	5	1	2	3	4	5
	129	*Bromus rubens L.*									X						X			
	130	*Dactylis glomerata*									X						X			
	131	*Echinaria capitata (L.) Desf.*									X						X			
	132	*Poa bulbosa L.*	Widespread								X							X		
CRASSULACEAE	133	*Sedum amplexicaule subsp. tenuifolium (Sm.) Greuter & Burdet*	Mediterranean								X					X				
	134	*Sedum caespitosum (Cav.) DC*	Mediterranean								X					X				
	135	*Sedum hispanicum L.*	Irano- Turanian								X					X				
	136	*Umbilicus rupestris (Salisb.) Dandy*	Widespread								X					X				

Relative abundance: 1: Very Rare, 2: Rare, 3: Moderately Abundant 4: Abundant 5: Very Abundant

Endemism: **R**: Regional **W**: Widespread

TRDB: Turkish Red Data Book: Cr: Critically Endangered, En: Endangered, VU: Vulnerable, NT: Near Threatened, LC: Least Concern

Habitat Classification:

1: F5.2: Maquis

2: J1.2: Residential buildings of villages and urban peripheries

3: J4.2: Road networks

4: J4.5: Hard-surfaced areas of ports

5: I1.2: Mixed crops of market gardens and horticulture

4.1.4 Status of Plants in Terms of Threatened Category and Endemism

As a result of the field study, a total of 2 widespread endemic plant species were identified (*Peucedanum chryseu and Centaurea polyclada*). There is no data different from which was identified in the local EIA process for the ETL and access road, and no rare/regional or endangered plant species are present in these locations.

Widespread endemic species are generally distributed across similar habitats in the Mediterranean and Aegean regions. The widespread endemic species are classified as "LC: Least Concern" according to the TRDB List of Threatened Species. Additionally, three plant species with limited populations, though not endemic, were identified. (See Table 4-7)

Table 4-7 The endemic flora species in the Project area of ınfluence

Taxon	National Red List Category	Bern
Widespread Endemic Species		
Peucedanum chryseum	LC	-
Centaurea polyclada	LC	-

4.2 Terrestrial Mammal

4.2.1 Büyük Menderes Delta and Bafa Lake Key Biodiversity Area

The KBAs report for the Büyük Menderes Delta and Bafa Lake, along with the online databases and resources reviewed, does not provide specific information regarding the presence of mammal species relevant to the KBA in the region. The turbine, switchyard, access road, and ETL components are located outside the boundaries of the Bafa Lake KBA. However, portions of the access road and site roads intersect with the Büyük Menderes Delta KBA.

4.2.2 Terrestrial Mammals Surveys

The similar data as provided in the ESIA regarding terrestrial mammals has been obtained. A total of 28 mammal species from 14 families were identified within the Project Area of Influence through a combination of field studies, literature reviews, and survey interviews. Among these species, 10 were directly observed during fieldwork, and 18 were identified through a thorough review of existing literature (See Table 4-8).

There is no endemic mammal species among the identified species.

Among the mammal species identified in the Project Area of Influence, 6 species are listed in Annex II of the Bern Convention, 7 species in Annex III, and 2 species in Annex II of CITES. According to the IUCN Red List, no species in the area is classified as endangered, with 1 species categorized as Vulnerable (VU), 2 species categorized as Near threatened (NT), 1 species categorized as Data Deficient (DD). The remaining species are classified as Least Concern (LC), indicating they are not currently at significant risk of extinction.

Marbled polecat (*Vormela peregusna*) is Vulnerable (VU). Its habitat preference (open land, arid, steppe areas) does not majorly overlap with the habitat characteristics of the Project area (Maquis) but it could be a rare occurrence here. Marbled polecat has been recorded as literature data.

Jungle Cat (*Felis chaus*)(LC): During the 2024 monitoring studies for the Akköy WPP Project, the jungle cat was observed at two locations near the Project area, on May 8 in the Büyük Menderes Delta and on May 17 in the Yalıköy region, both outside the Project footprint.

The nearest wind turbine to the first observation site is T3, located 4.15 km away, while the closest turbine to the second observation site is T6, situated 3 km from the sighting location.

Although the Project area does not provide suitable habitat for the jungle cat, two important areas for the species have been identified nearby: the areas around Lake Bafa and Mount Latmos, and the Büyük Menderes Delta. Data from GPS collar tracking provided by Aydın Nature Conservation and National Parks show that an individual tagged in the Lake Bafa region traveled between Lake Bafa and the Büyük Menderes Delta. However, movement analysis indicated that this individual did not enter the Akköy, Yeniköy, or Akyeniköy regions, instead utilizing habitats in the upper sections of villages farther from the Project area.

Table 4-8 Terrestrial Mammal Taxa and Threatened Categories Identified in the Project Area of Influence

Family	Species Name	English Name	Endemism	IUCN	BERN	CITES	Monitoring Criteria	Observation / Literature
Erinaceidae	*Erinaceus concolor*	Southern White-breasted Hedgehog	-	LC		-	-	L / O
Soricidae	*Neomys anomalus*	Southern Water Shrew	-	LC	Ann -II			L
Soricidae	*Suncus etruscus*	Etruscan Shrew	-	LC	Ann -II			L
Talpidae	*Talpa levantis*	Levantine Mole	-	LC	Ann -III	-	-	L
Leporidae	*Lepus europaeus*	European Hare	-	LC	Ann -III	-	-	L / O
Sciuridae	*Sciurus anomalus*	Caucasian Squirrel	-	LC	Ann -III	-	-	L / O
Sciuridae	*Spermophilus xanthoprymnus*	Ground Squirrel	-	NT	-	-	-	L
Cricetidae	*Arvicola amphibius*	Water Vole	-	LC	-	-	-	L
Muridae	*Microtus guentheri*	Guenther's Vole	-	LC	-	-	-	L / O
Muridae	*Mesocricetus brandti*	Turkish Hamster	-	NT	-	-	-	L
Muridae	*Apodemus mystacinus*	Broad-toothed Field Mouse	-	LC	-	-	-	L
Muridae	*Apodemus sylvaticus*	Wood Mouse	-	LC	-	-	-	L
Muridae	*Rattus rattus*	Black Rat	-	LC	-	-	-	L / O
Muridae	*Rattus norvegicus*	Brown Rat	-	LC	-	-	-	L
Spalacidae	*Nannospalax leucodon*	Lesser Mole Rat	-	DD	-	-	-	L
Gliridae	*Dryomys nitedula*	Forest Dormouse	-	LC	Ann -II	-	-	L
Hystricidae	*Hystrix indica*	Indian Crested Porcupine	-	LC	-	-	-	L
Canidae	*Canis lupus*	Grey Wolf	-	LC	Ann -II	Ann -II	-	L
Canidae	*Canis aureus*	Golden Jackal	-	LC	-	-	-	L
Canidae	*Vulpes vulpes*	Red Fox	-	LC	-	-	-	L / O
Mustelidae	*Mustela nivalis*	Least Weasel	-	LC	Ann -III	-	-	L / O
Mustelidae	*Vormela peregusna*	Marbled Polecat	-	VU	Ann -III	-	=	L

Family	Species Name	English Name	Endemism	IUCN	BERN	CITES	Monitoring Criteria	Observation / Literature
Mustelidae	*Martes martes*	Pine Marten	-	LC	Ann -II	-	-	L
Mustelidae	*Martes foina*	Beech Marten	-	LC	Ann -III	-	-	L / O
Mustelidae	*Meles meles*	European Badger	-	LC	Ann -III	-	-	L
Felidae	*Felis silvestris*	Wildcat	-	LC	Ann -II	-	-	L
Felidae	*Felis chaus*	Jungle Cat	-	LC	-	Ann -II	-	L/O
Suidae	*Sus scrofa*	Boar	-	LC		-	-	L / O

4.3 Herpetofauna

4.3.1 Büyük Menderes Delta and Bafa Lake Key Biodiversity Area

The KBAs report for the Büyük Menderes Delta and Bafa Lake, along with the online databases and resources reviewed, does not provide specific information regarding the presence of herpetofauna species relevant to the KBA in the region. The turbine, switchyard, access road, and ETL components are located outside the boundaries of the Bafa Lake KBA. However, portions of the access road and site roads intersect with the Büyük Menderes Delta KBA.

4.3.2 Amphibia

The similar data as provided in the ESIA regarding amphibia has been obtained. A total of 9 herpetofauna species from 5 families were identified within the Project Area of Influence through a combination of field studies, literature reviews, and survey interviews. Among these species, 2 were directly observed during fieldwork, and 7 were identified through a thorough review of existing literature. (See Table 4-9).

There is no endemic amphibia species among the identified species.

Among the amphibia species identified in the Project Area of Influence, 4 species are listed in Annex II of the Bern Convention, 5 species in Annex III. According to the IUCN Red List, no species in the area are classified as endangered. All species are classified as Least Concern (LC), indicating they are not currently at significant risk of extinction. According to the CITES Convention, none of the nine species are listed in the annexes.

During the field survey, no permanent water sources, such as ponds, were observed within the project area. However, water channels formed by excessive irrigation around agricultural fields, where the identified species were observed.

4.3.3 Reptilia

The similar data as provided in the ESIA regarding Reptilia has been obtained. A total of 25 Reptilia species from 11 families were identified within the Project Area of Influence through a combination of field studies, literature reviews, and survey interviews. Among these species, 5 were directly observed during fieldwork, and 20 were identified through a thorough review of existing literature. (See Table 4-10)

There is no endemic reptile species among the identified species.

Among the Reptilia species identified in the Project Area of Influence, 12 species are listed in Annex II of the Bern Convention, 13 species in Annex III. According to the IUCN Red List, no species in the area are classified as endangered.

Except for one species, the remaining species are classified as Least Concern (LC) by the IUCN, indicating they are not currently at significant risk of extinction. One species, *Testudo graeca*, is classified as 'VU (Vulnerable)' under the IUCN criteria and CITES Annex-II. Additionally, according to the CITES Convention, only 1 of the 25 species is listed in its annexes.

Table 4-9 Amphibia Taxa and Threatened Categories Identified in the Project Area of Influence

Family	Species Name	English Name	Endemism	IUCN	BERN	CITES	Monitoring Criteria	Observation / Literature
Salamandridae	*Triturus vulgaris*	Smooth newt	-	LC	Ann -II	-	-	L
Salamandridae	*Triturus karelinii*	Southern crested newt	-	LC	Ann -II	-	-	L
Pelobatidae	*Pelobates syriacus*	Eastern spadefoot	-	LC	Ann -II	-	-	L / O
Bufonidae	*Bufo bufo*	Common Toad	-	LC	Ann-III	-	-	L
Bufonidae	*Bufotes viridis*	European green toad	-	LC	Ann -II	-	-	L / O
Hylidae	*Hyla orientalis*	Eastern tree frog	-	LC	Ann -III	-	-	L
Ranidae	*Pelophylax ridibundus*	Marsh frog	-	LC	Ann -III	-	-	L
Ranidae	*Rana macrocnemis*	Long-legged wood frog	-	LC	Ann -III	-	-	L
Ranidae	*Pelophylax bedriagae*	Levant water frog	-	LC	Ann -III	-	-	L

Table 4-10 Reptilia Taxa and Threatened Categories Identified in the Project Area of Influence

Family	Species Name	English Name	Endemism	IUCN	BERN	CITES	Monitoring Criteria	Observation / Literature
Testudinidae	*Testudo graeca*	Common tortoise	-	VU	Ann -II	Ann -II	X	O / L
Gekkonidae	*Cyrtopodion kotschyi*	Kotschy's gecko	-	LC	Ann -III	-	-	L
Gekkonidae	*Hemidactylus turcicus*	Mediterranean house gecko	-	LC	Ann -III	-	-	L
Agamidae	*Stellagama stellio*	Starred agama	-	LC	Ann -II	-	-	O / L
Anguidae	*Pseudopus apodus*	Sheltopusik	-	LC	Ann -II	-	-	O / L
Scincidae	*Ablepharus kitaibelii*	European copper skink	-	LC	Ann -II	-	-	L
Scincidae	*Heremites auratus*	Levant skink	-	LC	Ann -III	-	-	L
Lacertidae	*Podarcis muralis*	Common wall lizard	-	LC	Ann -II	-	-	L
Lacertidae	*Parvilacerta parva*	Dwarf lizard	-	LC	Ann -III	-	-	L
Lacertidae	*Lacerta diplochondrodes*	Rhodos green lizard	-	LC	Ann -III	-	-	L
Lacertidae	*Ophisops elegans*	Snake-eyed lizard	-	LC	Ann -II	-	-	O / L
Blanidae	*Blanus strauchi*	Turkish worm lizard	-	LC	Ann -II	-	-	L
Boidae	*Eryx jaculus*	Javelin sand boa	-	LC	Ann -III	-	-	L
Colubridae	*Dolichophis caspius*	Caspian whipsnake	-	LC	Ann -III	-	-	O / L
Colubridae	*Coluber jugularis*	Large Whip Snake	-	LC	Ann -II	-	-	L
Colubridae	*Platyceps najadum*	Dahl's Whip Snake	-	LC	Ann -II	-	-	L
Colubridae	*Hemorrhois nummifer*	Coin-marked snake	-	LC	Ann -III	-	-	L
Colubridae	*Platyceps collaris*	Red whip snake	-	LC	Ann -III	-	-	L
Colubridae	*Eirenis modestus*	Ring-headed dwarf snake	-	LC	Ann -III	-	-	L
Colubridae	*Elaphe sauromates*	Eastern Four-Lined Ratsnake	-	LC	Ann -III	-	-	L
Colubridae	*Zamenis situla*	European ratsnake	-	LC	Ann -II	-	-	L
Colubridae	*Malpolon insignitus*	Eastern Montpellier snake	-	LC	Ann -III	-	-	L
Natricidae	*Natrix natrix*	Grass snake	-	LC	Ann -III	-	-	L
Colubridae	*Telescopus fallax*	European cat snake	-	LC	Ann -II	-	-	L
Viperidae	*Montivipera xanthina*	Ottoman viper	-	LC	Ann -II	-	-	L

4.4 Bird

4.4.1 Vantage Point Observations

VP methodology records bird “contacts” and the results therefore are expected to feature repeat “contacts” of the same individuals especially for resident species.

Spring

During the spring of 2024, a total of 79 birds were detected in VP1 and VP2 (Table 4-11). The most frequently encountered species was Short-toed Snake Eagle (*Circaetus gallicus*) with 38 contacts observed. Dalmatian Pelican (*Pelecanus crispus*) (NT) was recorded with 9 contacts which listed as Near Threatened (NT) in IUCN Red List (BirdLife International 2018).

Table 4-11 Total number of soaring migratory and resident bird species observed in VP1 and VP2 spring 2024

Common Name	Scientific Name	IUCN	Migrant	Resident	Total
Short-toed Snake-Eagle	*Circaetus gallicus*	LC	14	24	38
White Stork	*Ciconia ciconia*	LC	2	17	19
Dalmatian Pelican	*Pelecanus crispus*	NT	-	9	9
Eurasian Sparrowhawk	*Accipiter nisus*	LC	-	4	4
Common Buzzard	*Buteo buteo*	LC	-	4	4
Eurasian Kestrel	*Falco tinnunculus*	LC	1	3	4
Montagu's Harrier	*Circus pygargus*	LC	1	-	1
Total		-	18	61	79

During spring migration period, 18 birds were identified as a migrant. The migration rate was determined to be 0.3 birds per hour for the spring migratory season.

Among the birds observed in VP1 and VP2, 52 (about 66% of all observed birds) were reported to fly at risk height (at rotor height and below and 500 m buffer) (Table 4-12). The species that most frequently entered the risk zone was Short-toed Snake Eagle (*Circaetus gallicus*). However, these numbers do not represent unique birds and contain multiple reports of the same bird for residents.

Dalmatian Pelican (*Pelecanus crispus*) activity pattern in the risk zone is primarily directed in the NE-SW axis at the northwestern end of the turbine risk zone. The species was not observed to cross perpendicular to the turbine alignment, instead flying parallel to the alignment along the northwestern side, mainly at the T1 to T3 buffer zones.

Table 4-12 Resident and migrant bird occurrences at risk zone in spring 2024

Common Name	Scientific Name	IUCN	Migrant	Resident	Total
Short-toed Snake-Eagle	*Circaetus gallicus*	LC	9	19	28
White Stork	*Ciconia ciconia*	LC	1	10	11
Eurasian Sparrowhawk	*Accipiter nisus*	LC	-	4	4
Common Buzzard	*Buteo buteo*	LC	-	4	4
Eurasian Kestrel	*Falco tinnunculus*	LC	1	3	4
Montagu's Harrier	*Circus pygargus*	LC	1	-	1
Total	-	-	12	40	52

An additional vantage point at the delta, VP3, was established to monitor the movement patterns of waterbirds at the delta in Buyuk Menderes NP. A total of 2762 birds were detected in

VP3 including 2672 contacts of Greater Flamingo (*Phoenicopterus roseus*) and 81 contacts of Dalmatian Pelican (*Pelecanus crispus*). Birds observed from VP3 were not detected to head towards turbine areas or risk zones (Table 4-13).

Table 4-13 Total number of soaring migratory and resident bird species observed in VP3 (delta) spring 2024

Common Name	Scientific Name	IUCN	Migrant	Resident	Unknown	Total
Greater Flamingo	*Phoenicopterus roseus*	LC	-	2672	-	2672
Dalmatian Pelican	*Pelecanus crispus*	NT	-	81	-	81
Eurasian Kestrel	*Falco tinnunculus*	LC	-	2	-	2
Montagu's Harrier	*Circus pygargus*	LC	2	-	-	2
Eleonora's Falcon	*Falco eleonorae*	LC	1	-	-	1
White Stork	*Ciconia ciconia*	LC	1	-	-	1
Eurasian Marsh-Harrier	*Circus aeruginosus*	LC	-	1	-	1
unidentified Falcon	*Falco sp.*	-	-	-	1	1
Short-toed Snake-Eagle	*Circaetus gallicus*	LC	1	-	-	1
Total			5	2756	1	2762

Summer

During summer VP surveys, a total of 133 birds were detected at the site (Table 4-14). The most frequently encountered species was the White Stork (*Ciconia ciconia*), with 82 contacts observed. Other notable observations included the Short-toed Snake-Eagle (*Circaetus gallicus*) with 25 contacts, comprised of 4 migrants and 11 residents, and the Eurasian Kestrel (Falco tinnunculus). Despite the variety of species, no threatened species were recorded during the survey.

Table 4-14 Total number of soaring migratory and resident bird species observed in summer 2024

Common Name	Scientific Name	IUCN	Migrant	Resident	Unknown	Total
White Stork	*Ciconia ciconia*	LC	-	82	-	82
Short-toed Snake-Eagle	*Circaetus gallicus*	LC	-	25	-	25
Eurasian Kestrel	*Falco tinnunculus*	LC	-	12	-	12
Peregrine Falcon	*Falco peregrinus*	LC	-	3	-	3
Long-legged Buzzard	*Buteo rufinus*	LC	-	3	-	3
Eurasian Sparrowhawk	*Accipiter nisus*	LC	-	2	-	2
unidentified Eagle	*Aquila/Clanga spp.*	-	-	-	2	2
Eleonora's Falcon	*Falco eleonorae*	LC	-	1	-	1
unidentified Falcon	*Falco spp.*	-	-	2	-	2
Montagu's Harrier	*Circus pygargus*	LC	1	-	-	1

Common Name	Scientific Name	IUCN	Migrant	Resident	Unknown	Total
Total	-	-	1	130	2	133

During the summer of 2024, a survey totalling 88 hours and 26 minutes was conducted per vantage point. Over this period, 1 bird was identified as a migrant. The migration rate was determined to be 0.01 birds per hour which is negligible.

Among the birds observed, 93 (about 70% of all observed birds) were reported to fly at risk height (at rotor height and below and 500 m buffer) (Table 4-15). Majority of birds that entered the risk zone were White Stork (*Ciconia ciconia*), with a maximum count of 12 contacts observed at a single time. However, these numbers do not represent unique birds and contain multiple reports of the same bird for residents.

Table 4-15 Resident and migrant bird occurrences at risk zone in summer 2024

Common Name	Scientific Name	IUCN	Migrant	Resident	Unknown	Total
White Stork	*Ciconia ciconia*	LC	-	52	-	52
Short-toed Snake-Eagle	*Circaetus gallicus*	LC	-	18	-	18
Eurasian Kestrel	*Falco tinnunculus*	LC	-	12	-	12
Peregrine Falcon	*Falco peregrinus*	LC	-	3	-	3
Long-legged Buzzard	*Buteo rufinus*	LC	-	3	-	3
unidentified Eagle	*Aquila/Clanga spec.*	-	-	-	2	2
Eleonora's Falcon	*Falco eleonorae*	LC	-	1	-	1
Eurasian Sparrowhawk	*Accipiter nisus*	LC	-	1	-	1
Montagu's Harrier	*Circus pygargus*	LC	1	-	-	1
Total	-	-	1	90	2	93

Autumn

During autumn VP surveys, a total of 150 birds were detected at the site (Table 4-16). The most frequently encountered species was the Eurasian Kestrel (*Falco tinnunculus*), with 47 contacts observed, all of which were residents. Other notable observations included the Short-toed Snake-Eagle (*Circaetus gallicus*) and Eurasian Sparrowhawk (Accipiter nisus) with 46 and 12 contacts, respectively. The Dalmatian Pelican (*Pelecanus crispus*), classified as Near Threatened (NT) on the IUCN Red List (BirdLife International 2018), was observed during the autumn VP surveys.

Table 4-16 Total number of soaring migratory and resident bird species observed in autumn 2024

Common Name	Scientific Name	IUCN	Migrant	Resident	Unknown	Total
Eurasian Kestrel	*Falco tinnunculus*	LC	-	47	-	47
Short-toed Snake-Eagle	*Circaetus gallicus*	LC	-	46	-	46
Eurasian Sparrowhawk	*Accipiter nisus*	LC	1	11	-	12
White Stork	*Ciconia ciconia*	LC	8	-	-	8
Long-legged Buzzard	*Buteo rufinus*	LC	7	2	-	9
unidentified Sparrowhawk	*Accipiter spec.*	-	-	-	7	7
Dalmatian Pelican	*Pelecanus crispus*	NT	-	6	-	6
Peregrine Falcon	*Falco peregrinus*	LC	-	3	-	3
Common Buzzard	*Buteo buteo*	LC	3	-	-	3
unidentified Falcon	*Falco spec.*	-	-	-	2	2
unidentified Eagle	*Aquila/Clanga spec.*	-	-	-	2	2

Common Name	Scientific Name	IUCN	Migrant	Resident	Unknown	Total
Eurasian Hobby	*Falco subbuteo*	LC	1	-	-	1
Hen Harrier	*Circus cyaneus*	LC	1	-	-	1
Booted Eagle	*Hieraaetus pennatus*	LC	1	-	-	1
Eurasian Marsh-Harrier	*Circus aeruginosus*	LC	1	-	-	1
Montagu's Harrier	*Circus pygargus*	LC	1	-	-	1
Total	-	-	**24**	**115**	**11**	**150**

During the autumn of 2024, an extensive survey totalling 102 hours and 50 minutes was conducted per vantage point. Over this period, 24 birds were identified as migrants. The migration rate was determined to be 0,23 birds per hour for the autumn season.

Among the birds observed, 121 (about 81% of all observed birds) were reported to fly at risk height (at rotor height and below and 500 m buffer) (Table 4-17). The species that most frequently entered the risk zone was Eurasian Kestrel (*Falco tinnunculus*). Dalmatian Pelican (*Pelecanus crispus*) was observed at the risk zone during autumn VP surveys. However, these numbers do not represent unique birds and contain multiple reports of the same bird for residents.

Table 4-17 Resident and migrant bird occurrences at risk zone in autumn 2024

Common Name	Scientific Name	IUCN	Migrant	Resident	Unknown	Total
Eurasian Kestrel	*Falco tinnunculus*	LC	-	39	-	39
Short-toed Snake-Eagle	*Circaetus gallicus*	LC	-	36	-	36
Eurasian Sparrowhawk	*Accipiter nisus*	LC	1	10	-	11
White Stork	*Ciconia ciconia*	LC	6	-	-	6
Dalmatian Pelican	*Pelecanus crispus*	NT	-	6	-	6
Long-legged Buzzard	*Buteo rufinus*	LC	5	2	-	7
unidentified Sparrowhawk	*Accipiter spec.*	-	-	-	4	4
Peregrine Falcon	*Falco peregrinus*	LC	-	3	-	3
unidentified Falcon	*Falco spec.*	-	-	-	2	2
Common Buzzard	*Buteo buteo*	LC	2	-	-	2
Hen Harrier	*Circus cyaneus*	LC	1	-	-	1
Booted Eagle	*Hieraaetus pennatus*	LC	1	-	-	1
Eurasian Marsh-Harrier	*Circus aeruginosus*	LC	1	-	-	1
unidentified Eagle	*Aquila/Clanga spec.*	-	-	-	1	1
Montagu's Harrier	*Circus pygargus*	LC	1	-	-	1
Total	-	-	**18**	**96**	**7**	**121**

4.4.2 ETL Observations

During the spring 2024 surveys at VP ETL and VP1 covering the ETL, a total of 18 birds were detected across various species (Table 4-18). Out of these, 14 birds, which account for approximately 78% of the total, were observed flying at the height of the transmission lines, placing them at potential risk of collision. The most common species observed was the Short-toed Snake-Eagle (*Circaetus gallicus*), with 6 contacts detected and all of them flying at risk height.

Based on the limited ETL survey data, passage along the route is uniform and risk is considered low Figure 4-2.

Table 4-18 Total number of bird species observed at VP ETL points at risk height in spring 2024.

Common Name	Scientific Name	IUCN	Total	Risk Height
Short-toed Snake-Eagle	*Circaetus gallicus*	LC	6	6
Eurasian Kestrel	*Falco tinnunculus*	LC	4	1
Long-legged Buzzard	*Buteo rufinus*	LC	3	3
Eurasian Sparrowhawk	*Accipiter nisus*	LC	2	1
Peregrine Falcon	*Falco peregrinus*	LC	1	1
Montagu's Harrier	*Circus pygargus*	LC	1	1
Common Buzzard	*Buteo buteo*	LC	1	1
Total	-	-	18	14

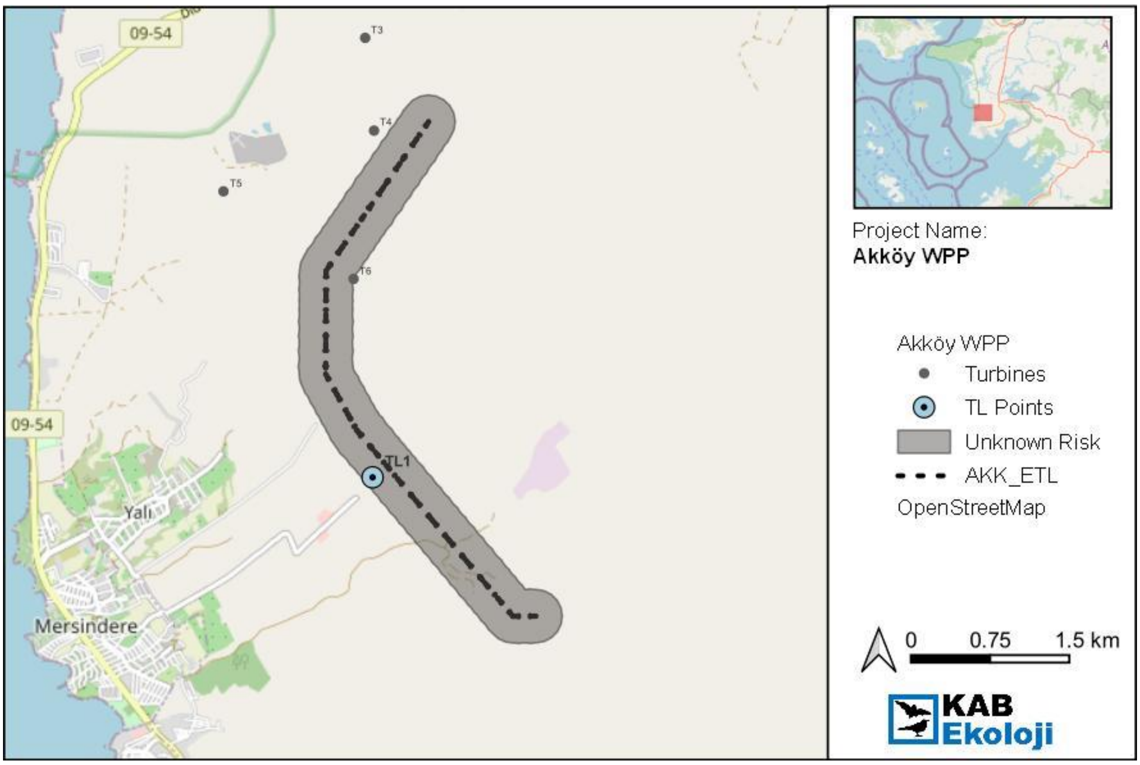


Figure 4-2 ETL segment risk assessment

4.4.3 Collision Risk Model

For collision risk model, the average time spent at each VP for each season was utilized. It would be the most optimal and would provide the best possible results if the individual VP efforts are very similar. However often in field conditions survey effort at each VP may vary due to logistics, weather, surveyor wellbeing and other circumstances that may arise. While bigger differences in survey effort may degrade the predictive power of the model at locations where target bird species are highly active, where activity is even and at low – moderate levels the model's estimations are not considered significantly.

VP observations, where appropriate, ran in parallel to ETL observations to optimize field survey schedules, if shared VPs were available Similar to the first point, while for busy airspaces (such as major migration routes) this would have a negative impact on study results, at locations lower rates of activity, the two methodologies are compatible and do not detract from survey effort. This is due to NatureScot methodology not involving continuous surveillance of the airspace, but rather surveillance at intervals (every 5 minutes). The two methodologies can be stacked due to the interval observations approach.

Total daylight hours in each season are calculated based on 12 hours for residents and 10 hours for migrants. This is a practice that enhances the predictive power of the model which is backed by studies of migrant behaviour from Istanbul migration counts. Migrant soaring species, relative to their resident counterparts, are mostly inactive before the sun is higher and the thermal air currents are better developed since energy conservation during migration is of critical importance. This behaviour is reflected in the hourly distribution of bird passages in most raptor counts (typically between 09:00 and 17:00). Therefore, 2 hours from daylight are subtracted to reflect migrant active hours in the model. There are one published and two unpublished reports on the bird migration over the Bosporus, which also features analysis of the hourly distribution of birds.[5][6][7]

Spring

Sample collision risk calculation for resident species is shown in Table 4-19. Calculation for all species with risk above 0 is shown on Table 4-20.

Table 4-19 Mortality rate calculation for migrant species in detail (spring)

Variable	Value	Unit
Species	Short-toed Snake-Eagle	
Recorded number of birds at risk height/zone	9	birds
Duration of observation	59.10	hr/ VP
Study Period	2024-03-01	
	2024-06-15	
Total migration hours	1070	hr
Estimated number of birds at risk height/zone (n)	163	birds

[5] Üner, Ö., Boyla, K.A., Bacak, E., Birel, E., Çelikoba, İ., Dalyan, C., Tabur, E. & Yardım, Ü. (2006). Spring migration of soaring birds over the Bosphorus, Turkey, in 2006. Sandgrouse 32.

[6] İKGT. (2010). 2010 İstanbul Boğazı Kuş Göçü Sayımları. İstanbul Kuş Gözlem Topluluğu, İstanbul.

[7] Bilgin, S., Boyla, K.A. & Topluluğu, İ.K.G. (2011). İstanbul Boğazı Göçü–İlkbahar 2011. İstanbul Kuş Gözlem Topluluğu, İstanbul.

Variable	Value	Unit
N	6	
width	5082	m
height	180	m
W	914760	m2
A	89742.74	m2
A/W	0.1	%
n x (A/W)	15.99	birds
P. Probability of bird being hit when flying through the rotor	0.09	
Mortality rate without avoidance	1.39	birds
(1 - avoidance rate)	0.02	
Mortality estimation per year	0.03	birds

Table 4-20 The estimated mortality rates of migrant species in spring 2024 (mort. w/o avo.: mortality without avoidance, mort. w/ avo.: mortality with avoidance)

Common Name	observed	# observed	# thru rotors	Mort. w/o avo.	Mort. w/ avo.
Short-toed Snake-Eagle	9	162.94	17.56	1.53	0.03
Eurasian Kestrel	1	18.1	1.95	0.18	0.00
Montagu's Harrier	1	18.1	1.95	0.23	0.00
White Stork	1	18.1	1.95	0.17	0.00
Total	12	217.26	23.41	2.11	0.04

Sample collision risk calculation for resident species is shown in Table 4-21. Calculation for all species with risk above 0 is shown on Table 4-22/

Table 4-21 Mortality rate calculation for resident species in detail (spring)

Variable	Value	Unit
Species	Short-toed Snake-Eagle	
Total duration of individual bird observations	900.5	sec
Total duration of observations	59.10	hr/VP
Study Period	2024-03-01	
	2024-06-15	
Total migration hours	1284	hr
Estimated total birds x seconds	19564.1	bird x sec
N	6	
Area	4662586	m2
height	180	m
Vw	8.39E+08	m3
Sweeping Area	89742.74	m2
r	69	m
d	4	m
L	0.66	m
Vr = N x πR2 x (d + l)	417752.4	m3
n	19564.1	sec
n x (Vr / Vw)	9.74	sec
v	13.4	m/s

Variable	Value	Unit
t = (d + l) / v	0.35	sec
n x (Vr / Vw) / t	28.03	birds
Probability of bird being hit when flying through the rotor	0.09	
Mortality rate without avoidance	2.44	birds
(1 - avoidance rate)	0.02	
Mortality estimation for study period	0.05	birds

Table 4-22 The estimated mortality rates of resident species in spring 2024 (mort. w/o avo.: mortality without avoidance, mort. w/ avo.: mortality with avoidance)

Common Name	Total	Total (sec/year)	Occupancy	# passage	Mort. w/o avo.	Mort. w/ avo.
Short-toed Snake-Eagle	900	19564	11	31	2.68	0.05
White Stork	832	18076	11	34	2.92	0.06
Eurasian Sparrowhawk	466	10134	5	13	1.13	0.02
Common Buzzard	205	4459	2	6	0.57	0.01
Eurasian Kestrel	54	1164	1	1	0.13	0.00
Total	2458	53399	29	86	7.43	0.15

Summer

Sample collision risk calculation for migrant species is shown in Table 4-22.Calculation for all species with risk above 0 is shown on Table 4-24.

Table 4-23 Mortality rate calculation for migrant species in detail (summer)

Variable	Value	Unit
Species	Montagu's Harrier	
Recorded number of birds at risk height/zone	1	birds
Duration of observation	88.42.	hr/VP
Study Period	2024-06-16	
	2024-08-31	
Total migration hours	770	hr
Estimated number of birds at risk height/zone (n)	8.71	birds
N	6	
width	5083	m
height	165.3	m
W	840219.9	m2
A	90524.8	m2
A/W	0.11	%
n x (A/W)	0.94	birds
P. Probability of bird being hit when flying through the rotor	0.12	
Mortality rate without avoidance	0.11	birds
(1 - avoidance rate)	0.02	
Mortality estimation per year	0.00	birds

Table 4-24 The estimated mortality rates of migrant species in summer 2024 (mort. w/o avo.: mortality without avoidance, mort. w/ avo.: mortality with avoidance)

Common Name	observed	# observed	# thru rotors	Mort. w/o avo.	Mort. w/ avo.
Montagu's Harrier	1	8.71	0.94	0.11	0.00
Total	1	8.71	0.94	0.11	0.00

Sample collision risk calculation for resident species is shown in Table 4-25. Calculation for all species with risk above 0 is shown on Table 4-26.

Table 4-25 Mortality rate calculation for resident species in detail (summer)

Variable	Value	Unit
Species	White Stork	
Total duration of individual bird observations	3365.63	sec
Total duration of observations	88.42	hr/VP
Study Period	2024-06-16	
	2024-08-31	
Total migration hours	924	hr
Estimated total birds x seconds	35169.22	bird x sec
N	6	
Area	4662586	m2
height	165.3	m
Vw	770725466	m3
Sweeping Area	90524.8	m2
r	69.3	m
d	4	m
L	0.98	m
Vr = N x πR2 x (d + l)	450360.9	m3
n	35169.22	sec
n x (Vr / Vw)	20.55	sec
v	16	m/s
t = (d + l) / v	0.31	sec
n x (Vr / Vw) / t	66.09	birds
Probability of bird being hit when flying through the rotor	0.09	
Mortality rate without avoidance	5.68	birds
(1 - avoidance rate)	0.02	
Mortality estimation for study period	0.11	birds

Table 4-26 The estimated mortality rates of resident species in summer 2024 (mort. w/o avo.: mortality without avoidance, mort. w/ avo.: mortality with avoidance)

Common Name	Total	Total (sec/year)	Occupancy	# passage	Mort. w/o avo.	Mort. w/ avo.
White Stork	3366	35169	21	66	5.68	0.11
Short-toed Snake-Eagle	1424	14884	8	23	2.04	0.04
Eurasian Kestrel	568	5939	3	7	0.66	0.01
Eurasian Sparrowhawk	240	2508	1	3	0.28	0.01
Long-legged Buzzard	150	1563	1	2	0.2	0.00

Common Name	Total	Total (sec/year)	Occupancy	# passage	Mort. w/o avo.	Mort. w/ avo.
Others	149	1558	1	2	0.18	0.00
Total	5897	61621	35	104	9.04	0.18

Autumn

Sample collision risk calculation for migrant species is shown in Table 4-27. Calculation for all species with risk above 0 is shown on Table 4-28.

The data indicates that the collision risk for migrant species during the spring period is negligible.

Table 4-27 Mortality rate calculation for migrant species in detail (Autumn)

Variable	Value	Unit
Species	White Stork	
Recorded number of birds at risk height/zone	6	birds
Duration of observation	102.83	hr/VP
Study Period	2024-09-01	
	2024-11-15	
Total migration hours	760	hr
Estimated number of birds at risk height/zone (n)	44.35	birds
N	6	
width	5083	m
height	165.3	m
W	840219.9	m2
A	90524.8	m2
A/W	0.11	%
n x (A/W)	4.78	birds
P. Probability of bird being hit when flying through the rotor	0.09	
Mortality rate without avoidance	0.41	birds
(1 - avoidance rate)	0.02	
Mortality estimation per year	0.01	birds

Table 4-28 The estimated mortality rates of migrant species in Autumn 2024 (mort. w/o avo.: mortality without avoidance, mort. w/ avo.: mortality with avoidance)

Common Name	observed	# observed	# thru rotors	Mort. w/o avo.	Mort. w/ avo.
White Stork	6	44.35	4.78	0.41	0.01
Long-legged Buzzard	5	36.96	3.98	0.37	0.01
Common Buzzard	2	14.78	1.59	0.15	0.00
Booted Eagle	1	7.39	0.8	0.07	0.00
Eurasian Marsh-Harrier	1	7.39	0.8	0.07	0.00
Others	3	22.17	2.39	0.25	0.01
Total	18	133.04	14.33	1.32	0.03

Sample collision risk calculation for resident species is shown in Table 4-29. Calculation for all species with risk above 0 is shown on Table 4-30.

Table 4-29 Mortality rate calculation for resident species in detail (Autumn)

Variable	Value	Unit
Species	Short-toed Snake-Eagle	
Total duration of individual bird observations	2430.61	sec
Total duration of observations	102.83	hr/VP
Study Period	2024-09-01	
	2024-11-15	
Total migration hours	912	hr
Estimated total birds x seconds	21558.14	bird x sec
N	6	
Area	4662586	m2
height	165.3	m
Vw	770725466	m3
Sweeping Area	90524.8	m2
r	69.3	m
d	4	m
L	0.66.	m
Vr = N x πR2 x (d + l)	421393.	m3
n	21558.14	sec
n x (Vr / Vw)	11.79	sec
v	13.4	m/s
t = (d + l) / v	0.35	sec
n x (Vr / Vw) / t	33.93	birds
Probability of bird being hit when flying through the rotor	0.09	
Mortality rate without avoidance	2.95	birds
(1 - avoidance rate)	0.02	
Mortality estimation for study period	0.06	birds

Table 4-30 The estimated mortality rates of resident species in Autumn 2024 (mort. w/o avo.: mortality without avoidance, mort. w/ avo.: mortality with avoidance)

Common Name	Total	Total (sec/year)	Occupancy	# passage	Mort. w/o avo.	Mort. w/ avo.
Short-toed Snake-Eagle	2431	21558	12	34	2.95	0.06
Eurasian Kestrel	2010	17832	9	21	1.97	0.04
Dalmatian Pelican	1587	14073	9	26	2.99	0.06
Eurasian Sparrowhawk	364	3230	2	4	0.36	0.01
Long-legged Buzzard	232	2058	1	3	0.26	0.01
Others	57	506	0	1	0.06	0.00
Total	6681	59257	33	89	8.59	0.17

4.4.4 Additive Collision Risk (Project Galeforce)

Since each WPP within the financial package is a project of Project Galeforce consisting of 9 WPPs, the Lenders would like an evaluation of avian collision risks of the package in its entirety. The additive collision risk which is a collation of collision risk estimation results from each project are presented in this section.

It should be noted that this section presents an “additive” collision risk evaluation, not a “cumulative” evaluation. Previously, the Consultant has provided a regional, high-level, qualitative assessment for the Project. In this assessment, the Project’s potential impact on the migratory flyways was considered. Submitted qualitative assessment in ESIA Report for each project’s Chapter 17 was based on Gauld et al (2022) study[8] where collision vulnerability of migratory species is identified which was also restricted by the lack of data for majority of the grids for the regional assessment.

The main limitations regarding a qualitative Cumulative Collision Risk for the Project are (1) WPPs in Türkiye either do not carry out collision risk assessments or mortality studies, or do not carry those up to IFI standards, or if conducted, do not publicly disclose such studies, and this leads to (2) a lack of credible publications on mortality risks for WPPs in Türkiye which the quantitative cumulative assessment for Project Galeforce would have benefitted from in terms of data points.

Furthermore, (3) a regional level Cumulative CRA requires an understanding of how the WPPs in the region might potentially synergize, publications on which are not available from the region either. (4) Due to the vast geographical extent of the Project Galeforce, the variety of terrain and habitats, etc., gathering the data needed for a quantitative cumulative assessment is a high effort and long-term task.

Finally, (5) a cumulative risk assessment of the 9 WPPs would need to include rates associated with ETL collision mortality since those are considered project components, the quantitative data for which is also scarce from the region, and modelling methods, such as those associated with turbine mortality, are not well established in literature. These limitations must be considered if a cumulative collision risk assessment is to be undertaken in the future.

For the additive assessment section of the interim reports, National EIA data was incorporated into the evaluations for the purpose of having as little data gap as possible. However, it was already well established that the National EIA collision risk tables were incomplete on multiple accounts, such as on project or season levels, or had methodological inconsistencies or gaps that challenged robust comparison. Additionally, the risk tables clock almost all mortality estimations at “zero” except for Buteo buteo at 0.03 bird/spring season at Dampınar, and Falco tinnunculus at 0.03 birds/spring season for Akköy.

With the completion of the supplementary baseline in 2024 at hand, which was conducted by the same team, applying consistent methodology over 3 seasons across all projects over the same time period, and seeing that the inclusion of National EIA would simply complicate the dataset and dilute the risk estimations, it is more sensible to only consider 2024 results in the final baseline report for 2024 and interim reports for 2024 baseline may be reviewed for a compilation of National EIA results.

An overview of baseline collision risk estimation at each project broken down by resident or migrant status, covering spring, summer and autumn seasons based on 2024 studies are shown in Table 4-31. The results demonstrate that baseline risk over the study period was

[8] Gauld et al (2022). Hotspots in the grid: Avian sensitivity and vulnerability to collision risk from energy infrastructure interactions in Europe and North Africa. Journal of Applied Ecology.

driven mainly by resident activity as opposed to migratory movement over the minor pathways which was a picture that was already emerging at the interim stage.

It is important to note that none of the 2024 surveys account for winter periods. Though activity in winter is expected to be significantly diminished, it is not expected to be non-existent either. projects located in high altitudes, with extensive precipitation and high winds over the winter are not expected to host significant activity over the winter (e.g. Kestanederesi, potentially) while those projects in lowlands and near important wetlands may indeed receive activity (such as Ihlamur, with anecdotal findings, and Akköy, near a well-known protected wetland for wintering bird species). Therefore, the data from the three seasons was not extrapolated to cover winter (such as substituting an average or a minimum value or applying a coefficient to represent "winter" data) since the effect of winter on collision risk is mixed across the projects.

The table features additional lines to account for the potential effect of the discontinued surveys in Hacıhıdırlar WPP which resulted in missed seasons for autumn and summer. The line 8 WPP without Hacıhıdırlar calculates the %migrant and collision per turbine per year values without the project. The line 8 WPP with extrapolated Hacıhıdırlar is obtained by assuming the same collision risk values in summer and autumn as the spring results for the project.

Table 4-31 Collision risk summary for Project Galeforce and each of its projects as calculated in 2024

Projects	Migrant /yr*	Resident /yr*	Total /yr*	%migrant	Turbine count	Collision/ turbine/ yr*
Akköy	0.05	0.49	0.54	9.26	6	0.09
Armutçuk	0.19	0.43	0.62	30.65	20	0.03
Dampınar	0.06	1.44	1.50	4.00	11	0.14
Hacıhıdırlar**	0.00	0.50	0.50	0.00	15	0.03
Harmancık	0.05	0.06	0.11	45.45	10	0.01
Ihlamur	0.27	2.51	2.78	9.71	18	0.15
Kestanederesi	0.18	5.10	5.28	3.41	28	0.19
Ovacık	0.07	0.16	0.23	30.43	13	0.02
Uygar	0.65	1.76	2.41	26.97	60	0.04
Project Galeforce	1.52	12.45	13.97	10.88	181	0.08
8 WPP (- Hacıhıdırlar)	1.52	11.95	13.47	11.28	166	0.08

*Though denoted year (yr), the survey period consists of spring, summer and autumn, and does not account for winter periods

**Hacıhıdırlar WPP baseline collection was disrupted, and summer and autumn data could not be collected.

The data table summarizing the project specific collision risk estimations from the data is presented in Table 4-32.

Table 4-32 Additive Collision Risk Assessment summary for the 9 WPP Project.

Common Name	Projects	Migrant	Resident	Total
Black Kite	Harmancık	0.00	0.00	0.00
Subtotal		0.00	0.00	0.00
Black Stork	Ihlamur	0.00	0.02	0.02
	Uygar	0.01	0.01	0.02
Subtotal		0.01	0.03	0.04
Booted Eagle	Akköy	0.00	0.00	0.00
	Armutçuk	0.00	0.00	0.00
	Harmancık	0.00	0.00	0.00
	Ihlamur	0.01	0.00	0.01
	Kestanederesi	0.00	0.02	0.02
	Ovacık	0.01	0.00	0.01
	Uygar	0.00	0.02	0.02
Subtotal		0.02	0.04	0.06
Common Buzzard	Akköy	0.00	0.01	0.01
	Armutçuk	0.15	0.21	0.36
	Dampınar	0.00	0.19	0.19
	Hacıhıdırlar	0.00	0.40	0.40
	Harmancık	0.02	0.03	0.05
	Ihlamur	0.11	0.50	0.61
	Kestanederesi	0.00	1.00	1.00
	Ovacık	0.02	0.10	0.12
	Uygar	0.25	0.98	1.23
Subtotal		0.55	3.42	3.97
Dalmatian Pelican	Akköy	0.00	0.06	0.06
Subtotal		0.00	0.06	0.06
Eleonora's Falcon	Armutçuk	0.00	0.07	0.07
	Dampınar	0.00	0.48	0.48
	Hacıhıdırlar	0.00	0.04	0.04
	Harmancık	0.00	0.02	0.02
	Ihlamur	0.04	0.65	0.69
	Kestanederesi	0.00	0.35	0.35
	Ovacık	0.00	0.01	0.01
	Uygar	0.00	0.02	0.02
Subtotal		0.04	1.64	1.68
Eurasian Hobby	Ihlamur	0.00	0.06	0.06
	Ovacık	0.00	0.00	0.00
	Uygar	0.01	0.00	0.01
Subtotal		0.01	0.06	0.07
Eurasian Kestrel	Akköy	0.00	0.05	0.05
	Armutçuk	0.00	0.03	0.03
	Dampınar	0.01	0.00	0.01
	Hacıhıdırlar	0.00	0.02	0.02
	Harmancık	0.00	0.00	0.00
	Ihlamur	0.00	0.74	0.74
	Kestanederesi	0.00	1.06	1.06
	Ovacık	0.00	0.01	0.01
	Uygar	0.01	0.10	0.11
Subtotal		0.02	2.01	2.03
Eurasian Marsh-Harrier	Akköy	0.00	0.00	0.00
	Ihlamur	0.01	0.00	0.01
	Kestanederesi	0.03	0.00	0.03
	Ovacık	0.01	0.00	0.01
Subtotal		0.05	0.00	0.05
Eurasian Sparrowhawk	Akköy	0.00	0.04	0.04
	Armutçuk	0.01	0.04	0.05
	Dampınar	0.03	0.03	0.06
	Hacıhıdırlar	0.00	0.02	0.02
	Harmancık	0.02	0.00	0.02
	Ihlamur	0.03	0.02	0.05
	Kestanederesi	0.03	0.00	0.03
	Ovacık	0.02	0.01	0.03
	Uygar	0.30	0.05	0.35
Subtotal		0.44	0.21	0.65
European Honey-buzzard	Armutçuk	0.02	0.04	0.06
	Dampınar	0.01	0.01	0.02
	Harmancık	0.01	0.00	0.01
	Ihlamur	0.01	0.06	0.07
	Kestanederesi	0.11	0.00	0.11
	Uygar	0.04	0.04	0.08
Subtotal		0.20	0.15	0.35
Hen Harrier	Ihlamur	0.01	0.00	0.01
Subtotal		0.01	0.00	0.01
Lesser Kestrel	Kestanederesi	0.00	1.91	1.91
Subtotal		0.00	1.91	1.91
Levant Sparrowhawk	Harmancık	0.00	0.00	0.00
	Uygar	0.02	0.00	0.02
Subtotal		0.02	0.00	0.02
Long-legged Buzzard	Akköy	0.01	0.01	0.02
	Dampınar	0.00	0.00	0.00
	Kestanederesi	0.00	0.28	0.28
Long-legged Buzzard Total		0.01	0.29	0.30
Montagu's Harrier	Akköy	0.00	0.00	0.00
	Dampınar	0.01	0.00	0.01
	Kestanederesi	0.01	0.00	0.01
Subtotal		0.02	0.00	0.02
Peregrine Falcon	Dampınar	0.00	0.00	0.00
	Kestanederesi	0.00	0.04	0.04
Peregrine Falcon Total		0.00	0.04	0.04
Red-footed Falcon	Ihlamur	0.01	0.00	0.01
Red-footed Falcon Total		0.01	0.00	0.01
Short-toed Snake-Eagle	Akköy	0.03	0.15	0.18
	Armutçuk	0.01	0.04	0.05
	Dampınar	0.00	0.73	0.73
	Hacıhıdırlar	0.00	0.02	0.02
	Harmancık	0.00	0.01	0.01
	Ihlamur	0.04	0.46	0.50
	Kestanederesi	0.00	0.44	0.44
	Ovacık	0.01	0.03	0.04
	Uygar	0.00	0.54	0.54
Subtotal		0.09	2.42	2.51
unidentified Falcon	Harmancık	0.00	0.00	0.00
	Uygar	0.01	0.00	0.01
Subtotal		0.01	0.00	0.01
White Stork	Akköy	0.01	0.17	0.18
Subtotal		0.01	0.17	0.18
Total		1.52	12.45	13.97

4.4.5 Breeding Bird Observations

During breeding bird surveys, a total of 51 bird species were recorded. Among these, 29 species have a breeding code, indicating possible, probable or confirmed breeding. The noticeable common breeding species observed were Ruddy Shelduck (*Tadorna ferruginea*), Chukar (*Alectoris chukar*) and Eastern Black-eared Wheatear (*Oenanthe melanoleuca*). Additionally, species observed during breeding bird surveys which are not breeding were included (denoted -) All species are listed in Table 4-33.

Table 4-33 List of species encountered during breeding bird surveys and highest number recorded each month. (X: observed but not counted)

Common Name	Scientific Name	IUCN	Code	Mar	Apr	May	Jun	Jul
Ruddy Shelduck	*Tadorna ferruginea*	LC	C13	9	-	44	1	-
Mallard	*Anas platyrhynchos*	LC	-	-	-	4	-	-
Chukar	*Alectoris chukar*	LC	C12	5	2	2	12	12
Rock Pigeon	*Columba livia*	LC	-	7	-	-	-	-
European Turtle-Dove	*Streptopelia turtur*	VU	-	-	-	4	-	-
Eurasian Collared-Dove	*Streptopelia decaocto*	LC	-	-	-	X	-	-
Alpine Swift	*Tachymarptis melba*	LC	-	-	-	1	-	-
Common Swift	*Apus apus*	LC	-	-	-	40	-	-
White Stork	*Ciconia ciconia*	LC	-	-	-	3	7	9
Short-toed Snake-Eagle	*Circaetus gallicus*	LC	-	-	-	6	3	2
Eurasian Sparrowhawk	*Accipiter nisus*	LC	-	-	-	3	-	1
Eurasian Marsh-Harrier	*Circus aeruginosus*	LC	-	1	-	1	-	-
Common Buzzard	*Buteo buteo*	LC	-	1	-	1	-	-
Long-legged Buzzard	*Buteo rufinus*	LC	-	-	-	2	-	1
Eurasian Scops-Owl	*Otus scops*	LC	-	-	-	2	-	-
Little Owl	*Athene noctua*	LC	C13	-	-	2	2	1
Eurasian Hoopoe	*Upupa epops*	LC	-	-	-	2	-	-
European Bee-eater	*Merops apiaster*	LC	-	-	X	17	1	5
Syrian Woodpecker	*Dendrocopos syriacus*	LC	-	2	-	-	-	-
Eurasian Kestrel	*Falco tinnunculus*	LC	-	-	-	1	1	2
Eleonora's Falcon	*Falco eleonorae*	LC	-	-	-	1	-	1
Peregrine Falcon	*Falco peregrinus*	LC	-	-	-	1	-	1
Woodchat Shrike	*Lanius senator*	NT	-	-	-	-	-	1
Eurasian Jay	*Garrulus glandarius*	LC	A1	1	-	2	-	2
Eurasian Magpie	*Pica pica*	LC	A1	8	-	4	2	4
Hooded Crow	*Corvus cornix*	LC	A1	-	-	2	2	8
Common Raven	*Corvus corax*	LC	A1	-	-	4	-	3
Great Tit	*Parus major*	LC	A1	-	-	1	-	-
Eurasian Skylark	*Alauda arvensis*	LC	A1	6	X	X	1	-
Crested Lark	*Galerida cristata*	LC	C12	18	X	X	X	26
Greater Short-toed Lark	*Calandrella brachydactyla*	LC	A1	-	-	12	-	-
Eurasian Reed Warbler	*Acrocephalus scirpaceus*	LC	A1	-	-	1	-	-
Barn Swallow	*Hirundo rustica*	LC	A1	12	X	7	11	X
European red-rumped swallow	*Cecropis rufula*	LC	A1	24	X	X	-	4

Common Name	Scientific Name	IUCN	Code	Mar	Apr	May	Jun	Jul
Common Chiffchaff	*Phylloscopus collybita*	LC	-	-	-	1	-	-
Cetti's Warbler	*Cettia cetti*	LC	A1	2	-	1	-	-
Eurasian Blackcap	*Sylvia atricapilla*	LC	A1	-	-	1	1	-
Sardinian Warbler	*Curruca melanocephala*	LC	A1	2	-	-	-	-
Mistle Thrush	*Turdus viscivorus*	LC	-	-	-	1	-	-
Eurasian Blackbird	*Turdus merula*	LC	A1	8	-	1	-	-
Rufous-tailed Scrub-Robin	*Cercotrichas galactotes*	LC	-	-	-	1	-	-
European Robin	*Erithacus rubecula*	LC	-	2	-	-	-	-
Black Redstart	*Phoenicurus ochruros*	LC	-	3	-	X	-	-
Blue Rock-Thrush	*Monticola solitarius*	LC	A1	-	-	1	-	-
European Stonechat	*Saxicola rubicola*	LC	-	-	-	1	-	-
Northern Wheatear	*Oenanthe oenanthe*	LC	C12	-	-	6	4	10
Isabelline Wheatear	*Oenanthe isabellina*	LC	-	-	-	-	-	1
Eastern Black-eared Wheatear	*Oenanthe melanoleuca*	LC	C12	-	-	6	2	3
House Sparrow	*Passer domesticus*	LC	C13	30	-	4	-	7
Eurasian Tree Sparrow	*Passer montanus*	LC	C13	-	-	X	-	-
Western Yellow Wagtail	*Motacilla flava*	LC	-	9	-	4	-	-
White Wagtail	*Motacilla alba*	LC	A1	-	-	2	-	-
Tawny Pipit	*Anthus campestris*	LC	A1	-	-	X	-	-
European Greenfinch	*Chloris chloris*	LC	-	-	-	1	-	-
European Goldfinch	*Carduelis carduelis*	LC	C12	-	-	2	6	11
European Serin	*Serinus serinus*	LC	-	-	-	1	-	-
Eurasian Siskin	*Spinus spinus*	LC	-	2	-	1	-	-
Black-headed Bunting	*Emberiza melanocephala*	LC	A1	-	-	1	1	-
Corn Bunting	*Emberiza calandra*	LC	A1	-	-	4	-	-
Cretzschmar's Bunting	*Emberiza caesia*	LC	A1	-	-	1	-	1

4.5 Bat

Spring

Based on Auto-ID results, a total of 53,505 recordings were made. 4,854 recordings, or 9.07%, were identified as bat recordings in spring. Noise accounted for the majority of the recordings, with 48,651 noise recordings, or 90.93%. The average nightly noise percentage ranged from 43.70% to 98.87%. All nights were analysed manually. A summary is shown on Table 4-34.

Table 4-34 Number of bat recordings and noise recorded each night based on Auto-ID in spring.

Night	Detectors	Bat	Noise	Total	Noise Ratio	Analysis
1	6	170	4216	4386	96.12%	Manual_ID
2	6	746	5923	6669	88.81%	Manual_ID
3	6	153	13366	13519	98.87%	Manual_ID
4	6	1412	7033	8445	83.28%	Manual_ID
5	6	344	5995	6339	94.57%	Manual_ID
6	6	185	4979	5164	96.42%	Manual_ID
7	6	667	2528	3195	79.12%	Manual_ID
8	6	203	2590	2793	92.73%	Manual_ID
9	6	98	1341	1439	93.19%	Manual_ID
10	6	876	680	1556	43.70%	Manual_ID
Total	-	4844	48651	53505	90.93%	-

Table 4-35 presents the distribution of bat recordings across 6 SPs based on Manual ID results. SP06 had the highest average recordings, accounting for 2.69 times the total average of all detections, followed by SP04 and SP02. Night 4 recorded the highest bat activity, with 1250 recordings, 23 times the average value, showing the highest potential of the site. Failures of the recorders are indicated by blank cells in the table.

Table 4-35 Distribution of bat recordings across SPs by night based on Manual-ID results in spring

Night	SP01	SP02	SP03	SP04	SP05	SP06	Total
1	4	9	11	44	9	20	97
2	8	25	16	39	54	493	635
3	0	10	3	2	14	12	41
4	115	278	136	434	113	174	1250
5	28	44		105	22	28	227
6		6		8	19	43	76
7		24		151	48	113	336
8				15		63	78
9						38	38
10						477	477
Total	155	396	166	798	279	1461	3255
Average	16	40	17	80	28	146	54,3

Table 4-36 summarizes the results of the Auto-ID analysis of bat recordings for all nights, yielding a total of 4844 recordings across 6 SPs over two nights. Ultimately, the total number of bat recordings identified through Manual-ID corresponds to 67.3% of the total results from Auto-ID for spring.

Table 4-36 Distribution of bat recordings across SPs by selected nights based on Auto-ID results in spring

Night	SP01	SP02	SP03	SP04	SP05	SP06	Total
1	Auto ID	6	11	16	72	9	56
2	Auto ID	9	25	23	90	63	536
3	Auto ID	0	15	5	2	100	21
4	Auto ID	120	292	162	468	128	242
5	Auto ID	29	51	0	160	41	63
6	Auto ID	0	9	0	27	45	104
7	Auto ID	0	25	0	188	57	397
8	Auto ID	0	0	0	47	0	156
9	Auto ID	0	0	0	0	0	98
10	Auto ID	0	0	0	0	0	876
Total	Auto ID	164	428	206	1054	443	2549

The Auto-ID of the sounds at all nights shows the most common species was Nathusius' Pipistrelle (*Pipistrellus nathusii*) with 26.78% of the recordings and with 36.60% of recordings when non-ID species are distributed evenly. The second most common species is Common Pipistrelle (Pipistrellus pipistrellus) with 20.46% of the recordings and with 27.96% of recordings when non-ID species are distributed evenly.

Scheiber's Bent-winged Bat (*Minopterus scheibersii*), classified as VU (Vulnerable) by the IUCN, has only 0.02% of the total recordings and 0.03% when non-ID species are distributed evenly.

The software failed to identify more than 26.82% of the recordings. (Table 4-37).

Table 4-37 Bat groups and species recorded during selected nights at each SP based on Auto-ID in spring

Group	Species	IUCN	SP01	SP02	SP03	SP04	SP05	SP06	Total	Percent	Percent_2
Pipistrelloid	PIPNAT	LC	68	184	103	484	100	361	1300	26.78%	36.60%
Pipistrelloid	PIPPIP	LC	56	62	31	65	65	714	993	20.46%	27.96%
Pipistrelloid	PIPKUH	LC	11	42	9	105	52	122	341	7.03%	9.60%
Pipistrelloid	MINSCH	VU	0	0	0	0	1	0	1	0.02%	0.03%
Nyctaloid	NYCNOC	LC	0	1	0	17	28	6	52	1.07%	1.46%
Nyctaloid	NYCLAS	VU	0	0	1	4	2	38	45	0.93%	1.27%
Nyctaloid	NYCLEI	LC	0	0	0	0	5	3	8	0.16%	0.23%
Nyctaloid	EPTSER	LC	0	1	0	1	3	0	5	0.10%	0.14%
Tadarida	TADTEN	LC	5	7	5	45	21	722	805	16.58%	22.66%
Myotis	MYOSPE	NA	0	1	0	0	0	1	2	0.04%	0.06%
-	NoID	-	34	130	57	333	166	582	1302	26.82%	
Total	-	-	174	428	206	1054	443	2549	4854	-	-

When checking the manual ID species of 3255 total records in total, we can observe some differences between the Auto-ID and Manual-ID results. Common Pipistrelle (*Pipistrellus pipistrellus*): In the Manual-ID results, this species had 49.12% of the total recordings, whereas in the Auto-ID results, it made up 20.46%. This shows a noticeable increase in the Manual-ID results, suggesting that this species was more accurately identified manually. Nathusius'

Pipistrelle (*Pipistrellus nathusii*): The Manual-ID results show 49.98% for this species and it showed it with *Pipistrellus kuhlii* as the distinguishing kuhlii and nathusii is difficult, while in the Auto-ID results, it accounted for 33.81%. European Free-tailed Bat (*Tadarida teniotis*): In the Manual-ID results, this species made up 0.28% of the total, while in the Auto-ID results, it was listed with a much higher percentage, 16.58%. This reflects a substantial difference in identification rates. (Table 4-38).

Table 4-38 Bat groups and species recorded during selected nights at each SP based on Manual ID in spring

Group	Species	IUCN	SP01	SP02	SP03	SP04	SP05	SP06	Total	Percent
Pipistrelloid	PIPKUH/PIPNAT	-	78	164	125	450	194	616	1627	49.98%
Pipistrelloid	PIPPIP	LC	68	229	41	348	78	835	1599	49.12%
Pipistrelloid	PIPPYG	LC	6	0	0	0	0	0	6	0.18%
Nyctaloid	NYCLAS/NYCNOC	-	0	0	0	0	0	10	10	0.31%
Nyctaloid	NYCLAS	VU	3	0	0	0	0	0	3	0.09%
Nyctaloid	NYCLEI	LC	0	0	0	0	1	0	1	0.03%
Tadarida	TADTEN	LC	0	3	0	0	6	0	9	0.28%
Total	-	-	155	396	166	798	279	1461	3255	-

The bat activity during the hours of the night was analyzed for *Pipistrelloid, Nyctaloid*, and *Tadarida* groups, as they are known to be high and middle altitude fliers (Rodrigues et al. 2014), making them potential subjects to possible curtailment planning. Figure 4-3 illustrates the activity patterns of these selected species throughout the night during the spring season, spanning from 17:00 to 05:00.

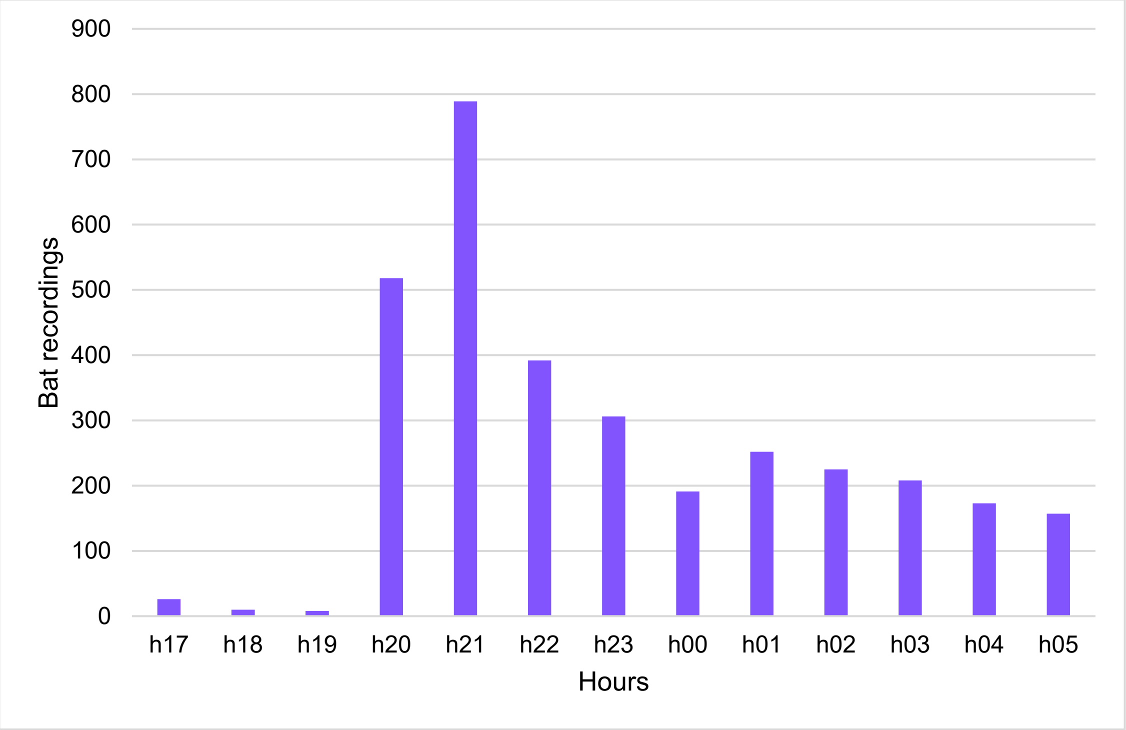


Figure 4-3 Hourly distribution of bat recordings through the night in spring

Summer

Based on Auto-ID results, a total of 23,323 recordings were made. 3,907 recordings, or 16.75%, were identified as bat recordings in summer. Noise accounted for the majority of the recordings (83.25%), with an average nightly noise percentage ranging from 61.70% to 95.74%.

Nights 5 and 7 were selected for manual species identification. (Table 4-39).

Table 4-39 Number of bat recordings and noise recorded each night based on Auto-ID in summer

Night	Detectors	Bat	Noise	Total	Noise Ratio	Analysis
1	6	228	2346	2574	91.14%	
2	6	160	1991	2151	92.56%	
3	6	474	1397	1871	74.67%	
4	6	524	1404	1928	72.82%	
5	6	558	1746	2304	75.78%	Manual_ID
6	6	475	2110	2585	81.62%	
7	6	734	2385	3119	76.47%	Manual_ID
8	6	346	2203	2549	86.43%	
9	6	100	1417	1517	93.41%	
10	6	92	2069	2161	95.74%	
11	6	216	348	564	61.70%	
Total	-	3907	19416	23323	83.25%	-

Table 4-40 presents the distribution of bat recordings across 6 SPs based on Auto-ID results. SP06 had the highest average recordings, accounting for 130.5% of all detections, followed by SP05 and SP03. Night 7 recorded the highest bat activity, showing the highest potential of the site.

Table 4-40 Distribution of bat recordings across SPs by night based on Auto-ID results in summer

Night	SP01	SP02	SP03	SP04	SP05	SP06	Total
1	17	34	33	27	49	68	228
2	35	17	4	9	24	71	160
3	38	80	122	60	67	107	474
4	81	85	77	64	122	95	524
5	48	68	155	67	111	109	558
6	27	161	102	26	122	37	475
7	43	119	126	107	169	170	734
8	32	64	50	69	38	93	346
9	10	33	7	13	18	19	100
10	10	11	3	2	38	28	92
11	20	5	37	36	69	49	216
Average	33	62	65	44	75	77	59

Table 4-41 and Table 4-42 summarizes the results of the Manual-ID analysis of bat recordings for the selected nights (5 and 7), yielding a total of 1,298 recordings across 6 SPs over two nights. Overall, the number of recordings identified through Manual-ID closely aligns with those identified through Auto-ID, with a difference of approximately 5%. However, in some instances, noise was misclassified as bat calls by one detector, widening the discrepancy. Ultimately, the total number of bat recordings identified through Manual-ID corresponds to 100.46% of the total results from Auto-ID for summer.

Table 4-41 Distribution of bat recordings across SPs by selected nights based on Manual-ID results in summer

Night	Method	SP01	SP02	SP03	SP04	SP05	SP06	Total
5	Manual ID	48	68	161	67	115	114	573
7	Manual ID	43	119	128	111	158	166	725
Total	Manual ID	91	187	289	178	273	280	1298

Table 4-42 Distribution of bat recordings across SPs by selected nights based on Auto-ID results in summer

Night	Method	SP01	SP02	SP03	SP04	SP05	SP06	Total
5	Auto ID	48	68	155	67	111	109	558
7	Auto ID	43	119	126	107	169	170	734
Total	Auto ID	91	187	281	174	280	279	1292

The Auto-ID of the sounds at all nights shows the most common species was Nathusius' Pipistrelle (*Pipistrellus nathusii*) with 38.93% of the recordings and 48.53% of the recordings when non-identified species are distributed evenly. The second most common species is Common Pipistrelle (*Pipistrellus pipistrellus*) with 34.48% of the recordings and 42.98% when non-identified species are distributed evenly.

Notably, the presence of two species listed as Vulnerable (VU) by the IUCN, Schreiber's Bent-winged Bat (*Miniopterus schreibersii*) and Giant Noctule (*Nyctalus lasiopterus*), emphasizes the potential importance of this area for bat populations.

The software failed to identify more than 19.79% of the recordings. (Table 4-43).

Table 4-43 Bat groups and species recorded during selected nights at each SP based on Auto-ID in summer

Group	Species	IUCN	SP01	SP02	SP03	SP04	SP05	SP06	Total	Percent	Percent_2
Pipistrelloid	PIPNAT	LC	98	324	311	223	277	288	1521	38.93%	48.53%
Pipistrelloid	PIPPIP	LC	164	217	281	153	256	276	1347	34.48%	42.98%
Pipistrelloid	PIPKUH	LC	8	31	33	36	33	44	185	4.74%	5.90%
Pipistrelloid	HYPSAV	LC	0	1	1	0	3	1	6	0.15%	0.19%
Pipistrelloid	MINSCH	VU	0	0	0	0	1	1	2	0.05%	0.06%
Pipistrelloid	PIPPYG	LC	0	0	0	0	0	1	1	0.03%	0.03%
Nyctaloid	NYCNOC	LC	0	1	0	0	2	12	15	0.38%	0.48%
Nyctaloid	NYCLAS	VU	0	0	0	1	0	0	1	0.03%	0.03%
Tadarida	TADTEN	LC	7	4	10	5	9	20	55	1.41%	1.75%
Myotis	MYOSPE	NA	0	0	0	0	1	0	1	0.03%	0.03%
-	NoID	-	84	99	80	62	245	203	773	19.79%	
Total	-	-	361	677	716	480	827	846	3907	-	-

When checking the manual ID species of 1,298 records in total, we can see some differences. First, *Pipistrellus kuhlii/nathusii* was identified as the most common group in Manual ID, accounting for 61.09% of recordings, whereas in Auto-ID, *Pipistrellus nathusii* was the most common species with 38.93% of recordings. Second*, Pipistrellus pipistrellus*, which ranked second in both analyses, showed a slightly higher proportion in Auto-ID (34.48%) compared to Manual ID (37.29%). Third, while Schreiber's Bent-winged Bat (*Miniopterus schreibersii*) accounted for only 0.05% of the Auto-ID results, it was still detected at a slightly higher rate in Manual ID (0.39%), reflecting the increased accuracy of manual identification for rare species. (Table 4-44).

Table 4-44 Bat groups and species recorded during selected nights at each SP based on Manual ID in summer

Group	Species	IUCN	SP01	SP02	SP03	SP04	SP05	SP06	Total	Percent
Pipistrelloid	PIPKUH/PIPNAT	-	44	126	172	119	170	162	793	61.09%
Pipistrelloid	PIPPIP	LC	46	59	111	56	98	114	484	37.29%
Pipistrelloid	MINSCH	VU	0	0	1	0	3	1	5	0.39%
Tadarida	TADTEN	LC	1	2	5	3	2	3	16	1.23%
Total	-	-	91	187	289	178	273	280	1298	-

The bat activity during the hours of the night was analyzed for Pipistrelloid, Nyctaloid, and Tadarida groups, as they are known to be high and middle altitude fliers (Rodrigues et al. 2014), making them potential subjects to possible curtailment planning. Figure 4-4 illustrates the activity patterns of these selected species throughout the night during the summer season, spanning from 19:00 to 05:00.

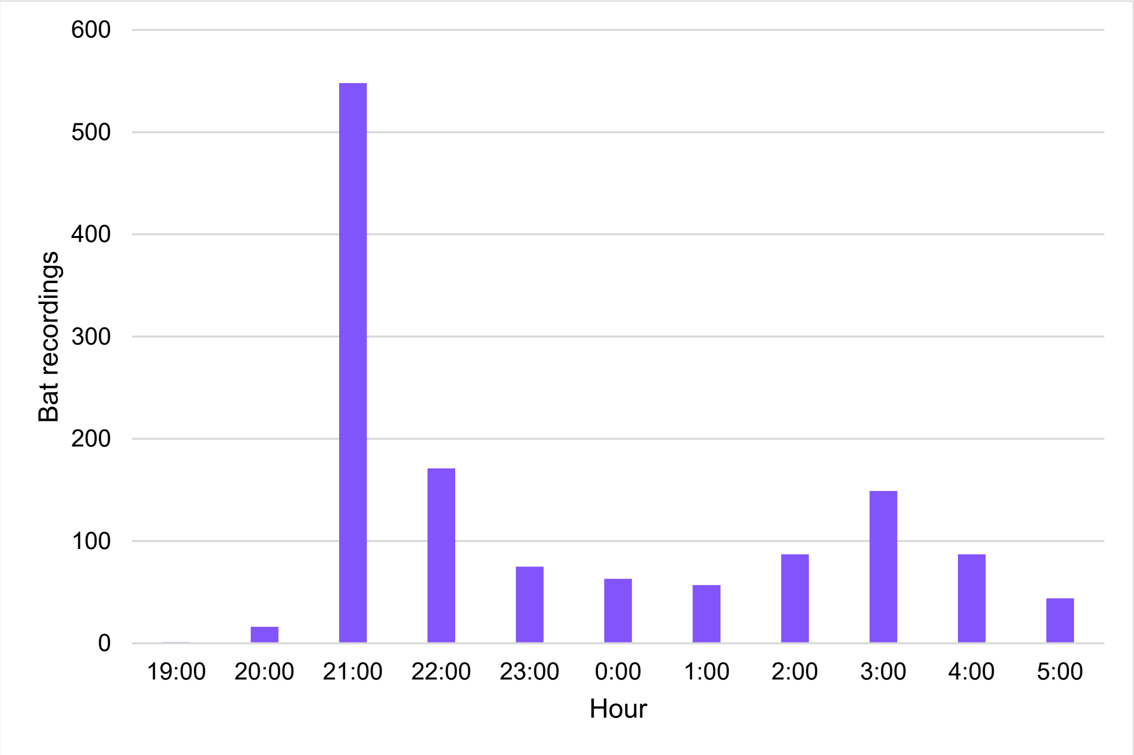


Figure 4-4 Hourly distribution of bat recordings through the night in summer

Autumn

Based on Auto-ID results, a total of 10,230 recordings were made. Of these, 4,066 recordings, or 39.74%, were identified as bat recordings in autumn. Noise accounted for the majority of the recordings (60.25% of the total), with an average nightly noise percentage ranging from 20.55% to 84.98%. Nights 6 and 7 were selected for manual species identification. A summary is shown on Table 4-45.

Table 4-45 Number of bat recordings and noise recorded each night based on Auto-ID in autumn

Night	Detectors	Bat	Noise	Total	Noise Ratio	Analysis
1	6	356	268	624	42.95%	
2	6	398	932	1330	70.08%	
3	6	382	145	527	27.51%	
4	6	406	105	511	20.55%	
5	6	478	168	646	26.01%	
6	6	812	727	1539	47.24%	Manual_ID
7	6	575	1766	2341	75.44%	Manual_ID
8	6	215	218	433	50.35%	
9	6	144	815	959	84.98%	
10	6	191	721	912	79.06%	
11	6	109	299	408	73.28%	
Total	-	4066	6164	10230	60.25%	-

Table 4-46 presents the distribution of bat recordings across 6 SPs based on Auto-ID results. SP05 had the highest average recordings, accounting for 12.7% of all detections, followed by SP06 (12.3%) and SP04 (12.1%). Night 6 recorded the highest bat activity (812 recordings), showing the highest potential of the site.

Table 4-46 Distribution of bat recordings across SPs by night based on Auto-ID results in autumn

Night	SP01	SP02	SP03	SP04	SP05	SP06	Total
1	45	80	52	51	36	92	356
2	81	40	67	103	35	72	398
3	28	189	24	49	30	62	382
4	20	201	39	58	39	49	406
5	54	71	49	65	117	122	478
6	62	93	72	216	260	109	812
7	61	18	84	107	176	129	575
8	30	18	26	36	58	47	215
9	11	10	20	16	56	31	144
10	26	21	48	38	29	29	191
11	7	5	20	15	29	33	109
Ave	39	68	46	69	79	70	62
Ave_corrected	32	56	38	57	65	58	51

Table 4-47 and Table 4-48 summarizes the results of the Manual-ID analysis of bat recordings for the selected nights (Nights 6 and 7), yielding a total of 1,141 recordings across 6 SPs over two nights.

The number of recordings identified through Manual-ID closely aligns with those identified through Auto-ID, with a difference of approximately 17.7% in total recordings. However, discrepancies arose due to instances where noise was misclassified as bat calls by some detectors. Ultimately, the total number of bat recordings identified through Manual-ID corresponds to 82.3% of the total results from Auto-ID for autumn.

Table 4-47 Distribution of bat recordings across SPs by selected nights based on Auto-ID results in autumn

Night	Method	SP01	SP02	SP03	SP04	SP05	SP06	Total
6	Auto ID	62	93	72	216	260	109	812
7	Auto ID	61	18	84	107	176	129	575
Total	Auto ID	123	111	156	323	436	238	1387

Table 4-48 Distribution of bat recordings across SPs by selected nights based on Manual-ID results in autumn

Night	Method	SP01	SP02	SP03	SP04	SP05	SP06	Total
6	Manual ID	63	102	74	185	129	107	660
7	Manual ID	62	18	85	64	123	129	481
Total	Manual ID	125	120	159	249	252	236	1141

The Auto-ID of the bat recordings across all nights revealed that the most common species was Nathusius' Pipistrelle (*Pipistrellus nathusii*), which accounted for 39.38% of the total detections and 54.64% when non-ID species were evenly distributed. The second most common species was Common Pipistrelle (*Pipistrellus pipistrellus*), with 13.85% of the recordings and 19.22% when non-ID species were evenly distributed.

Notably, Schreiber's Bent-winged Bat (*Miniopterus schreibersii*), a VU (Vulnerable) species, was recorded in 0.66% of the detections, highlighting the potential conservation concern for this species. Similarly, Giant Noctule (*Nyctalus lasiopterus*), classified as VU (Vulnerable), was recorded in 1.60% of the results.

The software was unable to identify 27.94% of the recordings. (Table 4-49)

Table 4-49 Bat groups and species recorded during selected nights at each SP based on Auto-ID in autumn

Group	Species	IUCN	SP01	SP02	SP03	SP04	SP05	SP06	Total	Percent	Percent_2
Pipistrelloid	PIPNAT	LC	125	406	198	218	270	384	1601	39.38%	54.64%
Pipistrelloid	PIPPIP	LC	107	119	102	82	75	78	563	13.85%	19.22%
Pipistrelloid	PIPKUH	LC	40	31	55	29	112	88	355	8.73%	12.12%
Pipistrelloid	MINSCH	VU	3	6	2	5	7	4	27	0.66%	0.92%
Pipistrelloid	HYPSAV	LC	3	0	1	4	3	1	12	0.30%	0.41%
Nyctaloid	NYCLAS	VU	2	2	8	37	7	9	65	1.60%	2.22%
Nyctaloid	NYCNOC	LC	8	0	4	12	0	3	27	0.66%	0.92%
Nyctaloid	NYCLEI	LC	1	1	2	4	1	2	11	0.27%	0.38%

Group	Species	IUCN	SP01	SP02	SP03	SP04	SP05	SP06	Total	Percent	Percent_2
Nyctaloid	VESMUR	LC	0	0	2	0	2	2	6	0.15%	0.20%
Nyctaloid	EPTSER	LC	0	0	1	0	0	0	1	0.02%	0.03%
Tadarida	TADTEN	LC	12	44	32	109	24	36	257	6.32%	8.77%
Plecotus	PLESPE	NA	0	0	0	0	0	1	1	0.02%	0.03%
Myotis	MYOSPE	NA	1	0	1	0	0	0	2	0.05%	0.07%
Rhinolophus	RHIHIP	NT (E,M)	0	0	0	1	0	0	1	0.02%	0.03%
Barbastella	BARBAR	VU (E)	0	0	1	0	0	0	1	0.02%	0.03%
-	NoID	-	123	137	92	253	364	167	1136	27.94%	
Total	-	-	425	746	501	754	865	775	4066	-	-

When checking the Manual-ID species of 1141 total records, we can see some key differences compared to the Auto-ID results. *Pipistrellus kuhlii/nathusii* accounts for 76.25% of the total recordings in the Manual-ID data, significantly higher than the 48% recorded in Auto-ID. On the other hand, Common Pipistrelle (*Pipistrellus pipistrellus*) makes up 10.08% in the Manual-ID results, which is lower than its 13.85% representation in the Auto-ID data, indicating it may have been less prevalent or harder to identify manually. Additionally, Noctule (*Nyctalus noctula*) shows a substantial increase in its percentage from 0.66% in Auto-ID to 6.57% in Manual-ID, suggesting that this species was underrepresented in the Auto-ID process. (Table 4-50).

Table 4-50 Bat groups and species recorded during selected nights at each SP based on Manual ID in autumn

Group	Species	IUCN	SP01	SP02	SP03	SP04	SP05	SP06	Total	Percent
Pipistrelloid	PIPKUH/PIPNAT	-	57	78	131	174	226	204	870	76.25%
Pipistrelloid	PIPPIP	LC	18	19	16	22	15	25	115	10.08%
Pipistrelloid	MINSCH	VU	1	4	1	2	2	0	10	0.88%
Pipistrelloid	HYPSAV	LC	2	0	0	0	1	0	3	0.26%
Nyctaloid	NYCNOC	LC	35	0	0	36	0	4	75	6.57%
Nyctaloid	NYCLEI	LC	2	0	0	2	0	0	4	0.35%
Nyctaloid	EPTSER	LC	0	0	1	0	1	0	2	0.18%
Nyctaloid	NYCLAS	VU	0	0	0	2	0	0	2	0.18%
Tadarida	TADTEN	LC	10	19	9	11	7	3	59	5.17%
Myotis	MYOSPE	NA	0	0	1	0	0	0	1	0.09%
Total	-	-	125	120	159	249	252	236	1141	-

The bat activity during the hours of the night was analyzed for Pipistrelloid, Nyctaloid, and Tadarida groups, as they are known to be high and middle altitude fliers (Rodrigues et al. 2014), making them potential subjects to possible curtailment planning.

Figure 4-5 illustrates the activity patterns of these selected species throughout the night during the autumn season, spanning from 19:00 to 06:00.

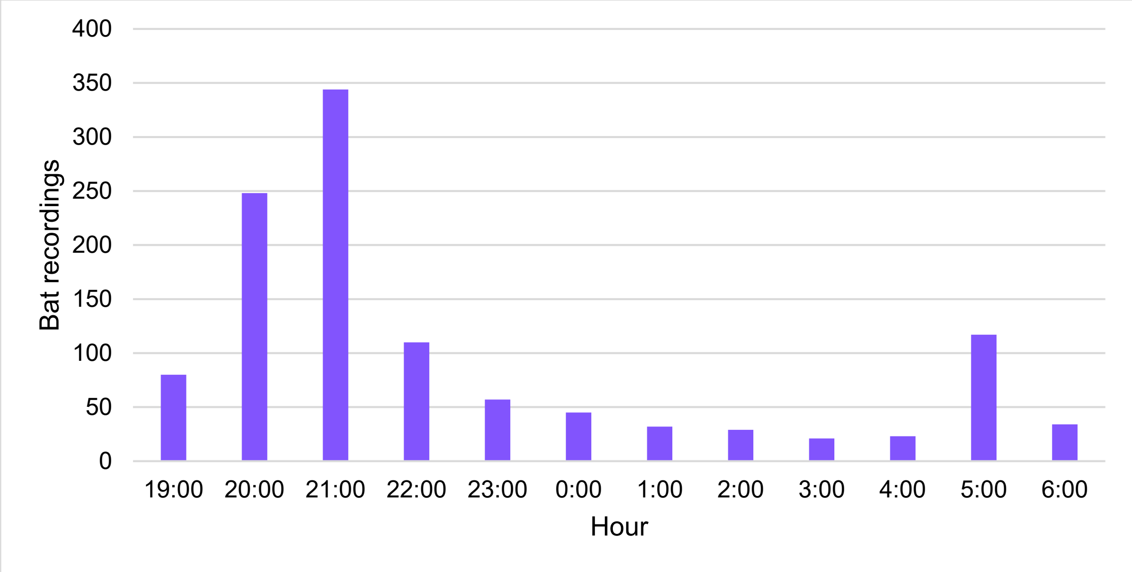


Figure 4-5 Bat groups and species recorded during the hours of the night in autumn

Transect Surveys

Based on the mobile surveys, a total of 2495 recordings were made. 497 recordings, or 19.93%, were identified as bat recordings in spring, summer and autumn. Noise accounted for the majority of the recordings, with 1998 noise recordings, or 80.08%. The average nightly noise percentage ranged from 46.62% to 93.69%. (Table 4-51)

Table 4-51 Number of bat recordings and noise recorded each night during transect surveys

Date	Bat	Noise	Total	Noise Ratio
2024-04-21	54	351	405	86.67%
2024-05-01	89	790	879	89.87%
2024-05-02	26	386	412	93.69%
2024-07-18	71	62	133	46.62%
2024-07-28	149	183	332	55.12%
2024-09-13	49	155	204	75.98%
2024-09-23	59	71	130	54.62%

Based on the Auto-ID results of the sounds recorded across all nights, the most common species was Common Pipistrelle (*Pipistrellus pipistrellus*) with 27.97% recordings, and with 36.20% recordings when non-ID species are distributed evenly. Remarkably, the second most common species is Nathusius' Pipistrelle (*Pipistrellus nathusii*) with 27.36% recordings and with 35.42% recordings when non-ID species are distributed evenly. (Table 4-52)

Table 4-52: Bat groups and species recorded during mobile surveys based on Auto-ID results

Group	Species	IUCN	04_M1a	04_M1b	07_M1a	07_M1b	09_M1a	09_M1b	Total	Percent	Percent_2
Pipistrelloid	PIPPIP	LC	10	36	17	64	7	5	139	27.97%	36.20%

Group	Species	IUCN	04_M1a	04_M1b	07_M1a	07_M1b	09_M1a	09_M1b	Total	Percent	Percent_2
Pipistrelloid	PIPNAT	LC	6	19	24	56	18	13	136	27.36%	35.42%
Pipistrelloid	PIPKUH	LC	4	11	2	5	5	8	35	7.04%	9.11%
Pipistrelloid	MINSCH	VU	0	0	0	0	0	3	3	0.60%	0.78%
Pipistrelloid	HYPSAV	LC	0	0	0	1	0	0	1	0.20%	0.26%
Nyctaloid	NYCNOC	LC	4	2	21	7	5	6	45	9.05%	11.72%
Nyctaloid	EPTSER	LC	8	0	0	0	0	0	8	1.61%	2.08%
Nyctaloid	NYCLAS	VU	4	1	0	0	0	0	5	1.01%	1.30%
Nyctaloid	NYCLEI	LC	2	0	0	0	0	3	5	1.01%	1.30%
Tadarida	TADTEN	LC	0	2	1	0	0	4	7	1.41%	1.82%
-	NoID	-	16	44	6	16	14	17	113	22.74%	
Total	-	-	54	115	71	149	49	59	497	-	-

When checking the Manual ID of a total of 366 records, several differences are observed compared to the Auto-ID results. First, the most common species based on Manual ID is *Pipistrellus kuhlii/nathusii* (PIPKUH/PIPNAT), accounting for 52.73% of the records, whereas in Auto-ID results, the most common species was Common Pipistrelle (*Pipistrellus pipistrellus*). Second, while Common Pipistrelle (*Pipistrellus pipistrellus*) is the second most common species in Manual ID with 44.26%, its proportion is slightly higher in Auto-ID at 27.97%. Third, species like Lesser Noctule (*Nyctalus leisleri*) and European Free-tailed Bat (*Tadarida teniotis*) are much less represented in Manual ID, with each making up only 0.27% and 1.37%, respectively. Schreiber's Bent-winged Bat (*Miniopterus schreibersii*) vulnerable species according to the IUCN Red List, were recorded during mobile surveys. (Table 4-53)

Table 4-53: Bat groups and species recorded during mobile surveys based on Manual ID results

Group	Species	IUCN	04_M1a	04_M1b	07_M1a	07_M1b	09_M1a	09_M1b	Total	Percent
Pipistrelloid	PIPKUH/PIPNAT	-	11	21	34	74	23	30	193	52.73%
Pipistrelloid	PIPPIP	LC	10	57	19	64	7	5	162	44.26%
Pipistrelloid	MINSCH	VU	0	0	0	0	1	4	5	1.37%
Nyctaloid	NYCLEI	LC	0	0	0	1	0	0	1	0.27%
Tadarida	TADTEN	LC	0	1	1	0	1	2	5	1.37%
Total	-	-	21	79	54	139	32	41	366	-
Pipistrelloid	PIPKUH/PIPNAT	-	11	21	34	74	23	30	193	52.73%
Pipistrelloid	PIPPIP	LC	10	57	19	64	7	5	162	44.26%
Pipistrelloid	MINSCH	VU	0	0	0	0	1	4	5	1.37%
Nyctaloid	NYCLEI	LC	0	0	0	1	0	0	1	0.27%
Tadarida	TADTEN	LC	0	1	1	0	1	2	5	1.37%
Total	-	-	21	79	54	139	32	41	366	-

Heat maps for exclusively available for autumn since track recording could not be accomplished during spring and summer and the mapped data from autumn is shown on Figure 4-6.

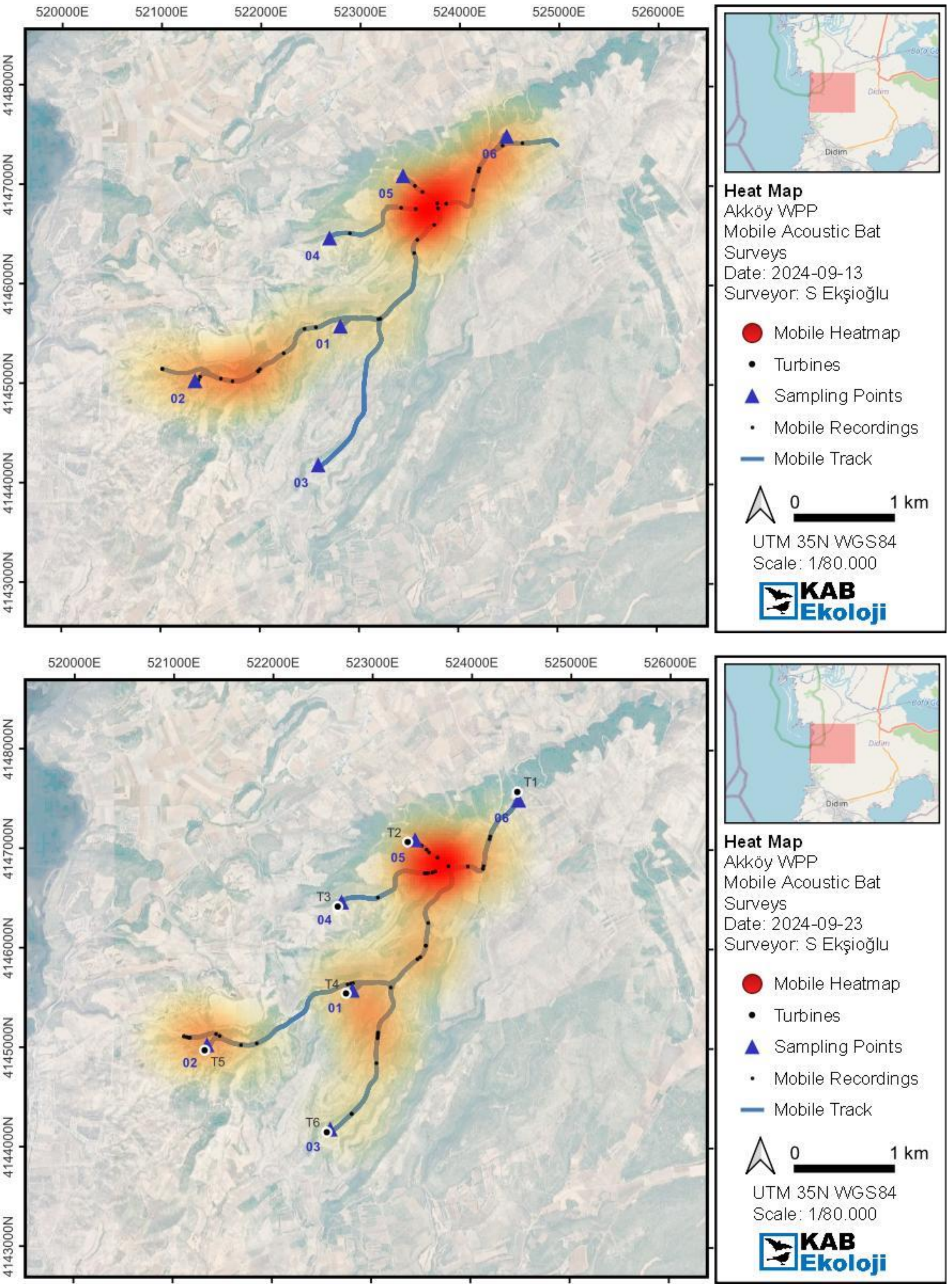


Figure 4-6 Heat maps from autumn transect surveys

4.6 Fatality Monitoring

4.6.1 Step 1: Carcass Searches under the Turbines and the ETL

A total of 56 bat and 2 bird carcasses were found under the turbines during routine searches (Table 4-54, Table 4-56, Table 4-55). Highest number of bat carcasses were observed in week 29 (15-21 June). Since genetic samples were confiscated and further genetic material collection was restricted by local authorities, bat DNA analysis results are not available. According to the forearm measurement, the found bats most likely belong to Common Pipistrelle (*Pipistrellus pipistrellus*) and are the most common species. Most bat carcasses were found near turbine 3 and found during July.

Table 4-54 Weekly distribution of observed bat carcasses in 2024

Week	T01	T02	T03	T04	T05	T06	Total
16	1	1	3	-	2	-	7
17	1	1	-	-	1	-	3
18	-	-	1	-	-	-	1
19	1	-	1	-	-	-	2
20	-	-	-	-	-	-	0
21	-	-	1	-	-	-	1
22	1	-	2	-	-	-	3
23	-	1	1	-	-	-	2
24	-	-	-	-	-	-	0
25	1	-	1	-	-	-	2
26	1	-	-	-	2	-	3
27	-	1	-	-	-	-	1
28	-	-	-	-	-	-	0
29	1	1	1	4	1	2	10
30	-	-	2	-	-	-	2
31	1	-	1	1	-	1	4
32	1	-	3	-	-	-	4
33	-	-	1	-	-	-	1
34	1	-	-	-	-	-	1
35	-	1	-	-	-	-	1
36	-	-	-	-	-	-	0
37	-	-	-	-	-	-	0
38	-	-	4	-	1	-	5
39	-	-	-	-	-	-	0
40	-	-	-	1	-	-	1
41	-	-	-	2	-	-	2
42	-	-	-	-	-	-	0
43	-	-	-	-	-	-	0
44	-	-	-	-	-	-	0
45	-	-	-	-	-	-	0
46	-	-	-	-	-	-	0
Total	10	6	22	8	7	3	56

Table 4-55 Bird carcasses found in 2024

Date	Week	Turbine	Common Name	Scientific Name
31 May	W22	T05	Yellow-legged Gull	*Larus michahellis*
13 November	W46	T05	Yellow-legged Gull	*Larus michahellis*

Table 4-56 Identification of bat species found in 2024

Date	Week	Turbine	Species	ForeArm (mm)
2024-04-16	W16	T03	P. pipistrellus	-
2024-04-16	W16	T03	P. pipistrellus	-
2024-04-16	W16	T03		-
2024-04-18	W16	T05	unidentified (very degraded)	40.6
2024-04-18	W16	T05	Pipistrelloid	-
2024-04-19	W16	T01	P. pipistrellus	36.6
2024-04-19	W16	T02	Pipistrelloid	43.3
2024-04-22	W17	T01	Nyctaloid	42.3
2024-04-25	W17	T02	Nyctaloid	51.3
2024-04-26	W17	T05	Pipistrelloid	43.3
2024-05-02	W18	T03	P. pipistrellus	37.7
2024-05-08	W19	T01	Pipistrelloid	32.4
2024-05-08	W19	T03	Nyctaloid	47.7
2024-05-22	W21	T03	P. pipistrellus	31.6
2024-05-27	W22	T03	P. pipistrellus	33.5
2024-05-27	W22	T03	Nyctaloid	42.6
2024-05-30	W22	T01	Nyctaloid	43.6
2024-06-03	W23	T02	P. pipistrellus	33.3
2024-06-03	W23	T03	P. pipistrellus	38.1
2024-06-18	W25	T01	unidentified (very degraded)	-
2024-06-18	W25	T03	P. pipistrellus	34.2
2024-06-25	W26	T05	P. pipistrellus	36.5
2024-06-25	W26	T05	unidentified (very degraded)	35.8
2024-06-27	W26	T01	unidentified (very degraded)	30.5
2024-07-03	W27	T02	unidentified (very degraded)	39.8
2024-07-15	W29	T01	P. pipistrellus	31.1
2024-07-15	W29	T02	P. pipistrellus	29.6
2024-07-15	W29	T03	P. pipistrellus	31.9
2024-07-15	W29	T04	P. pipistrellus	33.7
2024-07-15	W29	T04	P. pipistrellus	36.6
2024-07-15	W29	T04	P. pipistrellus	34.5
2024-07-15	W29	T04	P. pipistrellus	32.7
2024-07-15	W29	T05	P. pipistrellus	30.6
2024-07-15	W29	T06	Pipistrelloid	31.5
2024-07-15	W29	T06	P. pipistrellus	33.8
2024-07-24	W30	T03	P. pipistrellus	29.7
2024-07-26	W30	T03	P. pipistrellus	31.3

Date	Week	Turbine	Species	ForeArm (mm)
2024-07-29	W31	T01	P. pipistrellus	33.1
2024-07-29	W31	T03	Pipistrelloid	30.6
2024-08-02	W31	T04	P. pipistrellus	29.6
2024-08-02	W31	T06	P. pipistrellus	33.6
2024-08-05	W32	T01	P. pipistrellus	33.6
2024-08-08	W32	T03	P. pipistrellus	30.8
2024-08-08	W32	T03	P. pipistrellus	31.9
2024-08-08	W32	T03	P. pipistrellus	30.2
2024-08-13	W33	T03	P. pipistrellus	32.6
2024-08-19	W34	T01	P. pipistrellus	30.0
2024-08-29	W35	T02	P. pipistrellus	30.7
2024-09-16	W38	T03	P. pipistrellus	30.7
2024-09-19	W38	T03	Nyctalus lasiopterus	62.7
2024-09-19	W38	T03	P. pipistrellus	30.8
2024-09-19	W38	T03	P. pipistrellus	35.9
2024-09-20	W38	T05	P. pipistrellus	29.6
2024-10-02	W40	T04	P. pipistrellus	32.0
2024-10-08	W41	T04	P. pipistrellus	31.2
2024-10-09	W41	T04	P. pipistrellus	31.7

No bird carcasses were found under the ETL. Bat carcasses were not found either, which are also not expected due to the body size of regional bats.

4.6.2 Step 2: Determining the Adjustment Factors (Experimental Trials)

20 mouse carcasses were selected by the conductor to calculate the searcher efficiency of the surveyor. Below inputs are selected for analysis in GenEst;

- Observations: s1, s2, s3, s4
- Predictor Variable: Season
- Model Selection: p ~ season, k fixed at 1 (AICc: 57.19, ΔAICc: 0).

The searcher efficiency varied between 65% and 97% for mouse carcasses (Table 4-57).

Table 4-57 Searcher Efficiency for mouse carcasses in 2024

Season	n	median	p_0.05	p_0.95
Spring	20	97%	88%	99%
Early Summer	20	65%	48%	79%
Late Summer	20	68%	67%	94%
Autumn	20	97%	88%	99%

20 mouse carcasses were deployed by the conductor to calculate carcass persistence. Below inputs are selected for analysis in GenEst;

- Predictor Variable: Season
- Distribution: Weibull
- Model Selection: l ~ Season, s ~ Constant (AICc: 128.17, ΔAICc: 0)

Persistence of mouse carcasses during the trial lasted a median of 2.67 days in spring, 1.10 days in early summer, 0.45 days in late summer, and 1.26 days in autumn (Table 4-58).

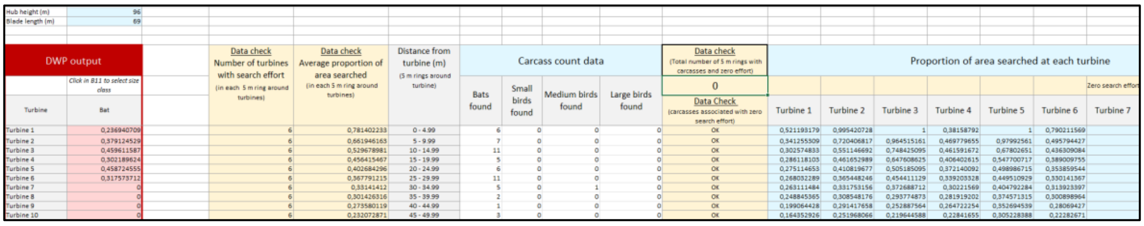
Table 4-58 Carcass Persistence for mouse carcasses in 2024

Season	n	medianCP	r1	r3	r7	r14	r28
Spring	20	2.67	0.91	0.72	0.44	0.24	2.67
Early summer	20	1.10	0.77	0.43	0.20	0.10	1.10
Late summer	20	0.45	0.50	0.19	0.08	0.04	0.45
Autumn	20	1.26	0.80	0.48	0.22	0.11	1.26

DWP for each turbine was calculated using the PCFM methodology, as outlined in Appendix D of the DWP SE Trial Placement Tool from the PCFM Handbook (IFC, EBRD, KfW, 2023).

- First, the proportion of the area searched within defined distance bands around each turbine was determined. This was done by creating 5-meter rings around each turbine. Predefined road and pad areas for each turbine were then incorporated, and the overlap between these areas and the rings was calculated (Step 1).
- Next, carcass count data corresponding to each searched area was integrated (Step 2) (Figure 4-7).
- Finally, the DWP values were derived by combining the proportion of the area searched with the carcass count data (Step 3).

DWP values are listed in Table 4-59. The values varied between 20% and 45%. The sweeping area ranges between 3222 m^2 and 5616 m^2 and the average pad area is 4482 m^2


Hub height (m) 96
Blade length (m) 69

DWP output			Data check Number of turbines with search effort (in each 5 m ring around turbines)	Data check Average proportion of area searched (in each 5 m ring around turbines)	Distance from turbine (m) (5 m rings around turbine)	Carcass count data				Data check (Total number of 5 m rings with carcasses and zero effort)	Proportion of area searched at each turbine						
	Click in B11 to select size class									0							Zero search effort
Turbine	Bat					Bats found	Small birds found	Medium birds found	Large birds found	Data Check (carcasses associated with zero search effort)	Turbine 1	Turbine 2	Turbine 3	Turbine 4	Turbine 5	Turbine 6	Turbine 7
Turbine 1	0,236940709		6	0,781402233	0 - 4.99	6	0	0	0	OK	0,521193179	0,995420728	1	0,38158792	1	0,790211569	
Turbine 2	0,379124529		6	0,661946163	5 - 9.99	7	0	0	0	OK	0,341255309	0,720406817	0,964515161	0,469779655	0,97992561	0,495794427	
Turbine 3	0,459611587		6	0,529678981	10 - 14.99	11	0	0	0	OK	0,302574833	0,551146692	0,748425095	0,461591672	0,67802651	0,436309084	
Turbine 4	0,302189624		6	0,456415467	15 - 19.99	5	0	0	0	OK	0,286118103	0,461652989	0,647608625	0,406402615	0,547700717	0,389009755	
Turbine 5	0,458724555		6	0,402684296	20 - 24.99	6	0	0	0	OK	0,275114653	0,410819677	0,505185095	0,372140092	0,498986715	0,353859544	
Turbine 6	0,317573712		6	0,367791215	25 - 29.99	11	0	0	0	OK	0,268032289	0,365448246	0,454411129	0,339203328	0,449510929	0,330141367	
Turbine 7	0		6	0,33141412	30 - 34.99	5	0	1	0	OK	0,263111484	0,331753156	0,372688712	0,30221569	0,404792284	0,313923397	
Turbine 8	0		6	0,301426316	35 - 39.99	2	0	0	0	OK	0,248845365	0,308548176	0,293774873	0,281919202	0,374571315	0,300898964	
Turbine 9	0		6	0,273580119	40 - 44.99	1	0	0	0	OK	0,199064428	0,291417658	0,252887564	0,264722254	0,352694539	0,28069427	
Turbine 10	0		6	0,232072871	45 - 49.99	3	0	0	0	OK	0,164352926	0,251968066	0,219644588	0,22841655	0,305228388	0,22282671	

Figure 4-7 DWP calculation from Appendix D DWP SE Trial Placement Tool (IFC, EBRD, KfW 2023)

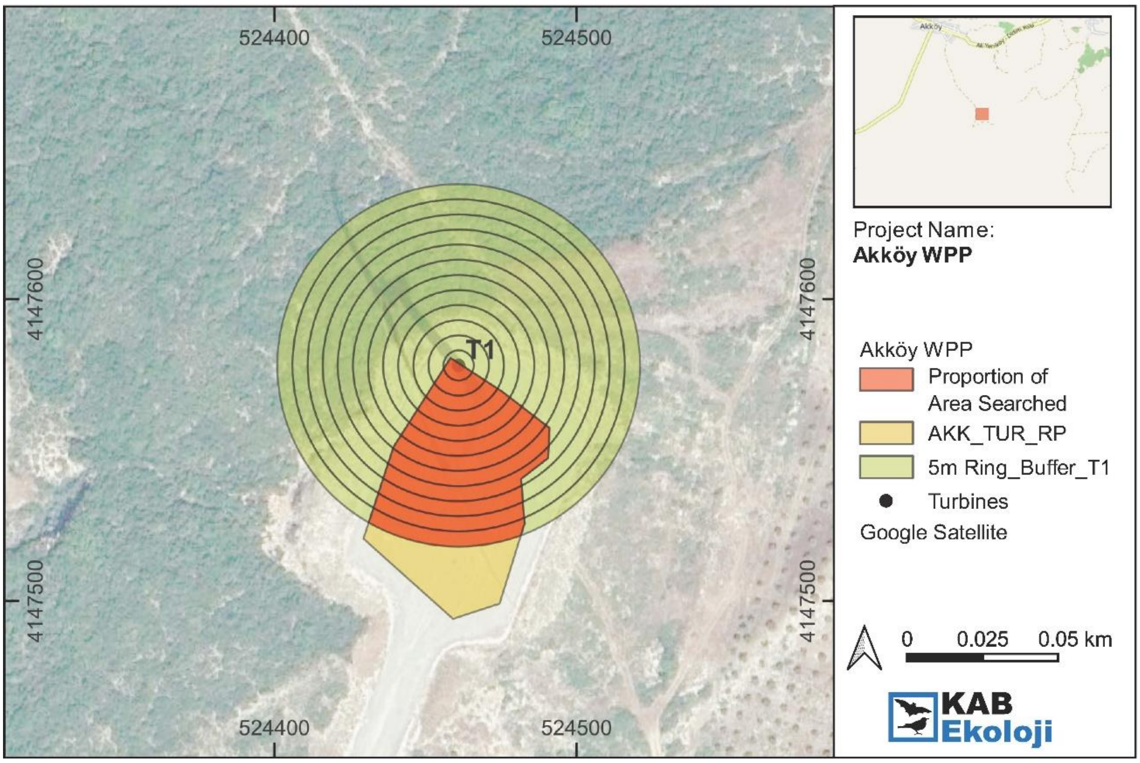


Figure 4-8 The DWP calculation graph for turbine T1

Table 4-59 DWP values for each turbine

Turbine	DWP
T01	0,237
T02	0,379
T03	0,460
T04	0,302
T05	0,459
T06	0,318

Using GenEst statistical modelling, the estimated number of bat carcasses for 2024 was calculated to be 665 bat fatalities per year (confidence interval: 455 - 986, CI = 90%) (Figure 4-9). Periods with elevated fatality rates were also analysed, with week 29 identified as the riskiest period (Figure 4-10). The model was applied to each turbine individually to pinpoint those contributing most to the fatality, revealing that turbine T3 accounted for 40% of the fatalities (Figure 4-11).

Two peak periods are discernible. The first is a broad peak lasting approximately 7–8 weeks, with its highest point at week 29 (mid-July). The second is a smaller peak occurring at week 38, in the third week of August. These peak periods may vary from year to year, and a longer-term study, as already committed by the Project Company for PCFM, would be required to confirm whether this pattern consistently appears over each year.

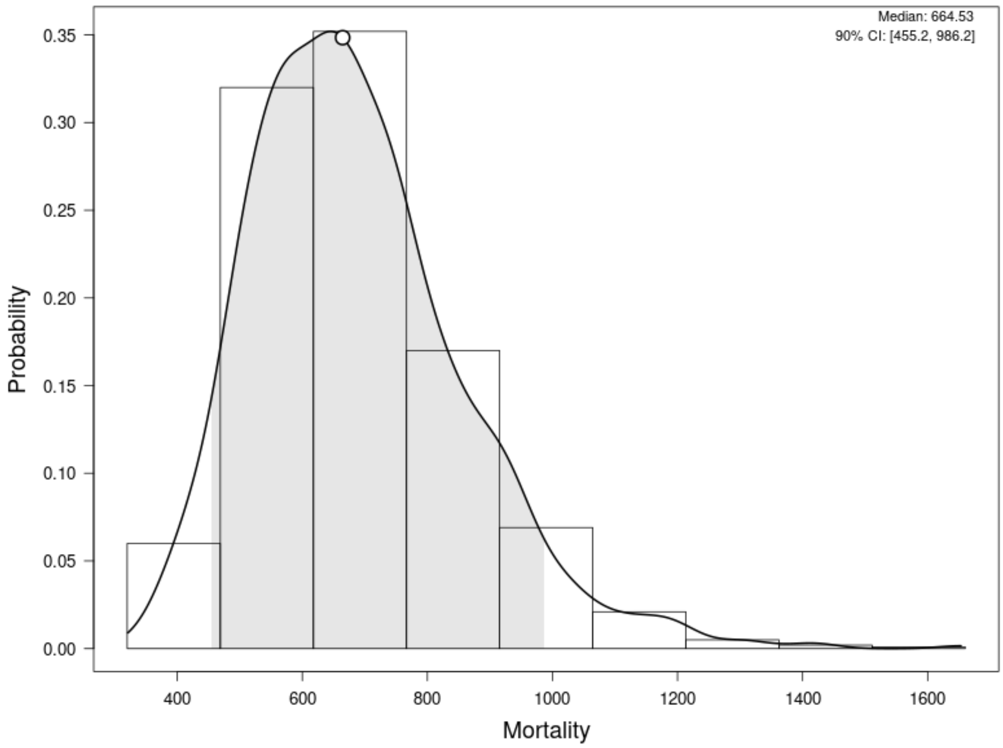


Figure 4-9 Total bat fatality estimation in 2024

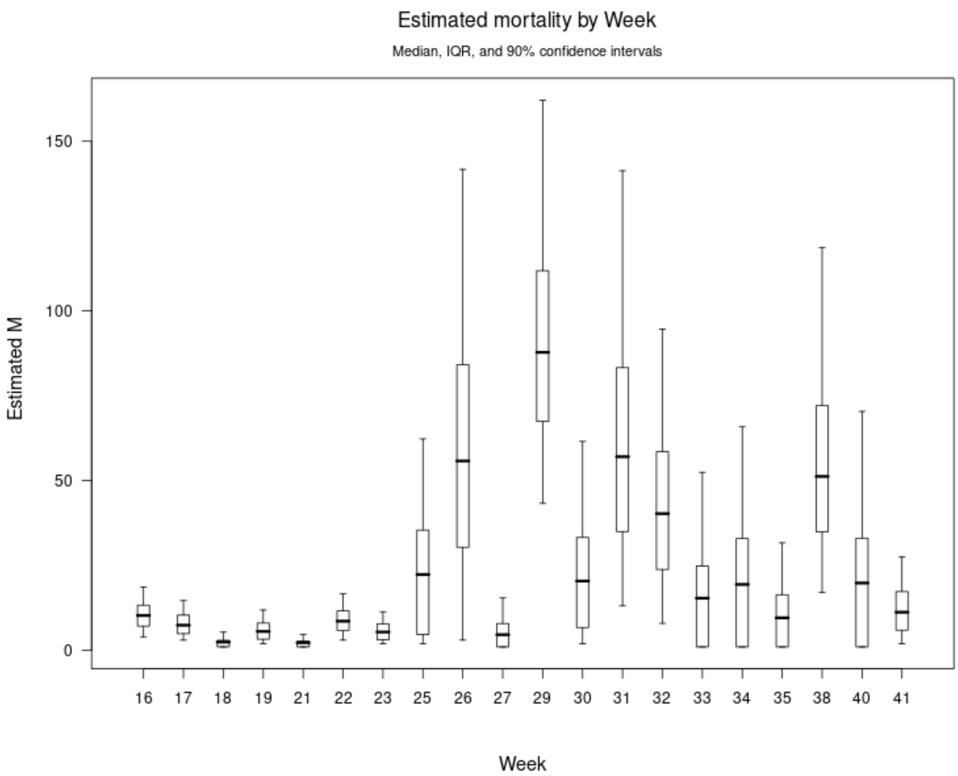


Figure 4-10 Fatality rate of bats per week in 2024

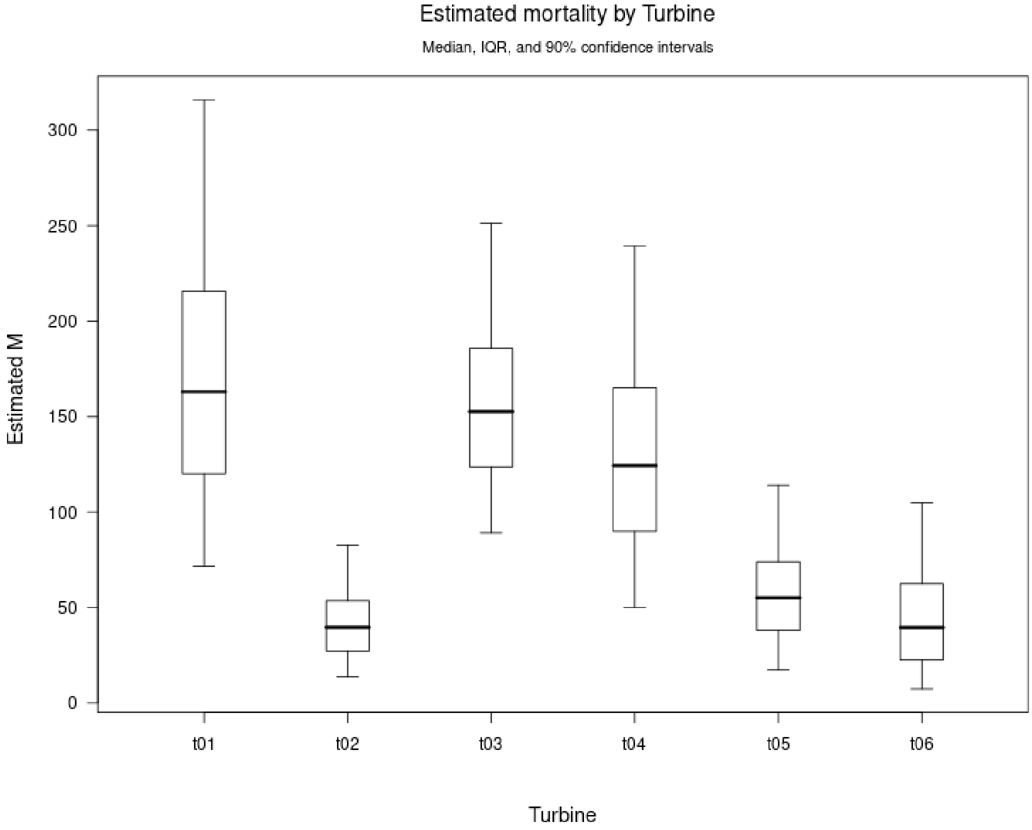


Figure 4-11 Fatality rate of bats per turbine in 2024

4.6.3 Carcass Surveys for ETL

Two sets of experimental study for ETL (late summer and autumn) were conducted (Table 4-60, Table 4-61, Table 4-62). Since no carcasses were found along the ETL line, important parameters such as Carcass Persistence and Surveyor Efficiency could not be obtained.

Table 4-60 Experimental studies for 2024

Season	StartDate	FinishDate
Late Summer	24 August	26 August
Autumn	5 October	7 October

Table 4-61 Experimental studies ETL in late summer 2024

cpID	InsTime1	Cntr1	InsTime2	Cntr2	SurTime1	Cntr1	SurTime2	Cntr2
exp001	24/08 08:08	present	26/08 07:09	absent	24/08 08:38	present	26/08 10:55	absent
exp002	24/08 08:08	present	26/08 07:09	absent	24/08 08:38	present	26/08 10:55	absent
exp003	24/08 08:08	present	26/08 07:09	absent	24/08 08:38	present	26/08 10:55	absent
exp004	24/08 08:08	present	26/08 07:09	absent	24/08 08:38	present	26/08 10:55	absent
exp005	24/08 08:08	present	26/08 07:09	absent				
exp006	24/08 08:08	present	26/08 07:09	absent	24/08 08:38	present	26/08 10:55	absent
exp007	24/08 08:08	present	26/08 07:09	absent	24/08 08:38	present	26/08 10:55	absent
exp008	24/08 10:01	present	26/08 08:03	absent	24/08 10:20	present	26/08 11:42	absent
exp009	24/08 10:07	present	26/08 08:10	absent	24/08 10:20	present	26/08 11:42	absent
exp010	24/08 10:12	present	26/08 08:16	absent	24/08 10:20	present	26/08 11:42	absent

Table 4-62 Experimental studies for ETL in autumn 2024

cpID	InsTime1	Cntr1	InsTime2	Cntr2	SurTime1	RI1	SurTime2	RI2
exp001	05/10 07:14	present	07/10 07:21	absent	05/10 08:44	present	07/10 11:17	absent
exp002	05/10 07:14	present	07/10 07:21	absent	05/10 08:44	present	07/10 11:17	absent
exp003	05/10 07:14	present	07/10 07:21	absent	05/10 08:44	present	07/10 11:17	absent
exp004	05/10 07:14	present	07/10 07:21	absent	05/10 08:44	present	07/10 11:17	absent
exp005	05/10 07:14	present	07/10 07:21	absent	05/10 08:44	present	07/10 11:17	absent
exp006	05/10 07:14	present	07/10 07:21	absent	05/10 08:44	present	07/10 11:17	absent
exp007	05/10 07:14	present	07/10 07:21	absent	05/10 08:44	present	07/10 11:17	absent
exp008	05/10 07:14	present	07/10 07:21	absent	05/10 08:44	present	07/10 11:17	absent
exp009	05/10 07:14	present	07/10 07:21	absent	05/10 08:44	present	07/10 11:17	absent
exp010	05/10 07:14	present	07/10 07:21	absent	05/10 08:44	present	07/10 11:17	absent

5 Discussion

5.1 Flora

- The field study identified a total of 2 widespread endemic plant species.
- Widespread endemic species are generally distributed across similar habitats in the Mediterranean and Aegean regions.
- No new data has been identified that differs from the findings of the local EIA process for the ETL areas. Additionally, no rare, regional, or endangered plant species have been found in these locations.
- The target species, *Globularia alypum*, was not identified during the 2024 field surveys. Due to seasonal variations observed in 2024, further research should be undertaken in 2025 to verify the absence of this species within the Project area.

5.2 Terrestrial Mammal

- The sensitivity of the terrestrial fauna within the project area, as assessed in the ESIA, has been categorized as low. Given the mitigation measures outlined in the ESIA, no significant impacts are expected on terrestrial fauna due to the project operational activities. Additionally, the monitoring schedule proposed in BMP will enable the assessment of long-term effects on terrestrial fauna during the operational phase. This monitoring framework will allow for the identification and addressing of any potential ecological disturbances over time. Based on the current evaluation and mitigation strategies, the project is not expected to cause any lasting or significant impact on the terrestrial mammal.
- Jungle Cat (*Felis chaus*)(LC): During the 2024 monitoring studies for the Akköy WPP project, the jungle cat was observed at two locations near the project area, on May 8 in the Büyük Menderes Delta and on May 17 in the Yalıköy region, both outside the project boundaries. The nearest wind turbine to the first observation site is T3, located 4.15 km away, while the closest turbine to the second observation site is T6, situated 3 km from the sighting location.
- The monitoring period and frequency for the mammal species should be conducted annually during the operational phase, specifically for 10 days each in April, May, and June.

5.3 Herpetofauna

- The sensitivity of the herpetofauna, as determined in the ESIA, has been classified as low. With the implementation of the impact mitigation measures outlined in the ESIA, the significance of potential impacts on herpetofauna is considered negligible. Monitoring schedule provided in the BMP will facilitate the assessment of long-term effects on herpetofauna during the operational phase. Based on the available data and the mitigation measures in place, no significant or lasting impacts on herpetofauna are anticipated because of the project.
- Among the reptiles identified in the project area and its surroundings, ıt is recommended to relocate the species *Testudo graeca*, which was detected in the field, Additionally, if the species is identified within the project area, translocation (relocation) efforts should be carried out.
- The ESIA demonstrates that the impacts on *Testudo graeca* are expected to be minor. Moreover, the implementation of the BMP actions will be sufficient to address and mitigate any potential effects.

5.4 Bird

During the spring surveys, an average of 59 hours of observation was completed in VP1 and VP2 (which cover the WPP), and 24 hours and 41 minutes of observation from VP3 (delta), before local authorities restricted access to the delta. From the WPP area (VP1 and 2) a total of 79 birds were counted during the observations in VP1 and VP2, comprising 18 migrant birds and 61 resident birds. Among these observed birds, only 52 passed through the risk zone of the wind farm. Collision risk modelling for spring estimated rates of 0.04 for migratory birds and 0.15 for resident birds.

VP3 was established to monitor waterbird activity at Büyük Menderes NP delta which is away from the turbines. A good amount of data was collected in spring prior to pausing the study due to permit processes which could not be resolved in 2024. Similarly, VP ETL1 observations, though put on hold and therefore did not meet minimum effort to be considered sufficient and remains inconclusive, is thought to provide some amount of understanding about bird activity near the ETL. Additionally, turbine VPs partially cover the ETL and therefore, some data is available for bird activity at the ETL which did not identify a significant high-risk activity so far.

The summer surveys were conducted with an average of 88 observation hours at two vantage points (VP). During these surveys, only 93 birds were recorded passing through the wind farm's risk zone. Collision risk modelling for the summer period indicated rates of 0 for migratory birds and 0.18 for resident birds.

For the autumn, VP surveys were conducted over an average of 102 hours for two vantage points. During these surveys, 121 birds were observed passing through the wind farm's risk zone. Collision risk modelling for autumn estimated rates of 0.03 for migratory birds and 0.17 for resident birds.

Due to projects location with respect to significant wetlands that feature waterbird assemblages with breeding and wintering activity, and interaction with KBAs, movement of key species such as Greater Flamingo and Dalmatian Pelican across buffer zones for collision risk was identified as a potential concern. While Greater Flamingo was only recorded at the VP at delta for flocks at rest, and therefore no flights across project components was recorded from VP observations overall, risky flight of Dalmatian Pelican was detected in autumn. Collision risk for autumn season as calculated in 2024 was 0.06 birds per season without avoidance. Since the species is active in winter, years to fatal collision should be calculated after winter data is available.

Migratory rates recorded in 2024 were low. Sustained low level of activity is expected since some species route over the Aegean coast. However anthropogenic and climate influences are continually shaping migrant species behaviours across the migration corridors in the region. The presence of the landfill will remain a good year-round opportunity for feeding for species like storks, kites, Aquila eagles and vultures, some of which were not recorded in 2024 but remain a possibility that could not be completely written off based on 2024 data alone. It appears that high level of activity from aggressive generalist species like Yellow-legged Gull might deter other species to some extent, though the trends in activity should continue to be monitored long term.

Among the observed species, the Short-toed Snake-Eagle (*Circaetus gallicus*), White Stork (*Ciconia ciconia*), and Dalmatian Pelican (*Pelecanus crispus*) were identified as having the highest estimated collision rates. It is anticipated that collision risk may increase during the winter period, and further surveys are planned to monitor this potential change. The annual collision rate for the site has been calculated as 0.50 birds per year. Notably, no flamingos were recorded within the project area. However, due to NatureScot methodology which inherently accounts for daytime movement, night activity of species which can undertake nocturnal movements are not accounted for, which could be a topic to watch for during future PCFM studies.

No globally threatened soaring bird species were recorded during the surveys. However, a notable number of Dalmatian Pelicans (*Pelecanus crispus*), classified as globally Near Threatened (NT) and nationally Vulnerable (VU), were observed, with a maximum flock size of 27 individuals. This species is considered at risk, with only four remaining breeding colonies, one of which is in the Büyük Menderes Delta, approximately 10 km northwest of the project site. The species, and its summer and winter grounds including Büyük Menderes NP, is under high conservation priority nationally with active monitoring and restoration programs, as outlined in the Species Action Plan (SAP) issued by DKMP in 2019. Further investigation is needed to understand the daily movement patterns of Dalmatian Pelicans between the Büyük Menderes Delta and the Güllük Delta. Continuous VP and VP ETL surveys throughout the year are recommended to collect the necessary data. Similarly notable numbers of Greater Flamingo were observed at the delta. This species were not observed during flight and delta observations only detected birds during rest. Waterbird species including Greater Flamingo can be nocturnally active and it would be important to account for this type of activity.

The main threats to the Dalmatian Pelican population in Türkiye include water pollution, destruction of breeding islands, human disturbances, stray dogs, insufficient fish stocks, excessive salinity in the Dalyan water, wind power plants, energy transmission lines, low genetic diversity, and viral, bacterial, and parasitic diseases. Notable levels of electrocution mortality was recorded in the region.

Due to its large size, heavy weight, and limited manoeuvrability, the Dalmatian Pelican is particularly vulnerable to turbine collisions. A comprehensive risk assessment of turbine-related fatalities is essential, along with further research and monitoring to better understand their movement patterns and develop effective measures to mitigate potential risks to this species.

While spring results suggested the species was not utilizing the risk zone, autumn season showed activity in the turbine risk zones. It is not entirely understood whether seasonal movement patterns affect utilization of the WPP airspace. Continued monitoring will enable recognition in year-on-year patterns of activity. Winter activity need also be accounted for moving forward.

The species' national status conservation status was evaluated as VU[9], but this is now outdated and a new national assessment was not made. By 2019, due to ongoing conservation efforts, populations of the species have rebounded. However the latest national conservation status assessment is still outdated and a new assessment for national status is not available. Consultations with DKMP, NGOs and local ornithology experts will be crucial for this species moving forward in elucidating project impact and risks, and potential mitigation measures.

A significant number of Yellow-legged Gulls (*Larus michahellis*) were observed at the site, which are attracted to Didim Sanitary Landfill. As this species is not a target species and is not of conservation concern, it was excluded from the analysis. Landfills often significantly increase bird activity by providing feeding opportunities for unexpected species, thereby enhancing bird diversity and attracting certain species to the site. Mortality of this species was recorded as discussed in the fatality monitoring sections of this report. Furthermore, the continuous availability of food resources at landfills may alter the seasonal dynamics of bird activity for all species which landfills are known to attract.

During ETL surveys, all the observed species are classified as Least Concern (LC). However, the surveys were discontinued due to the lack of permits for the site. 2024 baseline is

[9] Guy Kirwan, Barbaros Demirci, Hilary Welch, Kerem Boyla, Metehan Özen, Peter Castell, Tim Marlow. 2008. The Birds of Turkey. (Helm Field Guides).

considered indicative since some of the ETL is covered visually by WPP VPs. Despite this, the potential passage of flamingos and pelicans raises some concerns and warrants further investigation.

Breeding bird survey was conducted using only point count method from Vantage Points due to the uniform habitat and relatively small area of the wind farm in April to June. In addition, a transect count method conducted in July to verify the accuracy of the point count results. The results suggest a limited number of common and widespread species are breeding, and as expected most of the breeding activity would be directed toward the protected areas which are nearby.

Additive Collision Risk Assessment (Project Galeforce)

Additive collision risk evaluation for Project Galeforce established from the 2024 baseline collection estimated the yearly total target species collision risk at 14 birds for the study period (spring, summer, autumn). The results indicate that about 11% of the collision risk was driven by migrant activity, while 80% of migrant collision risk was attributed to autumn period movement as opposed to spring migration. This finding is congruent with literature information regarding spring and autumn movement across Anatolia. Whereas spring movement occurs in a more concentrated manner spatially and temporally, autumn movement is usually more dispersed both over autumn period and geographically.

Interestingly, due to the correlation with autumn migrant activity, the project which accounted for the most estimated migrant risk was Uygar, followed by a three-way tie between Armutçuk, Ihlamur and Kestanederesi. Due to the massive area that over which Uygar spreads, its higher proportion in total migrant risk makes sense. Harmancık receiving little migratory activity and accounting for low risk this year was the least expected result, however Harmancık is indeed distinct in the sense that it is the only project where the percentage of migrant risk overall is approximately 50%, while others are lower, meaning risk at Harmancık is moreso driven by migrants than any other project. This is significant due to the year-on-year variations in migratory rates over minor routes, which are not as consistently active each year as the major routes are, however can exhibit bursts of activity over some years. This is one of the reasons long-term monitoring datasets are crucial.

For residents, approximately half of the collision risk is attributed to summer season while spring and autumn are more or less equivalent. In terms of species, Common Buzzard, Short-toed Snake Eagle and Eurasian Kestrel, which are common, abundant, breeding raptors, topped the collision risk estimations and accounted for approximately 65% of the estimated risk for residents. These species are expected to continue to be active post-construction due to the habituation effect, and many of the projects providing adequate habitat for feeding and opportunities for perching. Additionally, Eleanora's Falcon activity will continue to be associated with late-summer and autumn passerine migration movement, since their breeding activity is reliant on the food source represented by migrant passerines in autumn. The species is also an indirect indicator of passerine migration at each project and wherever they are active can be assumed to be significant fly-over and/or rest habitats for songbirds.

Two further considerations are pertinent for the additive collision risk evaluation. (1) Regarding substitution of data for Hacıhıdırlar, if summer and autumn are assumed homogenous with spring, the overall results are not altered much. However, if resident bird species are relatively more active over the summer, or if autumn migratory movement is similarly moderate like with some other projects, this has the potential to have a medium level of influence on the overall picture, which is the more likely case. Operation phase monitoring and management may require a more pro-active approach due to baseline data gaps. Scheduling additional baseline collection study, while ensuring its smooth implementation ahead of construction is another option.

The second consideration is that (2) the baseline does not account for winter activity. As previously mentioned, target species activity in the WPP airspaces are generally expected to be diminished, though not non-existent. For some projects near important wetlands, such as Akköy and Ihlamur, wintering waterbird and wetland associating raptor activity might be a concern and these are discussed in respective final baseline reports. If winter activity is factored in as about the same as overall spring collision risk (which would indicate the maximum expected risk level), overall target species mortality for Project Galeforce would be contained within the range of 14-17 birds annually.

5.5 Bat

The methodology was applied effectively, and the results appear reliable. The survey confirmed that the equipment was deployed successfully, and recordings were completed across all seasons. The NatureScot methodology demonstrated that the 10-day monitoring period is effective. Drastic changes in bat call recordings across days highlighted significant fluctuations in bat activity.

Some technical issues were noted during specific surveys. In spring, some detectors failed to record throughout the entire 10-day recording period. In contrast, no such problems were encountered during the summer and autumn surveys. Despite these challenges, the recordings obtained from these detectors were sufficient for a meaningful analysis.

The number of recordings were distributed rather evenly across the project site. Also considering the similar habitat across the whole project site, this can be explained well. During transect surveys slightly elevated activity of the bats near the substation area was noted, perhaps due to the increased lighting of the area which might attract some bats.

In Turkey, assessing the risk level of a wind turbine is challenging due to the lack of comprehensive datasets and analytical ecological studies on bat population sizes. Based on ground static acoustic monitoring methodology, an indirect measure of activity levels is obtained in terms of recording numbers per unit time, which is not equivalent to number of individuals, yet is still a useful measure for gauging relative activity. The activity level, on average, is in the range of 50 recordings / night / turbine for the Project in the spring season, 50-70 recordings / night / turbine in summer, and 50 recordings / night / turbine in autumn.

Regarding species composition, the Common Pipistrelle (*Pipistrellus pipistrellus*) accounted for 60–80% of all recordings. This species is the most widespread and abundant bat in Europe and much of Türkiye. The second most recorded species was Kuhl's Pipistrelle (*Pipistrellus kuhli*) which is one of the most common species along the Mediterranean coastland.

No significant presence of any globally threatened species was observed, the level of Schreiber's Bent-winged Bat (*Miniopterus schreibersii*) was usually less than 1% of all bat recordings, and slightly higher during transect surveys. Low percentages of *Nyctalus lasiopterus* (VU) was also documented, which was actually accompanied by documentation of species mortality in late summer. This finding is detailed further in the fatality sections of this report since low acoustic activity did not necessarily correlate with low mortality in Akköy WPP.

Based on the findings of the fatality monitoring studies, which indicates a disproportionate rate of bat mortality for the project, ground static acoustic monitoring methodology, even though a internationally accepted and recommended methodology, did not prove to be the most effective in capturing bat activity levels at the project, as the low level of activity could have been misleading for the actual amount of activity at the blade level. Where ground static acoustic surveys capture high levels of high-flyer activity (Pipistrelloid and Nyctaloid), the possibility elevated of high-flyer activity should always be considered, even at low activity levels on ground.

This piece of evidence from Akköy WPP is recommended to be kept in context while evaluating the Project Galeforce projects in general. It is also important to note that acoustic surveys may yield different results for projects pre-operation vs operation phases. In addition, the importance of post-construction fatality monitoring programmes is highlighted by baseline bat activity outcomes mismatches.

5.6 Fatality Monitoring

The carcass surveys in 2024 were conducted successfully, with no missed survey dates or significant interruptions. Efforts were evenly distributed across all weeks and turbines, and the surveyor swiftly gained expertise following induction training, ensuring the consistent application of the methodology.

One limitation of the data is the absence of surveys in March and the first half of April though the surveyor was mobilized as quickly as possible during 2024 following the assignment of the field studies. The discovery of seven carcasses in the first week of surveys clearly indicates a high fatality rate during this period.

The other limitation was the ETL access issues due to which the ETL was not surveyed for the first half of the field surveys and only partially accessed during the second half. Along the ETL line, no carcasses have been found in 2024. However, there have been significant challenges due to physical access issues and the lack of permits required to conduct proper surveys.

However, bird species attracted to the landfill might possibly be at risk for collision, though bird monitoring or fatality monitoring does not indicate this thus far. Similarly White Stork might be attracted to the landfill. In addition, pelican movements across the area might become a factor in future monitoring studies.

Bat Fatalities

The bat fatality rate is estimated at 665 bat fatalities per year (confidence interval: 455–986, CI = 90%) across the project. This translates to approximately 75–164 bats per turbine annually. These figures exceed the European average, where wind turbines typically result in 1.5–30 bat fatalities per turbine per year, with an average of about 14.3.

Survey results indicate a significant concentration of fatalities around turbines T1 and T3. A large proportion is linked to turbine T3. This is likely due to the topography of T3's location, situated on a high hill between two valleys, which may obstruct bats during their commuting routes potentially to Didim Sanitary Landfill, though where from is even less clear.

The location of the Didim Sanitary Landfill, which is within the license area and is within 300 m of T5, is probably an important factor in attracting bats due to the higher presence of prey in the area. The landfill area does not appear to increase the mortality rate as initially expected for T5 which is closer to the landfill. While the landfill was thought to attract bats due to the higher presence of flies, T5, the turbine closest to the landfill, exhibits a lower fatality rate overall. This might be due to the presence of other scavengers near the turbine which might have affected the true carcass persistence rate. Alternatively, bats might be routing over T3 to the landfill due to some other reason (e.g. topography).

The Common Pipistrelle (*Pipistrellus pipistrellus*) is one of the most frequently encountered species at the site. This species is commonly found in lowlands and heavily used agricultural areas, including olive groves, near urban and rural regions in Turkey. Another group of bats with forearm lengths exceeding 38 mm may belong to Nyctaloid species. While measurements suggest Lesser Noctule (*Nyctalus leisleri*), it is worth noting the Lesser Noctule is not known to have been documented near the Akköy area.

A notable species among the fatalities was the Giant Noctule (*Nyctalus lasiopterus*), a rare migratory bat with an under-documented range in Turkey. The species is recorded in literature as a tree-obligate, preferring deciduous or mixed woodlands, while preferring old coniferous woodland in montane areas. The species is carnivorous and opportunistic, feeding on large insects and even passerine bird species when they are abundant during migratory seasons. Since the species is known to be both a long-range migrant and could travel a long distance from roost areas, the species might be attracted to the feeding opportunities presented by the landfill and the prey species which it might attract.

It is worth noting that the finding of low acoustic bat activity in 2024 was accompanied by a conversely high fatality estimation. This is an important point of note for ground static acoustic monitoring methodology in general especially where high flying species are concerned. While this a methodology that is internationally accepted, the results of acoustic monitoring must be considered in context of other evidence and cannot by itself be correlated to actual fatality. Based on 2024 results, bats experts are focusing on the possibility of a behavioural pattern where a roosting population of bats possibly within the Project AoI are mobilized by their attraction to the abundant feeding opportunities presented by the landfill, taking a specific route over apparently T1 and T3, flying at blade level, to approach the landfill. Though 2024 results may suggest T2 is for some reason bypassed, this information should be verified in the long-term dataset and might be coincidental. Elevated mortality near T1-T3 suggests a northeastern approach path to turbine swept areas, but this is conclusion cannot be easily drawn by 2024 results alone.

Bird Fatalities

No significant bird fatalities were detected during the study. The only species recorded was the Yellow-legged Gull (*Larus michahellis*), a common scavenging bird. This species breeds and rests in large numbers at the river delta and frequents landfill areas. Yellow-legged Gulls were observed near turbine T5, which is located adjacent to the landfill area. No raptor or waterbird remains or carcasses were found, alleviating initial concerns about potential impacts on these target species. These concerns stemmed from the regular flights of waterbirds between the Büyük Menderes Delta and other wetlands to the south, which pass near the project. This might be due to disturbance and barrier effects.

5.7 Monitoring and Mitigation Implications

- Flora: The monitoring actions outlined in the BMP should be implemented, and the current status should be presented and evaluated in progress reports.
- Habitats: Natural habitats such as adjacent to operation sites should be monitored for disturbances, with BMP actions implemented and progress evaluated in reports.
- Birds:
    - Due to wintering activity of waterbird species, the monitoring schedule should encompass coverage of the winter season
    - Due to year-round activity and conservation targets for the Dalmatian Pelican, enhanced ETL marking and other measures to prevent collisions and electrocutions (such as line spacing, insulation measures etc.) can be considered, potentially following more data collection for the ETL.
    - The Project Company can collaborate with DKMP and NGOs to safeguard Dalmatian Pelicans by sharing survey data and enabling biodiversity research at the Project, which can further help identify and mitigate risks. Net Gain requirements will be further explored for the species.
    - In 2025, the process of obtaining the necessary permits for bird surveys to be carried out in the national parks and private lands will be under the careful

supervision of the Enerjisa Üretim Santralleri A.Ş. Access to both delta and the ETL areas need to be secured for bird monitoring.
    - Operation phase VP and breeding bird / raptor monitoring, collision risk estimates, post-construction fatality monitoring will further inform adaptive management.
    - Shutdown on demand implementation is needed for the Project, and either observer initiated or automated processes should be feasible due to the small size of the Project. The AoI is defined by presence of important wetlands and protected areas, year-round activity, and the presence of a landfill for abundant food. Further discussion on SDOD needs are featured in a stand-alone Final SDOD Technical Note document also prepared by the Consultant using 2024 baseline data.
- Bats: Additional considerations are outlined below in "fatality monitoring".
- Fatality monitoring and mitigation:
    - Due to wintering activity of waterbird species, and high temperatures in the region enabling early activation of bats, and the landfill attracting bird and bat species, the fatality monitoring schedule should encompass coverage of the winter season.
    - Enhanced access to ETL route should be secured.
    - The relatively high number of bat carcasses found highlights the potential environmental impact of the project. This suggests a pressing need for mitigation measures. Turbine curtailment is one of the most effective methods to reduce bat fatalities, and the project should strongly consider implementing such measures in the future. Adjusting turbine operations during peak bat activity periods could significantly minimize fatalities. The project should develop either a blunt or smart curtailment programme, based on project needs and cost efficiency.
        - Peak Time: Ground acoustic bat activity was observed to peak shortly following sunset for each season, spring, summer and autumn, with clear peaks demonstrated at 21:00 with generally higher activity between 20:00-22:00.
        - Peak Season: Though ground static acoustic activity appeared relatively even across the seasons, mortality estimations start picking up after week 25 (mid-June), peaking in week 29 (mid-July), and displaying a second peak later during week 38 (mid-September). While bat activity at WPPs are generally assumed to peak mid-August, the mortality peak in mid-July may demonstrate an earlier peak in activity likely due to the southern latitude of this project compared to literature information available from European studies.
        - Activity by Turbine: High *Pipistrellus* acoustic activity at SP4/ T3 and corresponding high carcass count and estimated mortality rates for T3 was identified. Median T1 mortality estimations were higher as well.
    -
- Fauna: The monitoring actions outlined in the BMP should be implemented, with progress reports evaluating the status of *Vormela peregusna*, a potentially present vulnerable mammal species.
- Herpetofauna: The monitoring actions outlined in the BMP should be implemented, with progress reports evaluating the status of *Testudo graeca*, a potentially present vulnerable reptile species.

6 Appendix

6.1 Literature for Flora Surveys

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6.7 Bird Survey Conditions

Spring

Date	Surveyor	VP	Cloud %	WindDir	WindSp (m/s)	Prec	Temp (°)	Vis (km)
16/04	IU	VP1	40	KB	7.5	0	24	20
17/04	IU	VP3	100	SE	15	0	26	5
18/04	IU	VP2	30	SW	7	0	22	20
22/04	IU	VP1	70	S	3	0	22	5
24/04	IU	VP3	90	S	9	0	28	5
25/04	IU	VP2	80	SW	6	0	22	2
29/04	IU	VP2	30	N	4	0	27	20
30/04	IU	VP3	30	NNW	10	0	33	20
02/05	IU	VP1	30	NNW	5	0	25	20
06/05	IU	VP2	30	N	11	0	23	20
07/05	IU	VP1	10	WNW	3	0	23	20
08/05	IU	VP3	20	SW	5	0	25	20
10/05	IU	VP2	100	ENE	14	0	24	5
13/05	IU	VP2	30	NNW	7	0	24	5
14/05	IU	VP1	30	N	10	0	23	5
15/05	IU	VP3	0	WNW	5	0	23	5
20/05	IU	VP2	0	NW	3	0	32	4
21/05	IU	VP1	0	WNW	3	0	28	4
22/05	IU	VP3	100	SW	4	0	30	3
24/05	IU	VP2	30	NW	4	0	24	3
27/05	IU	VP2	30	NW	5	30	27	3
28/05	IU	VP1	5	NNW	6	0	25	3
29/05	IU	VP2	50	W	6	0	24	3
30/05	IU	VP1	30	SW	6	0	24	3
31/05	IU	VP1	10	SSW	4	0	23	3
03/06	IU	VP2	50	WNW	6	0	31	3
04/06	IU	VP1	0	W	5	0	31	3
05/06	IU	VP2	0	WNW	5	0	32	3
06/06	IU	VP1	80	NW	6	0	33	3
07/06	IU	VP2	100	NNE	4	0	34	5
10/06	IU	VP2	0	W	5	0	30	5
11/06	IU	VP1	0	W	5	0	28	5
12/06	IU	VP2	0	W	5	0	31	5
13/06	IU	VP1	0	W	3	0	33	5
14/06	IU	VP2	100	SSW	6	0	31	5

Summer

Date	Surveyor	VP	Cloud %	WindDir	WindSp (m/s)	Prec	Temp (°)	Vis (km)
24/06	IU	VP2	0	W	5	0	29	5
25/06	IU	VP1	0	WNW	6	0	32	5
26/06	IU	VP2	0	NNW	6	0	35	5
27/06	IU	VP1	0	NNW	6	0	34	5

Date	Surveyor	VP	Cloud %	WindDir	WindSp (m/s)	Prec	Temp (°)	Vis (km)
01/07	IU	VP2	0	N	6	0	34	5
02/07	IU	VP1	0	NNW	6	0	32	5
03/07	IU	VP2	0	SW	6	0	28	5
04/07	IU	VP1	70	SW	6	0	27	5
05/07	IU	VP2	30	NW	6	0	29	5
08/07	IU	VP2	0	NW	6	0	34	5
09/07	IU	VP1	0	NNE	10	0	36	5
10/07	IU	VP2	0	SW	6	0	37	5
11/07	IU	VP1	0	NW	10	0	32	5
12/07	IU	VP2	5	NNE	10	0	31	5
22/07	IU	VP2	0	WNW	10	0	33	5
23/07	IU	VP1	10	WNW	10	0	35	5
24/07	IU	VP2	0	NW	10	0	33	5
25/07	IU	VP1	10	WNW	8	0	32	5
26/07	IU	VP2	0	NNW	12	0	32	5
29/07	IU	VP2	0	NW	12	0	33	5
30/07	IU	VP1	0	N	13	0	35	5
31/07	IU	VP2	0	NNE	14	0	36	5
01/08	IU	VP1	0	NW	12	0	34	5
02/08	IU	VP2	0	WNW	7	0	31	5
05/08	IU	VP2	0	NW	7	0	34	5
06/08	IU	VP1	0	NW	7	0	33	5
07/08	IU	VP2	0	NNW	7	0	34	5
08/08	IU	VP2	0	NNW	10	0	33	5
09/08	IU	VP1	0	NW	10	0	31	5
12/08	IU	VP2	0	NW	11	0	38	5
13/08	IU	VP1	0	WNW	11	0	33	5
14/08	IU	VP2	0	W	11	0	31	5
15/08	IU	VP1	5	NW	11	0	35	5
19/08	IU	VP1	0	W	11	0	30	5
20/08	IU	VP2	0	W	11	0	32	5
21/08	IU	VP1	20	SW	11	0	29	5
22/08	IU	VP2	0	NW	11	0	31	5
23/08	IU	VP1	0	W	5	0	32	5
26/08	IU	VP2	20	W	5	0	30	5
27/08	IU	VP1	5	W	5	0	30	5
28/08	IU	VP2	10	NW	5	0	31	5
29/08	IU	VP1	0	NW	5	0	31	5

Autumn

Date	Surveyor	VP	Cloud %	WindDir	WindSp (m/s)	Prec	Temp (°)	Vis (km)
24/06	IU	VP2	0	W	5	0	29	5
25/06	IU	VP1	0	WNW	6	0	32	5
26/06	IU	VP2	0	NNW	6	0	35	5
27/06	IU	VP1	0	NNW	6	0	34	5

Date	Surveyor	VP	Cloud %	WindDir	WindSp (m/s)	Prec	Temp (°)	Vis (km)
01/07	IU	VP2	0	N	6	0	34	5
02/07	IU	VP1	0	NNW	6	0	32	5
03/07	IU	VP2	0	SW	6	0	28	5
04/07	IU	VP1	70	SW	6	0	27	5
05/07	IU	VP2	30	NW	6	0	29	5
08/07	IU	VP2	0	NW	6	0	34	5
09/07	IU	VP1	0	NNE	10	0	36	5
02/09	IU	VP2	70	W	5	0	28	5
03/09	IU	VP1	30	WNW	6	0	30	5
04/09	IU	VP2	0	NW	6	0	31	5
05/09	IU	VP1	0	NNW	6	0	32	5
06/09	IU	VP2	0	N	11	0	35	5
09/09	IU	VP2	0	NNW	8	0	29	5
10/09	IU	VP1	100	SSW	8	2	27	5
11/09	IU	VP2	75	S	8	0	27	5
12/09	IU	VP1	50	SSW	8	0	28	5
13/09	IU	VP2	50	SW	7	0	28	5
16/09	IU	VP2	30	W	7	0	26	5
17/09	IU	VP1	30	W	6	0	27	5
18/09	IU	VP2	90	WSW	6	0	27	5
19/09	IU	VP1	70	NW	6	0	27	5
20/09	IU	VP2	70	NNW	6	0	27	5
23/09	IU	VP2	30	NNW	6	0	27	5
24/09	IU	VP1	100	W	6	0	26	5
25/09	IU	VP2	0	NW	6	0	28	5
26/09	IU	VP1	10	NW	8	0	28	5
27/09	IU	VP1	0	NNW	7	0	29	5
30/09	IU	VP1	30	NW	12	0	24	5
01/10	IU	VP2	10	NNW	12	0	23	5
02/10	IU	VP1	0	N	12	0	25	5
03/10	IU	VP2	0	SW	5	0	24	5
07/10	IU	VP1	50	WSW	5	0	25	5
08/10	IU	VP2	0	NW	7	0	27	5
09/10	IU	VP1	40	SW	7	0	25	5
10/10	IU	VP2	90	SW	7	0	25	5
11/10	IU	VP1	5	WSW	7	0	26	5
14/10	IU	VP2	30	NNW	7	0	25	5
15/10	IU	VP1	0	N	8	0	26	5
16/10	IU	VP2	0	NNW	9	0	27	5
17/10	IU	VP1	70	N	14	0	25	5
18/10	IU	VP2	5	NNE	15	0	24	5
21/10	IU	VP2	0	N	11	0	23	5
22/10	IU	VP1	0	NNE	12	0	24	5
23/10	IU	VP2	0	N	9	0	23	5
24/10	IU	VP1	5	N	9	0	23	5

Date	Surveyor	VP	Cloud %	WindDir	WindSp (m/s)	Prec	Temp (°)	Vis (km)
25/10	IU	VP2	0	NNE	9	0	23	5
30/10	IU	VP2	75	N	9	0	24	5
31/10	IU	VP1	0	NNW	9	0	24	5
01/11	IU	VP1	0	NW	9	0	24	5
04/11	IU	VP2	30	NNE	9	0	20	5
05/11	IU	VP1	0	N	9	0	22	5
06/11	IU	VP2	0	NNE	9	0	20	5
07/11	IU	VP1	0	NNE	9	0	21	5
08/11	IU	VP1	0	NNE	9	0	21	5
11/11	IU	VP1	0	N	9	0	17	5
12/11	IU	VP2	0	N	9	0	19	5
13/11	IU	VP1	40	WSW	9	0	22	5
14/11	IU	VP2	90	WSW	9	0	21	5
15/11	IU	VP1	70	SW	9	0	21	5

6.8 Bird Observation Data

Sample rows from the Project bird data table is provided. Total duration of flight is noted as Dur. The height intervals are below the rotor height (a), at rotor height (b) and above the rotor height (c). Spec* abbreviations follow first three letters of genus name and first two letters of species name convention (for example, *Cirga denotes Circaetus gallicus*).

Spring

Date	VP	Time	Spec*	Number	Dur (sec)	Flight_Height	Behaviour	Status
16/04	VP1	15:24	Cirga	1	120	cccccccc------------	patrolling	Migrant
16/04	VP1	16:44	Cicci	1	30	bb------------------	patrolling	Migrant
17/04	VP3	17:40	Pelcr	1	60	aaaa----------------	patrolling	Resident
18/04	VP2	15:33	Butbu	1	30	aa------------------	patrolling	Resident
22/04	VP1	14:36	Cirga	1	0	aaaaaaaaaaaaaaaaaaaa	other	Migrant
22/04	VP1	15:14	Falti	1	30	aa------------------	patrolling	Resident
22/04	VP1	15:26	Cirga	1	30	aa------------------	patrolling	Migrant
24/04	VP3	13:31	Pelcr	1	45	aaa-----------------	other	Resident
24/04	VP3	13:52	Pelcr	1	30	aa------------------	patrolling	Resident
24/04	VP3	14:23	Pelcr	11	300	aaaaaaaaaaaaaaaaaaaa	patrolling	Resident
24/04	VP3	15:18	Pelcr	1	30	bb------------------	patrolling	Resident
24/04	VP3	15:50	Pelcr	1	60	bbbb----------------	patrolling	Resident
29/04	VP2	15:11	Pelcr	1	180	bbbbbbcccccc--------	patrolling	Resident
29/04	VP2	15:59	Pelcr	1	30	bb------------------	hunting/foraging	Resident
29/04	VP2	16:04	Accni	1	240	aaaabbbbbbbaaaaa----	patrolling	Resident
29/04	VP2	17:26	Pelcr	1	120	cccccccc------------	patrolling	Resident
30/04	VP3	14:27	Pelcr	4	60	aabc----------------	patrolling	Resident
30/04	VP3	14:37	Cirga	1	30	aa------------------	patrolling	Migrant
30/04	VP3	15:28	Pelcr	2	60	bbcc----------------	patrolling	Resident
30/04	VP3	15:41	Pelcr	6	60	aaaa----------------	patrolling	Resident
30/04	VP3	16:27	Pelcr	27	300	bbbbbbbbbbbbbbbbbbbb	patrolling	Resident
…								

Summer

Date	VP	Time	Spec*	Number	Dur (sec)	Flight_Height	Behaviour	Status
24/06	VP2	11:50	Cicci	1	240	aaaaaaaaaabbbbbb----	patrolling	Resident
25/06	VP1	14:35	Cicci	1	300	aaaaaaaaaaaaaaaaaaaa	patrolling	Resident
25/06	VP1	14:59	Cicci	1	60	aaaa----------------	patrolling	Resident
25/06	VP1	15:56	Cicci	5	60	cccc----------------	patrolling	Resident
26/06	VP2	16:24	Cicci	1	360	bbbbbbbbbbbbcccccccc	patrolling	Resident
01/07	VP2	11:53	Cicci	1	240	aaaaaaaaaaaabbbb----	patrolling	Resident
01/07	VP2	12:26	Accni	1	240	aaaaaaaaaaaaaaaa----	other	Resident
01/07	VP2	15:44	Cicci	8	300	bbbbbbbbcccccccccccc	patrolling	Resident
01/07	VP2	16:18	Falti	1	60	aaaa----------------	patrolling	Resident
01/07	VP2	16:41	Cicci	1	180	cccccccccccc--------	patrolling	Resident
03/07	VP2	14:37	Cicci	2	300	aaaaaaaaaaaaaaaaaaaa	patrolling	Resident
05/07	VP2	16:49	Falti	1	120	aaaaaaaa------------	patrolling	Resident
08/07	VP2	15:13	Cirga	1	0	ccccccccccccbbbbaaaa	patrolling	Resident

Date	VP	Time	Spec*	Number	Dur (sec)	Flight_Height	Behaviour	Status
08/07	VP2	16:37	Falti	1	60	aaaa----------------	patrolling	Resident
08/07	VP2	17:12	Falti	1	30	aa------------------	patrolling	Resident
09/07	VP1	11:46	Accni	1	15	b-------------------	patrolling	Resident
09/07	VP1	15:46	Falti	1	120	aaaabbbb------------	patrolling	Resident
09/07	VP1	16:40	Cicci	1	0	bbbbbbbbbbbbbbbbbbbb	patrolling	Resident
11/07	VP1	11:10	Falti	1	60	aabc----------------	patrolling	Resident
11/07	VP1	15:08	Cirga	1	180	bbbbbbbbcccc--------	patrolling	Resident
11/07	VP1	16:47	Cirga	1	300	bbbbbbbbbbbbbbbbbbbb	patrolling	Resident

Autumn

Date	VP	Time	Spec*	Number	Dur (sec)	Flight_Height	Behaviour	Status
02/09	VP2	12:12	Cirga	1	120	aabbcccc------------	patrolling	Resident
02/09	VP2	15:32	Cirga	1	180	aaaaaaaabccc--------	patrolling	Resident
02/09	VP2	15:42	Cirga	1	120	aaaaaaaa------------	patrolling	Resident
03/09	VP1	15:23	Cirga	1	0	aaaaaaaaaaaaaaaaaaaa	patrolling	Resident
03/09	VP1	16:27	Falpe	1	30	aa------------------	patrolling	Resident
04/09	VP2	15:05	Cirga	1	0	a-------------------	other	Resident
04/09	VP2	15:16	Cirga	1	0	aaaaaaaaaaaaaaaaaaaa	took off	Resident
04/09	VP2	16:19	Cirga	1	0	a-------------------	other	Resident
04/09	VP2	16:43	Cirga	1	5	a-------------------	took off	Resident
05/09	VP1	11:08	Falpe	1	15	a-------------------	patrolling	Resident
06/09	VP2	15:17	Cirga	1	120	aaaaaaaa------------	patrolling	Resident
06/09	VP2	15:17	Falpe	1	30	aa------------------	patrolling	Resident
06/09	VP2	15:17	Falti	1	30	aa------------------	patrolling	Resident
09/09	VP2	12:00	Cirga	1	0	a-------------------	other	Resident
09/09	VP2	12:18	Cirga	1	15	a-------------------	took off	Resident
09/09	VP2	14:33	Cirga	1	0	a-------------------	other	Resident
09/09	VP2	15:01	Cirga	1	15	a-------------------	took off	Resident
09/09	VP2	15:42	Cirga	1	0	a-------------------	other	Resident
09/09	VP2	16:02	Cirga	1	15	a-------------------	took off	Resident
11/09	VP2	12:21	Pelcr	1	0	aaaaaaaabbcccccccccc	patrolling	Resident
….								

6.9 Collision Probability Calculation

Calculation of collision risk for bird passing through rotor area as in NatureScot (2010),

Only enter input parameters in blue

Parameters	Value	Unit
K: [1D or [3D] (0 or 1)	1	
NoBlades	3	
MaxChord	4,2	m
Pitch (degrees)	30	
Species	Common Buzzard	
BirdLength	0,58	m
Wingspan	1,37	m
F: Flapping (0) or gliding (+1)	1	
Bird speed	11,6	m/sec
RotorDiam	138	m
RotationPeriod	5,00	sec

Calculation of alpha and p(collision) as a function of radius

			Upwind:			Downwind:		
r/R	c/C	a	collide		contribution	collide		contribution
radius	chord	alpha	length	p(collision)	from radius r	length	p(collision)	from radius r
0,025	0,575	5,35	17,07	0,88	0,00110	14,65	0,76	0,00095
0,075	0,575	1,78	6,49	0,34	0,00252	4,08	0,21	0,00158
0,125	0,702	1,07	5,14	0,27	0,00332	2,19	0,11	0,00142
0,175	0,860	0,76	4,86	0,25	0,00440	1,25	0,06	0,00113
0,225	0,994	0,59	4,76	0,25	0,00554	0,58	0,03	0,00068
0,275	0,947	0,49	4,09	0,21	0,00581	0,74	0,04	0,00105
0,325	0,899	0,41	3,81	0,20	0,00640	1,12	0,06	0,00188
0,375	0,851	0,36	3,47	0,18	0,00673	1,26	0,07	0,00244
0,425	0,804	0,31	3,18	0,16	0,00700	1,34	0,07	0,00295
0,475	0,756	0,28	2,94	0,15	0,00721	1,39	0,07	0,00341
0,525	0,708	0,25	2,72	0,14	0,00738	1,41	0,07	0,00382
0,575	0,660	0,23	2,52	0,13	0,00750	1,40	0,07	0,00417
0,625	0,613	0,21	2,34	0,12	0,00756	1,38	0,07	0,00448
0,675	0,565	0,20	2,17	0,11	0,00757	1,35	0,07	0,00473
0,725	0,517	0,18	2,01	0,10	0,00753	1,31	0,07	0,00493
0,775	0,470	0,17	1,86	0,10	0,00744	1,27	0,07	0,00508
0,825	0,422	0,16	1,71	0,09	0,00730	1,21	0,06	0,00517
0,875	0,374	0,15	1,57	0,08	0,00710	1,15	0,06	0,00522
0,925	0,327	0,14	1,43	0,07	0,00685	1,09	0,06	0,00521
0,975	0,279	0,14	1,30	0,07	0,00655	1,02	0,05	0,00515
Overall p(collision) =				Up-wind	12,3%		Downwind	6,5%
				Average	9,4%			

6.10 Carcass Search Schedule

Date	Turbine	TimeStart	TimeFinish	Date	Turbine	TimeStart	TimeFinish
2024-04-16	T01	10:15	10:35	2024-07-15	T06	12:20	12:44
2024-04-16	T02	10:44	11:10	2024-07-24	T01	10:44	11:02
2024-04-16	T03	11:19	12:00	2024-07-24	T02	11:07	11:18
2024-04-16	T03	11:19	12:00	2024-07-24	T03	11:28	12:00
2024-04-16	T03	11:19	12:00	2024-07-25	T04	9:16	9:35
2024-04-18	T03	9:31	10:06	2024-07-25	T05	9:40	9:59
2024-04-18	T06	10:19	10:34	2024-07-25	T06	10:10	10:30
2024-04-18	T04	10:42	10:58	2024-07-26	T01	9:28	9:46
2024-04-18	T05	11:06	11:37	2024-07-26	T02	9:52	10:03
2024-04-18	T05	11:06	11:37	2024-07-26	T03	10:08	10:34
2024-04-19	T01	10:09	10:48	2024-07-29	T01	9:30	9:53
2024-04-19	T02	10:58	11:45	2024-07-29	T02	9:58	10:10
2024-04-19	T03	11:52	12:16	2024-07-29	T03	10:17	10:45
2024-04-19	T06	12:30	13:07	2024-08-02	T04	9:36	10:05
2024-04-19	T05	13:22	13:42	2024-08-02	T05	10:10	10:27
2024-04-19	T04	13:50	14:07	2024-08-02	T06	10:37	10:57
2024-04-22	T01	9:11	9:54	2024-08-05	T01	9:32	9:55
2024-04-22	T02	10:02	10:05	2024-08-05	T02	10:00	10:12
2024-04-22	T03	10:32	11:05	2024-08-05	T03	10:17	10:38
2024-04-22	T04	11:59	12:21	2024-08-06	T06	9:43	10:00
2024-04-22	T06	12:29	12:47	2024-08-06	T05	10:09	10:24
2024-04-22	T05	13:00	13:18	2024-08-06	T04	10:30	10:45
2024-04-24	T01	9:37	9:54	2024-08-08	T01	9:24	9:42
2024-04-24	T02	10:00	10:11	2024-08-08	T02	9:47	9:58
2024-04-24	T03	10:17	10:38	2024-08-08	T03	10:04	10:39
2024-04-24	T06	10:49	11:03	2024-08-08	T03	10:04	10:39
2024-04-24	T04	11:10	11:23	2024-08-08	T03	10:04	10:39
2024-04-24	T05	11:30	11:45	2024-08-09	T04	9:30	9:49
2024-04-25	T01	9:34	9:53	2024-08-09	T05	9:55	10:16
2024-04-25	T02	10:00	10:39	2024-08-09	T06	10:28	10:43
2024-04-25	T03	10:45	11:13	2024-08-13	T01	9:43	10:03
2024-04-25	T05	11:26	11:44	2024-08-13	T02	10:08	10:24
2024-04-25	T04	11:50	12:03	2024-08-13	T03	10:20	10:59
2024-04-25	T06	12:12	12:26	2024-08-14	T05	9:14	9:34
2024-04-26	T05	9:54	10:40	2024-08-14	T04	9:41	9:58
2024-04-26	T04	10:51	11:08	2024-08-14	T06	10:04	10:20
2024-04-26	T06	11:17	11:34	2024-08-15	T01	9:40	10:00
2024-04-29	T01	9:33	9:50	2024-08-15	T02	10:06	10:18
2024-04-29	T02	9:56	10:11	2024-08-15	T03	10:25	10:45
2024-04-29	T03	10:17	10:50	2024-08-19	T01	9:31	9:56

Date	Turbine	TimeStart	TimeFinish	Date	Turbine	TimeStart	TimeFinish
2024-04-30	T06	9:28	9:57	2024-08-19	T02	10:02	10:14
2024-04-30	T05	10:04	10:25	2024-08-19	T03	10:20	10:44
2024-04-30	T04	10:34	10:57	2024-08-20	T05	9:40	9:58
2024-05-02	T01	9:27	9:46	2024-08-20	T04	10:04	10:19
2024-05-02	T02	9:52	10:05	2024-08-20	T06	10:25	10:42
2024-05-02	T03	10:11	11:08	2024-08-22	T01	9:39	9:58
2024-05-03	T06	9:35	9:59	2024-08-22	T02	10:05	10:18
2024-05-03	T05	10:12	10:36	2024-08-22	T03	10:25	10:48
2024-05-03	T04	10:42	11:04	2024-08-23	T06	12:01	12:24
2024-05-06	T01	9:32	9:50	2024-08-23	T04	12:31	12:52
2024-05-06	T02	9:56	10:10	2024-08-23	T05	12:59	13:20
2024-05-06	T03	10:17	10:47	2024-08-26	T01	9:42	9:58
2024-05-07	T06	9:34	9:59	2024-08-26	T02	10:03	10:15
2024-05-07	T05	10:10	10:37	2024-08-26	T03	10:21	10:43
2024-05-07	T04	10:44	11:06	2024-08-27	T05	9:30	9:51
2024-05-08	T01	9:29	10:15	2024-08-27	T06	10:03	10:21
2024-05-08	T02	10:21	10:38	2024-08-27	T04	10:29	10:45
2024-05-08	T03	10:46	11:33	2024-08-29	T01	9:30	9:47
2024-05-09	T06	9:36	9:57	2024-08-29	T02	9:53	10:11
2024-05-09	T05	10:09	10:32	2024-08-29	T03	10:18	10:40
2024-05-09	T04	10:39	11:01	2024-09-02	T01	9:28	9:44
2024-05-10	T01	9:34	9:57	2024-09-02	T02	9:50	10:02
2024-05-10	T02	10:03	10:17	2024-09-02	T03	10:08	10:30
2024-05-10	T03	10:24	10:48	2024-09-03	T06	9:29	9:57
2024-05-13	T01	9:33	9:51	2024-09-03	T04	10:03	10:19
2024-05-13	T02	9:58	10:10	2024-09-03	T05	10:25	10:40
2024-05-13	T03	10:17	10:46	2024-09-04	T01	9:37	9:56
2024-05-14	T05	9:43	10:07	2024-09-04	T02	10:01	10:14
2024-05-14	T06	10:18	10:37	2024-09-04	T03	10:20	10:42
2024-05-14	T04	10:44	11:03	2024-09-05	T06	9:52	10:09
2024-05-15	T01	9:37	9:58	2024-09-05	T04	10:16	10:32
2024-05-15	T02	10:05	10:20	2024-09-05	T05	10:39	10:53
2024-05-15	T03	10:26	10:55	2024-09-09	T01	10:36	10:53
2024-05-16	T06	9:25	9:48	2024-09-09	T02	10:58	11:10
2024-05-16	T04	9:55	10:22	2024-09-09	T03	11:15	11:36
2024-05-16	T05	10:28	10:53	2024-09-10	T06	10:31	10:47
2024-05-17	T01	9:34	10:00	2024-09-10	T04	10:54	11:06
2024-05-17	T02	10:07	10:24	2024-09-10	T05	11:13	11:26
2024-05-17	T03	10:30	11:05	2024-09-11	T01	9:28	9:42
2024-05-20	T01	9:30	9:54	2024-09-11	T02	9:47	9:57
2024-05-20	T02	10:00	10:15	2024-09-11	T03	10:03	10:23
2024-05-20	T03	10:24	10:57	2024-09-12	T06	9:20	9:36

Date	Turbine	TimeStart	TimeFinish	Date	Turbine	TimeStart	TimeFinish
2024-05-21	T06	9:25	9:46	2024-09-12	T04	9:43	9:58
2024-05-21	T05	9:56	10:22	2024-09-12	T05	10:04	10:18
2024-05-21	T04	10:31	10:53	2024-09-16	T01	9:44	10:00
2024-05-22	T01	9:31	9:54	2024-09-16	T02	10:08	10:20
2024-05-22	T02	10:00	10:15	2024-09-16	T03	10:27	10:54
2024-05-22	T03	10:22	11:18	2024-09-18	T05	9:28	9:43
2024-05-23	T06	9:28	9:49	2024-09-18	T04	9:49	10:05
2024-05-23	T04	9:56	10:14	2024-09-18	T06	10:12	10:26
2024-05-23	T05	10:19	10:49	2024-09-19	T01	9:25	9:42
2024-05-24	T01	9:36	10:00	2024-09-19	T02	9:48	10:00
2024-05-24	T02	10:05	10:19	2024-09-19	T03	10:07	10:44
2024-05-24	T03	10:29	10:57	2024-09-19	T03	10:07	10:44
2024-05-27	T01	9:49	10:10	2024-09-19	T03	10:07	10:44
2024-05-27	T02	10:15	10:30	2024-09-20	T05	9:27	9:50
2024-05-27	T03	10:35	11:46	2024-09-20	T04	9:58	10:14
2024-05-27	T03	10:35	11:46	2024-09-20	T06	10:20	10:34
2024-05-29	T05	9:28	9:48	2024-09-24	T01	9:23	9:38
2024-05-29	T04	9:55	10:16	2024-09-24	T02	9:44	9:56
2024-05-29	T06	10:24	10:43	2024-09-24	T03	10:01	10:22
2024-05-30	T01	9:23	9:59	2024-09-25	T06	9:34	9:56
2024-05-30	T02	10:05	10:21	2024-09-25	T05	10:01	10:14
2024-05-30	T03	10:27	10:59	2024-09-25	T04	10:21	10:36
2024-05-31	T04	9:38	10:02	2024-09-26	T01	10:41	10:57
2024-05-31	T05	10:10	10:35	2024-09-26	T02	11:02	11:13
2024-05-31	T06	10:48	11:09	2024-09-26	T03	11:18	11:38
2024-06-03	T01	9:33	9:52	2024-09-27	T06	10:16	10:31
2024-06-03	T02	9:58	10:22	2024-09-27	T05	10:41	10:56
2024-06-03	T03	10:28	11:08	2024-09-27	T04	11:02	11:18
2024-06-04	T04	9:22	9:45	2024-10-01	T01	9:22	9:38
2024-06-04	T05	9:52	10:11	2024-10-01	T02	9:43	9:55
2024-06-04	T06	10:22	10:39	2024-10-01	T03	10:02	10:23
2024-06-05	T01	9:38	10:03	2024-10-02	T06	9:26	9:42
2024-06-05	T02	10:10	10:25	2024-10-02	T04	9:53	10:15
2024-06-05	T03	10:31	10:55	2024-10-02	T05	10:25	10:35
2024-06-06	T04	9:39	9:56	2024-10-03	T01	9:39	9:54
2024-06-06	T05	10:03	10:23	2024-10-03	T02	9:59	10:10
2024-06-06	T06	10:34	10:55	2024-10-03	T03	10:15	10:35
2024-06-10	T01	9:11	9:33	2024-10-04	T06	11:29	11:50
2024-06-10	T02	9:41	9:55	2024-10-04	T04	11:57	12:17
2024-06-10	T03	10:03	10:33	2024-10-04	T05	12:23	12:44
2024-06-11	T04	9:16	9:39	2024-10-07	T01	9:31	9:48
2024-06-11	T05	9:45	10:05	2024-10-07	T02	9:55	10:07

Date	Turbine	TimeStart	TimeFinish	Date	Turbine	TimeStart	TimeFinish
2024-06-11	T06	10:18	10:34	2024-10-07	T03	10:12	10:34
2024-06-12	T01	9:21	9:43	2024-10-08	T06	9:43	9:58
2024-06-12	T02	9:48	10:06	2024-10-08	T05	10:07	10:25
2024-06-12	T03	10:13	10:40	2024-10-08	T04	10:30	10:51
2024-06-13	T04	9:34	9:54	2024-10-09	T06	9:32	9:48
2024-06-13	T05	10:01	10:18	2024-10-09	T05	10:04	10:20
2024-06-13	T06	10:31	10:49	2024-10-09	T04	10:27	10:51
2024-06-17	T04	9:27	9:46	2024-10-11	T01	9:35	9:50
2024-06-17	T05	9:52	10:10	2024-10-11	T02	9:54	10:06
2024-06-17	T06	10:22	10:42	2024-10-11	T03	10:11	10:30
2024-06-18	T01	9:37	10:08	2024-10-14	T01	9:34	9:51
2024-06-18	T02	10:15	10:32	2024-10-14	T02	9:59	10:09
2024-06-18	T03	10:39	11:19	2024-10-14	T03	10:17	10:38
2024-06-25	T04	9:34	10:00	2024-10-15	T05	10:19	10:35
2024-06-25	T05	10:06	10:38	2024-10-15	T06	10:49	11:02
2024-06-25	T05	10:06	10:38	2024-10-15	T04	11:09	11:24
2024-06-25	T06	10:50	11:11	2024-10-16	T01	10:39	10:55
2024-06-27	T01	9:20	9:50	2024-10-16	T02	11:01	11:12
2024-06-27	T02	10:06	10:21	2024-10-16	T03	11:18	11:37
2024-06-27	T03	10:28	10:53	2024-10-23	T01	11:06	11:22
2024-07-01	T01	9:23	9:44	2024-10-23	T02	11:27	11:39
2024-07-01	T02	9:51	10:06	2024-10-23	T03	11:45	12:06
2024-07-01	T03	10:14	10:40	2024-10-24	T04	11:02	11:19
2024-07-02	T05	9:32	9:55	2024-10-24	T05	11:25	11:38
2024-07-02	T04	10:02	10:20	2024-10-24	T06	11:49	12:04
2024-07-02	T06	10:26	10:43	2024-11-01	T06	11:24	11:40
2024-07-03	T01	9:29	9:54	2024-11-01	T05	11:49	12:03
2024-07-03	T02	10:00	10:25	2024-11-01	T04	12:09	12:22
2024-07-03	T03	10:31	10:57	2024-11-01	T01	12:30	12:43
2024-07-04	T04	9:25	9:45	2024-11-01	T02	12:48	12:58
2024-07-04	T05	9:52	10:13	2024-11-01	T03	13:03	13:22
2024-07-04	T06	10:25	10:43	2024-11-06	T01	14:12	14:27
2024-07-05	T01	9:27	9:48	2024-11-06	T02	14:31	14:43
2024-07-05	T02	9:53	10:07	2024-11-06	T03	14:48	15:06
2024-07-05	T03	10:13	10:33	2024-11-08	T05	14:21	14:37
2024-07-11	T01	8:44	9:00	2024-11-08	T06	14:47	15:00
2024-07-11	T02	9:06	9:20	2024-11-08	T04	15:07	15:23
2024-07-11	T03	9:26	9:48	2024-11-11	T06	9:47	10:04
2024-07-12	T05	8:42	9:06	2024-11-11	T05	10:14	10:28
2024-07-12	T04	9:12	9:30	2024-11-11	T04	10:34	10:49
2024-07-12	T06	9:37	9:53	2024-11-12	T01	9:34	9:49
2024-07-15	T01	9:20	9:52	2024-11-12	T02	9:54	10:06

Date	Turbine	TimeStart	TimeFinish	Date	Turbine	TimeStart	TimeFinish
2024-07-15	T02	9:57	10:18	2024-11-12	T03	10:11	10:33
2024-07-15	T03	10:24	10:57	2024-11-13	T06	9:36	9:53
2024-07-15	T04	10:46	11:32	2024-11-13	T05	10:04	10:22
2024-07-15	T04	10:46	11:32	2024-11-13	T04	10:28	10:43
2024-07-15	T04	10:46	11:32	2024-11-15	T01	10:04	10:17
2024-07-15	T04	10:46	11:32	2024-11-15	T02	10:21	10:35
2024-07-15	T05	11:42	12:04	2024-11-15	T03	10:39	10:54
2024-07-15	T06	12:20	12:44				

6.11 Data Tables for GenEst

CO

carID,Turbine,DateFound,Species,SpeciesGroup,Size,Distance,Week
car001,t03,2024-04-16,Ps,bat1,bat,30,16
car002,t03,2024-04-16,Ps,bat1,bat,30,16
car003,t03,2024-04-16,Ps,bat1,bat,10,16
car004,t05,2024-04-18,Ps,bat1,bat,30,16
car005,t05,2024-04-18,Ps,bat1,bat,4,16
car006,t01,2024-04-19,Ps,bat1,bat,30,16
car007,t02,2024-04-19,Ne,bat1,bat,15,16
car008,t01,2024-04-22,Ps,bat1,bat,10,17
car009,t02,2024-04-25,Nn,bat1,bat,10,17
car010,t05,2024-04-26,Ne,bat1,bat,25,17
car011,t03,2024-05-02,Ps,bat1,bat,13,18
car012,t01,2024-05-08,Ps,bat1,bat,12,19
car013,t03,2024-05-08,Ne,bat1,bat,25,19
car014,t03,2024-05-22,Ps,bat1,bat,50,21
car015,t03,2024-05-27,Ps,bat1,bat,30,22
car016,t03,2024-05-27,Ps,bat1,bat,15,22
car017,t01,2024-05-30,Ne,bat1,bat,5,22
car018,t02,2024-06-03,Ps,bat1,bat,18,23
car019,t03,2024-06-03,Ps,bat1,bat,5,23
car020,t01,2024-06-18,Ps,bat1,bat,30,25
car021,t03,2024-06-18,Ps,bat1,bat,15,25
car022,t05,2024-06-25,Ps,bat1,bat,15,26
car023,t05,2024-06-25,Ps,bat1,bat,30,26
car024,t01,2024-06-27,Ps,bat1,bat,25,26
car025,t02,2024-07-03,Ps,bat1,bat,5,27
car026,t01,2024-07-15,Ps,bat1,bat,5,29
car027,t02,2024-07-15,Ps,bat1,bat,25,29
car028,t03,2024-07-15,Ps,bat1,bat,7,29
car029,t04,2024-07-15,Ps,bat1,bat,30,29
car030,t04,2024-07-15,Ps,bat1,bat,32,29
car031,t04,2024-07-15,Ps,bat1,bat,35,29
car032,t04,2024-07-15,Ps,bat1,bat,15,29
car033,t05,2024-07-15,Ps,bat1,bat,25,29
car034,t06,2024-07-15,Ps,bat1,bat,45,29
car035,t06,2024-07-15,Ps,bat1,bat,10,29
car036,t03,2024-07-24,Ps,bat1,bat,7,30
car037,t03,2024-07-26,Ps,bat1,bat,13,30
car038,t01,2024-07-29,Ps,bat1,bat,35,31
car039,t03,2024-07-29,Ps,bat1,bat,50,31
car040,t04,2024-08-02,Ps,bat1,bat,40,31
car041,t06,2024-08-02,Ps,bat1,bat,25,31
car042,t01,2024-08-05,Ps,bat1,bat,10,32
car043,t03,2024-08-08,Ps,bat1,bat,15,32
car044,t03,2024-08-08,Ps,bat1,bat,20,32
car045,t03,2024-08-08,Ps,bat1,bat,15,32
car046,t03,2024-08-13,Ps,bat1,bat,50,33
car047,t01,2024-08-19,Ps,bat1,bat,20,34
car048,t02,2024-08-29,Ps,bat1,bat,30,35
car049,t03,2024-09-16,Ps,bat1,bat,30,38
car050,t03,2024-09-19,Na,bat1,bat,40,38
car051,t03,2024-09-19,Ps,bat1,bat,20,38
car052,t03,2024-09-19,Ps,bat1,bat,20,38
car053,t05,2024-09-20,Ps,bat1,bat,5,38
car054,t04,2024-10-02,Ps,bat1,bat,30,40
car055,t04,2024-10-08,Ps,bat1,bat,15,41
car056,t04,2024-10-09,Ps,bat1,bat,35,41

CP

cpID,Size,Season,LastPresence,FirstAbsent
exp001,bat,spring,0.97,2.96
exp002,bat,spring,3.09,5.09
exp003,bat,spring,1.06,3.09
exp004,bat,spring,0.99,2.98
exp005,bat,spring,5.11,6.13
exp006,bat,spring,6.13,7.08
exp007,bat,spring,3.12,5.11
exp008,bat,spring,0.99,2.98
exp009,bat,spring,1.01,3.01
exp010,bat,spring,3.20,5.16
exp011,bat,spring,7.15,14.14
exp012,bat,spring,0.00,1.01
exp013,bat,spring,1.01,3.01
exp014,bat,spring,1.01,3.01
exp015,bat,spring,3.23,5.16
exp016,bat,spring,3.23,5.16
exp017,bat,spring,6.22,7.18
exp018,bat,spring,1.03,3.03
exp019,bat,spring,1.03,3.03
exp020,bat,spring,1.03,3.03
exp021,bat,summer_e,0.00,0.95
exp022,bat,summer_e,0.00,0.95
exp023,bat,summer_e,0.95,2.94
exp024,bat,summer_e,0.00,0.95
exp025,bat,summer_e,0.00,0.95
exp026,bat,summer_e,0.95,2.94
exp027,bat,summer_e,0.00,0.95
exp028,bat,summer_e,0.95,2.94
exp029,bat,summer_e,0.95,2.94
exp030,bat,summer_e,3.06,4.05
exp031,bat,summer_e,0.95,2.94
exp032,bat,summer_e,0.00,0.95
exp033,bat,summer_e,0.95,2.94
exp034,bat,summer_e,0.95,2.94
exp035,bat,summer_e,3.06,4.05
exp036,bat,summer_e,0.95,2.94
exp037,bat,summer_e,0.00,0.95
exp038,bat,summer_e,0.95,2.94
exp039,bat,summer_e,0.95,2.94
exp040,bat,summer_e,0.00,0.94
exp041,bat,summer_l,0.00,0.93
exp042,bat,summer_l,0.00,0.93
exp043,bat,summer_l,0.00,0.93
exp044,bat,summer_l,0.00,0.93
exp045,bat,summer_l,0.00,0.93
exp046,bat,summer_l,0.00,0.93
exp047,bat,summer_l,0.89,2.87
exp048,bat,summer_l,0.89,2.87
exp049,bat,summer_l,0.89,2.87
exp050,bat,summer_l,0.89,2.87
exp051,bat,summer_l,0.00,0.85
exp052,bat,summer_l,0.00,0.85
exp053,bat,summer_l,0.00,0.86
exp054,bat,summer_l,0.00,0.86
exp055,bat,summer_l,0.00,0.86
exp056,bat,summer_l,0.00,0.86
exp057,bat,summer_l,0.00,0.84
exp058,bat,summer_l,0.00,0.84
exp059,bat,summer_l,0.00,0.84
exp060,bat,summer_l,0.00,0.84
exp061,bat,autumn,0.00,0.93
exp062,bat,autumn,0.00,0.93

exp063,bat,autumn,0.00,0.93
exp064,bat,autumn,0.00,0.93
exp065,bat,autumn,0.00,0.93
exp066,bat,autumn,0.00,0.93
exp067,bat,autumn,0.00,0.93
exp068,bat,autumn,0.00,0.93
exp069,bat,autumn,3.07,4.11
exp070,bat,autumn,7.07,14.03
exp071,bat,autumn,0.00,0.93
exp072,bat,autumn,0.93,2.94
exp073,bat,autumn,0.93,2.94
exp074,bat,autumn,0.93,2.94
exp075,bat,autumn,0.93,2.94
exp076,bat,autumn,0.93,2.93
exp077,bat,autumn,0.93,2.93
exp078,bat,autumn,0.93,2.93
exp079,bat,autumn,0.93,2.93
exp080,bat,autumn,0.00,0.93

SS
SearchDate,Season,t01,t02,t03,t04,t05,t06
2024-04-16,spring,1,1,1,0,0,0
2024-04-18,spring,0,0,1,1,1,1
2024-04-19,spring,1,1,1,1,1,1
2024-04-22,spring,1,1,1,1,1,1
2024-04-24,spring,1,1,1,1,1,1
2024-04-25,spring,1,1,1,1,1,1
2024-04-26,spring,0,0,0,1,1,1
2024-04-29,spring,1,1,1,0,0,0
2024-04-30,spring,0,0,0,1,1,1
2024-05-02,spring,1,1,1,0,0,0
2024-05-03,spring,0,0,0,1,1,1
2024-05-06,spring,1,1,1,0,0,0
2024-05-07,spring,0,0,0,1,1,1
2024-05-08,spring,1,1,1,0,0,0
2024-05-09,spring,0,0,0,1,1,1
2024-05-10,spring,1,1,1,0,0,0
2024-05-13,spring,1,1,1,0,0,0
2024-05-14,spring,0,0,0,1,1,1
2024-05-15,spring,1,1,1,0,0,0
2024-05-16,spring,0,0,0,1,1,1
2024-05-17,spring,1,1,1,0,0,0
2024-05-20,spring,1,1,1,0,0,0
2024-05-21,spring,0,0,0,1,1,1
2024-05-22,spring,1,1,1,0,0,0
2024-05-23,spring,0,0,0,1,1,1
2024-05-24,spring,1,1,1,0,0,0
2024-05-27,summer_e,1,1,1,0,0,0
2024-05-29,summer_e,0,0,0,1,1,1
2024-05-30,summer_e,1,1,1,0,0,0
2024-05-31,summer_e,0,0,0,1,1,1
2024-06-03,summer_e,1,1,1,0,0,0
2024-06-04,summer_e,0,0,0,1,1,1
2024-06-05,summer_e,1,1,1,0,0,0
2024-06-06,summer_e,0,0,0,1,1,1
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2024-06-11,summer_e,0,0,0,1,1,1
2024-06-12,summer_e,1,1,1,0,0,0
2024-06-13,summer_e,0,0,0,1,1,1
2024-06-17,summer_e,0,0,0,1,1,1
2024-06-18,summer_e,1,1,1,0,0,0
2024-06-25,summer_e,0,0,0,1,1,1
2024-06-27,summer_e,1,1,1,0,0,0

2024-07-01,summer_e,1,1,1,0,0,0
2024-07-02,summer_e,0,0,0,1,1,1
2024-07-03,summer_e,1,1,1,0,0,0
2024-07-04,summer_e,0,0,0,1,1,1
2024-07-05,summer_e,1,1,1,0,0,0
2024-07-11,summer_e,1,1,1,0,0,0
2024-07-12,summer_e,0,0,0,1,1,1
2024-07-15,summer_e,1,1,1,1,1,1
2024-07-24,summer_l,1,1,1,0,0,0
2024-07-25,summer_l,0,0,0,1,1,1
2024-07-26,summer_l,1,1,1,0,0,0
2024-07-29,summer_l,1,1,1,0,0,0
2024-08-02,summer_l,0,0,0,1,1,1
2024-08-05,summer_l,1,1,1,0,0,0
2024-08-06,summer_l,0,0,0,1,1,1
2024-08-08,summer_l,1,1,1,0,0,0
2024-08-09,summer_l,0,0,0,1,1,1
2024-08-13,summer_l,1,1,1,0,0,0
2024-08-14,summer_l,0,0,0,1,1,1
2024-08-15,summer_l,1,1,1,0,0,0
2024-08-19,summer_l,1,1,1,0,0,0
2024-08-20,summer_l,0,0,0,1,1,1
2024-08-22,summer_l,1,1,1,0,0,0
2024-08-23,summer_l,0,0,0,1,1,1
2024-08-26,summer_l,1,1,1,0,0,0
2024-08-27,summer_l,0,0,0,1,1,1
2024-08-29,summer_l,1,1,1,0,0,0
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2024-09-05,summer_l,0,0,0,1,1,1
2024-09-09,summer_l,1,1,1,0,0,0
2024-09-10,summer_l,0,0,0,1,1,1
2024-09-11,summer_l,1,1,1,0,0,0
2024-09-12,summer_l,0,0,0,1,1,1
2024-09-16,autumn,1,1,1,0,0,0
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2024-10-08,autumn,0,0,0,1,1,1
2024-10-09,autumn,0,0,0,1,1,1
2024-10-11,autumn,1,1,1,0,0,0
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2024-10-23,autumn,1,1,1,0,0,0
2024-10-24,autumn,0,0,0,1,1,1
2024-11-01,autumn,1,1,1,1,1,1
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2024-11-08,autumn,0,0,0,1,1,1
2024-11-11,autumn,0,0,0,1,1,1
2024-11-12,autumn,1,1,1,0,0,0
2024-11-13,autumn,0,0,0,1,1,1
2024-11-15,autumn,1,1,1,0,0,0

SE
pkID,Size,Season,s1,s2,s3,s4
exp001,bat,spring,1,NA,NA,NA
exp002,bat,spring,1,NA,NA,NA
exp003,bat,spring,1,NA,NA,NA
exp004,bat,spring,1,NA,NA,NA
exp005,bat,spring,1,NA,NA,NA
exp006,bat,spring,1,NA,NA,NA
exp007,bat,spring,1,NA,NA,NA
exp008,bat,spring,1,NA,NA,NA
exp009,bat,spring,1,NA,NA,NA
exp010,bat,spring,1,NA,NA,NA
exp011,bat,spring,1,NA,NA,NA
exp012,bat,spring,1,NA,NA,NA
exp013,bat,spring,1,NA,NA,NA
exp014,bat,spring,1,NA,NA,NA
exp015,bat,spring,1,NA,NA,NA
exp016,bat,spring,1,NA,NA,NA
exp017,bat,spring,1,NA,NA,NA
exp018,bat,spring,1,NA,NA,NA
exp019,bat,spring,1,NA,NA,NA
exp020,bat,spring,1,NA,NA,NA
exp021,bat,summer_e,1,NA,NA,NA
exp022,bat,summer_e,1,NA,NA,NA
exp023,bat,summer_e,1,NA,NA,NA
exp024,bat,summer_e,0,NA,NA,NA
exp025,bat,summer_e,0,NA,NA,NA
exp026,bat,summer_e,0,1,NA,NA
exp027,bat,summer_e,1,NA,NA,NA
exp028,bat,summer_e,0,0,NA,NA
exp029,bat,summer_e,1,NA,NA,NA
exp030,bat,summer_e,1,NA,NA,NA
exp031,bat,summer_e,0,0,NA,NA
exp032,bat,summer_e,0,NA,NA,NA
exp033,bat,summer_e,1,NA,NA,NA
exp034,bat,summer_e,1,NA,NA,NA
exp035,bat,summer_e,1,NA,NA,NA
exp036,bat,summer_e,1,NA,NA,NA
exp037,bat,summer_e,1,NA,NA,NA
exp038,bat,summer_e,1,NA,NA,NA
exp039,bat,summer_e,1,NA,NA,NA
exp040,bat,summer_e,1,NA,NA,NA
exp041,bat,summer_l,1,NA,NA,NA
exp042,bat,summer_l,1,NA,NA,NA
exp043,bat,summer_l,1,NA,NA,NA
exp044,bat,summer_l,0,NA,NA,NA
exp045,bat,summer_l,0,NA,NA,NA
exp046,bat,summer_l,0,NA,NA,NA
exp047,bat,summer_l,1,NA,NA,NA
exp048,bat,summer_l,1,NA,NA,NA
exp049,bat,summer_l,1,NA,NA,NA
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exp053,bat,summer_l,1,NA,NA,NA
exp054,bat,summer_l,1,NA,NA,NA
exp055,bat,summer_l,1,NA,NA,NA
exp056,bat,summer_l,1,NA,NA,NA
exp057,bat,summer_l,1,NA,NA,NA
exp058,bat,summer_l,1,NA,NA,NA
exp059,bat,summer_l,1,NA,NA,NA
exp060,bat,summer_l,1,NA,NA,NA

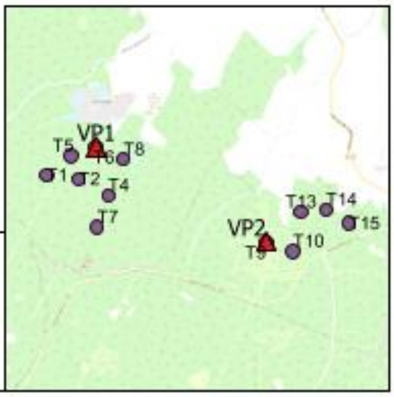
exp061,bat,autumn,1,NA,NA,NA
exp062,bat,autumn,1,NA,NA,NA
exp063,bat,autumn,1,NA,NA,NA
exp064,bat,autumn,1,NA,NA,NA
exp065,bat,autumn,1,NA,NA,NA
exp066,bat,autumn,1,NA,NA,NA
exp067,bat,autumn,1,NA,NA,NA
exp068,bat,autumn,1,NA,NA,NA
exp069,bat,autumn,1,NA,NA,NA
exp070,bat,autumn,1,NA,NA,NA
exp071,bat,autumn,1,NA,NA,NA
exp072,bat,autumn,1,NA,NA,NA
exp073,bat,autumn,1,NA,NA,NA
exp074,bat,autumn,1,NA,NA,NA
exp075,bat,autumn,1,NA,NA,NA
exp076,bat,autumn,1,NA,NA,NA
exp077,bat,autumn,1,NA,NA,NA
exp078,bat,autumn,1,NA,NA,NA
exp079,bat,autumn,1,NA,NA,NA
exp080,bat,autumn,1,NA,NA,NA

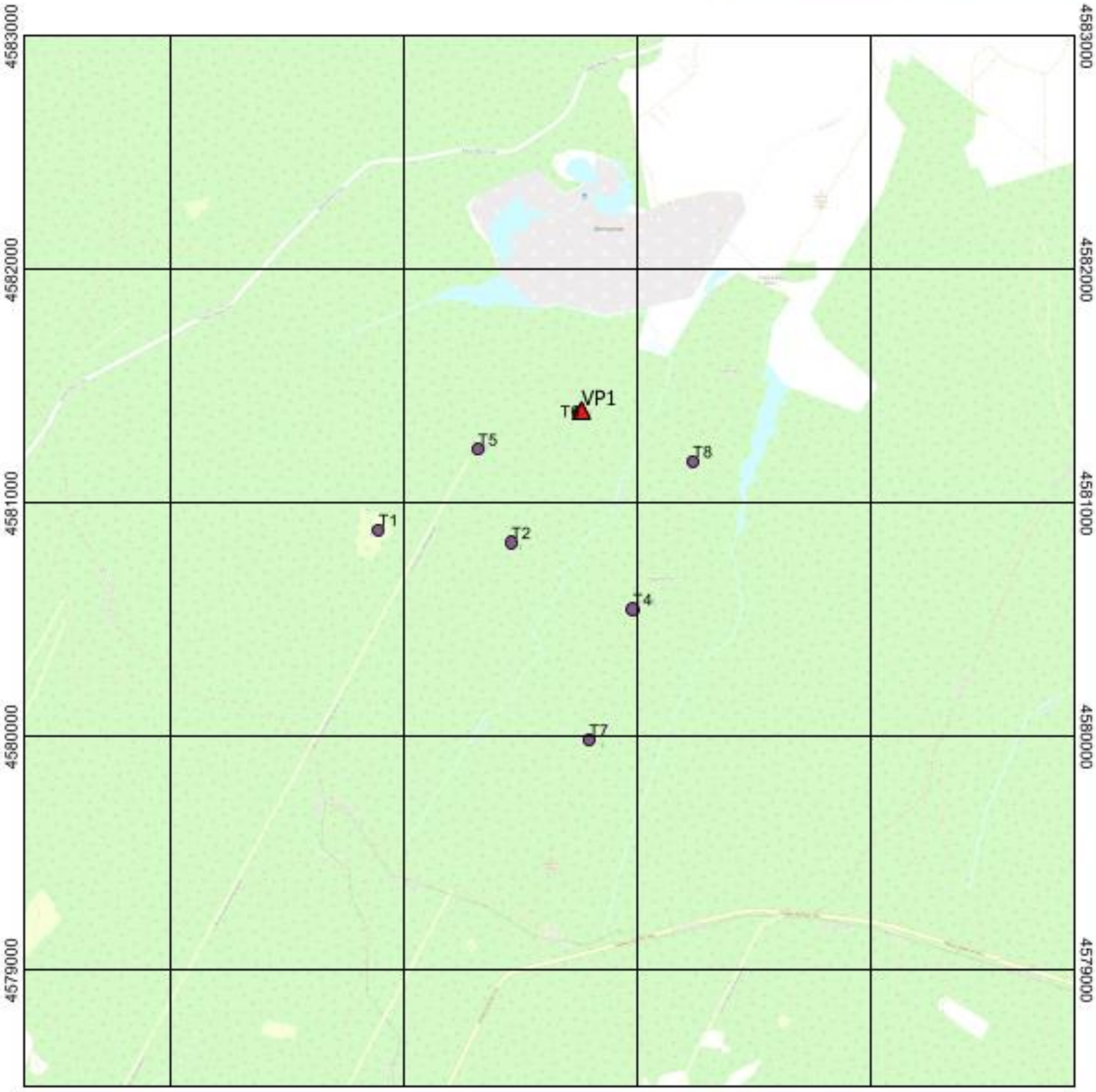
6.12 Sample Field Recording Sheets

6.12.1 VP Map and Sheet

VP Number		Date	
Surveyor		Start Time	
Project		End Time	

1:25.000
WGS 84 UTM 35N





Project		VP			Cloud cover	%	Precipitation	mm
Date		Start1-Finish1-			Wind Direction		Temp. (max)	ºC
Surveyor		Start2-Finish2			Wind Speed	m/s	Visibility	km
Comments								

Height: A (below rotor height), B (at rotor height), C (above rotor height)

	Time	Species	Count	Behaviour	Resident/Migrant/Unclear	Duration (sec)	Height	60	120	180	240	300
1							C					
							B					
							A					
2							C					
							B					
							A					
3							C					
							B					
							A					
4							C					
							B					
							A					
5							C					
							B					
							A					
6							C					
							B					
							A					
7							C					
							B					
							A					
8							C					
							B					
							A					
9							C					
							B					
							A					

6.12.2 Breeding Bird

Project		Point		Start time		Temperature (Celsius)	
Date		North (UTM)		Finish time		Wind direction	
Surveyor		East (UTM)		Duration (min)		Wind speed (m/s)	
Notes						Precipitation (mm)	
						Visibility (km)	

Species	Min. count	Max. count	Breeding code	Species	Min. count	Max. count	Breeding code

6.12.3 Acoustic Bat

Project		Coordinates (Utm-Wgs84)	
Surveyor		Folder Name	
Location		4 Directional Photo	☐
Detector Serial#		Notes	

Start	Control	Finish	Date	Hour	# Recording	Temp (C°)	Cloud (%)	Wind (M/S)	Precipitation?	Fog?	Notes
☐	☐	☐	___/ ___/ ___	___:___					☐	☐	
☐	☐	☐	___/ ___/ ___	___:___					☐	☐	
☐	☐	☐	___/ ___/ ___	___:___					☐	☐	
☐	☐	☐	___/ ___/ ___	___:___					☐	☐	
☐	☐	☐	___/ ___/ ___	___:___					☐	☐	

6.12.4 Fatality Monitoring

KAB Ekoloji

Saha Formu 4: Rutin Karkas Tarama

ENERJİSA Türkiye'nin Enerjisi

Bu form rüzgar santralleri altında türbin altında "Road and Pad" haftalık yapılan rutin karkas çalışmaları için hazırlanmıştır.
Bilgi için: info@kabecology.com, Nisan 2023

PROJE	
ARAŞTIRMACI	
HAFTA NO*	
TARİH	

*Yılın ilk pazartesisi ile başlayan = Google hafta -1

KARKAS TARAMA BİLGİLERİ

TARİH (GG/AA)	TRB/E TL	BAŞL.	BİT.	KAR NOları	NOTLAR

Açıklamalar
KAR NO – Karkas numaraları, örneğin 1 veya 2-4
Y / K – Tür grubu (Yarasa / Kuş)
TÜRB NO – Türbin numarası
TÜRB YÖN – Karkasın türbine göre yönü (derece)
TÜRB UZ - Karkasın türbine uzaklığı (metre)
ÖLÜMDEN SN SÜRE – Karkasın tahminen ne zamandan beri orada bulunduğu
FİZİKİ DURUMU – Açık yara olup olmadığını belirtiniz.
FOTO – Karkas fotoğrafı

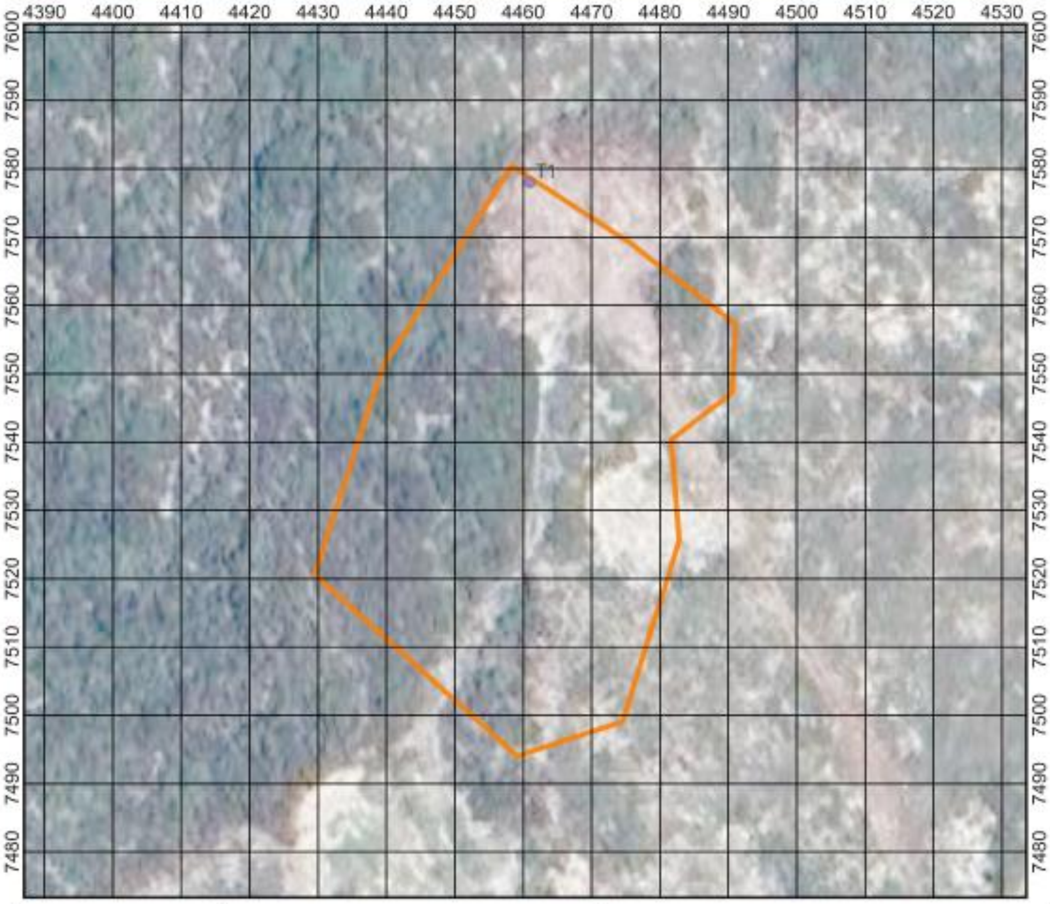
KARKAS GÖZLEMİ

KAR NO	TÜRB NO	Y / K	TAHMİNİ VEYA BİLİNEN TÜR	UTM-E 4 HANE	UTM-N 4 HANE	TÜRB YÖN (°)	TÜRB UZ (M)	ÖLÜMDEN SN SÜRE	FİZİKİ DURUMU	ÖN KOL (MM)	DOKU ALINDI TÜP NO	FOTO	NOTLAR
1											☐	☐	
2											☐	☐	
3											☐	☐	
4											☐	☐	
5											☐	☐	
6											☐	☐	

KAB Ekoloji

Saha Formu 12: **Deneysel Çalışma**

ENERJİSA Türkiye'nin Enerjisi



Deney Yöneticisi				Kontrol Günleri											Genel Notlar:
Karkas No	Karkas Kontrol	Araştırmacı		1	2	3	4	5	6	7	8	15	22	29	
			Bitiş Saati												
			Başl. Saati												
		UTM Koor.													
		Doğu	Kuzey												Karkas Notları
1															
2															
3															
4															
5															
6															
7															
8															

Akköy RES
Türbin 1
Ölçek: 1: 800

Görüş Kolaylığı:
- ☐ Yüksek
- ☐ Orta
- ☐ Düşük

6.13 Flight Line Maps

[Maps were provided in a separate document.]