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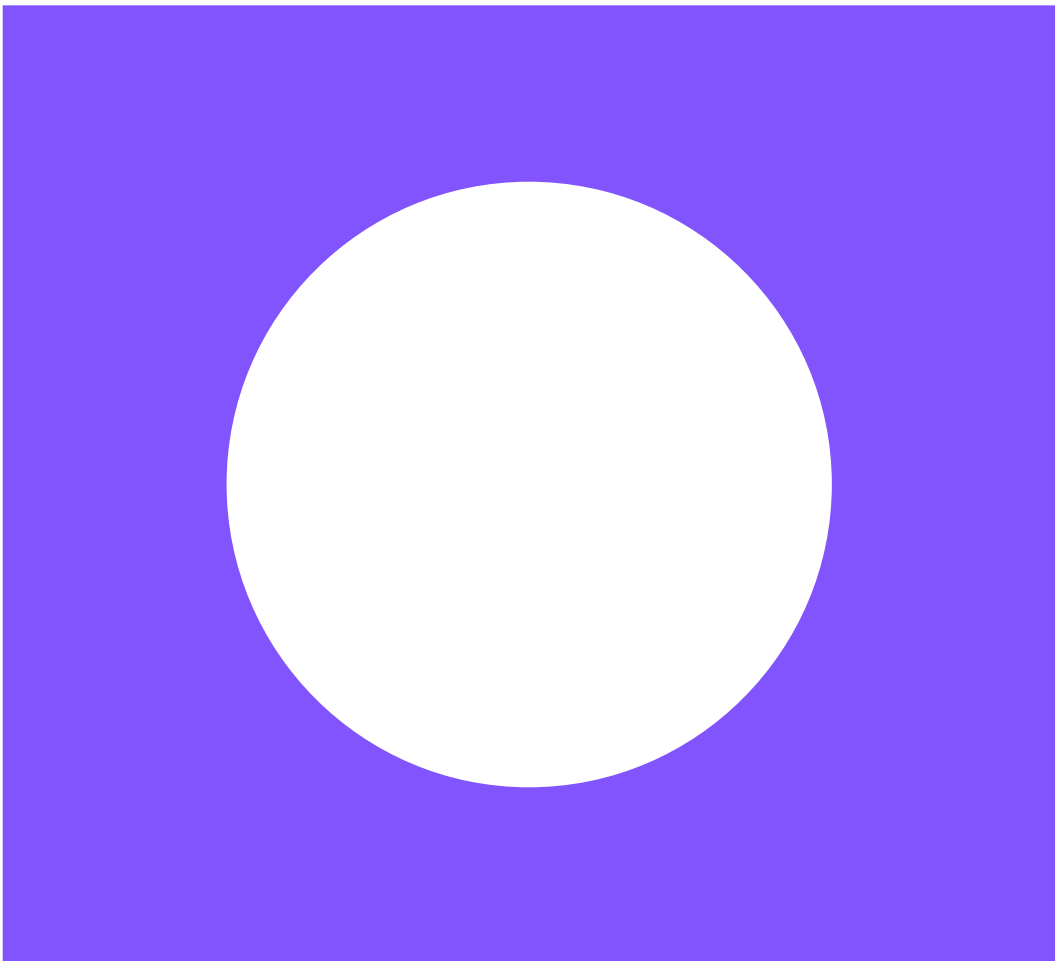

Uygar Wind Power Plant (WPP) Project

Supplementary Biodiversity Surveys Final Report

May 2025

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Uygar Wind Power Plant (WPP) Project

Supplementary Biodiversity Surveys Final Report

May 2025

Issue and Revision Record

Revision	Date	Originator	Checker	Approver	Description
A	February 2025	Esra Demirhan Anıl Öser Berkay Şahin Cihan Ünal Değirmenci	Gizem Arıkan Gürler	Hande Hatipoğlu	Draft Final Biodiversity Baseline Report for 2024
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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

Uygar Wind Power Plant (WPP) Project (“the Project”) with 60 turbines and 252 MWm/250 MWe total installed power, is planned to be implemented by Enerjisa Üretim. 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. Within the identified species, Common Tortoise is classified as Vulnerable (VU) and European Pond Turtle is classified as Near Threatened (NT) according to the IUCN Red List. The remaining species are categorized as Least Concern (LC) by the IUCN. Common Tortoise and Javelin Sand Boa are listed in CITES Annex II and European Pond Turtle is listed in CITES Annex III.

For the baseline collection of terrestrial mammal species during the spring and summer seasons of 2024, a total of 20 fieldwork days were conducted. Among the mammal species identified in the Project Area of Influence, 2 species are listed in Annex II, 7 species in Annex III of the Bern Convention. 3 species in Annex III and 1 Species Annex I of CITES. According to the IUCN Red List, no species in the area is classified as endangered. All species are classified as Least Concern (LC).

As a result of the literature review, a total of 2 regional endemic (*Digitalis trojana* and *Cirsium balikesirense*) plant species were identified. During the flora field studies, the target species selected for observation were not observed in the areas along the ETL route. These species were absent from the designated study areas. However, it is recommended to continue monitoring the target flora species for operation phase

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. Surveys revealed an unexpected discovery of a potential new minor migratory route for autumn migrants passing through inner Aegean utilizing those airspaces covered during VP surveys, demonstrating the importance of WPP biodiversity surveys for closing data gaps biodiversity literature in Türkiye. Though on a per turbine basis collision risk is not elevated, on an absolute basis the project contributes a high proportion of collision risk among the 9 WPPs for resident species. ETL segment with higher collision hazard was not identified. There are no additional recommendations than the previously identified mitigation and monitoring requirements for the project. Additional mitigation and monitoring approaches were recommended.

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 moderate levels of bat activity including threatened species. Caves and potential colonies associated with the T23 area warrant further investigation for enhancing baseline and clarifying mitigation measures. Additional mitigation and monitoring approaches were recommended for bat species.

1 Introduction

1.1 Project Background

Enerjisa Üretim Santralleri Anonim Şirketi has been awarded to invest in the Balıkesir 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.

Uygar Wind Power Plant (WPP) Project (“the Project”) with 60 turbines and 252 MWm/250 MWe total installed power, is planned to be implemented by Enerjisa Üretim in Balıkesir Province, Burhaniye and Savaştepe Districts, Haydar, İkizce, Büyükyenice and Taşdibi Neighbourhoods; İzmir Province, Bergama District, Oruçlar, Ürkütler, Yukarıada, İneşir, Alhatlı, Durmuşlar, Çamoba and Kozluca Neighbourhoods; Manisa Province, Soma District, Kiraz Neighbourhood. 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 Region of western Türkiye; aiming to harness the wind energy potential of the region. The Project will consist of 60 wind turbines with unit power of 4.2 MWm/4.167 MWe together with two switchyards, an administrative building, access and site roads, an internal Energy Transmission Line (ETL) to connect the switchyards and as well as an energy transmission line (ETL) as a Project associate 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 baseline 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, and (3) provide clarifications with regards to implementation of mitigation hierarchy. The

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

supplementary biodiversity surveys cover the period between March 2024 and November 2024, which represents three seasons, spring, summer, and autumn. The Final Report provides all available field findings, results, data analysis and conclusions obtained from the supplementary biodiversity surveys for the Project.

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 areas, with research and seed collection efforts directed towards the target plant species found within these designated areas.

- 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 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/

Field Studies:

- Field studies were conducted in areas that were not surveyed previously, specifically in areas where target species could potentially be observed. The flora studies, as a supplementary component, have been primarily concentrated on the ETL and access road areas, while turbine locations may be considered but are not the primary focus 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, first of all Flora of Turkey and the East Aegean Islands, as well as the digital version of the Flora of Turkey (Tübives) and other references 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 in June, July and September. Seed collection was conducted in the months of June, July and September. These activities were performed as part of the planned conservation and management efforts to ensure the successful preservation of the target species.

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 determined by considering all components and aspects of the Project, including land preparation, excavation works, installation and construction, transportation, energy production activities, any solid/liquid waste, 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)

Survey Point			Transect			
Station No	Survey Point	Nearest Project Element	Transect No	Transect Start Location	Transect End Location	Nearest Project Element
1	39°21'46.20"N - 27°24'1.77"E	ETL - Switch Yard	1	39°21'50.88"N - 27°23'57.79"E	39°21'37.46"N - 27°24'19.36"E	ETL - Switch Yard - Flora Target Species
2	39°21'26.76"N - 27°24'39.78"E	ETL - T33 - T34	2	39°21'35.00"N - 27°24'36.44"E	39°21'18.56"N - 27°24'20.96"E	ETL - T33 - T34 - Flora Target Species
3	39°21'7.97"N - 27°24'22.04"E	ETL - T34 - T35	3	39°21'12.75"N - 27°24'30.14"E	39°20'54.17"N - 27°24'26.84"E	ETL - T34 - T35
4	39°20'44.35"N - 27°24'36.50"E	ETL - T35	4	39°20'48.18"N - 27°24'28.59"E	39°20'29.88"N - 27°24'37.84"E	ETL - T35
5	39°20'21.20"N - 27°24'25.20"E	ETL	5	39°20'22.69"N - 27°24'35.29"E	39°20'7.08"N - 27°24'31.30"E	ETL

6	39°19'54.06"N - 27°24'20.74"E	ETL	6	39°19'59.11"N - 27°24'27.85"E	39°19'36.50"N - 27°24'22.85"E	ETL
7	39°19'29.58"N - 27°24'33.10"E	ETL	7	39°19'37.26"N - 27°24'35.62"E	39°19'14.86"N - 27°24'27.03"E	ETL
8	39°19'8.18"N - 27°24'35.03"E	ETL	8	39°19'12.45"N - 27°24'33.54"E	39°18'52.27"N - 27°24'21.19"E	ETL
9	39°18'42.79"N - 27°24'13.34"E	ETL	9	39°18'47.26"N - 27°24'21.59"E	39°18'27.15"N - 27°24'16.35"E	ETL
10	39°18'21.79"N - 27°24'7.79"E	ETL - T36	10	39°18'22.31"N - 27°24'5.37"E	39°18'14.65"N - 27°24'26.42"E	ETL - T36
11	39°17'56.60"N - 27°24'32.59"E	ETL - T37	11	39°18'3.46"N - 27°24'27.82"E	39°17'32.84"N - 27°24'29.50"E	ETL - T37
12	39°17'18.76"N - 27°24'13.59"E	ETL	12	39°17'19.67"N - 27°24'23.06"E	39°17'3.29"N - 27°24'3.63"E	ETL - T40
13	39°16'55.90"N - 27°24'2.15"E	ETL - T40	13	39°16'56.58"N - 27°24'5.27"E	39°16'36.26"N - 27°23'59.45"E	ETL - T40
14	39°16'30.98"N - 27°24'0.78"E	ETL	14	39°16'31.23"N - 27°24'0.45"E	39°16'10.36"N - 27°24'13.52"E	ETL - T43
15	39°16'7.44"N - 27°24'9.73"E	ETL - Switch Yard	15	39°16'7.44"N - 27°24'9.73"E	39°15'48.32"N - 27°24'12.90"E	ETL - Switch Yard
16	39°15'48.66"N - 27°24'27.15"E	ETL - Switch Yard - T54	16	39°15'52.88"N - 27°24'23.82"E	39°15'31.89"N - 27°24'33.21"E	ETL - Switch Yard - T54
17	39°15'37.51"N - 27°24'58.59"E	ETL - T55	17	39°15'46.60"N - 27°24'47.67"E	39°15'30.04"N - 27°24'56.24"E	ETL - T55
18	39°14'56.06"N - 27°25'15.01"E	ETL	18	39°14'56.06"N - 27°25'15.01"E	39°14'44.20"N - 27°25'23.91"E	ETL
19	39°14'8.71"N - 27°25'26.94"E	ETL	19	39°14'16.79"N - 27°25'27.14"E	39°13'47.38"N - 27°25'34.85"E	ETL
20	39°13'44.41"N - 27°25'34.30"E	ETL	20	39°13'44.41"N - 27°25'34.30"E	39°13'14.41"N - 27°25'36.51"E	ETL
21	39°13'11.41"N - 27°25'29.55"E	ETL	21	39°13'11.41"N - 27°25'29.55"E	39°12'41.57"N - 27°25'33.76"E	ETL
22	39°12'25.86"N - 27°25'49.15"E	ETL	22	39°12'25.86"N - 27°25'49.15"E	39°11'54.99"N - 27°25'43.25"E	ETL
23	39°11'36.37"N - 27°25'41.01"E	ETL	23	39°11'42.02"N - 27°25'42.43"E	39°11'18.93"N - 27°26'1.68"E	ETL
24	39°11'5.93"N - 27°26'27.71"E	ETL	24	39°11'12.20"N - 27°26'37.28"E	39°10'41.45"N - 27°26'29.55"E	ETL
25	39°10'27.17"N - 27°27'19.63"E	ETL	25	39°10'37.61"N - 27°26'59.09"E	39°10'29.65"N - 27°27'30.98"E	ETL
26	39°10'25.23"N - 27°28'6.00"E	ETL	26	39°10'24.78"N - 27°27'42.46"E	39°10'31.93"N - 27°28'19.84"E	ETL
			27	39°24'43.32"N - 27°21'30.20"E	39°25'54.66"N - 27°21'6.17"E	Target Species
			28	39°23'15.15"N - 27°22'19.69"E	39°23'35.37"N - 27°21'8.57"E	Target Species

	29	39°22'16.93"N - 27°23'52.67"E	39°21'56.83"N - 27°24'52.73"E	Target Species
	30	39°21'15.04"N - 27°24'40.30"E	39°21'57.21"N - 27°25'32.84"E	Target Species

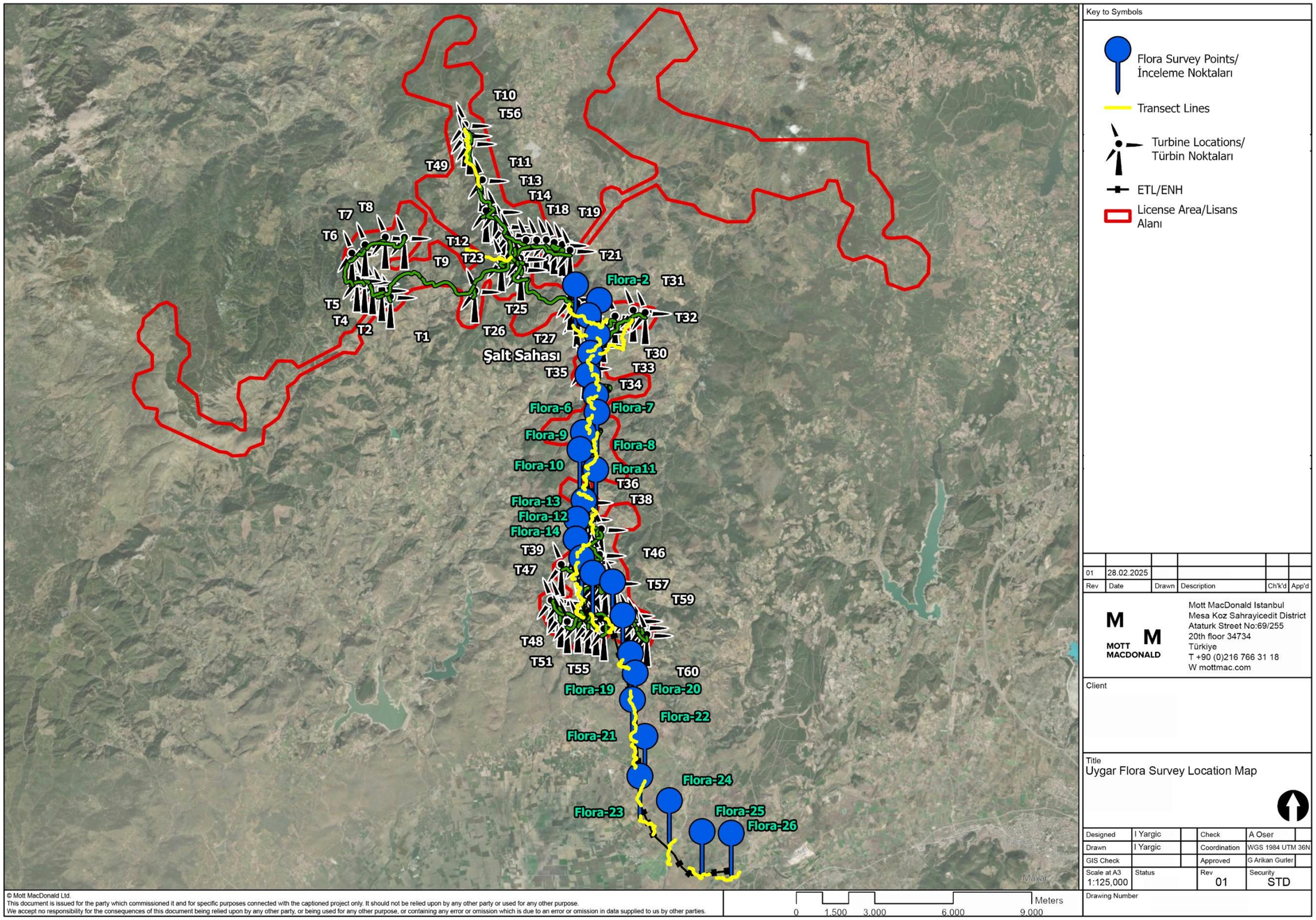


Figure 3-1 Flora Survey Location Map

3.2 Terrestrial Mammal

3.2.1 Terrestrial Mammal Methodology

In order to reveal the terrestrial mammal 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 terrestrial 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 terrestrial mammal 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 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 May 2024.

3.2.2 Field Schedule

A total of 20 days of survey was conducted in 2024 during the active season (April and May) 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 terrestrial mammal diversity within the scope of the Project, the boundaries of the study area were first defined. The study area was determined by considering all components and aspects of the Project, including land preparation, excavation works, installation and construction, transportation, energy production activities, any solid/liquid waste, dust, air emissions, noise, electromagnetic impacts, and the environmental effects and spread distances of any 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	39°21'41.21"N - 27°24'21.48"E	ETL - Switch Yard -T29 - T33	1	39°21'46.84"N - 27°24'32.99"E	39°21'27.19"N - 27°24'33.06"E	ETL - Switch Yard -T29 - T33 - T34
2	39°21'9.55"N - 27°24'18.53"E	ETL - T34 - T35	2	39°21'23.66"N - 27°24'30.14"E	39°21'0.85"N - 27°24'20.43"E	ETL - T34 - T35
3	39°20'32.15"N - 27°24'34.10"E	ETL	3	39°20'48.15"N - 27°24'29.66"E	39°20'19.09"N - 27°24'24.12"E	ETL
4	39°19'52.41"N - 27°24'16.92"E	ETL	4	39°20'2.45"N - 27°24'27.19"E	39°19'36.52"N - 27°24'30.81"E	ETL
5	39°19'25.12"N - 27°24'28.52"E	ETL	5	39°19'33.58"N - 27°24'33.01"E	39°19'1.71"N - 27°24'27.58"E	ETL
6	39°19'4.58"N - 27°24'16.60"E	ETL	6	39°19'5.28"N - 27°24'21.77"E	39°18'26.68"N - 27°24'20.16"E	ETL
7	39°18'25.47"N - 27°24'6.10"E	ETL	7	39°18'30.76"N - 27°24'7.41"E	39°18'11.99"N - 27°24'35.55"E	ETL
8	39°17'49.48"N - 27°24'38.83"E	ETL - T37 - T38	8	39°17'59.45"N - 27°24'46.46"E	39°17'36.15"N - 27°24'24.71"E	ETL - T37 - T38
9	39°17'31.66"N - 27°24'25.18"E	ETL - T27 - T38	9	39°17'34.86"N - 27°24'25.77"E	39°17'21.94"N - 27°24'16.11"E	ETL - T27 - T38
10	39°17'19.62"N - 27°24'9.20"E	ETL	10	39°17'20.26"N - 27°24'15.31"E	39°16'58.63"N - 27°24'3.52"E	ETL - T40
11	39°16'57.62"N - 27°23'49.16"E	ETL - T39 - T40	11	39°17'0.82"N - 27°23'46.99"E	39°16'32.11"N - 27°23'59.64"E	ETL - T39 - T40
12	39°16'19.37"N - 27°23'55.97"E	ETL - T43	12	39°16'26.53"N - 27°23'55.23"E	39°16'7.03"N - 27°24'7.51"E	ETL - Switch yard - T43

13	39°15'59.12"N - 27°24'34.03"E	ETL - Switch Yard	13	39°15'56.94"N - 27°24'22.48"E	39°15'40.05"N - 27°24'53.58"E	ETL - Switch Yard - T53 - T54
14	39°15'42.51"N - 27°25'13.47"E	ETL - T57 - T58	14	39°15'49.81"N - 27°25'10.50"E	39°15'13.71"N - 27°25'4.83"E	ETL - T57 - T58
15	39°15'7.22"N - 27°25'12.48"E	ETL	15	39°15'11.26"N - 27°25'22.42"E	39°14'46.58"N - 27°25'19.24"E	ETL
16	39°14'42.36"N - 27°24'55.53"E	ETL	16	39°14'46.70"N - 27°24'58.76"E	39°14'27.19"N - 27°25'13.99"E	ETL
17	39°14'20.49"N - 27°25'27.23"E	ETL	17	39°14'27.80"N - 27°25'27.81"E	39°13'56.62"N - 27°25'33.32"E	ETL
18	39°13'47.47"N - 27°25'48.12"E	ETL	18	39°14'5.85"N - 27°25'41.71"E	39°13'47.44"N - 27°26'4.36"E	ETL
19	39°13'28.24"N - 27°25'50.73"E	ETL	19	39°13'41.64"N - 27°25'39.83"E	39°13'20.01"N - 27°25'59.38"E	ETL
20	39°10'20.82"N - 27°28'6.29"E	ETL	20	39°10'30.84"N - 27°27'47.72"E	39°10'22.01"N - 27°28'1.01"E	ETL
			21	39°22'2.19"N - 27°23'50.64"E	39°21'53.61"N - 27°23'58.20"E	Switch Yard - ETL
			22	39°12'55.63"N - 27°25'34.53"E	39°12'32.50"N - 27°25'42.02"E	ETL
			23	39°12'18.49"N - 27°25'44.42"E	39°11'36.31"N - 27°25'53.33"E	ETL
			24	39°11'15.24"N - 27°26'7.72"E	39°10'40.34"N - 27°26'47.23"E	ETL
			25	39°10'31.77"N - 27°26'59.59"E	39°10'30.11"N - 27°27'43.02"E	ETL

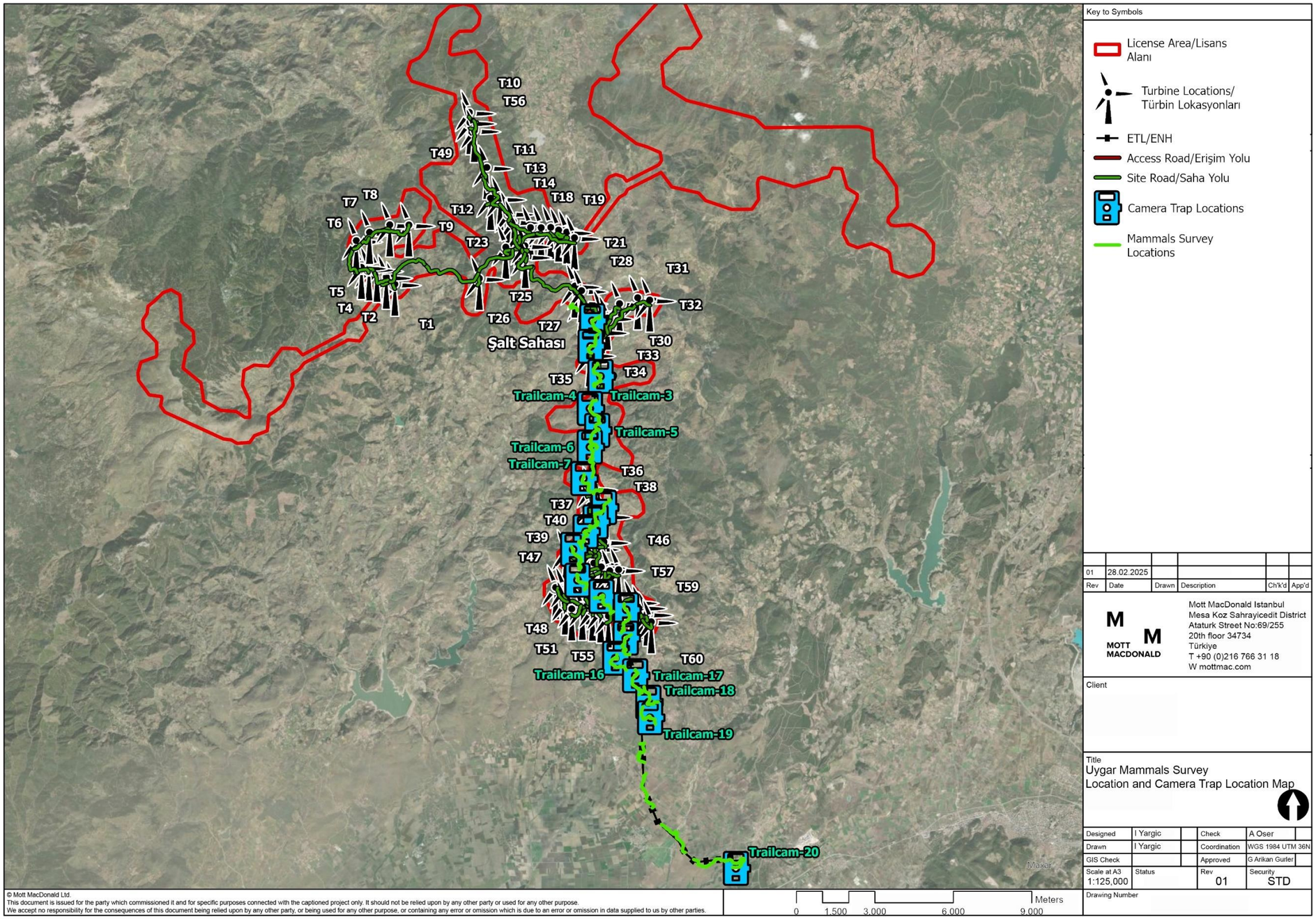


Figure 3-2 Terrestrial Mammal Camera Trap and Transect Survey Locations

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.

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 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 25 stations and 25 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 Field Schedule

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 determined by considering all components and aspects of the Project, including land preparation, excavation works,

installation and construction, transportation, energy production activities, any solid/liquid waste, dust, air emissions, noise, electromagnetic impacts, and the environmental effects and spread distances of any emissions. (See Table 3-3 and Figure 3-3)

Table 3-3 Herpetofauna Survey Locations

Survey Point			Transect			
Station No	Survey Point	Nearest Project Element	Transect No	Transect Start Location	Transect End Location	Nearest Project Element
1	39°21'46.20"N - 27°24'1.77"E	ETL - Switch Yard	1	39°21'50.08"N - 27°23'55.83"E	39°21'32.69"N - 27°24'30.71"E	ETL - Switch Yard - T29
2	39°21'26.76"N - 27°24'39.78"E	ETL - T33 - T34	2	39°21'34.08"N - 27°24'38.79"E	39°21'14.89"N - 27°24'30.25"E	ETL - T33 - T34
3	39°21'7.97"N - 27°24'22.04"E	ETL - T34 - T35	3	39°21'12.92"N - 27°24'27.44"E	39°20'48.32"N - 27°24'28.53"E	ETL - T34 - T35
4	39°20'44.35"N - 27°24'36.50"E	ETL - T35	4	39°20'46.44"N - 27°24'33.31"E	39°20'29.06"N - 27°24'27.95"E	ETL - T35
5	39°20'21.20"N - 27°24'25.20"E	ETL	5	39°20'23.33"N - 27°24'35.55"E	39°20'3.39"N - 27°24'30.21"E	ETL
6	39°19'54.06"N - 27°24'20.74"E	ETL	6	39°19'57.71"N - 27°24'27.81"E	39°19'33.66"N - 27°24'25.55"E	ETL
7	39°19'29.58"N - 27°24'33.10"E	ETL	7	39°19'31.17"N - 27°24'35.55"E	39°19'18.19"N - 27°24'28.51"E	ETL
8	39°19'8.18"N - 27°24'35.03"E	ETL	8	39°19'12.18"N - 27°24'33.30"E	39°18'55.82"N - 27°24'23.71"E	ETL
9	39°18'21.79"N - 27°24'7.79"E	ETL - T36	9	39°18'30.87"N - 27°24'9.02"E	39°18'12.47"N - 27°24'24.85"E	ETL - T36
10	39°17'56.60"N - 27°24'32.59"E	ETL	10	39°18'3.46"N - 27°24'27.82"E	39°17'32.84"N - 27°24'29.50"E	ETL - T37
11	39°17'18.76"N - 27°24'13.59"E	ETL	11	39°17'19.67"N - 27°24'23.06"E	39°17'3.29"N - 27°24'3.63"E	ETL - T40
12	39°16'55.90"N - 27°24'2.15"E	ETL - T40	12	39°16'56.58"N - 27°24'5.27"E	39°16'37.45"N - 27°23'56.30"E	ETL - T40
13	39°16'30.98"N - 27°24'0.78"E	ETL	13	39°16'31.23"N - 27°24'0.45"E	39°16'10.36"N - 27°24'13.52"E	ETL - T43
14	39°16'7.44"N - 27°24'9.73"E	ETL - Switch Yard	14	39°16'7.44"N - 27°24'9.73"E	39°15'48.32"N - 27°24'12.90"E	ETL - Switch Yard
15	39°15'48.66"N - 27°24'27.15"E	ETL - Switch Yard - T54	15	39°15'48.66"N - 27°24'27.15"E	39°15'31.66"N - 27°24'33.54"E	ETL - Switch Yard - T54
16	39°15'37.51"N - 27°24'58.59"E	ETL - T55	16	39°15'41.84"N - 27°24'53.50"E	39°15'30.23"N - 27°24'56.86"E	ETL - T55
17	39°14'56.06"N - 27°25'15.01"E	ETL	17	39°15'7.28"N - 27°25'12.41"E	39°14'46.11"N - 27°25'19.98"E	ETL
18	39°14'8.71"N - 27°25'26.94"E	ETL	18	39°14'16.79"N - 27°25'27.14"E	39°13'47.38"N - 27°25'34.85"E	ETL
19	39°13'44.41"N - 27°25'34.30"E	ETL	19	39°13'44.41"N - 27°25'34.30"E	39°13'14.41"N - 27°25'36.51"E	ETL

20	39°13'11.41"N - 27°25'29.55"E	ETL	20	39°13'11.41"N - 27°25'29.55"E	39°12'42.64"N - 27°25'38.71"E	ETL
21	39°12'25.86"N - 27°25'49.15"E	ETL	21	39°12'25.86"N - 27°25'49.15"E	39°11'54.99"N - 27°25'43.25"E	ETL
22	39°11'36.37"N - 27°25'41.01"E	ETL	22	39°11'42.02"N - 27°25'42.43"E	39°11'18.93"N - 27°26'1.68"E	ETL
23	39°11'5.93"N - 27°26'27.71"E	ETL	23	39°11'8.25"N - 27°26'21.41"E	39°10'44.63"N - 27°26'33.04"E	ETL
24	39°10'27.17"N - 27°27'19.63"E	ETL	24	39°10'34.63"N - 27°26'55.95"E	39°10'29.62"N - 27°27'31.34"E	ETL
25	39°10'25.23"N - 27°28'6.00"E	ETL	25	39°10'27.83"N - 27°27'48.12"E	39°10'36.65"N - 27°28'24.94"E	ETL

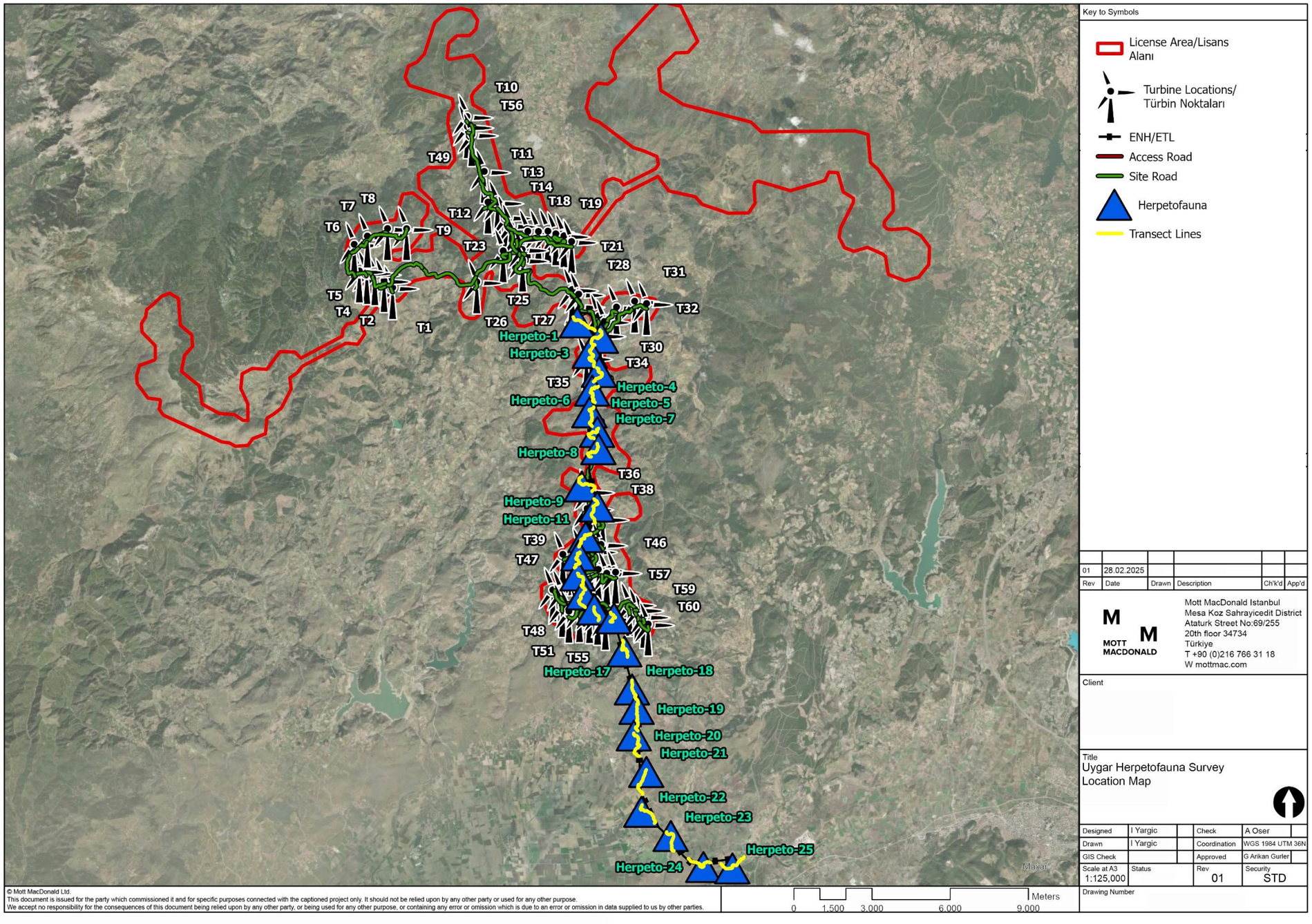


Figure 3-3 Transect and Point Survey Locations of Herpetofauna

3.4 Bird

As previously presented in the standalone methodology reports[2], 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. On the other hand, a short summary of minor changes to established methodologies based on field ground truthing are summarised below, and discussed in further detail under Section 3.4.1, 3.4.2 and 3.4.4

- Since the north external ETL (+100 km to Bayramiç, Çanakkale connection) was scoped out from the Project, bird studies covering this ETL were discontinued.
- VPs were renamed (numeration) for field surveyor convenience (see Section 3.4.1, and Section 3.4.2)
- VP1 was moved 700 m northwest, VP2 was moved 1 km south, VP4 was moved 2 km north based on ground truthing for improved visual coverage. Since sufficient coverage was achieved, the VP near T60 was removed (see Section 3.4.1).
- The VP at the southern end of the ETL was removed due to coverage within 5 km buffer within VP ETL6. Visual coverage of the ETL within 2km exceeds 70%. (see 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 6.9).

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.

3.4.1.1 Vantage Point Field Schedule

During Spring of 2024, a total of 265 hours and 52 minutes of surveys were conducted across 7 vantage points (VP1, 2, 3, 4, 5, 6, 7) as presented Table 3-4. Week number of the year are denoted with Monday as first day. The surveys started in early April 2024 and continued until

[2] Uygar WPP Biodiversity Monitoring Methodology. Mott MacDonald. Issue date 28 March 2024.

mid-June 2024. On average, approximately 37 hours and 58 minutes of surveys were conducted per vantage point.

Table 3-4 VP survey effort and dates in spring.

Week	First Day	VP1	VP2	VP3	VP4	VP5	VP6	VP7	Total (h)
W15	08/04	12:50	9:40	7:07	7:40	7:22	13:45	11:50	70:14
W16	15/04	-	-	-	6:55	7:10	2:31	4:35	21:11
W19	06/05	-	-	-	6:47	7:16	13:10	12:46	39:59
W20	13/05	-	-	-	6:06	6:23	-	-	12:29
W21	20/05	13:25	12:20	11:37	-	-	-	-	37:22
W23	03/06	-	-	-	5:59	6:24	14:18	13:41	40:22
W24	10/06	11:23	9:55	8:58	6:44	7:15	-	-	44:15
Total	-	37:38	31:55	27:42	40:11	41:50	43:44	42:52	265:52

During Summer 2024, a total of 312 hours and 22 minutes of surveys were conducted across 7 vantage points (VP1, 2, 3, 4, 5, 6, 7) as presented in Table 3-5. Week number of the year are denoted with Monday as first day. The surveys started in early April and continued until mid-June. On average, approximately 44 hours and 37 minutes of surveys were conducted per vantage point.

Table 3-5 VP survey effort and dates in summer.

Week	First Day	VP1	VP2	VP3	VP4	VP5	VP6	VP7	Total (h)
W26	24/06	6:01	11:49	6:01	-	-	-	-	23:51
W27	01/07	-	6:24	6:01	-	-	-	-	12:25
W28	08/07	25:49	12:27	21:54	12:55	15:47	13:17	12:40	114:49
W30	22/07	-	-	-	7:32	7:48	15:13	14:50	45:23
W31	29/07	-	-	-	12:27	13:13	5:52	-	31:32
W32	05/08	-	-	-	-	-	7:43	7:30	15:13
W33	12/08	15:55	13:12	12:48	13:04	5:58	-	8:12	69:09
Total	-	47:45	43:52	46:44	45:58	42:46	42:05	43:12	312:22

During Autumn 2024, a total of 320 hours and 2 minutes of surveys were conducted across 7 vantage points (VP1, 2, 3, 4, 5, 6, 7) as presented in Table 3-6. Week number of the year are denoted with Monday as first day. The surveys started in the beginning of September and continued until mid- November. On average, approximately 45 hours and 40 minutes of surveys were conducted per vantage point.

Table 3-6 VP survey effort and dates in autumn.

Week	First Day	VP1	VP2	VP3	VP4	VP5	VP6	VP7	Total (h)
W36	02/09	15:49	14:04	12:50	13:34	14:08	15:28	14:54	100:47
W38	16/09	-	-	-	-	-	15:35	15:02	30:37
W39	23/09	-	-	-	13:08	13:29	-	-	26:37
W40	30/09	5:11	4:47	4:25	-	-	-	-	14:23
W41	07/10	8:17	8:07	7:45	-	-	-	-	24:09
W42	14/10	-	-	-	13:22	14:00	15:28	14:55	57:45
W44	28/10	6:53	7:58	8:13	5:21	5:34	-	-	33:59
W45	04/11	6:25	7:13	7:23	-	-	5:30	5:14	31:45
Total	-	42:35	42:09	40:36	45:25	47:11	52:01	50:05	320:02

3.4.1.2 VP Locations

7 VPs are used for the best visual coverage of the turbine areas. Locations of the VPs are shown on Figure 3-4 and Figure 3-5, 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	526437	4358998
VP2	531001	4362682
VP3	532078	4360180
VP4	534586	4357963
VP5	536290	4356244
VP6	535008	4347992
VP7	535139	4346007

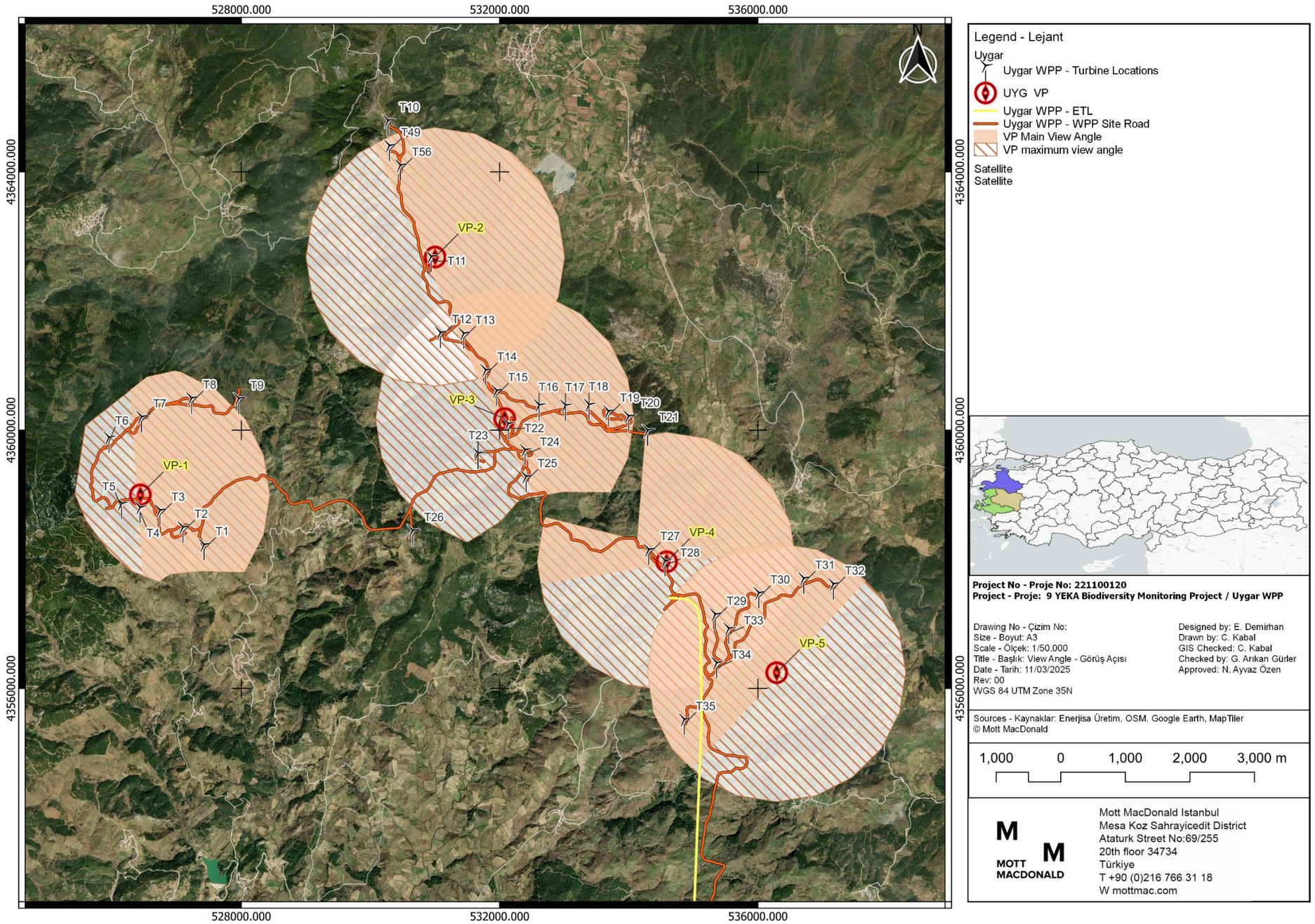


Figure 3-4 Locations of the VPs (north)

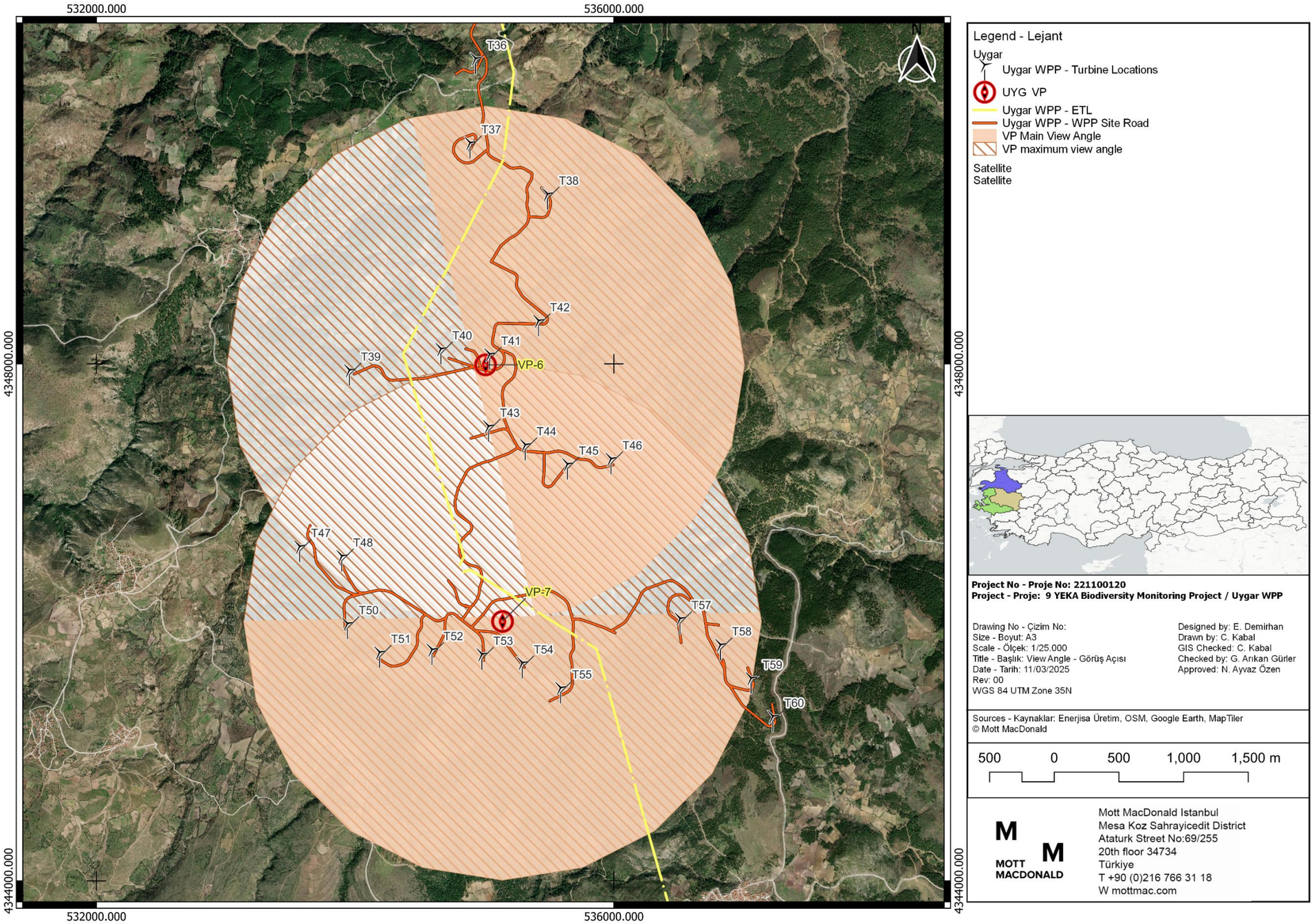


Figure 3-5 Locations of the VPs (south)

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.

Energy transmission line (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, 6 vantage points (VP ETLs) were thoughtfully selected, and observations were conducted at these points. 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.

3.4.2.1 ETL Observation Field Schedule

A total of 252 hours and 6 minutes of surveys were conducted during the spring of 2024, starting on 8 April 2024 and finishing on 15 June 2024. The surveys were carried out at 6 transmission line points (VP ETL1, 2, 3, 4, 5, 6). On average, approximately 42 hours of surveys were conducted per VP ETL as shown in Table 3-8.

Table 3-8 ETL survey effort and dates

Week	First Day	VP ETL1	VP ETL2	VP ETL3	VP ETL4	VP ETL5	VP ETL6	Total
W15	08/04	11:50	13:45	7:20	7:40	-	-	40:35
W16	15/04	4:35	-	7:10	6:55	14:50	7:34	41:04
W19	06/05	12:46	13:10	7:16	6:47	8:10	14:59	63:08
W20	13/05	-	-	6:23	6:06	7:18	-	19:47
W23	03/06	13:41	14:18	6:24	5:59	8:34	16:45	65:41
W24	10/06	-	-	7:15	6:44	7:52	-	21:51
Total	-	42:52	41:13	41:48	40:11	46:44	39:18	252:06

A total of 264 hours and 36 minutes of surveys were conducted during the summer of 2024, starting on 16 June, and finishing on 31 August. The surveys were carried out at 6 transmission line points (VP ETL1, 2, 3, 4, 5, 6).On average, approximately 44 hours and 8 minutes was conducted per vantage point (VP ETL) as shown in Table 3-9.

Table 3-9 ETL survey effort and dates in summer

Week	First Day	VP ETL1	VP ETL2	VP ETL3	VP ETL4	VP ETL 5	VP ETL6	Total
W28	08/07	12:40	13:17	15:47	12:55	17:59	15:35	88:13

Week	First Day	VP ETL1	VP ETL2	VP ETL3	VP ETL4	VP ETL 5	VP ETL6	Total
W30	22/07	14:50	15:13	7:48	7:32	8:21	16:43	70:27
W31	29/07	-	5:52	13:13	12:27	8:13	-	39:45
W32	05/08	7:30	7:43	-	-	-	8:28	23:41
W33	12/08	8:12	-	5:58	13:04	6:19	8:57	42:30
Total	-	43:12	42:05	42:46	45:58	40:52	49:43	264:36

A total of 295 hours and 23 minutes of surveys were conducted during the autumn of 2024, starting on 1 September, and finishing on 15 November. The surveys were carried out at 6 transmission line points (VP ETL1, 2, 3, 4, 5, 6). On average, approximately 49 hours and 13 minutes was conducted per vantage point (VP ETL) as shown in Table 3-10.

Table 3-10 ETL survey effort and dates in autumn

Week	First Day	VP ETL1	VP ETL2	VP ETL3	VP ETL4	VP ETL5	VP ETL6	Total
W36	02/09	14:54	15:28	14:08	13:34	15:01	16:34	89:39
W38	16/09	15:02	15:35	-	-	-	16:57	47:34
W39	23/09	-	-	13:29	13:08	14:20	-	40:57
W42	14/10	14:55	15:28	14:00	13:22	14:35	16:54	89:14
W44	28/10	-	-	5:34	5:21	-	-	10:55
W45	04/11	5:14	5:30	-	-	-	6:20	17:04
Total	-	50:05	52:01	47:11	45:25	43:56	56:45	295:23

3.4.2.2 ETL Observation Locations

3 VPs are used for the best visual coverage of the turbine areas. Locations of the ETL VPs are shown on Figure 3-6 and on Figure 3-7. Coordinates of the ETL VPs are provided in Table 3-11.

Table 3-11 Locations of the VPs (WGS 84 UTM 35N)

VP	Easting	Northing
VP ETL1	535139	4346007
VP ETL2	535008	4347992
VP ETL3	536290	4356244
VP ETL4	534586	4357963
VP ETL5	535234	4351965
VP ETL6	537746	4341374

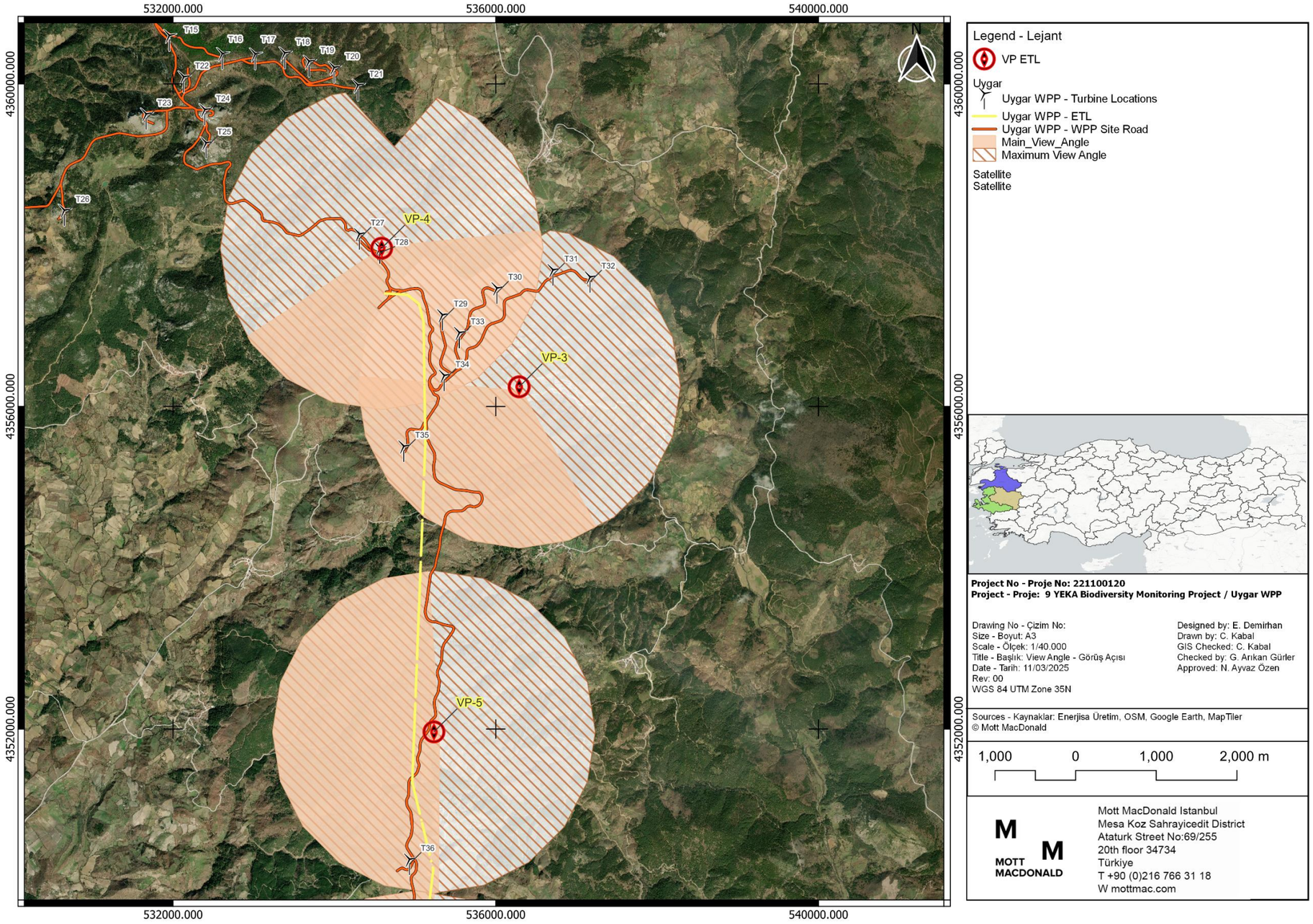


Figure 3-6 Locations of the ETL VPs (north)

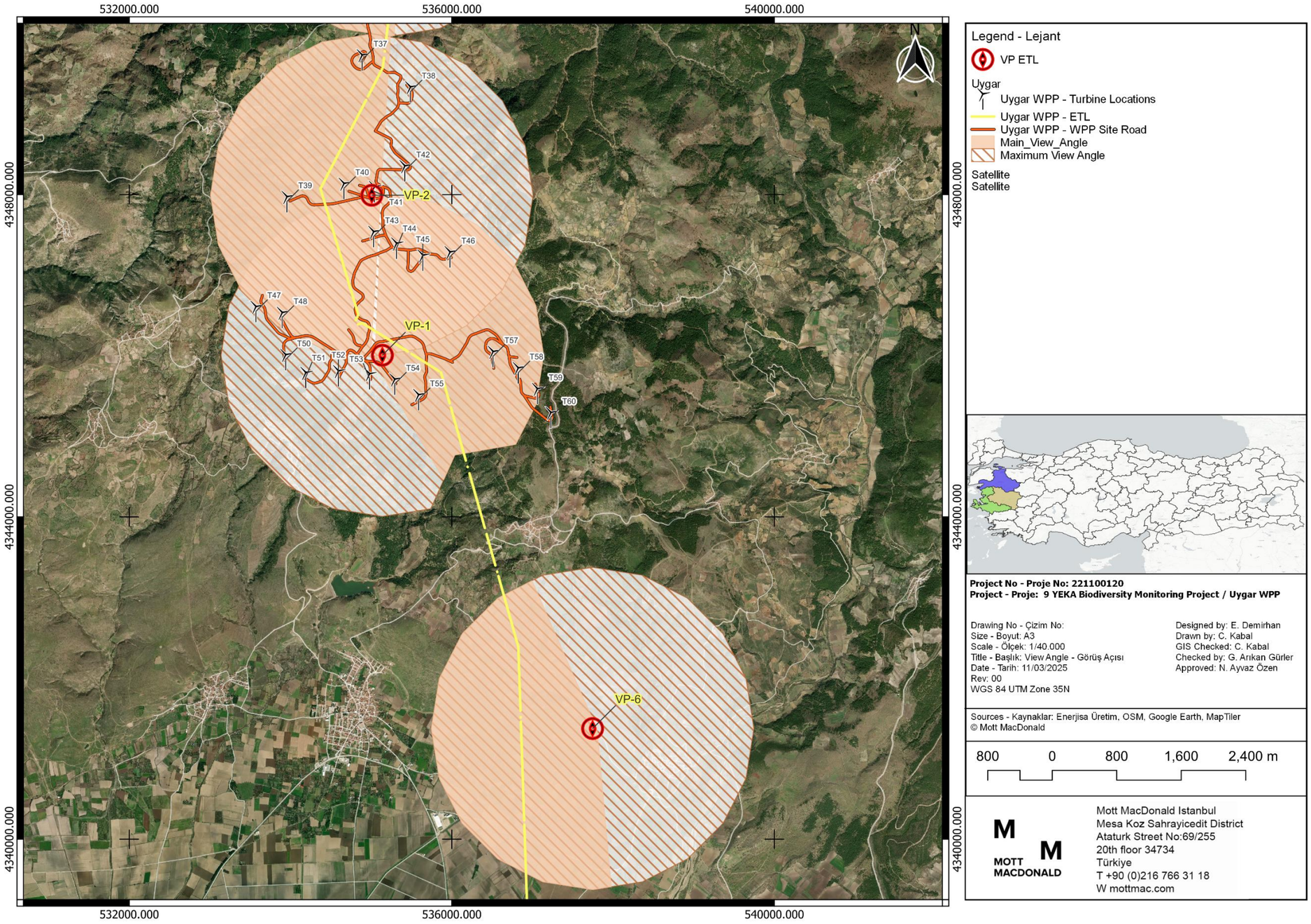


Figure 3-7 Locations of the ETL VPs (south)

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.

3.4.3.1 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: $A = N \times \pi R2$ 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)

3.4.3.2 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[3]). Breeding bird surveys were conducted for early and late breeding seasons at the Wind Farm. These surveys utilized both line transect (VPs) and points counts (VP ETLs) methods. For the line transect method, transects were selected adjacent to vantage points. Observers walked along these transect lines, recording each potential breeding bird observed, along with the species and the highest level of breeding code for each bird species as given in Table 3-12. For the point count method, observers recorded each potential breeding bird observed at VP and VP ETL points during bird monitoring surveys, along with the species and the highest level of breeding code for each bird species.

[3] https://ebba2.info/

Table 3-12 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
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

3.4.4.1 Breeding Bird Field Schedule and Locations

During the breeding bird surveys, a total of 5 transect walks were conducted (Figure 3-8, Figure 3-9, Figure 3-10) in April and June 2024 (Table 3-13). The walks lasted an average of 58.6 minutes and covered 1.2 km. Most walks were conducted at around 09:00 in the morning.

In addition, bird sighting data collated from all VPs and VP ETLs between March and June 2024 were used for additional data points on breeding birds.

Table 3-13 Breeding bird survey dates and nearest VPs.

Transect Location	Date	Month	Time	Duration (min)	Distance (km)
UYG-VP4(VP ETL4)	13/04	Apr	09:49:00	65	0
UYG-VP5(VP ETL3)	13/04	Apr	09:57:00	60	1
UYG-VP1	13/04	Apr	09:59:00	72	1
UYG-VP3	13/04	Apr	10:50:00	64	1
UYG-VP2	13/04	Apr	10:54:00	59	1
UYG-VP6(VP ETL2)	14/04	Apr	08:45:00	85	1
UYG-VP7(VP ETL1)	14/04	Apr	09:01:00	60	1
UYG-VP7(VP ETL1)	14/04	Apr	10:13:00	60	1
UYG-VP ETL5	15/04	Apr	09:02:00	63	0
UYG-VP ETL6	16/04	Apr	08:55:00	65	1
UYG-VP1	21/05	May	09:20:00	63	1
UYG-VP2	21/05	May	10:16:00	70	2

Transect Location	Date	Month	Time	Duration (min)	Distance (km)
UYG-VP3	21/05	May	10:20:00	60	1
UYG-VP6(VP ETL2)	07/06	Jun	09:21:00	60	0
UYG-VP7(VP ETL1)	07/06	Jun	09:30:00	60	1
UYG-VP5(VP ETL3)	09/06	Jun	09:59:00	62	2
UYG-VP4(TL4)	09/06	Jun	10:15:00	60	1

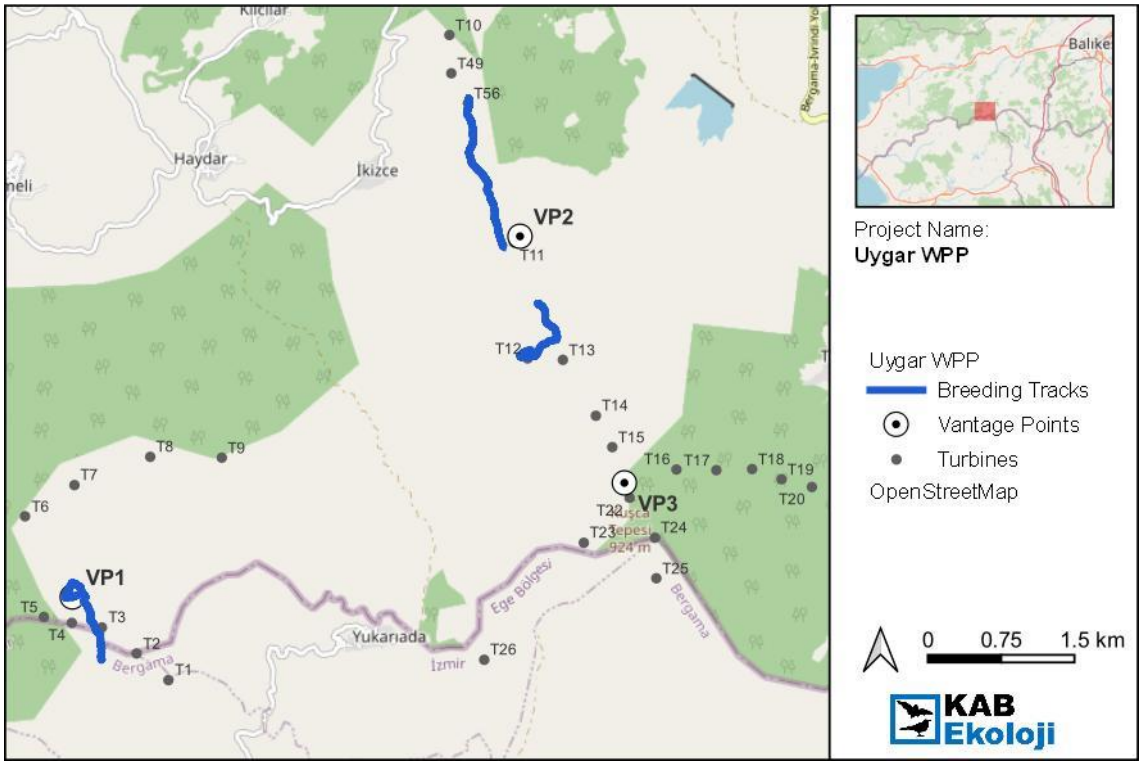


Figure 3-8 Line transects used for breeding surveys at the project site VP1, VP2 and VP3

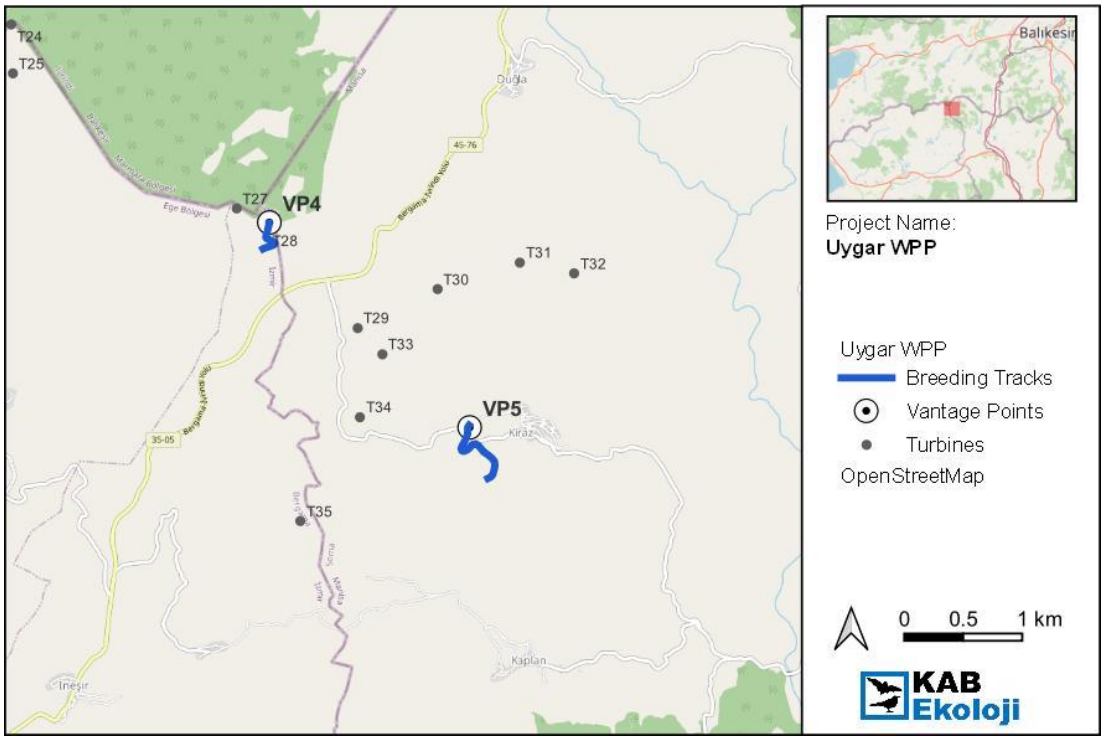


Figure 3-9 Line transects used for breeding surveys at the project site – VP4 and VP5

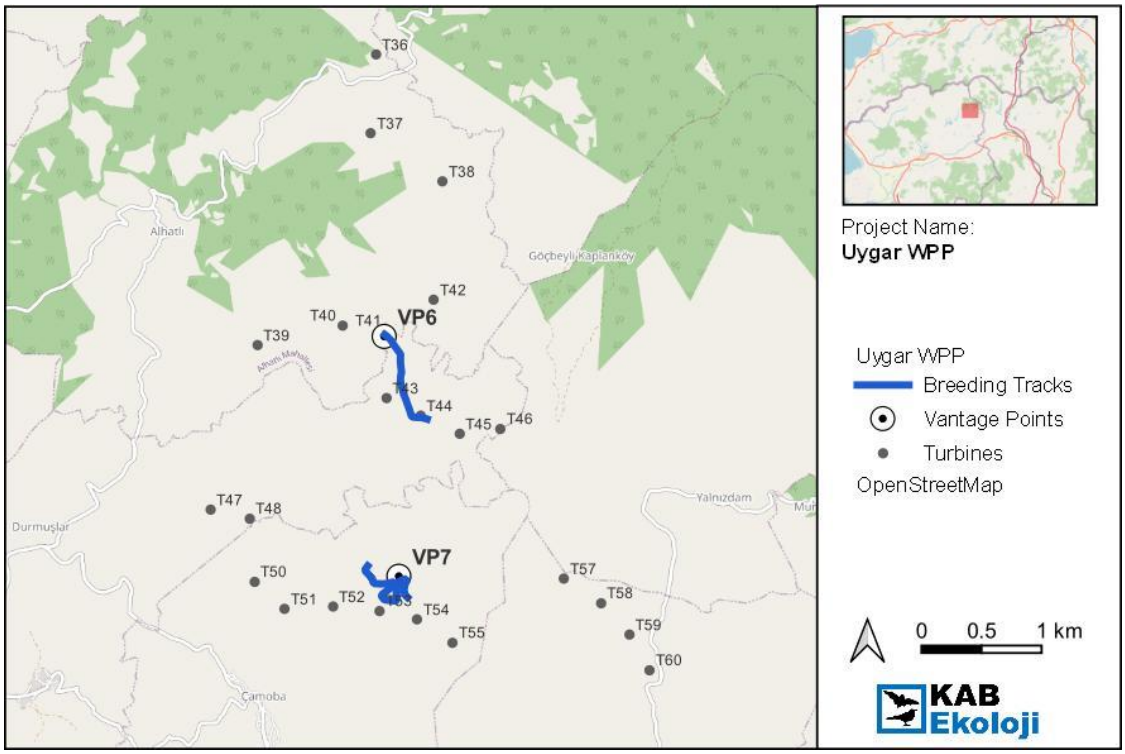


Figure 3-10 Line transects used for breeding surveys at the project site – VP6 and VP7

3.5 Bat

No major changes to the established bat methodology were made. Some data loss occured due to device failures of unknown causes. Despite device recording failures 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 4-36, summer in Table 4-42 and autumn in Table 4-48. 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 site. For static surveys, 30 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 site, 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 3-11). 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.

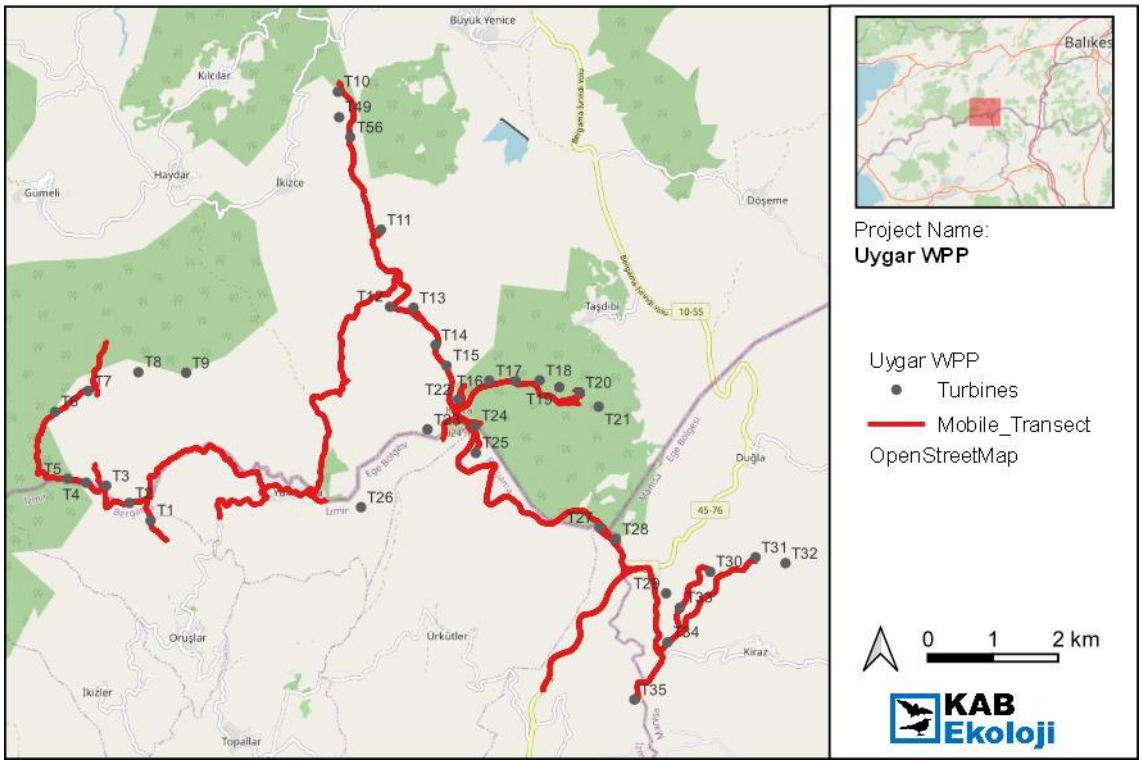
3.5.2 Acoustic Analysis Methodology

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.



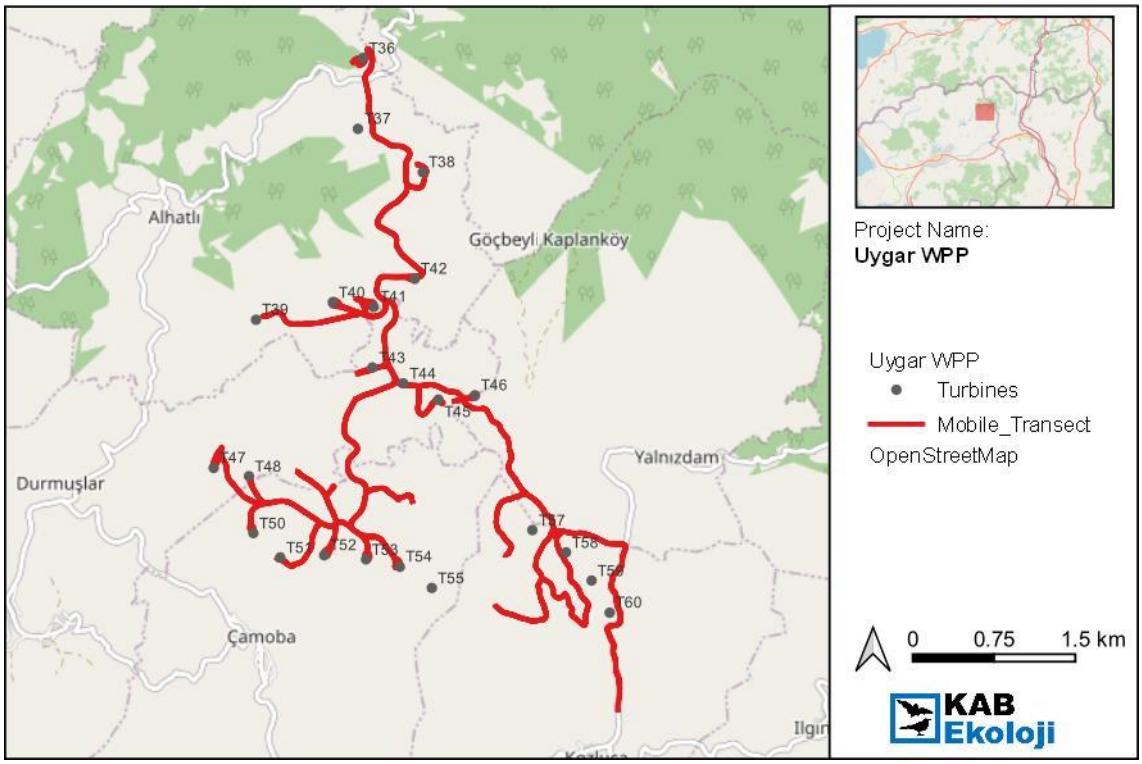


Figure 3-11 Transect survey route at the project

3.5.3 Field Schedule

A set of static and transect acoustic bat surveys were conducted (Table 3-14). Weather conditions during surveys are given in

Table 3-15. When checking the weather conditions, the temperature varied between 13 and 22 degrees Celsius, and the wind speed was consistently less than 5-6 m/s throughout the nights. Overall, the survey conditions were favourable and should yield reliable results.

Table 3-14 Acoustic bat surveys for 2024 spring, summer, and autumn season.

Survey Season	Start Date	Finish Date	Number of Nights
Spring Static Surveys	21 May	3 June	10 nights
Spring Transect Survey 1	26 May	26 May	1 night
Spring Transect Survey 2	27 May	27 May	1 night
Spring Transect Survey 3	28 May	28 May	1 night
Spring Transect Survey 4	29 May	29 May	1 night
Spring Transect Survey 5	30 May	30 May	1 night
Spring Transect Survey 6	31 May	31 May	1 night
Summer Static Surveys	29 August	9 September	10 nights
Summer Transect Survey 1	29 August	29 August	1 night
Summer Transect Survey 2	30 August	30 August	1 night
Summer Transect Survey 3	31 August	31 August	1 night
Summer Transect Survey 4	1 September	1 September	1 night
Summer Transect Survey 5	2 September	2 September	1 night
Summer Transect Survey 6	3 September	3 September	1 night
Autumn Static Surveys	14 October	25 October	10 nights
Autumn Transect Survey 1	15 October	15 October	1 night
Autumn Transect Survey 2	16 October	16 October	1 night
Autumn Transect Survey 3	17 October	17 October	1 night
Autumn Transect Survey 4	18 October	18 October	1 night
Autumn Transect Survey 5	19 October	19 October	1 night
Autumn Transect Survey 6	20 October	20 October	1 night
Autumn Transect Survey 7	21 October	21 October	1 night
Autumn Transect Survey 8	22 October	22 October	1 night

Table 3-15 Weather conditions during the surveys.

Date	Temperature (°C)	Wind Speed (m/s)	Cloud cover %	Precipitation (mm)
2024-05-21	16	3	0	0
2024-05-22	17	2	10	0
2024-05-23	18	1	10	0
2024-05-24	14	2	20	0
2024-05-25	16	2	20	0
2024-05-26	15	5	20	0
2024-05-27	13	6	30	0
2024-05-28	13	3	10	0
2024-05-29	14	1	0	0
2024-05-30	14	1	0	0
2024-05-31	17	1	30	0
2024-06-01	16	1	0	0
2024-06-02	18	2	0	0
2024-06-03	22	2	0	0
2024-08-29	23	2	0	0
2024-08-30	22	2	0	0
2024-08-31	22	3	10	0
2024-09-01	21	3	40	0
2024-09-02	21	3	30	0
2024-09-03	20	2	20	0
2024-09-04	24	3	0	0
2024-09-05	23	4	0	0
2024-09-06	23	3	0	0
2024-09-07	23	3	0	0
2024-09-08	20	4	70	0
2024-09-09	19	4	10	0
2024-09-10	20	1	60	0
2024-10-14	13	4	20	0
2024-10-15	15	4	60	0
2024-10-16	15	4	0	0
2024-10-17	12	7	30	0
2024-10-18	9	5	20	0
2024-10-19	9	4	20	0
2024-10-20	10	4	0	0
2024-10-21	11	5	10	0
2024-10-22	10	4	10	0
2024-10-23	11	3	20	0
2024-10-24	12	4	10	0
2024-10-25	12	5	0	0

3.5.4 Survey Locations

Ground static bat detector locations (Sampling Point, SP) are provided in (Table 3-16). Please refer to Figure 3-12 and Figure 3-13 for the nearest turbines to each SP.

In planning the ground static acoustic SPs locations, sufficient representation of available habitats and coverage of the vast Project was aimed for. The acoustic bat baseline collection at Uygar WPP has become the largest and most detailed acoustic bat study at a WPP in Türkiye based on number of turbines covered, number of devices deployed, and number of consecutive nights recorded. While NatureScot prescribes a maximum of 40 devices for larger WPPs, due in part the inaccessibility of some parts of the Project, and uniformity of habitats at some other parts, 30 SPs were found to provide satisfactory representation of the habitat configurations of the Project. The study is much more detailed than the minimum acceptable standard as prescribed by EUROBATS guidelines.

Table 3-16 Ground static bat detector locations (WGS84 UTM35N)

SP	Easting	Northing
SP1	536702	4345901
SP2	537040	4345506
SP3	535674	4347193
SP4	536052	4347184
SP5	534818	4345663
SP6	534552	4346335
SP7	535690	4345508
SP8	535298	4347898
SP9	535036	4348360
SP10	535518	4349172
SP11	534819	4349583
SP12	534944	4350428
SP13	534120	4347893
SP14	535345	4356346
SP15	535231	4356865
SP16	535218	4357188
SP17	534614	4357940
SP18	534312	4358109
SP19	530622	4358392
SP20	527452	4358152
SP21	526508	4358722
SP22	525907	4359798
SP23	526406	4360154
SP24	526727	4358710
SP25	531938	4359641
SP26	532167	4360024
SP27	532603	4360294
SP28	531095	4361437
SP29	530940	4362616
SP30	530945	4362614

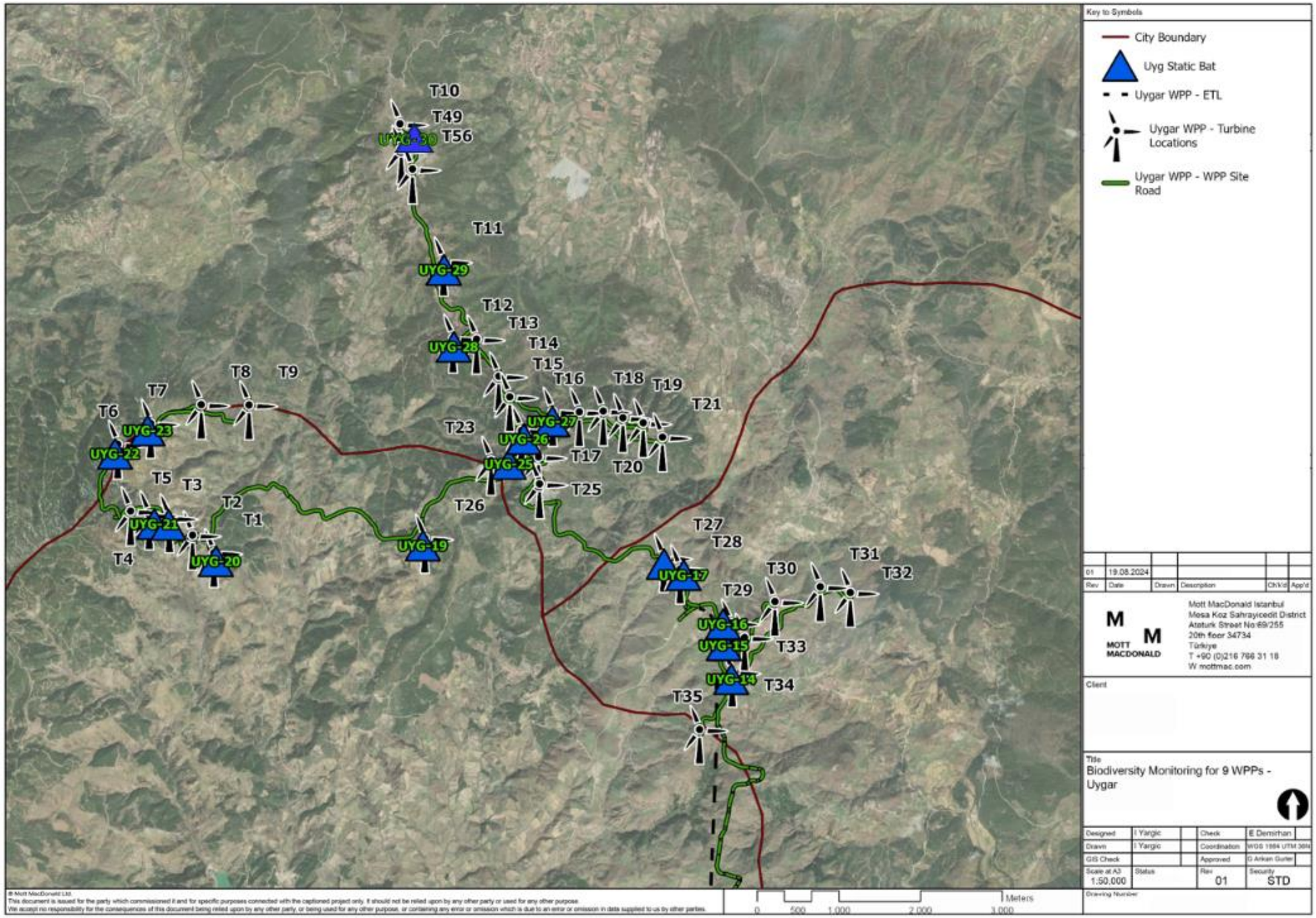


Figure 3-12 Ground static bat detector locations (north)

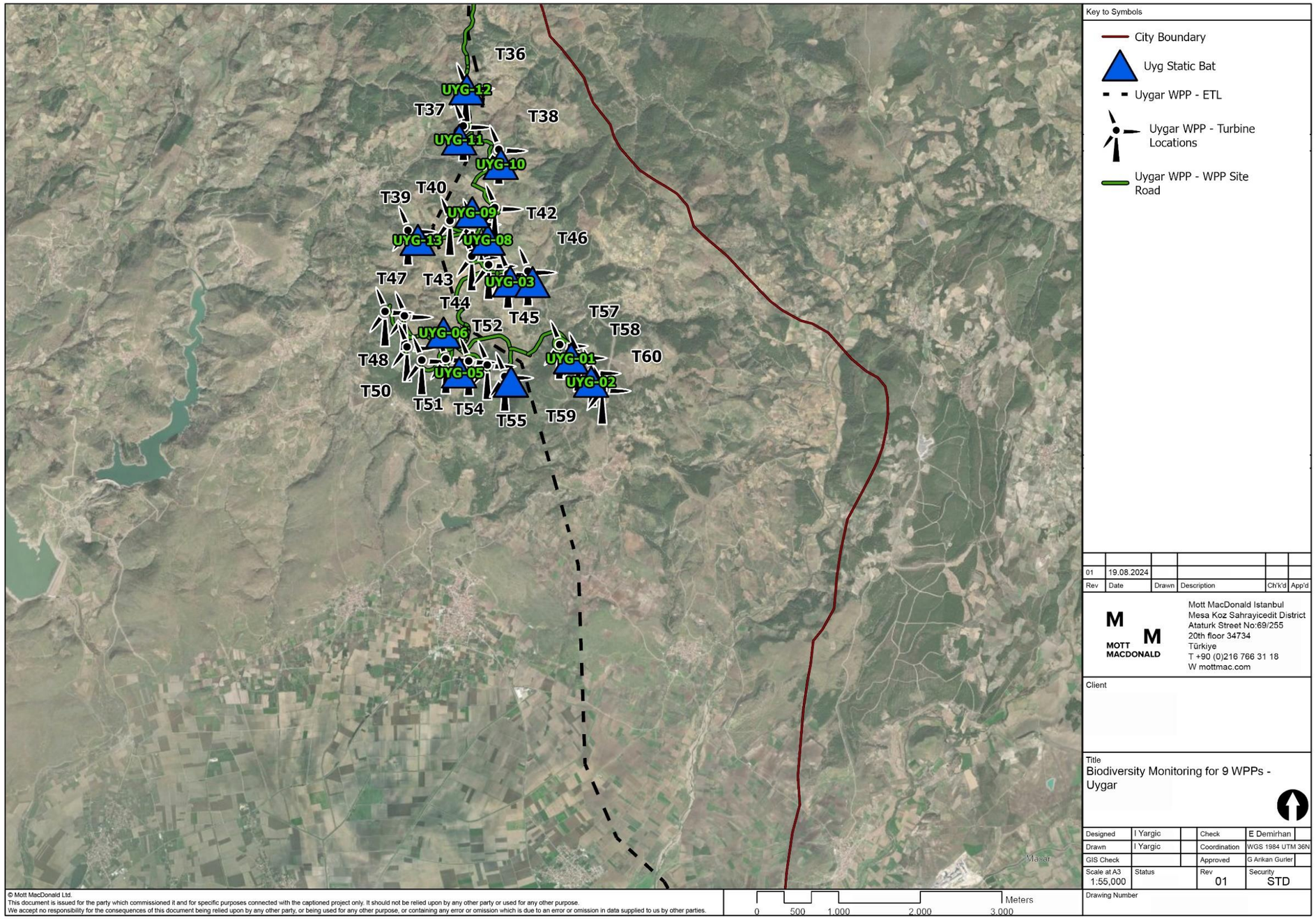


Figure 3-13 Ground static bat detector locations (south)

4 Results

4.1 Flora

4.1.1 Key Biodiversity Area

Components of Uygar WPP including turbines, site roads and ETL are not located within any protected or internationally recognized area and the AoI does not overlap any such areas either.

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 and shown in Figure 4-1, along with their wide distribution areas within the study area. The amount of habitat lost due to site roads, ETL, 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 (%)
Woodland	G1.7 Termophilus deciduous woodland	321.4	1.6%
	G4.B Mixed mediterranean pine - thermophilous oak woodland	4472.4	22.8%
	G4.D Mixed Black pine ([Pinus nigra]) - evergreen oak woodland	2274.7	11.6%
Step	E4.4 Calcareous alpine and subalpine grassland	4509.6	23.0%
Inland unvegetated or sparsely vegetated habitats	H3.6 Weathered rock and outcrop habitats	65.4	0.3%
Agricultural Areas	I1.1 Intensive unmixed crops	3643.1	18.6%
	I1.3 Arable land with unmixed crops grown by low-intensity agricultural methods	3923.0	20.0%
	I2.2 Small-scale ornamental and domestic garden areas	142.7	0.7%
Constructed, industrial and other artificial habitats	J1.2 Residential buildings of villages and urban peripheries	242.0	1.2%

Table 4-2 Habitat Loss on Site Roads

EUNIS	Area (ha)	Percentage
E4.4 Calcareous alpine and subalpine grassland	25.8	0.6%
G1.7 Termophilus deciduous woodland	2.3	0.7%
G4.B Mixed mediterranean pine - thermophilous oak woodland	9.8	0.2%
G4.D Mixed Black pine ([Pinus nigra]) - evergreen oak woodland	10.9	0.5%
H3.6 Weathered rock and outcrop habitats	3.8	5.9%
I1.1 Intensive unmixed crops	5.2	0.1%
I1.3 Arable land with unmixed crops grown by low-intensity agricultural methods	17.4	0.4%
Total	75.2	

Table 4-3 Habitat Loss on Turbine Footprint

EUNIS	Area (ha)	Percentage
E4.4 Calcareous alpine and subalpine grassland	32.9	0.7%
G1.7 Termophilus deciduous woodland	2.7	0.8%
G4.B Mixed mediterranean pine - thermophilous oak woodland	17.1	0.4%
G4.D Mixed Black pine ([Pinus nigra]) - evergreen oak woodland	8.2	0.4%
H3.6 Weathered rock and outcrop habitats	10.2	15.6%
I1.1 Intensive unmixed crops	6.4	0.2%
I1.3 Arable land with unmixed crops grown by low-intensity agricultural methods	11.9	0.3%
Total	89.4	

Table 4-4 Habitat Loss on Switchyard Area

EUNIS	Area	Percentage
E4.4 Calcareous alpine and subalpine grassland	6.2	0.1%
G1.7 Termophilus deciduous woodland	0.0	0.0%
G4.B Mixed mediterranean pine - thermophilous oak woodland	0.0	0.0%
G4.D Mixed Black pine ([Pinus nigra]) - evergreen oak woodland	0.0	0.0%
H3.6 Weathered rock and outcrop habitats	0.0	0.0%
I1.1 Intensive unmixed crops	0.0	0.0%
I1.3 Arable land with unmixed crops grown by low-intensity agricultural methods	4.1	0.1%
Total	10.3	

Table 4-5 Habitat Loss on ETL

EUNIS	Area (ha)	Percentage
E4.4 Calcareous alpine and subalpine grassland	26.7	0.6%
G4.B Mixed mediterranean pine - thermophilous oak woodland	27.8	0.6%
I1.1 Intensive unmixed crops	55.4	1.5%
I1.3 Arable land with unmixed crops grown by low-intensity agricultural methods	35.5	0.9%
I2.2 Small-scale ornamental and domestic garden areas	3.1	2.2%
Total	148.6	

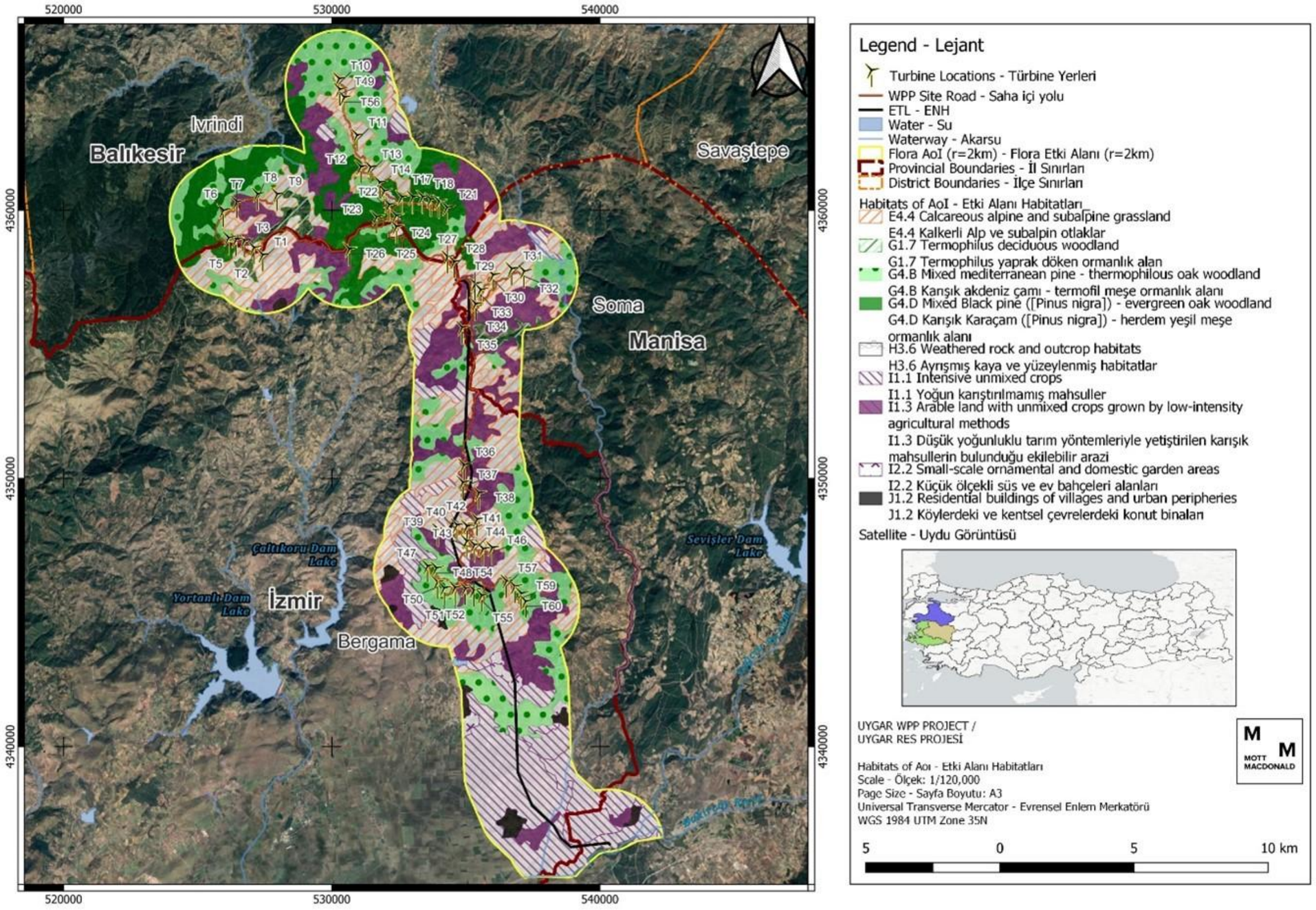


Figure 4-1 EUNIS Habitat Classification of Uygar WPP Area of Influence

4.1.3 Floristic Analyses

As a result of the field studies, 84 plant taxa at the species and subspecies level from 21 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	6	7	1	2	3	4	5
ASPARAGACEAE	1	*Asparagus officinalis*	Widespread											X				X				
PINACEAE	2	*Pinus brutia*	Mediterranean									X	X									X
	3	*Pinus pinea*	Widespread									X	X							X		
APOCYNACEAE	4	*Nerium oleander*	Widespread								X		X		X		X			X		
ASTERACEAE	5	*Anthemis chia*	Mediterranean											X		X	X		X			
	6	*Cichorium intybus*	Widespread								X		X			X					X	
	7	*Xanthium spinosum*	Widespread													X	X				X	
	8	*Dittrichia viscosa*	Mediterranean											X		X			X			
	9	*Taraxacum hellenicum*	Mediterranean													X				X		
	10	*Silybum marianum*	Widespread								X	X			X		X			X		
	11	*Senecio vernalis*	Widespread										X		X		X			X		
	12	*Senecio vulgaris*	Widespread									X	X		X		X			X		
	13	*Inula heterolepis*	Mediterranean														X			X		
	14	*Cyanus segetum*	Widespread													X				X		
	15	*Doronicum orientale*	Widespread									X	X				X		X			
	16	*Conyza canadensis*	Widespread													X			X			
	17	***Cirsium balikesirense***		**X**		**VU**																
BORAGINACEAE	18	*Anchusa arvensis*	Widespread											X			X	X				
	19	*Anchusa hybrida*	Widespread											X						X		
	20	*Echium italicum*	Widespread										X						X			
	21	*Myosotis cadmea*	Widespread									X								X		
	22	*Myosotis stricta*	Widespread											X							X	
BRASSICACEAE	23	*Capsella bursa-pastoris*	Widespread								X	X	X							X		
	24	*Arabis verna*	Mediterranean											X			X		X			
	25	*Camelina rumelica*	Widespread											X			X			X		
	26	*Draba muralis*	Widespread													X	X	X				
	27	*Sinapis arvensis*	Widespread														X			X		
	28	*Isatis tinctoria*	Widespread											X			X					
URTICACEAE	29	*Urtica dioica*	Euro - Siberia								X	X		X								X
	30	*Parietaria judaica*	Widespread														X	X			X	
CARYOPHYLLACEAE	31	*Cerastium glomeratum*	Widespread								X		X			X	X			X		
	32	*Dianthus calocephalus*	Mediterranean								X		X			X				X		
	33	*Herniaria hirsuta*	Widespread								X	X				X	X			X		
	34	*Herniaria micrantha*	Widespread														X		X			
	35	*Minuartia juniperina*	Widespread									X	X				X				X	
	36	*Silene lydia*	Mediterranean											X			X		X			

	37	*Silene italica*	Widespread			X	X	X				X	X			X	
	38	*Stellaria pallida*	Widespread								X	X		X			
	39	*Spergularia rubra*	Euro - Siberia			X	X	X						X			
	40	*Velezia rigida*	Widespread			X	X	X							X		
EUPHORBIACEAE	41	*Euphorbia anacampseros*	Widespread						X		X			X			
FABACEAE	42	*Vicia cracca subsp.. stenophylla*	Euro - Siberia				X	X			X	X					X
	43	*Astragalus glycyphylloides*	Widespread						X		X			X			
	44	*Astragalus trojanus*	Mediterranean				X	X			X			X			
	45	*Cicer montbretii*	Widespread					X	X			X		X			
	46	*Lathyrus sativus*	Euro - Siberia				X			X					X		
	47	*Lathyrus setifolius*	Mediterranean			X					X			X			
	48	*Trifolium dubium*	Widespread				X	X				X			X		
	49	*Vicia articulata*	Widespread			X		X			X			X			
	50	*Vicia bithynica*	Mediterranean				X					X			X		
	51	*Vicia melanops*	Widespread			X		X				X				X	
FAGACEAE	52	*Quercus coccifera*	Mediterranean			X	X	X							X		
	53	*Quercus infectoria subsp. infectoria*	Widespread				X	X			X				X		
	54	*Castanea sativa*	Euro - Siberia			X	X	X							X		
JUGLANDACEAE	55	*Juglans regia*	Widespread				X			X	X			X			
LAMIACEAE	56	*Satureja hortensis*	Mediterranean						X		X			X			
	57	*Thymus sipyleus*	Mediterranean			X					X			X			
	58	*Ziziphora capitata*	Mediterranean				X	X				X			X		
	59	*Sideritis lanata*	Widespread			X		X			X			X			
	60	*Salvia sclarea*	Mediterranean				X					X			X		
	61	*Micromeria myrtifolia*	Widespread			X	X				X				X		
MALVACEAE	62	*Malva neglecta*	Widespread			X		X			X				X		
MORACEAE	63	*Ficus carica subsp. carica*	Mediterranean			X	X				X	X			X		
	64	*Morus alba*	Widespread									X		X			
PAPAVERACEAE	65	*Papaver rhoeas*	Widespread				X	X				X				X	
	66	*Plantago lagopus*	Widespread					X				X				X	
	67	*Plantago afra*	Widespread							X				X			
	68	***Digitalis trojana***		**X**	**VU**												
	69	*Fumaria parviflora*	Widespread								X				X		
RANUNCULACEAE	70	*Nigella damascena*	Widespread						X			X		X			
ROSACEAE	71	*Pyrus elaeagnifolia subsp. elaeagnifolia*	Widespread			X	X	X				X	X			X	
	72	*Amygdalus communis*	Widespread								X	X		X			
CUPRESSACEAE	73	*Cupressus sempervirens*	Mediterranean			X	X	X						X			
	74	*Juniperus excelsa subsp. excelsa*	Widespread			X	X	X							X		

	75	*Juniperus oxycedrus subsp. oxycedrus*	Mediterranean	X	X	X							X		
ULMACEAE	76	*Ulmus canescens*	Mediterranean						X	X		X			
POACEAE	77	*Poa trivialis*	Irano -Turanian												
	78	*Poa bulbosa*	Euro - Sİberia			X			X	X		X			
	79	*Hordeum bulbosum*	Mediterranean			X	X		X	X			X		
	80	*Stipa cacuminis*	Widespread			X			X	X	X				
	81	*Poa angustifolia*	Mediterranean			X			X	X		X			
	82	*Bromus tectorum*	Mediterranean			X			X	X	X				
	83	*Bromus intermedius*	Widespread			X			X	X		X			
	84	*Aegilops umbellulata*	Widespread			X			X	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: G1.7 Termophilus deciduous woodland

2: G4.B Mixed mediterranean pine - thermophilous oak woodland

3: G4.D Mixed Black pine ([Pinus nigra]) - evergreen oak woodland

4: E4.4 Calcareous alpine and subalpine grassland

5: H3.6 Weathered rock and outcrop habitats

6: I1.1 Intensive unmixed crops

7: I1.3 Arable land with unmixed crops grown by low-intensity agricultural methods

4.1.4 Status of Plants in Terms of Threatened Category and Endemism

As a result of the literature review, a total of 2 regional endemic (*Digitalis trojana* and *Cirsium balikesirense*). During the field studies, no target species designated for observation were detected within the ETL route areas. These particular species were not present within the designated study areas. Table 4-6 includes the target species, which have been added as literature information.

Digitalis trojana is a regional endemic plant species, occurring in the provinces of Balıkesir and Çanakkale within Türkiye. The species is classified under the TRDB Threatened category as "VU: Vulnerable."

Cirsium balikesirense is a regional endemic plant species, occurring in the provinces of Çanakkale and Balıkesir within Türkiye. As the population status within its distribution areas remains relatively stable, the species is classified under the TRDB Threatened category as "VU: Vulnerable."

The target species were not observed in the ETL areas. The observation status of the target species is provided in Table 4-7.

Table 4-7 The endemic species in the study area and their observation status

Taxon	TRDB	Bern	Observation Status
Regional Endemic Species			
Digitalis trojana	VU	-	Observed (seeds are collected and delivered to Seed-Gen Bank)
Cirsium balikesirense	VU	-	Observed (seeds are collected and delivered to Seed-Gen Bank)

4.2 Terrestrial Mammal

4.2.1 Key Biodiversity Area

Components of Uygar WPP including turbines, site roads and ETL are not located within any protected or internationally recognized area and the AoI does not overlap any such areas either.

4.2.2 Terrestrial Mammals Surveys

The similar data as provided in the ESIA regarding terrestrial mammals has been obtained. A total of 22 mammal species from 12 Families were identified within the Project Area of Influence through a combination of field studies, and literature reviews. Among these species, 8 were directly observed during fieldwork, and 15 were identified through a review of existing literature (Table 4-8). There is no endemic mammal species among the identified species.

Among the mammal species identified in the Project Area of Influence, 2 species are listed in Annex II, 7 species in Annex III of the Bern Convention. 3 species in Annex III and 1 Species Annex I of CITES. According to the IUCN Red List, no species in the area is classified as endangered. All species are classified as Least Concern (LC), indicating they are not currently at significant risk of extinction.

Roe deer (*Capreolus capreolus)* (LC), which is distributed in very few places in the Mediterranean and Aegean Regio. It has been recorded as literature data in field and survey studies. Although its status is Least Concern, this species is considered to have national importance. Presence of a good Roe Deer population in the area was confirmed with conservations with locals. Roe deer has been recorded as literature data.

Table 4-8 Terrestrial Mammals 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
Leporidae	*Lepus europaeus*	European Hare	-	LC	-	-	-	L / O
Sciuridae	*Sciurus anomalus*	Caucasian Squirrel	-	LC	Ann -II	-	-	L / O
Cricetidae	*Arvicola amphibius*	Eurasian Water Vole	-	LC	-	-	-	L
Cricetidae	*Nothocricetulus migratorius*	Grey Dwarf Hamster	-	LC	-	-	-	L
Muridae	*Apodemus mystacinus*	Eastern Broad-toothed Field Mouse	-	LC	-	-	-	L
Muridae	*Apodemus sylvaticus*	Long-tailed Field Mouse	-	LC	-	-	-	L
Muridae	*Mus musculus*	House Mouse	-	LC	-	-	-	L
Muridae	*Rattus rattus*	House Rat	-	LC	-	-	-	L / O
Muridae	*Rattus norvegicus*	Brown Rat	-	LC	-	-	-	L
Spalacidae	*Nannospalax xanthodon*	Nehring's Blind Mole Rat	-	LC	-	-	-	L / O
Hystricidae	*Hystrix indica*	Indian Crested Porcupine	-	LC	-	-	-	L
Gliridae	*Dryomys nitedula*	Forest Dormouse	-	LC	Ann -III	-	-	L
Canidae	*Vulpes vulpes*	Red Fox	-	LC	-	Ann -III	-	L / O
Canidae	*Canis aureus*	Golden Jackal	-	LC	-	Ann -III	-	L
Canidae	*Canis lupus*	Grey Wolf	-	LC	Ann -II	Ann -I	-	L
Mustelidae	*Mustela nivalis*	Least Weasel	-	LC	Ann -III	-	-	L
Mustelidae	*Meles meles*	European Badger	-	LC	Ann -III	-	-	L
Mustelidae	*Martes foina*	Beech Marten	-	LC	Ann -III	Ann -III	-	L / O
Mustelidae	*Martes martes*	Pine Marten	-	LC	Ann -III	-	-	L
Suidae	*Sus scrofa*	Wild Boar	-	LC	Ann -III	-	-	L / O
Cervidae	*Capreolus capreolus*	European Roe Deer	-	LC	Ann -III	-	-	L

4.3 Herpetofauna

4.3.1 Key Biodiversity Area

Components of Uygar WPP including turbines, site roads and ETL are not located within any protected or internationally recognized area and the AoI does not overlap any such areas either.

4.3.2 Amphibia

The similar data as provided in the ESIA regarding amphibia has been obtained. A total of 8 amphibia 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, 3 were directly observed during fieldwork, and 5 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, 2 species are listed in Annex II, 6 species in Annex III of the Bern Convention. 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 eight species are listed in the annexes.

No permanent aquatic habitats, such as ponds, were identified within the project boundaries during the field surveys. Nevertheless, irrigation channels formed as a result of intensive agricultural practices were observed in adjacent farmland areas, where the presence of the recorded species was noted in association with these ephemeral water features.

4.3.3 Reptilia

The similar data as provided in the ESIA regarding Reptilia has been obtained. A total of 25 Reptilia species from 13 families were identified within the Project Area of Influence through a combination of field studies, literature reviews, and survey interviews. Among these species, 8 were directly observed during fieldwork, and 15 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, 10 species are listed in Annex II, 15 species in Annex III of the Bern Convention. According to the IUCN Red List, no species in the area are classified as endangered.

Within the identified species, Common Tortoise (*Testudo graeca*) is classified as Vulnerable (VU) and European Pond Turtle (*Emys orbicularis*) is classified as Near Threatened (NT) according to the IUCN Red List. The remaining species are categorized as Least Concern (LC) by the IUCN, signifying that they are not presently at a significant risk of extinction. Common Tortoise and Javelin Sand Boa are listed in CITES Annex II and European Pond Turtle is listed in CITES Annex III.

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	*Lissotriton vulgaris*	Smooth Newt	-	LC	Ann -III			L
Salamandridae	*Triturus karelinii*	Southern Crested Newt	-	LC	Ann -II			L
Bufonidae	*Bufo bufo*	Common Toad	-	LC	Ann -III	-	-	L / O
Bufonidae	*Bufotes viridis*	Green Toad	-	LC	Ann -III	-	-	L / O
Hylidae	*Hyla orientalis*	Shelkovnikov's Tree Frog	-	LC	Ann -III	-	-	L
Pelobatidae	*Pelobates syriacus*	Syrian Spadefoot	-	LC	Ann -II	-	-	L
Ranidae	*Pelophylax bedriagae*	Bedriaga's Frog	-	LC	Ann -III	-	-	L
Ranidae	*Pelophylax ridibundus*	Marsh Frog	-	LC	Ann -III	-	-	L / O

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
Emydidae	*Emys orbicularis*	European Pond Turtle	-	NT	Ann -II	Ann -III	-	L
Geoemydidae	*Mauremys rivulata*	Western Caspian Turtle	-	LC	Ann -III	-	-	L
Gekkonidae	*Hemidactylus turcicus*	Turkish Gecko	-	LC	Ann -III	-	-	L
Agamidae	*Laudakia stellio*	Starred Agama	-	LC	Ann -II	-	-	O / L
Anguidae	*Pseudopus apodus*	Sheltopusik	-	LC	Ann -II	-	-	O / L
Lacertidae	*Lacerta diplochondrodes*	Rhodos Green Lizard	-	LC	Ann -III	-	-	L
Lacertidae	*Ophisops elegans*	Snake-eyed Lizard	-	LC	Ann -II	-	-	O / L
Lacertidae	*Podarcis muralis*	Common Wall Lizard	-	LC	Ann -II	-	-	L
Lacertidae	*Anatololacerta anatolica*	Anatolian Rock Lizard	-	LC	Ann -III	-	-	L
Scincidae	*Heremites auratus*	Levant skink	-	LC	Ann -III	-	-	L
Scincidae	*Ablepharus kitaibelii*	Juniper Skink	-	LC	Ann -II	-	-	O / L
Typhlopidae	*Xerotyphlops vermicularis*	Eurasian Blind Snake	-	LC	Ann -III	-	-	L
Boidae	*Eryx jaculus*	Javelin Sand Boa	-	LC	Ann -III	Ann -II	-	L
Natricidae	*Natrix natrix*	Grass Snake	-	LC	Ann -III	-	-	O / L
Natricidae	*Natrix tessellata*	Dice Snake	-	LC	Ann -II	-	-	L
Colubridae	*Dolichophis caspius*	Large Whip Snake	-	LC	Ann -III	-	-	O / L
Colubridae	*Dolichophis jugularis*	Large Whip Snake	-	LC	Ann -III	-	-	L
Colubridae	*Elaphe sauromates*	Eastern Four-Lined Ratsnake	-	LC	Ann -III	-	-	L
Colubridae	*Malpolon insignitus*	Eastern Montpellier Snake	-	LC	Ann -III	-	-	L
Colubridae	*Telescopus fallax*	Cat Snake	-	LC	Ann -II	-	-	L
Colubridae	*Platyceps najadum*	Dahl's Whip Snake	-	LC	Ann -III	-	-	L
Colubridae	*Zamenis situla*	European Ratsnake	-	LC	Ann -III	-	-	L
Colubridae	*Eirenis modestus*	Ring-Headed Dwarf Snake	-	LC	Ann -III	-	-	O / 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 spring VP surveys, a total of 253 birds were detected at the site (Table 4-11). The most frequently encountered species were Common Buzzard (*Buteo buteo*), with 154 contacts observed. Among the globally threatened species, Dalmatian Pelican (*Pelecanus crispus*), which is listed as NT, was recorded.

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

Common Name	Scientific Name	IUCN	Migrant	Resident	Unknown	Total
Short-toed Snake-Eagle	*Circaetus gallicus*	LC	-	30	-	30
Eurasian Sparrowhawk	*Accipiter nisus*	LC	5	9	-	14
Eurasian Kestrel	*Falco tinnunculus*	LC	-	10	-	10
Black Stork	*Ciconia nigra*	LC	1	5	-	6
unidentified Raptor	*Accipitridae spp.*	-	-	-	3	3
Dalmatian Pelican	*Pelecanus crispus*	NT	-	3	-	3
Eleonora's Falcon	*Falco eleonorae*	LC	-	2	-	2
European Honey-buzzard	*Pernis apivorus*	LC	2	-	-	2
Eurasian Hobby	*Falco subbuteo*	LC	1	1	-	2
unidentified Falcon	*Falco sp.*	-	1	-	-	1
Total	-	-	10	60	3	73

During the spring observation period, an average of 37 hours and 58 minutes of surveys were conducted at each vantage point. A total of 19 migrant birds were recorded during this time. The migration rate was determined to be 0.5 birds per hour for the spring migratory season.

Among the birds observed, 73 (about 29% of all observed birds) were reported to fly at risk zone (both fly at rotor height and below and 500 m buffer of the project site), (Table 4-12). Majority of birds that entered the risk zone were resident. 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.

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

Common Name	Scientific Name	IUCN	Migrant	Resident	Unknown	Total
Common Buzzard	*Buteo buteo*	LC	-	148	-	148
Short-toed Snake-Eagle	*Circaetus gallicus*	LC	-	31	-	31
Eurasian Kestrel	*Falco tinnunculus*	LC	-	10	-	10
Eurasian Sparrowhawk	*Accipiter nisus*	LC	5	9	-	14
Black Stork	*Ciconia nigra*	LC	1	5	-	6
unidentified Raptor	*Accipitridae spp.*	-	-	-	3	3
Dalmatian Pelican	*Pelecanus crispus*	NT	-	3	-	3
Eleonora's Falcon	*Falco eleonorae*	LC	-	2	-	2
European Honey-buzzard	*Pernis apivorus*	LC	2	-	-	2
Eurasian Hobby	*Falco subbuteo*	LC	1	1	-	2

Common Name	Scientific Name	IUCN	Migrant	Resident	Unknown	Total
unidentified Falcon	*Falco sp.*	-	1	-	-	1
Total	-	-	**10**	**209**	**3**	**222**

Summer

During summer VP surveys, a total of 256 birds were detected at the site (Table 4-13). The most frequently encountered species was the Common Buzzard (*Buteo buteo*), with 119 contacts observed, all of which were residents. Other notable observations included the Short-toed Snake-Eagle (*Circaetus gallicus*) with 15 contacts, comprised of 4 migrants and 11 residents, and the Eurasian Kestrel (*Falco tinnunculus*) and Eleonora's Falcon (*Falco eleonorae*) with 46 and 20 resident contacts, respectively. No migrant and threatened species were observed during summer VP surveys.

Table 4-13 Total number of soaring migratory and resident bird species observed in summer 2024.

Common Name	Scientific Name	IUCN	Unknown	Resident	Total
Common Buzzard	*Buteo buteo*	LC	-	119	119
Short-toed Snake-Eagle	*Circaetus gallicus*	LC	-	46	46
Eleonora's Falcon	*Falco eleonorae*	LC	-	20	20
Eurasian Kestrel	*Falco tinnunculus*	LC	-	17	17
Black Stork	*Ciconia nigra*	LC	3	14	17
European Honey-buzzard	*Pernis apivorus*	LC	-	11	11
Eurasian Sparrowhawk	*Accipiter nisus*	LC	-	10	10
unidentified Raptor	*Accipitridae spp.*	-	1	3	4
White Stork	*Ciconia ciconia*	LC	-	3	3
Eurasian Hobby	*Falco subbuteo*	LC	-	2	2
unidentified Buzzard	*Buteo spp.*	-	1	1	2
Booted Eagle	*Hieraaetus pennatus*	LC	-	1	1
Long-legged Buzzard	*Buteo rufinus*	LC	-	1	1
unidentified Falcon	*Falco sp.*	-	-	1	1
unidentified Eagle	*Aquila/Clanga sp.*	-	-	1	1
Northern Goshawk	*Accipiter gentilis*	LC	-	1	1
Total	-	-	5	251	256

During the summer of 2024 a survey averaging approximately 44 hours and 37 minutes was conducted per vantage point. Over this period, no bird was identified as a migrant. The migration rate was determined to be 0.12 birds per hour for the summer migratory season.

Among the birds observed, 158 (about 62% of all observed birds) were reported to fly at risk height (at rotor height and below and below and 500 m buffer of the project site) (Table 4-14). The species that most frequently entered the risk zone was Common Buzzard (*Buteo buteo*). However, these numbers do not represent unique birds and contain multiple reports of the same bird for residents.

Table 4-14 Resident and migrant bird occurrences at risk zone in summer 2024.

Common Name	Scientific Name	IUCN	Resident	Unknown	Total
Common Buzzard	*Buteo buteo*	LC	91	-	91
Eurasian Kestrel	*Falco tinnunculus*	LC	16	-	16
Eleonora's Falcon	*Falco eleonorae*	LC	15	-	15

Common Name	Scientific Name	IUCN	Resident	Unknown	Total
Black Stork	*Ciconia nigra*	LC	8	3	11
European Honey-buzzard	*Pernis apivorus*	LC	10	-	10
Eurasian Sparrowhawk	*Accipiter nisus*	LC	9	-	9
unidentified Buzzard	*Buteo spec.*	-	1	1	2
Eurasian Hobby	*Falco subbuteo*	LC	1	-	1
Booted Eagle	*Hieraaetus pennatus*	LC	1	-	1
Long-legged Buzzard	*Buteo rufinus*	LC	1	-	1
Northern Goshawk	*Accipiter gentilis*	LC	1	-	1
Total	-	-	154	4	158

Autumn

During autumn VP surveys, a total of 330 birds were detected at the site (Table 4-15). The most frequently encountered species was the Common Buzzard (*Buteo buteo*), with 143 contacts observed. Other notable observations included the Eurasian Sparrowhawk (*Accipiter nisus*) and Short-toed Snake-Eagle (*Circaetus gallicus*) with 69 and 48 individuals, respectively. Despite the variety of species, no threatened species were recorded during the surveys.

Table 4-15 Total number of soaring migratory and resident bird species observed in autumn 2024.

Common Name	Scientific Name	IUCN	Migrant	Resident	Unknown	Total
Common Buzzard	*Buteo buteo*	LC	47	96	-	143
Eurasian Sparrowhawk	*Accipiter nisus*	LC	45	22	2	69
Short-toed Snake-Eagle	*Circaetus gallicus*	LC	-	47	1	48
European Honey-buzzard	*Pernis apivorus*	LC	25	1	-	26
Eurasian Kestrel	*Falco tinnunculus*	LC	1	14	2	17
Levant Sparrowhawk	*Accipiter brevipes*	LC	8	-	-	8
unidentified Raptor	*Accipitridae spp.*	-	3	3	1	7
Eurasian Marsh-Harrier	*Circus aeruginosus*	LC	6	-	-	6
Peregrine Falcon	*Falco peregrinus*	LC	-	2	-	2
Black Stork	*Ciconia nigra*	LC	-	1	-	1
Booted Eagle	*Hieraaetus pennatus*	LC	-	1	-	1
unidentified Buzzard	*Buteo sp.*	-	1	-	-	1
Northern Goshawk	*Accipiter gentilis*	LC	-	1	-	1
Total	-	-	136	188	6	330

During the autumn of 2024, a survey averaging approximately 45 hours and 40 minutes was conducted per vantage point. Over this period, 136 birds were identified as migrants. The migration rate was determined to be 2.97 birds per hour for the autumn migratory season.

Among the birds observed, 246 (about 75% of all observed birds) were reported to fly at risk height (at rotor height and below and 500 m buffer of the project site) (Table 4-16). The species that most frequently entered the risk zone was Common Buzzard (*Buteo buteo*). However, these numbers do not represent unique birds and contain multiple reports of the same bird for residents.

Table 4-16 Resident and migrant bird occurrences at risk zone in autumn 2024.

Common Name	Scientific Name	IUCN	Migrant	Resident	Unknown	Total
Common Buzzard	*Buteo buteo*	LC	35	81	-	116

Common Name	Scientific Name	IUCN	Migrant	Resident	Unknown	Total
Short-toed Snake-Eagle	*Circaetus gallicus*	LC	-	39	1	40
Eurasian Sparrowhawk	*Accipiter nisus*	LC	38	21	1	60
Eurasian Kestrel	*Falco tinnunculus*	LC	1	13	2	16
European Honey-buzzard	*Pernis apivorus*	LC	3	1	-	4
Levant Sparrowhawk	*Accipiter brevipes*	LC	3	-	-	3
unidentified Raptor	*Accipitridae xx*	-	-	2	1	3
Peregrine Falcon	*Falco peregrinus*	LC	-	1	-	1
Booted Eagle	*Hieraaetus pennatus*	LC	-	1	-	1
unidentified Buzzard	*Buteo spec.*	-	1	-	-	1
Northern Goshawk	*Accipiter gentilis*	LC	-	1	-	1
Total	-	-	81	160	5	246

4.4.2 ETL Observations

Spring

During the spring 2024 surveys at VP ETL points, a total of 163 birds were detected across various species (Table 4-17). Out of these, 58 birds, which account for approximately 36% 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 Common Buzzard (*Buteo buteo*), with 84 contacts detected and 32 of them flying at risk height. Other notable species include the Short-toed Snake-Eagle (*Circaetus gallicus*) with 41 contacts observed, 8 of which were at risk height, and the Black Stork (*Ciconia nigra*) with 11 contacts, 6 of which were at risk height.

Table 4-17 Total number of bird species observed at VP ETL points at risk height in spring 2024.

Common Name	Scientific Name	IUCN	VP ETL1	VP ETL2	VP ETL3	VP ETL4	VP ETL5	VP ETL6	Total
Common Buzzard	*Buteo buteo*	LC	2	4	6	9	9	2	32
Short-toed Snake-Eagle	*Circaetus gallicus*	LC	-	2	2	-	2	2	8
Black Stork	*Ciconia nigra*	LC	-	-	-	-	2	4	6
Eurasian Kestrel	*Falco tinnunculus*	LC	1	-	-	1	1	1	4
European Honey-buzzard	*Pernis apivorus*	LC	-	-	2	-	-	1	3
Eleonora's Falcon	*Falco eleonorae*	LC	-	-	-	2	-	-	2
Eurasian Sparrowhawk	*Accipiter nisus*	LC	-	-	1	-	-	-	1
Eurasian Hobby	*Falco subbuteo*	LC	-	-	-	1	-	-	1
Unidentified Raptor	*Accipiter sp.*	-	-	-	-	-	-	1	1
Total	-	-	3	6	11	13	14	11	58

Summer

During the Summer 2024 surveys at VP ETL points, a total of 106 birds were detected across various species (Table 4-18). Out of these, 27 birds, which account for approximately 25% 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 Common Buzzard (*Buteo buteo*), with 45 contacts detected and 14 of them flying at risk height.

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

Common Name	Scientific Name	IUCN	VP ETL1	VP ETL2	VP ETL3	VP ETL4	VP ETL5	VP ETL6	Total
Common Buzzard	*Buteo buteo*	LC	4	4	-	-	3	3	14
Eurasian Kestrel	*Falco tinnunculus*	LC	2	-	-	1	-	3	6
Northern Goshawk	*Accipiter gentilis*	LC	1	-	-	-	1	-	2
Eleonora's Falcon	*Falco eleonorae*	LC	-	-	1	-	-	-	1
Black Stork	*Ciconia nigra*	LC	1	-	-	-	-	-	1
Unidentified Falcon	*Falco sp.*	-	-	-	-	-	-	1	1
Unidentified Buzzard	*Buteo sp.*	-	-	-	-	1	-	-	-	1
Short-toed Snake-Eagle	*Circaetus gallicus*	LC	-	1	-	-	-	-	1
Total	-	-	8	5	2	1	4	7	27

With the available data, the bird passages are distributed fairly uniform along the route of the transmission line.

Autumn

During the Autumn 2024 surveys at VP ETL points, a total of 246 birds were detected across various species (Table 4-19). Out of these, 52 birds, which account for approximately 21% 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 Common Buzzard (*Buteo buteo*), with 92 contacts detected and 26 of them flying at risk height.

Table 4-19 Total number of bird species observed at VP ETL points at risk height in Autumn 2024.

Common Name	Scientific Name	IUCN	VP ETL1	VP ETL2	VP ETL3	VP ETL4	VP ETL5	VP ETL6	Total
Common Buzzard	Buteo buteo	LC	1	3	9	2	7	4	26
Eurasian Sparrowhawk	Accipiter nisus	LC	5	-	-	4	2	1	12
Short-toed Snake-Eagle	Circaetus gallicus	LC	-	5	-	-	4	1	10
Unidentified Raptor	Accipiter spp.	-	-	-	2	-	-	1	3
Black Stork	Ciconia nigra	LC	-	-	-	-	-	1	1
Total	-	-	6	8	11	6	13	8	52

With the available data, the bird passages are distributed fairly uniform along the route of the transmission line.

Summary

Based on the surveys conducted in spring, summer, and autumn 2024 at the transmission line points, the overall risk of bird collision with the Energy Transmission Lines remains low (Figure 4-3). Across all seasons, only a small proportion of birds observed were flying at the height of the transmission lines, posing a potential collision risk. In particular, 36% of birds recorded in spring, 25% in summer and 21% in autumn were at risk height.

Table 4-20: Total number of bird species observed across all TL points.

Common Name	Scientific Name	IUCN	VP ETL1	VP ETL2	VP ETL3	VP ETL4	VP ETL5	VP ETL6	Total	Total Risk
Common Buzzard	*Buteo buteo*	LC	28	14	33	71	42	33	221	72
Short-toed Snake-Eagle	*Circaetus gallicus*	LC	17	18	12	15	30	22	114	19

Common Name	Scientific Name	IUCN	VP ETL1	VP ETL2	VP ETL3	VP ETL4	VP ETL5	VP ETL6	Total	Total Risk
Eurasian Sparrowhawk	*Accipiter nisus*	LC	14	2	2	30	5	2	55	13
European Honey-buzzard	*Pernis apivorus*	LC	18	8	3	-	1	2	32	3
Black Stork	*Ciconia nigra*	LC	4	1	3	5	4	8	25	8
Eurasian Kestrel	*Falco tinnunculus*	LC	7	-	3	8	3	4	25	10
Unidentified Raptor	*Accipiteridae xx*	-	-	1	2	-	3	4	10	4
Levant Sparrowhawk	*Accipiter brevipes*	LC	5	-	-	3	-	-	8	-
Eurasian Marsh-Harrier	*Circus aeruginosus*	LC	2	-	-	3	2	-	7	-
Eleonora's Falcon	*Falco eleonorae*	LC	-	-	1	3	-	-	4	3
Eurasian Hobby	*Falco subbuteo*	LC	-	-	1	2	-	-	3	1
Peregrine Falcon	*Falco peregrinus*	LC	-	-	-	2	-	-	2	-
Unidentified Buzzard	*Buteo sp.*	-	-	1	1	-	-	-	2	1
Dalmatian Pelican	*Pelecanus crispus*	NT	-	-	-	2	-	-	2	-
Northern Goshawk	*Accipiter gentilis*	LC	1	-	-	-	1	-	2	2
Hen Harrier	*Circus cyaneus*	LC	-	-	-	1	-	-	1	-
Booted Eagle	*Hieraaetus pennatus*	LC	-	-	-	-	-	1	1	-
Unidentified Falcon	*Falco sp.*	-	-	-	-	-	-	1	1	1
Total	-	-	96	45	61	145	91	77	515	137

*It should the noted that the last 3 km segment not surveyed.

As a final station, a monitoring point could have been established near the southern end of the transmission line, close to Hamidiye Village, where the line terminates. However, this was overlooked, resulting in a 3 km gap in coverage. To address this, a correction factor was applied by assuming a hypothetical vantage point in the southern section, using bird species and numbers observed at VP ETL6 as a reference. This adjustment led to an approximate 20% increase in data. This assumption is considered reasonable, as the terrain south of VP ETL6 transitions from hilly to flatlands, where similar bird species are expected to occur. Risk quantification values and ETL segments are shown in Table 4-21 and Figure 4-2, Figure 4-3 respectively.

Table 4-21 Risk quantification values of each TL point based on passage rates.

Season	VP ETL1	VP ETL2	VP ETL3	VP ETL4	VP ETL5	VP ETL6	Sum	Corrected Sum
Spring	0.07	0.15	0.26	0.32	0.30	0.28	1.38	1.66
Summer	0.19	0.12	0.05	0.02	0.10	0.14	0.61	0.73
Autumn	0.12	0.15	0.23	0.13	0.30	0.14	1.08	1.29
Average	0.12	0.14	0.18	0.16	0.23	0.19	1.02	1.23

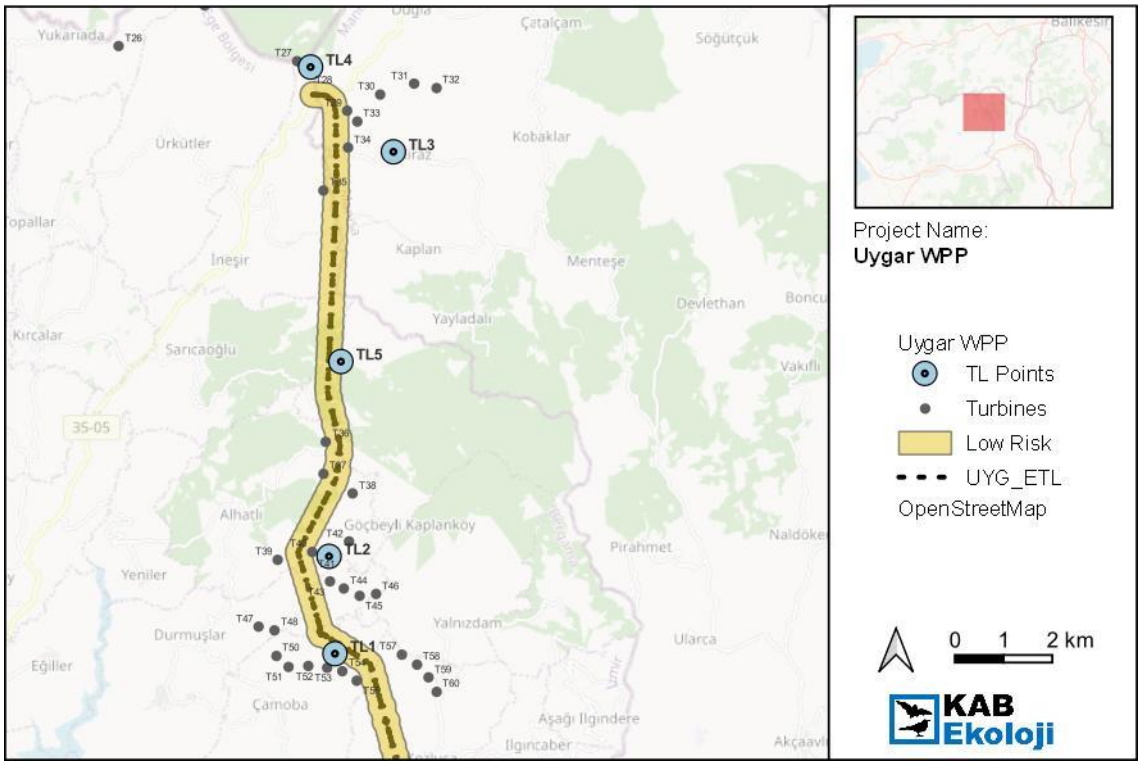


Figure 4-2 ETL segment risk assessment (VP ETL4, 3, 5, 2 and 1).

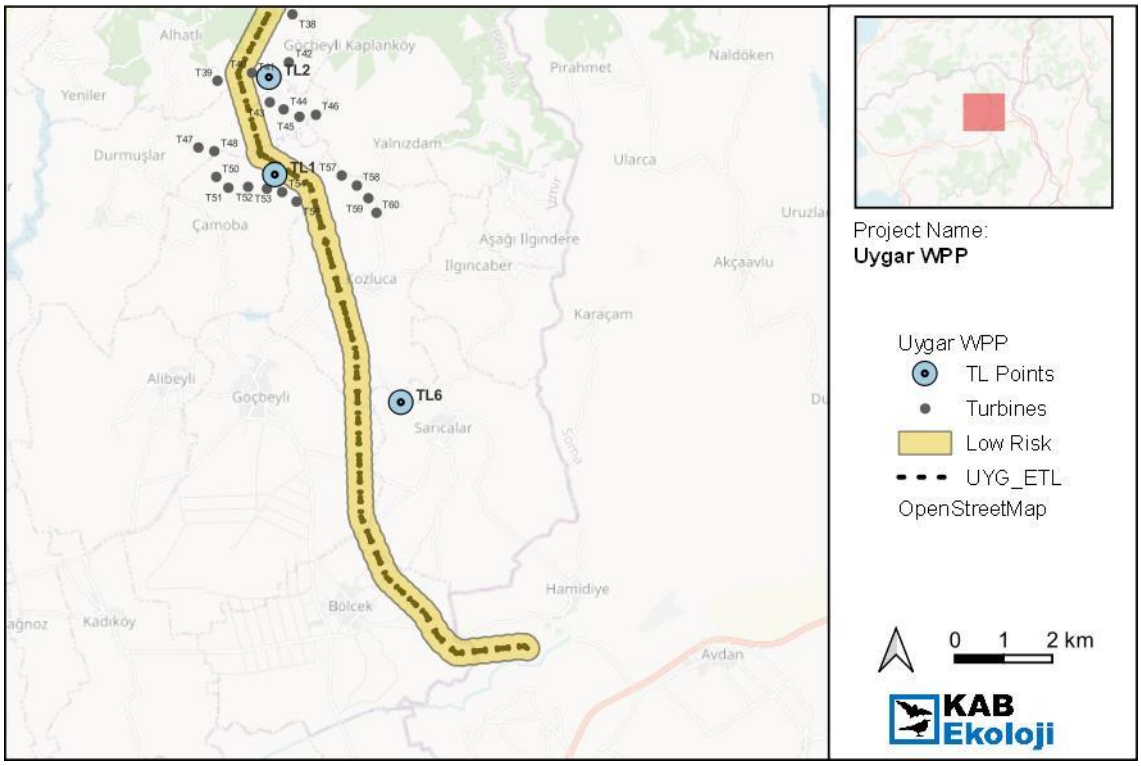


Figure 4-3 ETL segment risk assessment (VP ETL1, 2 and 6)

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.[4][5][6]

Spring

Sample collision risk calculation for resident species is shown in Table 4-22. Calculation for all species with risk above 0 is shown on Table 4-23.

Table 4-22 Mortality rate calculation for migrant species in detail (spring).

Variable	Value	Unit
Species	Eurasian Sparrowhawk	
Recorded number of birds at risk height/zone	5	birds
Duration of observation	37.98	hr/VP
Study Period	2024-03-01	
	2024-06-15	
Total migration hours	1070	hr
Estimated number of birds at risk height/zone (n)	140.86	birds

[4] 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.

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

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

Variable	Value	Unit
N	60	
width	21692	m
height	180	m
W	3904560	m2
A	905248	m2
A/W	0.23	%
n x (A/W)	32.66	birds
P. Probability of bird being hit when flying through the rotor	0.08	
Mortality rate without avoidance	3	birds
(1 - avoidance rate)	2.74	
Mortality estimation per year	0.05	birds

Table 4-23 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.
Eurasian Sparrowhawk	5	140.86	32.66	2.74	0.05
European Honey-buzzard	2	56.34	13.06	1.14	0.02
Black Stork	1	28.17	6.53	0.56	0.01
Eurasian Hobby	1	28.17	6.53	0.54	0.01
unidentified Falcon	1	28.17	6.53	0.55	0.01
Total	10	281.72	65.32	5.53	0.11

Sample collision risk calculation for resident species is shown in Table 4-24. Calculation for all species with risk above 0 is shown on Table 4-25.

Table 4-24 Mortality rate calculation for resident species in detail (spring).

Variable	Value	Unit
Species	Common Buzzard	
Total duration of individual bird observations	3698.9	sec
Total duration of observations	37.98	hr/VP
Study Period	2024-03-01	
	2024-06-15	
Total migration hours	1.284	hr
Estimated total birds x seconds	125046.73	bird x sec
N	60	
Area	30393153	m2
height	180	m
Vw	5470767540	m3
Sweeping Area	905248	m2
r	69.3	m
d	4	m
L	0.58	m
Vr = N x πR2 x (d + l)	4.105.730	m3
n	4141510	sec
n x (Vr / Vw)	125046.73	sec
v	11.96	m/s
t = (d + l) / v	0.39	sec
n x (Vr / Vw) / t	240.02	birds
Probability of bird being hit when flying through the rotor	0.09	
Mortality rate without avoidance	22.56	birds
(1 - avoidance rate)	0.02	
Mortality estimation for study period	0.45	birds

Table 4-25 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.
Common Buzzard	3699	125047	95	240	22.56	0.45
Short-toed Snake-Eagle	1124	38002	29	84	7.33	0.15
Eurasian Sparrowhawk	202	6829	5	13	1.07	0.02
Eurasian Kestrel	191	6459	5	11	1.00	0.02
Black Stork	86	2920	2	8	0.66	0.01
Others	101	3423	3	8	0.90	0.02
Total	5404	182680	139	364	33.53	0.67

Summer

Sample collision risk calculation for resident species is shown in Table 4-26. Calculation for all species with risk above 0 is shown on Table 4-27.

Table 4-26 Mortality rate calculation for resident species in detail (summer).

Variable	Value	Unit
Species	Common Buzzard	
Total duration of individual bird observations	3590.17	sec
Total duration of observations	44.62	hr/VP
Study Period	2024-06-16	
	2024-08-31	
Total migration hours	924	hr
Estimated total birds x seconds	74339.62	bird x sec
N	60	
Area	30393153	m2
height	180	m
Vw	5470767540	m3
Sweeping Area	905248	m2
r	69.3	m
d	4	m
L	0.58	m
Vr = N x πR2 x (d + l)	4141510	m3
n	74339.62	sec
n x (Vr / Vw)	56.28	sec
v	11.6	m/s
t = (d + l) / v	0.39	sec
n x (Vr / Vw) / t	142.69	birds
Probability of bird being hit when flying through the rotor	0.09	
Mortality rate without avoidance	13.41	birds
(1 - avoidance rate)	0.02	
Mortality estimation for study period	0.27	birds

Table 4-27 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.
Common Buzzard	3590	74340	56	143	13.41	0.27
Short-toed Snake-Eagle	1812	37519	29	83	7.24	0.14
Eurasian Kestrel	798	16531	12	28	2.57	0.05
European Honey-buzzard	527	10917	8	23	1.96	0.04
Eleonora's Falcon	335	6932	5	15	1.13	0.02
Others	577	11938	9	25	2.18	0.04
Total	7639	158178	119	316	28.49	0.57

Autumn

Sample collision risk calculation for migrant species is shown in Table 4-28. Calculation for all species with risk above 0 is shown on Table 4-29.

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

Table 4-28 Mortality rate calculation for migrant species in detail (autumn).

Variable	Value	Unit
Species	Eurasian Sparrowhawk	
Recorded number of birds at risk height/zone	38	birds
Duration of observation	45.72	hr/VP
Study Period	2024-09-01	
	2024-11-15	
Total migration hours	760	hr
Estimated number of birds at risk height/zone (n)	631.68	birds
N	60	
width	21692	m
height	180	m
W	3904560	m2
A	905248	m2
A/W	0.23	%
n x (A/W)	146.45	birds
P. Probability of bird being hit when flying through the rotor	0.08	
Mortality rate without avoidance	12.3	birds
(1 - avoidance rate)	0.02	
Mortality estimation per year	0.25	birds

Table 4-29 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	Est_MigRisk_all	# thru rotors	Mort. w/o avo.	Mort. w/ avo.
Eurasian Sparrowhawk	38	631.68	146.45	12.30	0.25
Common Buzzard	35	581.81	134.89	12.68	0.25
European Honey-buzzard	3	49.87	11.56	1.01	0.02
Levant Sparrowhawk	3	49.87	11.56	0.98	0.02
Eurasian Kestrel	1	16.62	3.85	0.36	0.01
Others	1	16.62	3.85	0.36	0.01
Total	81	1346.48	312.17	27.69	0.55

Sample collision risk calculation for resident species is shown in Table 4-30. Calculation for all species with risk above 0 is shown on Table 4-31.

Table 4-30 Mortality rate calculation for resident species in detail (autumn).

Variable	Value	Unit
Species	Common Buzzard	
Total duration of individual bird observations	3644.26	sec
Total duration of observations	45.72	hr/VP
Study Period	2024-09-01	
	2024-11-15	
Total migration hours	912	hr
Estimated total birds x seconds	72695.36	bird x sec
N	60	
Area	30393153	m2
height	180	m
Vw	5470767540	m3
Sweeping Area	905248	m2
r	69.3	m
d	4	m
L	0.58	m
Vr = N x πR2 x (d + l)	4141510	m3
n	72695.36	sec
n x (Vr / Vw)	55.03	sec
v	11.6	m/s
t = (d + l) / v	0.39	sec
n x (Vr / Vw) / t	139.54	birds
Probability of bird being hit when flying through the rotor	0.09	
Mortality rate without avoidance	13.12	birds
(1 - avoidance rate)	0.02	
Mortality estimation for study period	0.26	birds

Table 4-31 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.
Common Buzzard	3644	72695	55	140	13.12	0.26
Short-toed Snake-Eagle	3297	65766	51	146	12.69	0.25
Eurasian Kestrel	520	10375	7	17	1.61	0.03
Eurasian Sparrowhawk	442	8808	6	16	1.38	0.03
Booted Eagle	240	4788	4	9	0.81	0.02
Others	152	3035	2	6	0.54	0.01
Total	8295	165467	125	334	30.15	0.60

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[7] 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 4-32. The results demonstrate that baseline risk over the study period was

[7] 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 4-32 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 4-33.

Table 4-33 Additive Collision Risk Assessment summary for the Project Galeforce

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

The survey recorded a total of 104 bird species. Among these, 90 species have a breeding code, indicating active breeding. Notable sightings included the vulnerable European Turtle-Dove (*Streptopelia turtur*) and the near-threatened Woodchat Shrike (*Lanius senator*). The most common species observed were the Barn Swallow (*Hirundo rustica*), Common Wood-Pigeon (*Columba palumbus*), and European Bee-eater (*Merops apiaster*). Additionally, species observed during breeding bird surveys which are not breeding were included (denoted -) All species are listed in Table 4-34.

Table 4-34 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	Apr	May	Jun	Jul
Common Quail	*Coturnix coturnix*	LC	A2	-	1	-	-
Chukar	*Alectoris chukar*	LC	B4	2	-	-	2
Common Wood-Pigeon	*Columba palumbus*	LC	B6	6	4	4	6
European Turtle-Dove	*Streptopelia turtur*	VU	B4	2	2	2	2
Eurasian Collared-Dove	*Streptopelia decaocto*	LC	B5	6	1	-	-
Common Cuckoo	*Cuculus canorus*	LC	B4	3	2	-	1
Alpine Swift	*Tachymarptis melba*	LC	A1	3	10	-	6
Common Swift	*Apus apus*	LC	B4	10	50	5	6
Pallid Swift	*Apus pallidus*	LC	-	-	2	-	-
Yellow-legged Gull	*Larus michahellis*	LC	B4	30	29	4	105
Black Stork	*Ciconia nigra*	LC	C14	10	4	2	3
White Stork	*Ciconia ciconia*	LC	A1	2	5	-	3
Great Cormorant	*Phalacrocorax carbo*	LC	B3	7	6	-	2
Gray Heron	*Ardea cinerea*	LC	-	1	1	-	-
European Honey-buzzard	*Pernis apivorus*	LC	B5	5	19	-	2
Short-toed Snake-Eagle	*Circaetus gallicus*	LC	B3	2	3	3	1
Lesser Spotted Eagle	*Clanga pomarina*	LC	-	1	4	-	-
Booted Eagle	*Hieraaetus pennatus*	LC	A1	1	2	-	X
Golden Eagle	*Aquila chrysaetos*	LC	-	1	-	-	-
Levant sparrowhawk	*Tachyspiza brevipes*	LC	-	6	6	-	-
Eurasian Sparrowhawk	*Accipiter nisus*	LC	A1	2	1	1	1
Eurasian goshawk	*Astur gentilis*	LC	A1	1	-	-	X
Black Kite	*Milvus migrans*	LC	-	1	-	-	-
Common Buzzard	*Buteo buteo*	LC	B5	10	3	2	4
Long-legged Buzzard	*Buteo rufinus*	LC	A1	1	-	1	-
Tawny Owl	*Strix aluco*	LC	A2	1	X	-	-
Eurasian Hoopoe	*Upupa epops*	LC	B4	5	3	4	3
European Bee-eater	*Merops apiaster*	LC	B4	22	150	13	-
Eurasian Wryneck	*Jynx torquilla*	LC	A2	2	1	-	-
Middle Spotted Woodpecker	*Dendrocoptes medius*	LC	B4	2	2	3	2
Great Spotted Woodpecker	*Dendrocopos major*	LC	A1	1	1	-	-
Syrian Woodpecker	*Dendrocopos syriacus*	LC	B4	1	1	1	1
Lesser Spotted Woodpecker	*Dryobates minor*	LC	B4	1	1	-	1
Eurasian Green Woodpecker	*Picus viridis*	LC	A2	1	1	-	-

Common Name	Scientific Name	IUCN	Code	Apr	May	Jun	Jul
Eurasian Kestrel	*Falco tinnunculus*	LC	B3	2	2	1	1
Eleonora's Falcon	*Falco eleonorae*	LC	-	-	4	X	1
Eurasian Hobby	*Falco subbuteo*	LC	A1	1	2	-	X
Peregrine Falcon	*Falco peregrinus*	LC	-	-	1	-	-
Eurasian Golden Oriole	*Oriolus oriolus*	LC	B5	2	2	3	2
Red-backed Shrike	*Lanius collurio*	LC	C14	4	5	3	2
Masked Shrike	*Lanius nubicus*	LC	B7	-	1	-	2
Woodchat Shrike	*Lanius senator*	NT	C12	2	7	5	5
Eurasian Jay	*Garrulus glandarius*	LC	C12	6	7	6	4
Western jackdaw	*Coloeus monedula*	LC	-	3	-	11	-
Hooded Crow	*Corvus cornix*	LC	B4	10	6	4	1
Common Raven	*Corvus corax*	LC	B4	6	4	6	11
Coal Tit	*Periparus ater*	LC	C12	7	7	6	2
Sombre Tit	*Poecile lugubris*	LC	B5	3	6	9	1
Eurasian Blue Tit	*Cyanistes caeruleus*	LC	C14	4	5	1	5
Great Tit	*Parus major*	LC	C12	5	7	4	2
Wood Lark	*Lullula arborea*	LC	C12	7	8	3	6
Eurasian Skylark	*Alauda arvensis*	LC	A2	1	1	-	-
Crested Lark	*Galerida cristata*	LC	C12	9	12	12	8
Greater Short-toed Lark	*Calandrella brachydactyla*	LC	A2	4	1	-	-
Eastern Olivaceous Warbler	*Iduna pallida*	LC	A2	-	2	1	-
Barn Swallow	*Hirundo rustica*	LC	B4	100	100	13	46
Common House-Martin	*Delichon urbicum*	LC	B3	23	50	2	13
European red-rumped swallow	*Cecropis rufula*	LC	B3	7	10	8	10
Eastern Bonelli's Warbler	*Phylloscopus orientalis*	LC	B4	2	2	2	-
Common Chiffchaff	*Phylloscopus collybita*	LC	A2	9	7	1	1
Long-tailed Tit	*Aegithalos caudatus*	LC	B9	6	11	5	7
Eurasian Blackcap	*Sylvia atricapilla*	LC	B3	3	1	-	-
Lesser Whitethroat	*Curruca curruca*	LC	C12	4	2	-	2
Eastern Orphean Warbler	*Curruca crassirostris*	LC	B4	2	2	3	-
Sardinian Warbler	*Curruca melanocephala*	LC	B6	2	5	2	4
Eastern Subalpine Warbler	*Curruca cantillans*	LC	B7	6	1	4	2
Greater Whitethroat	*Curruca communis*	LC	C14	6	4	2	-
Goldcrest	*Regulus regulus*	LC	A1	1	-	-	-
Krüper's Nuthatch	*Sitta krueperi*	LC	A2	2	-	-	X
Eurasian Nuthatch	*Sitta europaea*	LC	B6	4	2	1	4
Short-toed Treecreeper	*Certhia brachydactyla*	LC	A2	2	-	-	2
Eurasian Wren	*Troglodytes troglodytes*	LC	A2	5	6	1	-
European Starling	*Sturnus vulgaris*	LC	C14	25	14	1	-
Mistle Thrush	*Turdus viscivorus*	LC	B4	3	2	3	7
Song Thrush	*Turdus philomelos*	LC	B3	2	2	X	-
Eurasian Blackbird	*Turdus merula*	LC	C14	8	7	4	5

Common Name	Scientific Name	IUCN	Code	Apr	May	Jun	Jul
Spotted Flycatcher	*Muscicapa striata*	LC	A1	-	1	-	-
European Robin	*Erithacus rubecula*	LC	C12	4	8	X	1
Common Nightingale	*Luscinia megarhynchos*	LC	B4	5	2	2	4
European Stonechat	*Saxicola rubicola*	LC	C12	2	4	-	1
Northern Wheatear	*Oenanthe oenanthe*	LC	B4	1	3	2	1
Isabelline Wheatear	*Oenanthe isabellina*	LC	B4	2	1	3	1
Eastern Black-eared Wheatear	*Oenanthe melanoleuca*	LC	C12	3	2	2	6
House Sparrow	*Passer domesticus*	LC	B6	10	5	6	15
Spanish Sparrow	*Passer hispaniolensis*	LC	B3	25	3	-	-
Eurasian Tree Sparrow	*Passer montanus*	LC	A1	-	-	-	2
Gray Wagtail	*Motacilla cinerea*	LC	B3	1	2	-	-
Western Yellow Wagtail	*Motacilla flava*	LC	-	1	-	-	-
White Wagtail	*Motacilla alba*	LC	B3	2	1	-	-
Tawny Pipit	*Anthus campestris*	LC	A2	-	1	-	-
Tree Pipit	*Anthus trivialis*	LC	-	1	-	-	-
Common Chaffinch	*Fringilla coelebs*	LC	C12	17	14	2	8
European Greenfinch	*Chloris chloris*	LC	B9	10	4	-	2
Eurasian Linnet	*Linaria cannabina*	LC	C14	10	4	4	4
European Goldfinch	*Carduelis carduelis*	LC	C14	20	10	8	9
European Serin	*Serinus serinus*	LC	C12	5	8	6	3
Eurasian Siskin	*Spinus spinus*	LC	A1	4	2	-	-
Black-headed Bunting	*Emberiza melanocephala*	LC	B4	1	4	5	-
Corn Bunting	*Emberiza calandra*	LC	B6	10	6	9	7
Cirl Bunting	*Emberiza cirlus*	LC	B6	3	6	4	4
Ortolan Bunting	*Emberiza hortulana*	LC	B4	1	1	2	-
Cretzschmar's Bunting	*Emberiza caesia*	LC	B3	-	2	-	-

4.5 Bat

Spring

Based on Auto-ID results, a total of 243,800 recordings were made. 71,736 recordings, or 29.42%, identified as bat recordings in spring (Table 4-35). Noise accounted for the majority of the recordings (172,064/243,800, or 70.58%), with an average nightly noise percentage ranging from 43.27% to 98.37%.

Table 4-35 Number of bat recordings and noise recorded each night based on Auto-ID in spring

Night	Detectors	Bat	Noise	Total	Noise Ratio	Analysis
1	30	1504	13732	15236	90.13%	
2	30	7500	21148	28648	73.82%	
3	30	12431	24124	36555	65.99%	Manual_ID
4	30	5811	15551	21362	72.80%	
5	30	6350	14977	21327	70.23%	Manual_ID
6	30	785	16390	17175	95.43%	
7	30	306	18503	18809	98.37%	
8	30	972	13076	14048	93.08%	
9	30	8646	10623	19269	55.13%	
10	30	14320	11527	25847	44.60%	
11	30	10214	7791	18005	43.27%	
12	30	2897	4622	7519	61.47%	
Total	-	71736	172064	243800	70.58%	-

Table 4-36 presents the distribution of bat recordings across 30 SPs based on Auto-ID results. SP27 had the highest average recordings, followed by SP22 and SP25. Night 10 recorded the highest bat activity (14,320), 58.2 times the average value, showing the highest potential of the site. Failures of the recorders are indicated by blank cells in the table.

Table 4-37 and Table 4-38 summarizes the results of the Manual-ID analysis of bat recordings for the selected nights (3 and 5), yielding a total of 19,356 recordings across 30 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 3.14%. 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 19,356 / 18,767 ≈ 103.14% of the total results from Auto-ID for spring.

The Auto-ID analysis of the bat sounds for all nights shows that the most common species was Common Pipistrelle (*Pipistrellus pipistrellus*), accounting for 72.02% of the total recordings and 86.14% when unidentified species are distributed evenly (Table 4-39). The second most common species is Savi's Pipistrelle (*Hypsugo savii*), with 1.97% of the total recordings and 2.36% when unidentified species are distributed evenly. Notably, the vulnerable species Schreiber's Bent-wing Bat (*Miniopterus schreibersii*) and Giant Noctule (*Nyctalus lasiopterus*) was recorded at a frequency of 1.42% and 0.09%. However, the software failed to identify more than 16.40% of the recordings.

Notably, the vulnerable species Schreiber's Bent-wing Bat (*Miniopterus schreibersii*) and Giant Noctule (*Nyctalus lasiopterus*) was recorded at a frequency of 1.42% and 0.09%. However, the software failed to identify more than 16.40% of the recordings.

When comparing the manual ID species records in Table 4-40 with the previous automatic ID analysis results, several key differences emerge. First, the Common Pipistrelle (*Pipistrellus pipistrellus*) is the most frequent species in both datasets, accounting for 72.02% of the total in the automatic ID analysis and 72.04% in the manual ID, showing close agreement between the two methods. Second, Savi's Pipistrelle (*Hypsugo savii*) appears less frequently in the manual ID dataset, contributing 1.83%, compared to 1.97% in the automatic ID analysis, suggesting that the automatic method may slightly overestimate its presence. Lastly, Schreiber's Bent-wing Bat (*Miniopterus schreibersii*) is recorded as 1.42% in the automatic ID analysis, while the manual ID shows a higher percentage at 3.44%, indicating that manual identification may be more sensitive to detecting this species.

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[8], making them potential subjects to possible curtailment planning. Figure 4-4 illustrates the activity patterns of these selected species throughout the night during the spring season, spanning from 17:00 to 06:00.

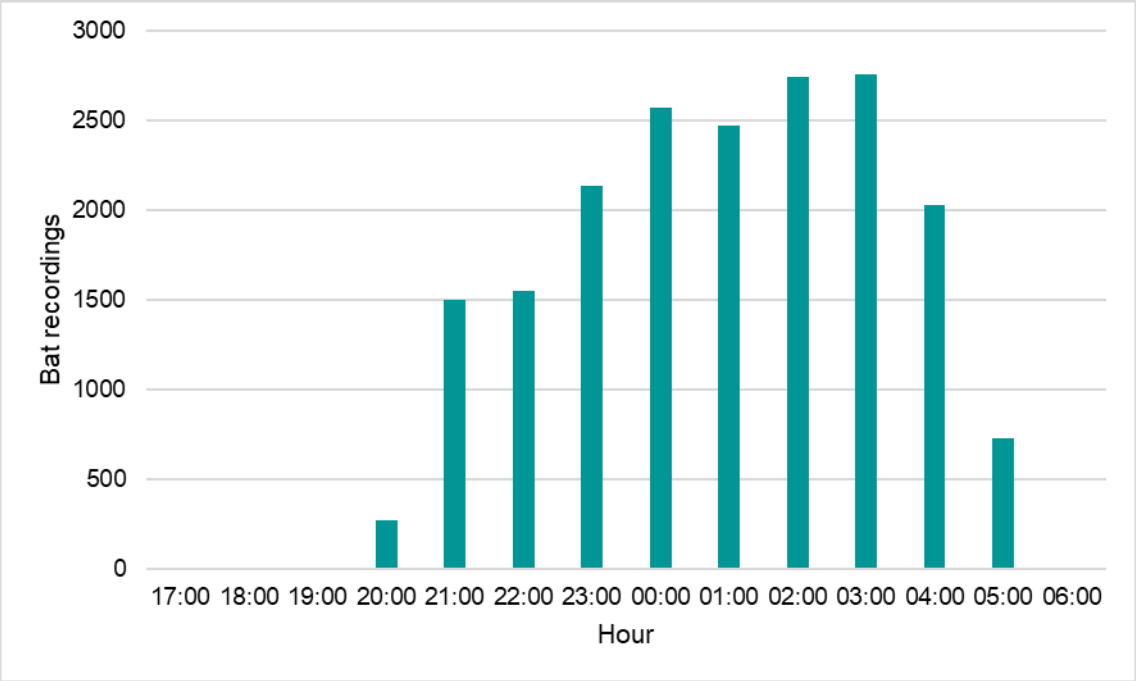


Figure 4-4 Hourly distribution of bat recordings through the night in spring

[8] Rodrigues L., Bach L., Dubourg-Savage M.J., Karapandža B., Kovač D., Kervyn T., ... and Mindermann J. (2014). Guidelines for consideration of bats in wind farm projects, Revision 2014. EUROBATS Publication Series No. 6. Bonn: UNEP/EUROBATS Secretariat.

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

Night	SP01	SP02	SP03	SP04	SP05	SP06	SP07	SP08	SP09	SP10	SP11	SP12	SP13	SP14	SP15	SP16	SP17	SP18	SP19	SP20	SP21	SP22	SP23	SP24	SP25	SP26	SP27	SP28	SP29	SP30	Total
1	43	8	3	47	17	26	16	96	1	174	578	456	39	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1504
2	71	277	80	123	131	296	147	280	58	223	740	885	123	417	494	44	155	322	117	318	504	883	593	219	0	0	0	0	0	0	7500
3	127	194	72	244	88	242	313	119	58	277	460	811	171	671	290	120	108	295	143	530	764	1222	201	231	1065	773	1068	483	616	675	12431
4	105	38	31	142	56	165	185	31	28	158	406	757	117	61	31	67	30	136	36	34	67	760	33	31	315	259	618	209	186	719	5811
5	82	18	1	77	39	8	86		9	127	269	415	4	24	139	19	42	228	36	51	104	809	89	34	563	245	1139	598	315	780	6350
6	18	0			22		3			53	36	4		2	4	3	1	13	29	18	17	63	15	8	169	12	151	127	8	9	785
7	0	0			70		3			8	3	0		1	2	1	1	2	14	39	0	13	12	0	26	1	30	66	12	2	306
8	10	1			50		10			31	251	12		0	3	3	2	15	11	34	8	53	12	3	142	15	142	126	21	17	972
9	187	38			132		46				256	750		33	168	50	70	636	86	33	400	662	192	67	671	883	1076	565	385	1260	8646
10	140	1069			443		204				588	584		568	230	101	92	306	252	1120	228	1847	311	365	1092	1339	1183	521	712	1025	14320
11	113	15			0		88				128	99		283	157	136	73	193	340	1299	0	739	867	205	1003	1238	1186	655	765	632	10214
12	0	0			0		0				0	0		0	1	4	6	20	84	56	0	69	68	49	765	138	458	344	162	673	2897
Average	90	184	37	127	105	147	100	132	31	131	338	477	91	229	138	50	53	197	104	321	262	647	218	121	581	490	705	369	318	579	246

Table 4-37 Distribution of bat recordings across SPs by selected nights based on Auto-ID results in spring

Night	Method	SP01	SP02	SP03	SP04	SP05	SP06	SP07	SP08	SP09	SP10	SP11	SP12	SP13	SP14	SP15	SP16	SP17	SP18	SP19	SP20	SP21	SP22	SP23	SP24	SP25	SP26	SP27	SP28	SP29	SP30	Total
3	Auto ID	127	194	72	244	88	242	313	119	58	277	460	811	171	671	290	120	108	295	143	530	764	1222	201	231	1065	773	1068	483	616	675	12431
5	Auto ID	82	18	0	77	39	8	86	0	0	127	269	415	0	24	139	19	42	228	36	51	104	809	89	34	563	245	1139	598	315	780	6336
Total	Auto ID	209	212	72	321	127	250	399	119	58	404	729	1226	171	695	429	139	150	523	179	581	868	2031	290	265	1628	1018	2207	1081	931	1455	18767

Table 4-38 Distribution of bat recordings across SPs by selected nights based on Manual-ID results in spring

Night	Method	SP01	SP02	SP03	SP04	SP05	SP06	SP07	SP08	SP09	SP10	SP11	SP12	SP13	SP14	SP15	SP16	SP17	SP18	SP19	SP20	SP21	SP22	SP23	SP24	SP25	SP26	SP27	SP28	SP29	SP30	Total
3	Manual ID	132	197	29	112	73	90	337	4	26	290	530	1004	158	815	306	120	107	313	140	565	870	1365	208	229	1241	792	1092	499	630	748	13022
5	Manual ID	82	19	0	58	5	1	88	0	0	130	246	416	0	25	140	18	41	235	23	25	109	833	86	33	622	250	1148	603	317	781	6334
Total	Manual ID	214	216	29	170	78	91	425	4	26	420	776	1420	158	840	446	138	148	548	163	590	979	2198	294	262	1863	1042	2240	1102	947	1529	19356

Table 4-39 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	SP07	SP08	SP09	SP10	SP11	SP12	SP13	SP14	SP15	SP16	SP17	SP18	SP19	SP20	SP21	SP22	SP23	SP24	SP25	SP26	SP27	SP28	SP29	SP30	Total	Percent	Percent_2
Pipistrelloid	PIPPIP	LC	445	1213	75	331	415	315	724	20	50	470	3179	3900	129	1420	1080	158	202	1123	304	2982	1428	6306	2033	623	2601	3791	5506	2650	2827	5363	51663	72.02%	86.14%
Pipistrelloid	HYPSAV	LC	25	168	2	5	149	18	52	0	3	4	90	199	1	47	23	11	4	20	43	6	19	45	21	25	147	106	47	45	26	62	1413	1.97%	2.36%
Pipistrelloid	MINSCH	VU	24	22	4	10	3	24	14	0	12	302	57	25	42	28	27	1	13	34	0	3	67	89	7	16	27	17	74	40	28	6	1016	1.42%	1.69%
Pipistrelloid	PIPKUH	LC	4	1	10	29	20	17	6	2	7	3	4	7	40	2	4	0	0	7	45	2	7	8	2	1	36	20	8	5	6	27	330	0.46%	0.55%
Pipistrelloid	PIPNAT	LC	10	3	0	3	1	1	7	0	0	1	1	10	0	1	1	2	1	4	8	14	16	34	8	9	47	94	11	7	5	2	301	0.42%	0.50%
Pipistrelloid	PIPPYG	LC	2	4	5	1	3	2	0	15	2	5	0	3	3	6	2	1	3	8	1	1	1	3	1	2	11	7	25	0	2	6	125	0.17%	0.21%
Nyctaloid	EPTSER	LC	25	0	2	1	27	3	1	3	1	5	52	8	3	132	9	17	48	367	13	13	87	36	20	27	606	17	48	73	28	5	1677	2.34%	2.80%
Nyctaloid	NYCLEI	LC	52	6	2	5	20	9	18	4	1	9	33	54	5	34	34	55	24	60	80	28	32	36	35	79	318	67	82	96	17	54	1349	1.88%	2.25%
Nyctaloid	NYCNOC	LC	2	0	14	11	10	5	25	30	2	15	5	50	2	38	92	27	24	32	38	22	22	10	15	25	22	22	87	6	4	10	667	0.93%	1.11%
Nyctaloid	VESMUR	LC	17	3	0	0	2	1	11	1	0	2	16	14	0	14	9	16	12	19	40	11	8	4	7	18	90	7	16	24	2	6	370	0.52%	0.62%
Nyctaloid	NYCLAS	VU	0	0	0	0	4	3	1	1	1	0	0	1	1	1	0	0	0	1	1	3	2	1	2	5	28	0	2	2	0	4	64	0.09%	0.11%
Tadarida	TADTEN	LC	7	3	1	6	23	36	12	11	14	14	9	8	24	3	6	13	4	3	24	195	8	7	25	15	127	2	26	8	2	9	645	0.90%	1.08%
Plecotus	PLESPE	NA	0	1	0	0	1	0	0	0	0	1	1	0	0	0	0	0	1	3	0	3	5	3	2	3	17	1	0	3	11	1	57	0.08%	0.10%
Myotis	MYOSPE	NA	3	0	1	13	1	16	2	2	3	5	1	0	1	1	2	3	3	4	9	4	12	22	18	4	56	6	25	12	2	5	236	0.33%	0.39%
Rhinolophus	RHIHIP	NT (E,M)	0	0	2	4	0	0	0	7	0	0	0	0	1	1	0	0	1	1	0	0	2	1	0	1	11	0	0	1	0	1	34	0.05%	0.06%
Rhinolophus	RHIFER	NT (E,M)	1	0	0	0	0	1	0	0	0	1	1	2	0	0	0	0	1	2	0	0	1	4	0	0	5	1	2	0	0	0	22	0.03%	0.04%
Rhinolophus	RHIEUR	VU (E,M)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	3	0	0	0	0	0	5	0.01%	0.01%
-	NoID	-	279	234	69	214	369	286	228	430	58	214	266	492	202	332	230	244	239	476	542	245	375	511	197	359	1659	745	1092	722	222	231	11762	16.40%	
Total	-	-	896	1658	187	633	1048	737	1101	526	154	1051	3715	4773	454	2060	1519	548	580	2166	1148	3532	2092	7120	2393	1212	5811	4903	7051	3694	3182	5792	71736	-	-

Table 4-40 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	SP07	SP08	SP09	SP10	SP11	SP12	SP13	SP14	SP15	SP16	SP17	SP18	SP19	SP20	SP21	SP22	SP23	SP24	SP25	SP26	SP27	SP28	SP29	SP30	Total	Percent
Pipistrelloid	PIPPIP	LC	99	176	17	142	34	68	311	1	13	195	509	861	92	508	272	45	65	287	32	467	688	1894	217	152	841	888	1978	896	870	1326	13944	72.04%
Pipistrelloid	MINSCH	VU	15	12	1	9	3	7	15	0	3	175	48	32	42	9	53	0	19	4	0	7	47	56	4	6	34	11	15	20	5	13	665	3.44%
Pipistrelloid	HYPSAV	LC	2	9	0	2	10	2	25	0	1	1	65	3	3	16	4	0	1	7	5	3	7	49	11	6	27	4	13	12	11	55	354	1.83%
Pipistrelloid	PIPKUH/PIPNAT	-	11	0	0	1	0	2	9	0	0	1	2	0	0	1	2	3	0	2	18	2	26	30	2	3	28	21	3	9	12	15	203	1.05%
Pipistrelloid	PIPPYG	LC	0	0	0	1	0	1	1	0	0	3	0	1	3	0	2	0	0	0	1	0	0	1	0	0	7	1	0	2	1	0	25	0.13%
Nyctaloid	NYCLEI	LC	71	15	4	3	28	5	45	0	6	35	82	228	6	118	63	67	49	113	102	92	112	76	44	82	570	79	176	118	36	104	2529	13.07%
Nyctaloid	EPTSER	LC	4	1	0	0	0	0	6	0	0	0	66	0	0	170	6	7	13	117	0	9	21	15	7	5	262	24	10	29	8	2	782	4.04%
Nyctaloid	NYCNOC	LC	2	0	5	7	2	2	0	2	3	4	0	8	0	13	39	12	1	9	0	2	1	1	1	3	6	8	30	0	1	3	165	0.85%
Nyctaloid	NYCLAS	VU	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14	0	0	0	0	1	15	0.08%
Tadarida	TADTEN	LC	2	1	0	1	0	3	10	1	0	2	4	0	9	0	0	0	0	1	0	6	2	3	2	3	25	6	4	2	0	5	92	0.48%
Plecotus	PLESPE	NA	0	0	0	0	0	0	1	0	0	0	0	0	0	2	0	0	0	0	0	0	2	2	0	0	2	0	0	4	2	2	17	0.09%
Myotis	MYOSPE	NA	0	2	0	2	1	1	1	0	0	3	0	0	2	0	2	4	0	5	4	1	12	18	6	1	25	0	10	4	0	1	105	0.54%
Rhinolophus	RHIFER	NT (E,M)	1	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	1	1	0	1	7	0	0	5	0	1	1	0	1	21	0.11%
Rhinolophus	RHIHIP	NT (E,M)	0	0	2	2	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	1	0	0	1	3	0	0	0	0	0	11	0.06%
Rhinolophus	RHIBLA	VU (E)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	3	0.02%
Rhinolophus	RHIEUR	VU (E,M)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	2	0.01%
Barbastella	BARBAR	VU (E)	7	0	0	0	0	0	1	0	0	0	0	0	0	2	3	0	0	0	0	1	59	46	0	0	10	0	0	5	1	1	136	0.70%
#N/A		#N/A	0	0	0	0	0	0	0	0	0	0	0	287	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	287	1.48%
Total	-	-	214	216	29	170	78	91	425	4	26	420	776	1420	158	840	446	138	148	548	163	590	979	2198	294	262	1863	1042	2240	1102	947	1529	19356	-

Summer

Based on the Auto-ID results, a total of 216,828 recordings were made (Table 4-41). Of these, 61,719 recordings, or 28.46%, were identified as bat recordings in the summer season. Noise accounted for the majority of the recordings, with 155,109 recordings, or 71.54%, being classified as noise. The average nightly noise percentage ranged from 63.03% to 84.59%, reflecting a significant presence of noise throughout the recording period.

Nights 1, 2, 4 and 5 were selected for manual species identification.

Table 4-41 Number of bat recordings and noise recorded each night based on Auto-ID in summer

Night	Detectors	Bat	Noise	Total	Noise Ratio	Analysis
1	30	2572	7602	10174	74.72%	Manual_ID
2	30	11100	18924	30024	63.03%	Manual_ID
3	30	7910	24286	32196	75.43%	
4	30	9991	25035	35026	71.48%	Manual_ID
5	30	10320	19040	29360	64.85%	Manual_ID
6	30	8585	17788	26373	67.45%	
7	30	3557	17726	21283	83.29%	
8	30	2441	7176	9617	74.62%	
9	30	3040	6445	9485	67.95%	
10	30	1409	7734	9143	84.59%	
11	30	794	3353	4147	80.85%	
Total	-	61719	155109	216828	71.54%	

Table 4-42 presents the distribution of bat recordings across 30 SPs based on Auto-ID results in the summer. SP29 had the highest average recordings, accounting for 999 out of all detections, followed by SP22 with an average of 898, and SP01 with 435. Night 2 recorded the highest bat activity, with 11,100 bat detections, a value that was 36.7 times higher than the average, indicating the highest potential of the site. Failures of the recorders are indicated by blank cells in the table.

Due to an insufficient number of detectors for summer surveys, samplings at SP03 and SP016 were incomplete and, as a result, these parts have been excluded from the analysis. The device shortage problem occurred during summer due to the stolen devices at Harmancık WPP (the details of which are provided in Harmancık WPP Supplementary Biodiversity Baseline Final Report for 2024) which required a last-minute change in device allocation plan across the different projects. The allocation was made from Uygar devices, and sampling stations that had low activity levels in spring which also had nearby stations with similar habitats were chosen as replacement devices for Harmancık WPP.

Table 4-43 and Table 4-44 summarizes the results of the Manual-ID analysis of bat recordings for the selected nights, yielding a total of 17,260 recordings across 30 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 85% of the total results from Auto-ID for the summer season.

The Auto ID of the sounds at all nights shows the most common species was Common Pipistrelle (*Pipistrellus pipistrellus*) with 35.46% recordings and with 60.37% recordings when non-id species are distributed evenly (Table 4-45). The second common species is Serotine

(*Eptesicus serotinus*) with 6.15% recordings and with 10.48% recordings when non-id species are distributed evenly. Schreiber's Bent-winged Bat (*Miniopterus schreibersii*) and Giant Noctule (*Nyctalus lasiopterus*) is listed as Vulnerable (VU) by IUCN were recorded. The software failed to identify more than 41.26% of the recordings.

When checking the Manual ID species of 17,260 records, there are notable differences in the species abundance compared to the Auto ID data (Table 4-46). For instance, Common Pipistrelle (*Pipistrellus pipistrellus*) represents 52.35% of the total recordings (9035 records) in the manual ID dataset, significantly higher than the 35.46% found in the auto ID data. Additionally, Lesser Noctule (*Nyctalus leisleri*) appears in 14.28% of the total recordings (2464 records) in the manual ID dataset, but it represents 3.07% from the auto ID dataset. Furthermore, Schreiber's Bent-winged Bat (*Miniopterus schreibersii*) shows a higher representation in the manual ID data at 7.17% (1238 records), compared to 2.40% in the auto ID dataset.

The bat activity during the hours of the night was analysed for *Pipistrelloid*, *Nyctaloid*, and *Tadarida* groups, as they are known to be high and middle altitude fliers[9] making them potential subjects to possible curtailment planning. Figure 4-5 represents the activity patterns of these selected species throughout the night during the summer season, spanning from 18:00 to 06:00.

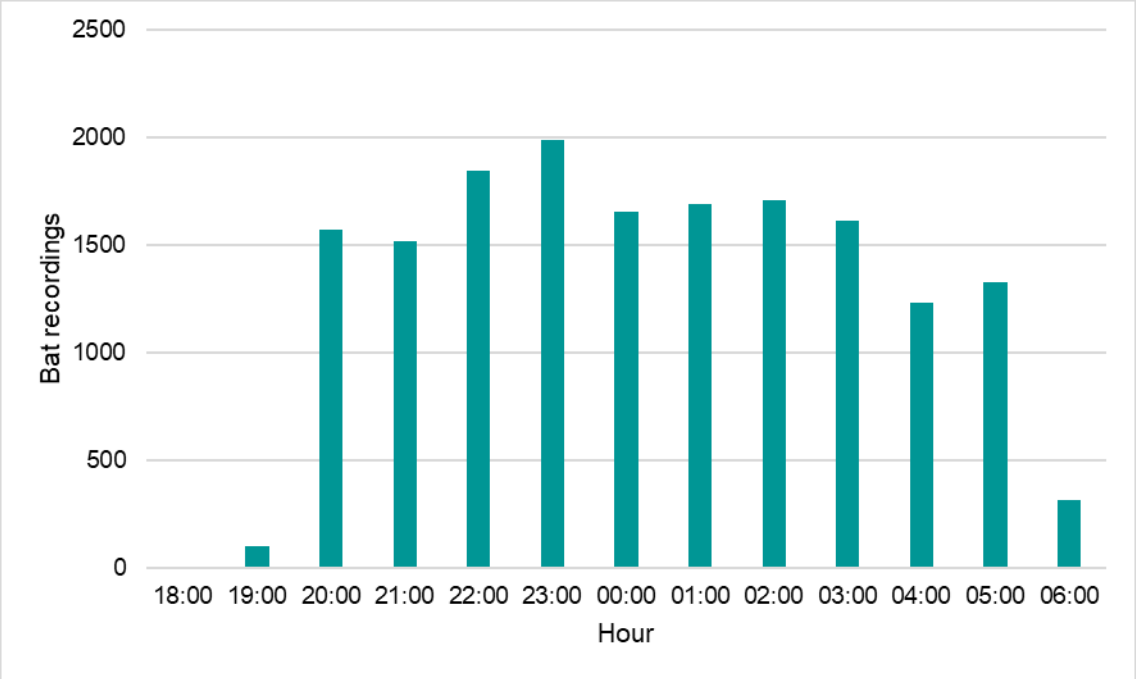


Figure 4-5 Hourly distribution of bat recordings through the night in summer

[9] Rodrigues L., Bach L., Dubourg-Savage M.J., Karapandža B., Kovač D., Kervyn T., ... and Mindermann J. (2014). Guidelines for consideration of bats in wind farm projects, Revision 2014. EUROBATS Publication Series No. 6. Bonn: UNEP/EUROBATS Secretariat.

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

Night	SP01	SP02	SP03	SP04	SP05	SP06	SP07	SP08	SP09	SP10	SP11	SP12	SP13	SP14	SP15	SP16	SP17	SP18	SP19	SP20	SP21	SP22	SP23	SP24	SP25	SP26	SP27	SP28	SP29	SP30	Total
1	720	54		198	128	120	136	94	91	383	109	481	58	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	2572
2	1385	30		155	216	51	111	86	82	312	172	947	143	36	216		173	713	186	144	663	949	463	247	530	355	659	420	1367	289	11100
3	291	18		106	57	36	43	55	25	160	109	418	482	18	340		61	294	109	34	334	886	390	243	366	434	247	500	1288	566	7910
4	339	30		242	147	141	170	79	239	234	133	117	43	95	292		173	723	335	49	358	1062	833	164	686	310	384	382	1364	867	9991
5	238	16		173	168	74	109	147	157	416	164	140	46	47	184		117	1166	154	57	377	1290	313	519	620	737	505	385	1684	317	10320
6	549	29		38	433	83	155	54	66	351	123	70	48	68	199		105	513	389	47	360	1733	455	212	964	663	340	336	194	8	8585
7	70	12			196	61	63	43	68	171	97	51	32	49	102		109	295	215	21	134	437	252	24	364	205	213	273			3557
8		9			2	41	50	119	42		112	35	18	2	136		96		9	71	195		303		32	640	234	295			2441
9		13				51	166	140	46		172	48	26		125		84			44			381			666	604	474			3040
10		26				54	129	15	90		65	44	15		12		109			41			81			171	331	226			1409
11		0				0	0	0	0		0	0	0		0		229			24			0			229	199	113			794
Ave	513	24		152	168	71	113	83	91	290	126	235	91	45	178		126	617	200	53	346	1060	386	235	509	441	372	340	1179	409	302
Ave_corrected	435	20		129	142	60	96	70	77	246	107	199	77	38	151		107	523	169	45	293	898	327	199	431	374	315	288	999	347	256

Table 4-43 Distribution of bat recordings across SPs by selected nights based on Manual-ID results in summer

Night	Method	SP01	SP02	SP04	SP05	SP06	SP07	SP08	SP09	SP10	SP11	SP12	SP13	SP14	SP15	SP17	SP18	SP19	SP20	SP21	SP22	SP23	SP24	SP25	SP26	SP27	SP28	SP29	SP30	Total
1	Manual ID	278	55	141	84	127	144	99	99	155	102	186	58	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1528
2	Manual ID	0	0	0	0	0	0	0	0	0	0	0	0	36	200	152	690	163	62	487	951	384	182	575	406	465	408	1495	184	6840
4	Manual ID	262	31	114	96	134	118	82	63	218	138	84	44	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1384
5	Manual ID	0	0	0	0	0	0	0	0	0	0	0	0	48	179	110	558	153	57	373	1128	274	156	713	860	498	408	1752	241	7508
Total	Manual ID	540	86	255	180	261	262	181	162	373	240	270	102	84	379	262	1248	316	119	860	2079	658	338	1288	1266	963	816	3247	425	17260

Table 4-44 Distribution of bat recordings across SPs by selected nights based on Auto-ID results in summer

Night	Method	SP01	SP02	SP04	SP05	SP06	SP07	SP08	SP09	SP10	SP11	SP12	SP13	SP14	SP15	SP17	SP18	SP19	SP20	SP21	SP22	SP23	SP24	SP25	SP26	SP27	SP28	SP29	SP30	Total
1	Auto ID	720	54	198	128	120	136	94	91	383	109	481	58	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2572
2	Auto ID	0	0	0	0	0	0	0	0	0	0	0	0	36	216	173	713	186	144	663	949	463	247	530	355	659	420	1367	289	7410
4	Auto ID	339	30	242	147	141	170	79	239	234	133	117	43	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1914
5	Auto ID	0	0	0	0	0	0	0	0	0	0	0	0	47	184	117	1166	154	57	377	1290	313	519	620	737	505	385	1684	317	8472
Total	Auto ID	1059	84	440	275	261	306	173	330	617	242	598	101	83	400	290	1879	340	201	1040	2239	776	766	1150	1092	1164	805	3051	606	20368

Table 4-45 Bat groups and species recorded during selected nights at each SP based on Auto-ID in summer

Group	Species	IUCN	SP01	SP02	SP04	SP05	SP06	SP07	SP08	SP09	SP10	SP11	SP12	SP13	SP14	SP15	SP17	SP18	SP19	SP20	SP21	SP22	SP23	SP24	SP25	SP26	SP27	SP28	SP29	SP30	Total	Percent	Percent_2
Pipistrelloid	PIPPIP	LC	659	133	355	318	257	498	417	250	574	614	282	134	96	555	331	1549	334	201	1456	3687	1829	385	696	1568	1363	1144	1642	559	21886	35.46%	60.37%
Pipistrelloid	MINSCH	VU	72	4	7	19	20	47	60	14	174	122	110	21	2	22	14	59	4	8	44	257	56	16	31	81	32	32	142	11	1481	2.40%	4.09%
Pipistrelloid	PIPKUH	LC	230	3	18	17	31	63	19	31	9	14	16	29	7	22	24	271	62	14	34	18	36	101	47	30	138	37	15	133	1469	2.38%	4.05%
Pipistrelloid	PIPNAT	LC	48	2	25	19	38	26	12	25	29	32	16	11	3	11	38	67	19	7	29	25	10	13	44	22	59	50	22	11	713	1.16%	1.97%
Pipistrelloid	HYPSAV	LC	97	2	15	12	59	32	21	18	18	21	52	10	4	9	9	25	25	7	1	11	16	6	28	54	61	30	14	41	698	1.13%	1.93%
Pipistrelloid	PIPPYG	LC	7	1	1	9	0	0	3	2	32	10	0	2	15	2	1	8	1	0	4	36	31	1	13	30	19	67	9	14	318	0.52%	0.88%
Nyctaloid	EPTSER	LC	238	15	12	45	17	28	22	72	21	15	354	227	22	42	92	77	77	36	137	53	129	90	235	36	207	104	1366	29	3798	6.15%	10.48%
Nyctaloid	NYCLEI	LC	31	5	7	7	55	9	24	19	26	19	36	9	11	16	46	66	21	14	25	23	51	37	191	480	286	272	91	17	1894	3.07%	5.22%
Nyctaloid	NYCNOC	LC	9	4	18	23	10	4	10	5	58	5	82	5	10	53	11	21	6	2	9	25	21	10	11	19	31	19	13	6	500	0.81%	1.38%
Nyctaloid	NYCLAS	VU	1	0	0	0	5	0	0	0	1	3	7	1	0	0	0	2	4	2	13	39	1	1	316	18	8	10	16	0	448	0.73%	1.24%
Nyctaloid	VESMUR	LC	7	1	3	7	15	9	8	6	7	13	3	6	4	6	18	20	11	1	7	7	13	10	17	40	32	33	39	4	347	0.56%	0.96%
Tadarida	TADTEN	LC	2	3	5	1	10	5	8	10	5	15	11	2	0	11	27	5	7	4	12	14	16	17	611	29	28	134	405	0	1397	2.26%	3.85%
Plecotus	PLESPE	NA	0	2	2	2	1	3	2	2	17	0	15	3	1	24	1	9	10	1	3	483	2	3	93	97	38	30	58	26	928	1.50%	2.56%
Myotis	MYOSPE	NA	36	0	1	2	0	4	5	8	6	5	13	1	0	2	2	12	13	4	20	14	13	5	61	21	14	23	20	10	315	0.51%	0.87%
Rhinolophus	RHIHIP	NT (E,M)	0	0	1	3	0	0	2	1	1	0	2	0	0	0	0	5	1	0	0	1	12	0	7	0	0	0	0	4	40	0.06%	0.11%
Rhinolophus	RHIFER	NT (E,M)	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	1	0	3	1	3	1	5	0	0	1	3	0	20	0.03%	0.06%
Rhinolophus	RHIEUR	VU (E,M)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	2	0.00%	0.01%
-	NoID	-	2155	62	442	863	194	403	219	443	1049	368	1352	450	140	831	642	1507	801	231	624	1663	1232	713	1154	1885	1400	1418	2042	1182	25465	41.26%	
Total	-	-	**3592**	**237**	**912**	**1347**	**712**	**1132**	**832**	**906**	**2027**	**1256**	**2351**	**911**	**315**	**1606**	**1256**	**3704**	**1397**	**532**	**2421**	**6357**	3471	1409	3562	4410	3716	3404	5897	2047	61719	-	-

Table 4-46 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	SP07	SP08	SP09	SP10	SP11	SP12	SP13	SP14	SP15	SP17	SP18	SP19	SP20	SP21	SP22	SP23	SP24	SP25	SP26	SP27	SP28	SP29	SP30	Total	Percent
Pipistrelloid	PIPPIP	LC	367	66	184	107	123	168	85	80	166	153	367	129	51	46	268	140	861	175	77	618	1481	462	213	319	605	462	320	1095	214	9035	52.35%
Pipistrelloid	MINSCH	VU	24	0	9	18	12	21	24	13	96	38	24	75	9	3	27	16	66	7	5	62	270	37	19	37	112	40	90	102	6	1238	7.17%
Pipistrelloid	PIPKUH/PIPNAT	-	37	1	21	15	33	37	12	21	11	8	37	9	7	6	27	23	69	33	7	29	54	17	10	81	27	49	36	17	28	725	4.20%
Pipistrelloid	HYPSAV	LC	20	0	7	6	32	9	8	6	8	4	20	24	6	1	2	6	7	11	2	0	10	3	1	9	19	14	2	8	26	251	1.45%
Pipistrelloid	PIPPYG	LC	1	0	1	9	0	0	3	1	43	4	1	2	2	4	3	4	1	0	0	3	15	10	1	11	22	5	3	4	10	162	0.94%
Nyctaloid	NYCLEI	LC	70	13	20	8	52	17	33	30	39	28	70	26	19	20	40	43	152	64	21	47	67	76	43	183	272	256	259	525	41	2464	14.28%
Nyctaloid	EPTSER	LC	12	6	6	7	4	5	7	4	2	3	12	2	4	4	6	20	45	3	4	59	34	14	29	110	23	99	22	1347	23	1904	11.03%
Nyctaloid	NYCLAS	VU	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	1	2	18	1	6	108	43	3	4	13	0	201	1.16%
Nyctaloid	NYCNOC	LC	0	0	0	0	1	0	0	1	0	0	0	0	1	0	1	3	5	0	0	1	6	9	6	1	7	9	5	3	4	63	0.37%
Tadarida	TADTEN	LC	1	0	0	1	2	2	0	1	2	0	1	1	0	0	4	0	0	8	0	6	9	0	2	320	50	4	51	46	0	510	2.95%
Plecotus	PLESPE	NA	0	0	2	0	0	0	0	1	0	0	0	0	0	0	0	2	14	4	0	5	79	1	1	42	65	7	2	36	45	306	1.77%
Myotis	MYOSPE	NA	6	0	1	2	0	3	5	2	6	2	6	0	1	0	1	4	18	6	2	27	31	17	5	52	20	14	20	45	18	308	1.78%
Rhinolophus	RHIFER	NT (E,M)	2	0	1	0	1	0	0	0	0	0	2	0	1	0	0	1	2	2	0	1	5	2	2	11	0	1	2	5	2	41	0.24%
Rhinolophus	RHIHIP	NT (E,M)	0	0	3	0	0	0	2	0	0	0	0	0	0	0	0	0	4	1	0	0	0	4	0	4	0	0	0	0	5	23	0.13%
Rhinolophus	RHIEUR	VU (E,M)	0	0	0	7	0	0	2	2	0	0	0	1	1	0	0	0	1	2	0	0	0	5	0	0	0	0	0	1	0	22	0.13%
Rhinolophus	RHIBLA	VU (E)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	2	0.01%
Barbastella	BARBAR	VU (E)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	3	4	0.02%
Total	-	-	540	86	255	180	261	262	181	162	373	240	540	270	102	84	379	262	1248	316	119	860	2079	658	338	1288	1266	963	816	3247	425	17260	-

Autumn

Based on Auto-ID results, a total of 168,166 recordings were made. Of these, 11,167 recordings, or 6.64%, were identified as bat recordings in autumn. Noise accounted for the majority of the recordings (93.36%), with an average nightly noise percentage ranging from 84.42% to 97.63%. A summary is shown on Table 4-47.

Nights 1, 2, 3, 9, and 10 were selected for manual species identification.

Table 4-47 Number of bat recordings and noise recorded each night based on Auto-ID in autumn

Night	Detectors	Bat	Noise	Total	Noise Ratio	Analysis
1	30	947	11567	12514	92.43%	Manual_ID
2	30	4409	23887	28296	84.42%	Manual_ID
3	30	680	28037	28717	97.63%	Manual_ID
4	30	436	17811	18247	97.61%	
5	30	592	7501	8093	92.69%	
6	30	534	10119	10653	94.99%	
7	30	744	17763	18507	95.98%	
8	30	311	10686	10997	97.17%	
9	30	750	8818	9568	92.16%	Manual_ID
10	30	1036	12001	13037	92.05%	Manual_ID
11	30	728	8809	9537	92.37%	
Total	-	11167	156999	168166	93.36%	-

Table 4-48 presents the distribution of bat recordings across 30 SPs based on Auto-ID results. SP13 had the highest average recordings, followed by SP20. Night 2 recorded the highest bat activity (4409), showing the highest potential of the site. Failures of the recorders are indicated by blank cells in the table.

Table 4-49 and Table 4-50 summarizes the results of the Manual-ID analysis of bat recordings for the selected nights (1, 2, 3, 9, and 10), yielding a total of 2773 recordings across 30 SPs over 5 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 1.65% of the total results from Auto-ID for autumn.

The Auto-ID analysis of bat recordings for all selected nights shows that the most common species was Common Pipistrelle (*Pipistrellus pipistrellus*), with 21.50% of the total recordings and 42.53% when non-identified species are distributed evenly. The second most common species was Kuhl's Pipistrelle (*Pipistrellus kuhlii*), with 12.69% of the total recordings and 25.10% when non-identified species are distributed evenly. Among the species recorded, Schreiber's Bent-winged Bat (*Miniopterus schreibersii*) and Giant Noctule (*Nyctalus lasiopterus*) are classified as Vulnerable (VU) by the IUCN, highlighting their conservation importance. The software failed to identify 49.44% of the total recordings (Table 4-51).

When the manual identification of 2,773 records in total is reviewed, differences between the two tables can be observed (Table 4-52). The highest proportion of records is constituted by the Common Pipistrelle (*Pipistrellus pipistrellus*), making up 57.12% of the total, whereas a lower percentage is accounted for in the first table. Similarly, a difference is shown by the Serotine (*Eptesicus serotinus*), contributing 10.35% in the second table, while a smaller proportion is held

in the first table. An increase is also shown by Nathusius' Pipistrelle or Kuhl's Pipistrelle (PIPKUH/PIPNAT), representing 10.57% of the total in the second table, compared to a lower percentage in the first.

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[10], making them potential subjects to possible curtailment planning. Figure 4-6 represents the activity patterns of these selected species throughout the night during the autumn season, spanning from 18:00 to 06:00.

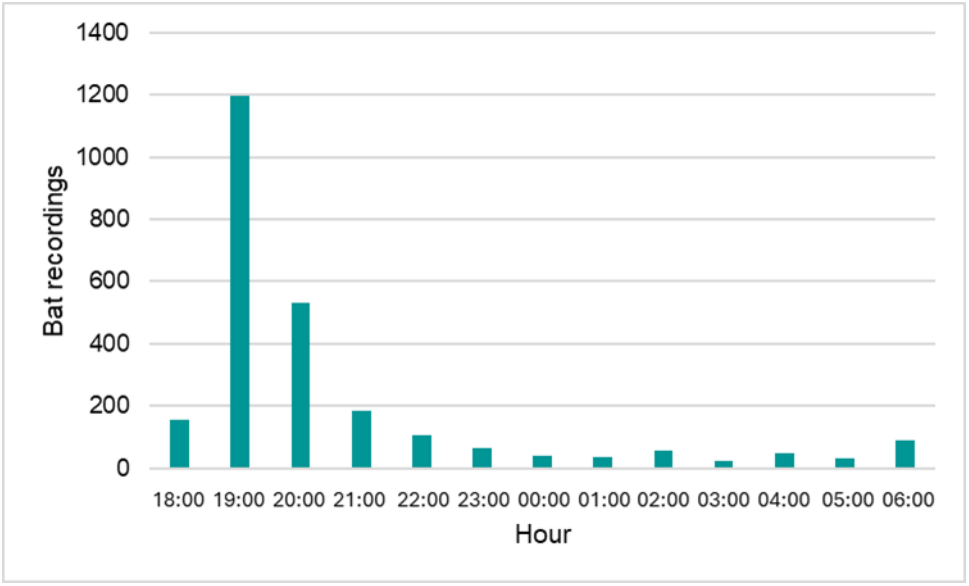


Figure 4-6 Bat groups and species recorded during the hours of the night in autumn

[10] Rodrigues L., Bach L., Dubourg-Savage M.J., Karapandža B., Kovač D., Kervyn T., ... and Mindermann J. (2014). Guidelines for consideration of bats in wind farm projects, Revision 2014. EUROBATS Publication Series No. 6. Bonn: UNEP/EUROBATS Secretariat.

Table 4-48 Distribution of bat recordings across SPs by night based on Auto-ID results in autumn

Night	SP01	SP02	SP03	SP04	SP05	SP06	SP07	SP08	SP09	SP10	SP11	SP12	SP13	SP14	SP15	SP16	SP17	SP18	SP19	SP20	SP21	SP22	SP23	SP24	SP25	SP26	SP27	SP28	SP29	SP30	Total
1	589	12	4	50	87	10	3	13	12	25	8	11	123	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	947
2	90	10	6	35	20	570	4	26	10	37	6	12	1379	2	10	55	28	96	106	306	88	115	607	30	278	33	53	150	180	67	4409
3	20	2	0	19	9	8	3	4	16	9	2	2	3	6	1	8	11	14	3	136	14	22	33	4	154	30	18	38	36	55	680
4	7	0	1	1	31	8	1	14	18	1	2	14	0	6	2	3	7	5	15	189	2	8	5	2	51	5	14	16		8	436
5	10	0	2	7	0	3	1	11	3	18	5	5	0		12	23	15	37	21	97	24	29	35	29	65	24	49	22		45	592
6	8	0	1	9	2	2	2	7	7	16	2	10	1		3	9	6	8	21	132	8	40	36	10	66	60	27	29		12	534
7	21	1	1	5	3	1	0	7	11	9	1	2	2		1	7	5	16	41	235	7	68	66	8	76	9	49	78		14	744
8	15		0	2	3	0	3	3	1	2	1	2	0		1	7	2	7	58	56	0	27	31	1	35	3	27	14		10	311
9	82		2	5	5	4	2	7	6	9	25	3	11		3	15	6	34	31	63	18	62	82	13	87	20	81	50		24	750
10	50		1	46	7	5	2	16	7	23	5	5	13		3	17	9	76	33	36	17	126	148	11	106	21	133	81		39	1036
11	0		0	0	0	0	0	0	0	0	0	0	0		0	3	3	8	106	379	1	26	22	3	33	5	86	31		22	728
Average	89	6	2	18	19	68	2	11	9	15	6	7	219	5	4	15	9	30	44	163	20	52	106	11	95	21	54	51	108	30	43
Average_corr	59	4	1	12	13	45	1	7	6	10	4	5	144	3	3	10	6	20	29	108	13	34	70	7	63	14	36	34	71	20	28

Table 4-49 Distribution of bat recordings across SPs by selected nights based on Auto-ID results in autumn

Night	Method	SP01	SP02	SP03	SP04	SP05	SP06	SP07	SP08	SP09	SP10	SP11	SP12	SP13	SP14	SP15	SP16	SP17	SP18	SP19	SP20	SP21	SP22	SP23	SP24	SP25	SP26	SP27	SP28	SP29	SP30	Total
1	Manual ID	116	12	4	48	88	10	4	13	5	28	6	10	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	349
2	Manual ID	0	6	0	0	0	0	0	0	0	0	0	0	0	0	9	57	26	87	19	217	75	116	145	27	225	35	54	144	198	57	1497
3	Manual ID	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	37	0	38
9	Manual ID	21	0	2	5	5	0	2	7	3	9	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	58
10	Manual ID	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	20	8	75	18	7	17	138	165	11	105	22	120	81	0	41	831
Total	Manual ID	137	18	6	53	93	10	6	20	8	37	8	12	5	1	12	77	34	162	37	224	92	254	310	38	330	57	174	225	235	98	2773

Table 4-50 Distribution of bat recordings across SPs by selected nights based on Manual-ID results in autumn

Night	Method	SP01	SP02	SP03	SP04	SP05	SP06	SP07	SP08	SP09	SP10	SP11	SP12	SP13	SP14	SP15	SP16	SP17	SP18	SP19	SP20	SP21	SP22	SP23	SP24	SP25	SP26	SP27	SP28	SP29	SP30	Total
1	Auto ID	589	12	4	50	87	10	3	13	12	25	8	11	123	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	947
2	Auto ID	0	10	0	0	0	0	0	0	0	0	0	0	0	0	10	55	28	96	106	306	88	115	607	30	278	33	53	150	180	67	2212
3	Auto ID	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	36	0	42
9	Auto ID	82	0	2	5	5	0	2	7	6	9	25	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	146
10	Auto ID	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	17	9	76	33	36	17	126	148	11	106	21	133	81	0	39	856
Total	Auto ID	671	22	6	55	92	10	5	20	18	34	33	14	123	6	13	72	37	172	139	342	105	241	755	41	384	54	186	231	216	106	4203

Table 4-51 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	SP07	SP08	SP09	SP10	SP11	SP12	SP13	SP14	SP15	SP16	SP17	SP18	SP19	SP20	SP21	SP22	SP23	SP24	SP25	SP26	SP27	SP28	SP29	SP30	Total	Percent	Percent_2
Pipistrelloid	PIPPIP	LC	78	12	3	73	68	4	3	9	7	56	5	22	2	0	10	46	18	124	13	28	77	334	366	38	424	123	148	165	76	69	2401	21.50%	42.53%
Pipistrelloid	PIPKUH	LC	6	0	1	2	4	104	1	4	3	1	1	7	879	1	0	6	4	5	17	269	1	14	35	0	17	0	9	16	1	9	1417	12.69%	25.10%
Pipistrelloid	HYPSAV	LC	2	0	0	2	0	0	1	0	3	1	0	0	0	0	0	0	0	0	6	152	0	0	8	1	8	1	9	1	0	5	200	1.79%	3.54%
Pipistrelloid	MINSCH	VU	41	0	0	6	2	0	1	9	1	17	1	2	1	0	0	1	1	9	1	2	3	2	6	1	48	9	16	11	5	2	198	1.77%	3.51%
Pipistrelloid	PIPNAT	LC	11	1	1	6	7	6	3	1	8	4	3	3	0	0	0	7	7	4	4	15	1	6	11	0	15	1	11	13	6	5	160	1.43%	2.83%
Pipistrelloid	PIPPYG	LC	2	1	0	0	2	0	0	0	1	0	0	0	0	0	0	1	0	0	0	2	0	0	0	0	8	1	4	0	0	0	22	0.20%	0.39%
Nyctaloid	NYCLEI	LC	13	1	1	0	2	5	1	2	3	12	3	7	1	1	5	8	3	15	10	20	3	40	46	7	16	9	53	20	13	37	357	3.20%	6.32%
Nyctaloid	EPTSER	LC	29	2	1	9	12	1	1	0	2	0	0	1	3	0	3	5	13	14	2	6	22	4	4	4	31	11	22	26	6	2	236	2.11%	4.18%
Nyctaloid	NYCNOC	LC	11	1	0	1	3	3	0	0	12	2	3	2	1	1	0	0	1	7	7	3	1	4	10	1	15	1	15	1	0	7	113	1.01%	2.00%
Nyctaloid	VESMUR	LC	10	0	0	1	0	3	0	3	1	1	1	1	0	0	1	8	1	3	0	4	1	10	2	1	18	2	4	11	2	7	96	0.86%	1.70%
Nyctaloid	NYCLAS	VU	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	1	3	0	3	3	3	1	7	1	0	41	1	2	68	0.61%	1.20%
Tadarida	TADTEN	LC	2	0	0	5	5	2	1	7	7	2	12	1	10	4	2	3	9	12	40	5	1	5	4	4	72	6	19	23	20	4	287	2.57%	5.08%
Plecotus	PLESPE	NA	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	2	2	1	0	10	2	0	11	4	1	36	0.32%	0.64%
Myotis	MYOSPE	NA	1	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	2	0	0	1	1	2	15	0	0	1	0	1	26	0.23%	0.46%
Rhinolophus	RHIFER	NT (E,M)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0.01%	0.02%
Barbastella	BARBAR	VU (E)	4	0	0	2	1	0	0	2	0	1	0	0	0	0	0	0	0	5	1	2	4	3	0	0	1	0	2	0	0	0	28	0.25%	0.50%
	NoID		680	7	11	72	61	483	9	71	43	50	28	20	635	7	14	62	34	102	328	1121	60	95	568	51	245	43	225	169	82	145	5521	49.44%	
Total	-	-	892	25	18	179	167	611	21	108	91	149	57	66	1532	14	36	147	92	301	435	1629	179	523	1065	111	951	210	537	509	216	296	11167	-	-

Table 4-52 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	SP07	SP08	SP09	SP10	SP11	SP12	SP13	SP14	SP15	SP16	SP17	SP18	SP19	SP20	SP21	SP22	SP23	SP24	SP25	SP26	SP27	SP28	SP29	SP30	Total	Percent
Pipistrelloid	PIPPIP	LC	55	11	1	29	58	2	0	8	1	24	2	2	1	0	8	48	19	102	12	14	63	184	229	18	222	45	87	127	162	50	1584	57.12%
Pipistrelloid	PIPKUH/PIPNAT	-	13	0	2	3	11	4	2	1	1	2	4	1	2	1	0	8	7	9	9	121	3	11	13	1	15	1	9	15	11	13	293	10.57%
Pipistrelloid	MINSCH	VU	13	2	0	3	5	0	0	3	0	2	0	2	0	0	0	1	1	7	1	0	1	1	4	2	30	0	26	31	4	2	141	5.08%
Pipistrelloid	HYPSAV	LC	2	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	83	0	0	1	0	2	0	5	0	0	3	98	3.53%
Pipistrelloid	PIPPYG	LC	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	3	0	0	9	0.32%
Nyctaloid	NYCLEI	LC	5	1	0	1	0	3	0	0	1	6	1	6	0	0	2	7	2	5	5	1	2	39	48	5	13	2	37	23	35	25	275	9.92%
Nyctaloid	EPTSER	LC	45	3	2	17	17	1	3	4	4	1	1	1	2	0	1	13	5	39	4	5	22	9	8	12	19	5	8	16	18	2	287	10.35%
Nyctaloid	NYCNOC	LC	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	0	0	0	2	0	6	0.22%
Nyctaloid	NYCLAS	VU	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	2	0	0	4	0.14%
Tadarida	TADTEN	LC	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	1	5	0	3	0	1	2	1	1	16	0.58%
Plecotus	PLESPE	NA	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.04%
Myotis	MYOSPE	NA	3	0	0	0	1	0	0	0	0	1	0	0	0	0	1	0	0	0	2	0	1	6	2	0	15	0	1	6	2	1	42	1.51%
Rhinolophus	RHIFER	NT (E,M)	0	0	0	0	0	0	0	4	1	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	8	0	0	0	0	1	16	0.58%
Rhinolophus	RHIHIP	NT (E,M)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0.04%
Total	-	-	137	18	6	53	93	10	6	20	8	37	8	aw	5	1	12	77	34	162	37	224	92	254	310	38	330	57	174	225	235	98	2773	-

Transect Surveys

Based on transect surveys, a total of 9563 recordings were made. 6111 recordings, or 63.86%, were identified as bat recordings in spring, summer and autumn. Noise accounted for the majority of the recordings, with 3452 noise recordings, or 36.10%, of the total. The average nightly noise percentage ranged from 22.18% to 91.39% (Table 4-53).

Table 4-53 Number of bat recordings and noise recorded each night during transect surveys

Date	Bat	Noise	Total	Noise Ratio
2024-05-26	39	414	453	91.39%
2024-05-27	121	148	269	55.02%
2024-05-28	635	33	668	4.94%
2024-05-29	534	24	558	4.30%
2024-05-30	371	418	789	52.98%
2024-05-31	435	190	625	30.40%
2024-08-29	371	221	592	37.33%
2024-08-30	289	273	562	48.58%
2024-08-31	233	85	318	26.73%
2024-09-01	607	228	835	27.31%
2024-09-02	214	61	275	22.18%
2024-09-03	586	211	797	26.47%
2024-10-15	178	208	386	53.89%
2024-10-16	160	205	365	56.16%
2024-10-17	151	203	354	57.34%
2024-10-18	151	76	227	33.48%
2024-10-19	322	160	482	33.20%
2024-10-20	310	144	454	31.72%
2024-10-21	199	86	285	30.18%
2024-10-22	205	64	269	23.79%
Total	6111	3452	9563	36.10%

The Auto-ID of the sounds from all nights shows the most common species was Common Pipistrelle (*Pipistrellus pipistrellus*) with 34.74% of the recordings, and with 47.61% of the recordings when non-ID species are distributed evenly. Notably, the second most common species is Noctule (*Nyctalus noctule*) with 27.64% of the recordings, and with 37.88% of the recordings when non-ID species are distributed evenly (Table 4-54)

When checking the manual ID species of 3857 total records, there are some noticeable differences in species distribution compared to the Auto-ID results. Common Pipistrelle (*Pipistrellus pipistrellus*) shows a significant shift, accounting for 69.30% of the manual identification records, compared to 34.74% in the Auto-ID data, indicating a higher proportion of *Pipistrellus pipistrellus* in the manual process. On the other hand, Noctule (*Nyctalus noctule*), which represented 27.64% of the Auto-ID records, makes up only 11.49% in the manual identification. Schreiber's Bent-winged Bat (*Miniopterus schreibersii*) and Giant Noctule (*Nyctalus lasiopterus*) is listed as Vulnerable (VU) by IUCN were recorded during mobile surveys (Table 4-55).

Table 4-54 Bat groups and species recorded during transect surveys based on Auto-ID results. Each column shows different transects (labeled with letters) at different months (labeled with the month number).

Group	Species	IUCN	06_M1a	06_M1b	06_M1c	06_M1d	06_M1e	06_M1f	08_M1a	08_M1b	08_M1c	08_M1d	08_M1e	08_M1f	10_M1a	10_M1b	10_M1c	10_M1d	10_M1e	10_M1f	10_M1g	10_M1h	Total	Percent	Percent_2
Pipistrelloid	PIPPIP	LC	4	18	413	390	250	234	87	59	29	258	38	241	2	8	0	2	15	19	17	39	2123	34.74%	47.61%
Pipistrelloid	HYPSAV	LC	0	0	0	6	2	1	5	5	1	7	1	3	1	2	2	2	6	4	0	3	51	0.83%	1.14%
Pipistrelloid	MINSCH	VU	0	0	4	0	5	4	13	2	2	3	1	6	4	0	0	0	1	0	0	0	45	0.74%	1.01%
Pipistrelloid	PIPKUH	LC	0	0	1	1	0	1	2	4	1	1	3	3	0	0	0	0	1	0	0	0	18	0.29%	0.40%
Pipistrelloid	PIPNAT	LC	0	0	0	0	0	2	0	0	0	4	0	1	1	0	0	0	0	0	1	0	9	0.15%	0.20%
Pipistrelloid	PIPPYG	LC	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	2	0.03%	0.04%
Nyctaloid	NYCNOC	LC	11	36	7	30	31	60	122	118	111	163	80	175	58	62	59	69	171	155	96	75	1689	27.64%	37.88%
Nyctaloid	NYCLEI	LC	5	14	10	4	8	14	24	21	14	26	20	18	15	18	18	15	19	21	5	15	304	4.97%	6.82%
Nyctaloid	EPTSER	LC	0	0	47	19	1	15	3	1	0	6	1	2	1	0	0	0	1	0	0	0	97	1.59%	2.18%
Nyctaloid	VESMUR	LC	0	1	3	1	4	5	6	2	3	10	4	7	3	2	0	2	4	4	3	3	67	1.10%	1.50%
Nyctaloid	NYCLAS	VU	0	0	1	0	0	0	0	0	2	1	5	0	0	1	0	0	1	0	2	1	14	0.23%	0.31%
Tadarida	TADTEN	LC	1	4	0	1	1	2	2	1	1	2	0	1	0	0	0	0	0	1	1	3	21	0.34%	0.47%
Plecotus	PLESPE	NA	0	0	0	2	0	0	0	1	0	1	0	4	0	0	0	0	0	0	0	0	8	0.13%	0.18%
Myotis	MYOSPE	NA	0	0	2	1	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	1	6	0.10%	0.13%
Rhinolophus	RHIHIP	NT (E,M)	0	1	0	0	0	0	0	0	0	1	0	0	1	0	1	0	0	0	0	0	4	0.07%	0.09%
Rhinolophus	RHIFER	NT (E,M)	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.02%	0.02%
-	NoID	-	18	47	147	79	68	97	107	74	68	124	61	125	92	67	71	60	102	106	74	65	1652	27.03%	
Total	-	-	39	121	635	534	371	435	371	289	233	607	214	586	178	160	151	151	322	310	199	205	6111	-	-

Table 4-55 Bat groups and species recorded during transect surveys based on Manual ID results. Each column shows different transects (labeled with letters) at different months (labeled with the month number).

Group	Species	IUCN	06_M1a	06_M1b	06_M1c	06_M1d	06_M1e	06_M1f	08_M1a	08_M1b	08_M1c	08_M1d	08_M1e	08_M1f	10_M1a	10_M1b	10_M1d	10_M1e	10_M1f	10_M1g	10_M1h	Total	Percent
Pipistrelloid	PIPPIP	LC	4	18	543	475	257	291	95	67	37	334	56	333	7	11	4	26	32	25	58	2673	69.30%
Pipistrelloid	MINSCH	VU	0	1	45	24	27	15	17	1	1	5	2	13	8	1	0	1	0	0	0	161	4.17%
Pipistrelloid	PIPKUH/PIPNAT	-	0	0	6	3	1	2	6	4	3	25	5	20	1	0	0	0	0	1	1	78	2.02%
Pipistrelloid	HYPSAV	LC	0	0	2	20	7	1	3	8	0	18	0	6	0	0	0	0	0	0	2	67	1.74%
Pipistrelloid	PIPPYG	LC	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0.03%
Nyctaloid	NYCLEI	LC	0	3	31	12	45	64	7	15	11	72	23	100	3	3	7	0	9	11	27	443	11.49%
Nyctaloid	EPTSER	LC	0	2	63	44	1	28	4	1	5	35	9	31	3	0	1	5	1	9	2	243	6.31%
Nyctaloid	NYCLAS	VU	0	0	1	0	0	0	4	1	2	2	10	0	0	1	0	0	0	1	2	24	0.62%
Nyctaloid	NYCNOC	LC	0	0	0	0	0	0	1	0	0	0	2	0	0	0	0	0	1	1	0	5	0.13%
Tadarida	TADTEN	LC	0	0	0	0	1	0	1	0	1	5	11	6	0	0	0	0	0	1	9	35	0.91%
Plecotus	PLESPE	NA	0	0	2	2	0	0	0	1	5	24	8	55	0	0	0	0	0	0	0	97	2.51%
Myotis	MYOSPE	NA	0	0	5	6	0	4	0	1	2	1	0	0	0	0	0	0	0	4	0	23	0.60%
Barbastella	BARBAR	VU (E)	0	0	1	2	0	0	0	0	0	1	0	2	0	0	0	0	0	0	0	6	0.16%
Total	-	-	4	24	699	588	339	405	138	99	67	522	126	566	22	16	13	32	43	53	101	3857	-

Heat maps are currently available exclusively for the summer (Figure 4-7) and autumn (Figure 4-8 and Figure 4-9) seasons, as no tracks were recorded during the spring mobile surveys. Without these tracks, proper data for a comprehensive analysis is lacking.

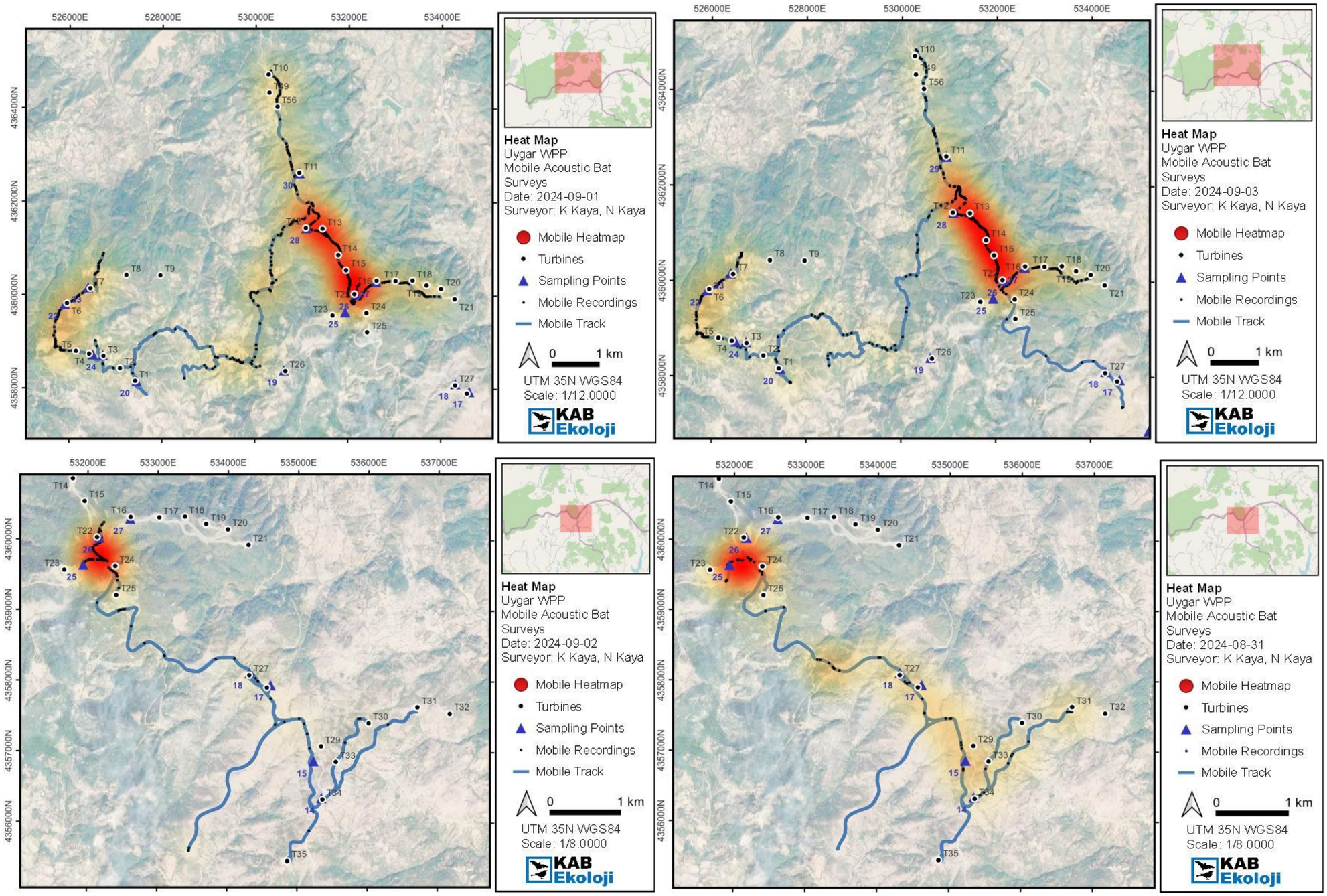


Figure 4-7 Heat maps from transect surveys in summer

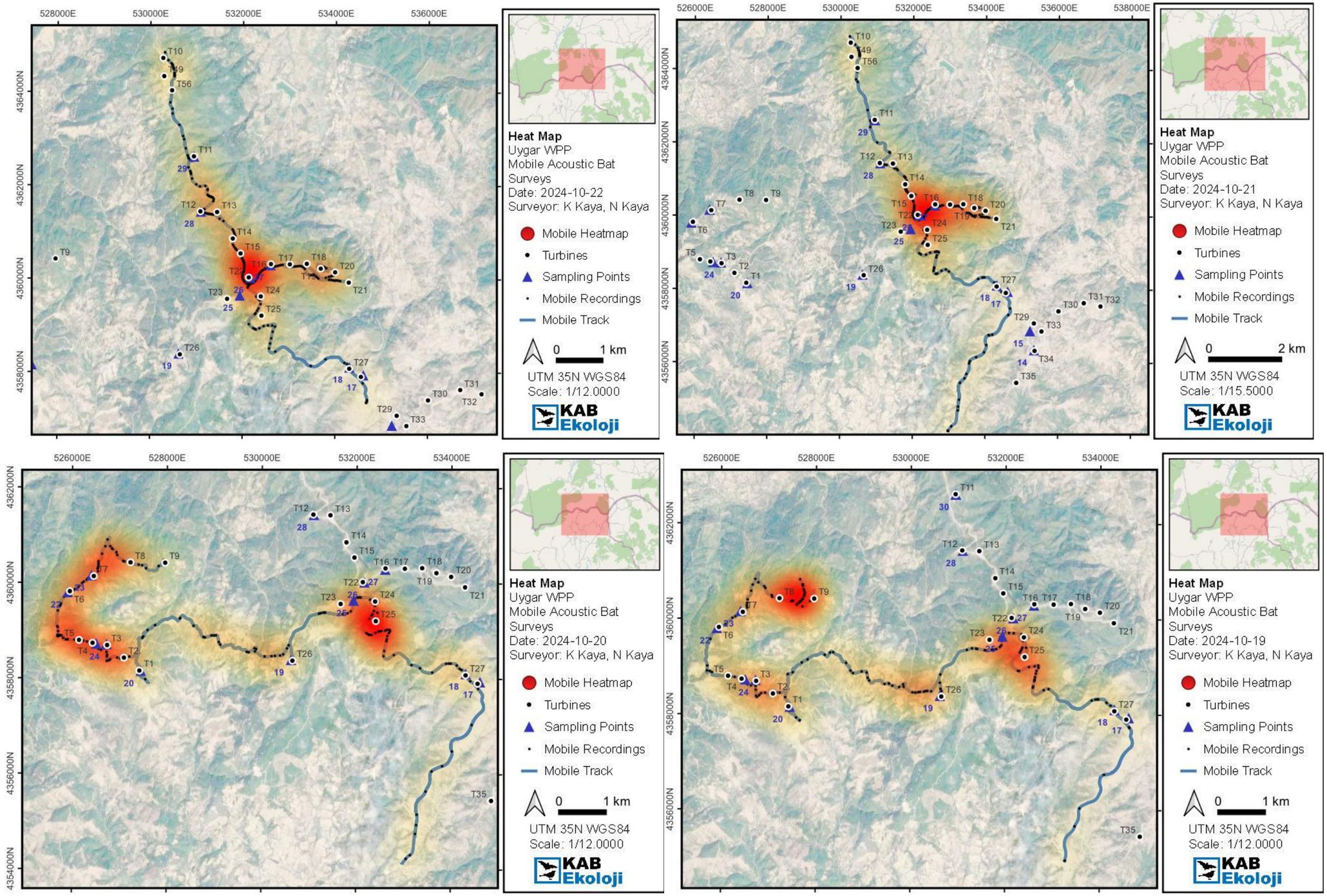


Figure 4-8 Heat maps from transect surveys in autumn - I

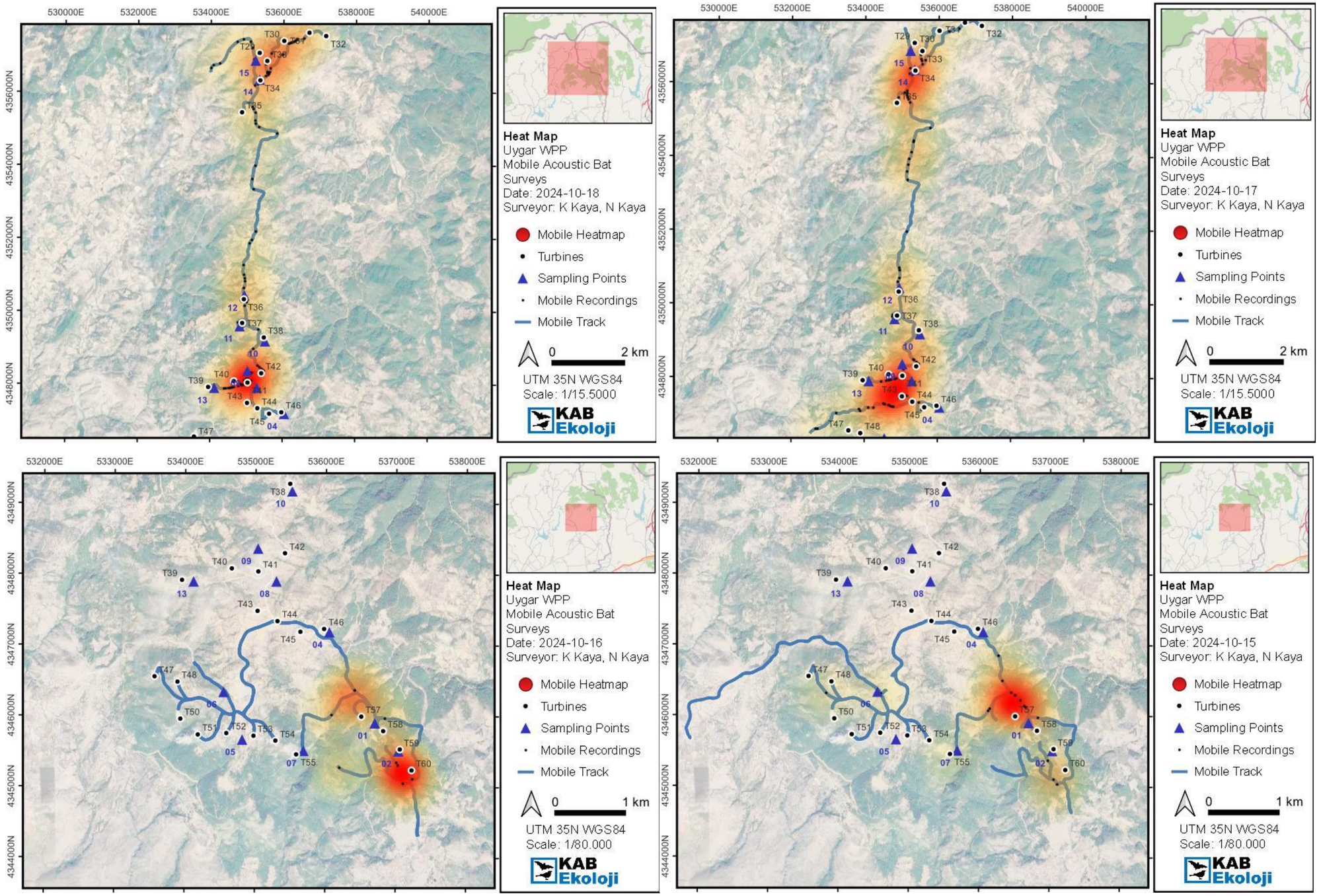


Figure 4-9 Heat maps from transect surveys in autumn - II

5 Discussion

5.1 Flora

- The seed of *Cirsium balikesirense and Digitalis trojana* are collected and delivered to Ankara Seed-Gen Bank. The species exhibits good population densities within the region and their distribution have scattered.
- There is no data different from which was identified in the local EIA process for the ETL and access road.

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.
- All species are classified as Least Concern (LC). Roe deer, a mammal species of national importance, is classified as Least Concern. Presence of a good Roe Deer population in the area was confirmed with conservations with locals. Roe deer has been recorded as literature data.
- The monitoring period and frequency for the terrestrial 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 herpetofauna 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

For spring VP surveys, an average of 37 hours has been spent at seven vantage points for bird surveys. A total of 253 birds were counted during the observations, comprising 19 migrant birds and 228 resident birds. Among these observed birds, 73 passed through the risk zone of the wind farm. The collision risk modelling for spring indicated a rate of 0.11 and 0.67 for migrant and resident birds, respectively.

For summer VP surveys, an average of 44 hours has been spent at seven vantage points for bird surveys. A total of 256 birds were counted during the observations, comprising 251 resident birds. Among these observed birds, only 158 passed through the risk zone of the wind farm. The collision risk modelling for summer indicated a rate of 0.57 for resident birds.

For autumn VP surveys, an average of 45 hours has been spent at seven vantage points for bird surveys. A total of 330 birds were counted during the observations, comprising 136 migrant birds and 188 resident birds. Among these observed birds, 246 passed through the risk zone of the wind farm. The collision risk modelling for autumn indicated a rate of 0.55 and 0.60 collisions for migrant and resident birds, respectively.

The bird survey conducted at the site indicates low spring migration movement, with only limited activity observed, suggesting that the collision risk for migrating birds is low. However, autumn activity is surprisingly high at the project at 2.97 birds/hr. In comparison autumn rates at Harmancık WPP which is located on a known minor route was 1.15 birds/hr. Considering that effort duration in Harmancık was doubled to 72 hr/VP per migration season, activity at Uygar is at least equivalent to minor route activity. Autumn VP survey effort should be increased to 72 hr/VP moving forward in order to capture migratory activity better.

During autumn, 40% of all observed species were migrants. Several migratory species, including the Common Buzzard (*Buteo buteo*), Eurasian Sparrowhawk (*Accipiter nisus*), and European Honey Buzzard (*Pernis apivorus*), have been observed in the project for a total of at least 6 species up to 8 including unidentified raptors. The minor migration routes in Western Anatolia remain poorly understood, as limited studies have focused on this subject. Though Türkiye's birdwatching and eBird user communities have been rapidly expanding, a lot of the inner region areas are remote and does not currently receive much citizen science attention. Therefore, WPP bird baseline and monitoring surveys often end up expanding the scientific understanding of this region. The presence of migrating birds near the project suggests that some individuals utilizing the Dardanelles crossing may concentrate in this area as part of their autumn migration route toward southern Turkey. While this observation was somewhat unexpected, it is consistent with this broader migratory pattern.

Overall Uygar WPP is ranked third in annual additive collision risk as detailed in the additive collision assessment sections. The project, however, is very large with its 60 turbines and on a per turbine per year basis the collision risk does not appear elevated above the other projects.

During VP ETL surveys, majority of observed species are classified as Least Concern (LC). The most frequently observed species at risk height was Common Buzzard (*Buteo buteo)*. Only near threatened species observed during ETL surveys was Dalmatian Pelican (*Pelecanus crispus*). The species were not recorded flying at the risk height. Bird observations indicate that passages are relatively evenly distributed along the transmission line route and a high risk segment was not identified.

The Dalmatian Pelican (*Pelecanus crispus*) has four breeding sites in Turkey: Manyas Lake, Gediz Delta, Büyük Menderes Delta in the west, and Akta Lake in the east. These birds frequently travel between breeding sites and additional feeding areas, such as dam lakes, a movement pattern confirmed through satellite tracking.

The project is located directly along the route between two critical sites, Manyas Gölü near Bandırma and the Gediz Delta near İzmir, which are approximately 200 km apart—a distance a Dalmatian Pelican can cover within a few hours. This confirms that the species actively moves between these key locations. Additionally, Dalmatian Pelicans occasionally utilize reservoirs as feeding areas.

Coverage at the southern end of the ETL could be improved. A monitoring station could have been established near the southern terminus, close to Hamidiye Village; resulting in a 3 km coverage gap. To compensate, a correction factor was applied by assuming a hypothetical vantage point in the southern section, using bird species and numbers observed at VP ETL6 as a reference. This adjustment led to an approximate 20% increase in data. This assumption is considered reasonable, as the terrain south of VP ETL6 transitions from hilly to flatlands, where similar species are expected to occur.

The assumption is deemed reasonable, as the terrain south of VP ETL6 transitions from hilly to flatlands, where similar bird species are expected. Despite these considerations, bird observations along the ETL remain very low, with an average of approximately 4 km per segment. The recorded maximum value is 0.32, the median is 0.15, and the minimum is 0.02 birds/hour/segment.

During the breeding bird surveys, the majority of observed species are classified as Least Concern (LC) and are both common and widespread. The only globally threatened species recorded was the European Turtle Dove (*Streptopelia turtur*). Despite its status, this species is common and widespread in Türkiye and is known for its fast and low flight, which reduces its susceptibility to turbine collisions, as supported by carcass search data in Türkiye.

The presence of the Chukar (*Alectoris chukar*) at the project site is considered a key indicator, likely attributed to the site's inaccessibility and the resulting low hunting pressure. Although this game bird is widespread, native genetic stocks are often compromised due to release programs. To support the conservation of native Chukar populations, the project may consider measures to limit hunter access and enforce hunting restrictions. The species is currently classified as Least Concern (LC) in terms of conservation status.

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, thought 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. During the analyses, it was observed that some detectors failed or stopped recording on certain nights. During spring, more than half of the recording period was affected by the failure of 7 detectors, while in summer, 15 detectors failed, and in autumn, failures were experienced by only 3 detectors. To overcome the issues related to the missing nights at certain Sampling Points, the average bat passes for each Sampling Point were calculated. Additionally, due to theft of acoustic devices in Harmancık WPP in the summer, devices from 2 of the least active and most representable SPs in Uygar WPP had to be allocated to Harmancık.

The highest bat activity was recorded particularly at the following SPs:

- In spring, SP27, 22, 25, 30 and 26
- In summer, SP22 and 29
- In autumn activity was notably very low, with SP13 showing an uptick of activity in night 2.

Transect surveys conducted during summer and autumn showed similar findings, with higher bat activity recorded at SP01 and SP02, SP10 through SP13, SP14 and SP15, SP20 through SP23, and SP25 and SP26.

Seasonal changes in activity levels were also observed. Higher activity was exhibited by stations SP20–SP23 in spring and particularly in summer, followed by a significant decline in autumn. A similar seasonal pattern was noted in the SP25–SP30 area. During transect surveys along the track between turbines T12 and T20, video footage capturing extremely high bat activity was recorded by the surveyor. In these videos, dozens of bats were visible simultaneously, illustrating the intensity of activity in this area.

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 150-250 recordings / night / turbine for the Project in the spring season, 150-250 recordings / night / turbine in summer, and 20-100 recordings / night / turbine in autumn which is notably very low and possibly attributable to construction disturbance, specifically blasting.

During spring, the species composition of bat activity was dominated by the Common Pipistrelle (*Pipistrellus pipistrellus*), accounting for 72% of the recorded calls. The Lesser Noctule (*Nyctalus leisleri*) contributed 13%, while the Schreiber's Bent-winged Bat (*Miniopterus schreibersii*), a globally threatened species, represented 3% of the activity. These results highlight the predominance of *Pipistrellus pipistrellus* during this season, with notable contributions from other species.

During summer, the species composition of bat activity was dominated by the Common Pipistrelle (*Pipistrellus pipistrellus*), accounting for 52% of the total recorded calls. The Lesser Noctule (*Nyctalus leisleri*) represented 14%, followed by the Serotine Bat (*Eptesicus serotinus*) at 11%. The Schreiber's Bent-winged Bat (*Miniopterus schreibersii*), a globally vulnerable species, contributed 7%, while Kuhl’s Pipistrelle (*Pipistrellus kuhli*) or Nathusius' Pipistrelle (*Pipistrellus nathusii*) made up 4%. Other species included the European Free-tailed Bat (*Tadarida teniotis*) at 3%, Myotis species (*Myotis* spp.) at 2%, and Long-eared Bats (*Plecotus* spp.) at 2%.

During autumn, the species composition of bat activity showed notable diversity. The Common Pipistrelle (*Pipistrellus pipistrellus*) was the most dominant species, accounting for 57% of the total recorded calls. Nathusius'/Kuhl’s Pipistrelle (*Pip nat*/*kuh*) followed at 11%. The Schreiber's Bent-winged Bat (*Miniopterus schreibersii*), a globally vulnerable species, accounted for 5%. Among Nyctaloid bats, Serotine Bat (*Eptesicus serotinus*) accounted for 10%, while the Lesser Noctule (*Nyctalus leisleri*) represented 9%. The European Free-tailed Bat (*Tadarida teniotis*) was also present, making up 0.01% of the total activity.

A remarkable diversity of bat species is exhibited in the area, with activity peaking in spring and summer and declining in autumn. The forest ecosystem is highly healthy and substantial populations of the Lesser Noctule (*Nyctalus leisleri*), typically found in humid forests of northwestern Turkey, are supported. The presence of the Schreiber's Bent-winged Bat (*Miniopterus schreibersii*) suggests the existence of cave roosts in the area. High-mountain bats such as the Savi’s Pipistrelle (*Hypsugo savii*) and the European Free-tailed Bat (*Tadarida teniotis*), both of which prefer rocky habitats with crevices, are also supported by the ecosystem. This biodiversity underscores the ecological richness and importance of the region.

Significant findings were revealed by roost searches conducted at Uygar WPP. Supplementary field visits, conducted jointly by the Consultant’s Bat Specialist and the Project Company’s Biodiversity Specialist between 6-9 November 2024, identified the presence of multiple cavities and at least two large caves at T23. The surveys consisted of visual searches at the location

and interviews with residents of the nearby villages. The cavities were examined, photographed, and bat recordings were obtained. The caves are not easily accessible, and the deployment of mountaineering and caving experts on site would be required to further investigate the two large caves on the hill where T23 is located, within a distance of 100-250 meters. However, interviews with residents of Yukariada, Tasdibi, and Derekoy villages verbally confirmed one of the caves as being at least 150 meters in length and containing a high abundance of bat guano, described as “waist deep” by one resident. Additionally, the presence of a sizable water reservoir within the hill is suspected due to a permanent spring originating from the rock, within 200-250 meters of T23, indicating further evidence of large underground systems in the T23 locality. Overall, the presence of sizable cave systems and a large colony of bats is implied for the T23 area, which may be a breeding cave based on the high activity recorded in spring and summer.

Both acoustic activity levels and findings of cavities and caves in Uygar North / T23 area converge on increased bat presence, suitable habitat for breeding or hibernating activities of cavity-dwelling bat species colonies, and a high-risk situation for habitat loss, disturbance, injury and mortality of sensitive bat species during both construction and operation phases of the project.

5.6 Monitoring and Mitigation Implications

The implications for additional project monitoring and mitigation measures based on final results are summarised below:

- Flora: The monitoring actions outlined in the BMP should be implemented, and the current status should be presented and evaluated in progress reports. During the first three years of the operational phase, the target flora species should be monitored, and the results of these monitoring activities should be evaluated thereafter
- Habitats: All natural habitats, including ETL areas should be monitored for disturbances, with BMP actions implemented and progress evaluated in reports.
- Bird species:
    - Due to unexpectedly high rates of migratory movement in autumn indicating a previously unknown (due to research and citizen science data gaps) migratory corridor, autumn VP survey effort should be increased to at least 72 hr/VP moving forward.
    - Project need for shutdown on demand should be reevaluated based on expanded autumn migration coverage.
- Bat species:
    - Both the identified cave at T23, and potential other caves at the area encompassed between T10 and T23 need to be explored through further studies, including caving expeditions if possible. Presence and population of bats in the cave at T23 is uncertain along with any irreversible impact sustained by any such colony since application of mitigation hierarchy, including no net loss or net gain measures, would depend on the habitat lost and the colony affected.
    - It is recommended that turbine curtailment measures be directed toward the turbines contained on the northern side at the T10-T23 alignment during operation phase.
    - A prominent peak in activity was identified during autumn shortly after sunset (at 19:00), which could be a consideration for curtailment measures.
    - The population of the Schreiber’s Bent-winged Bat (*Miniopterus schreibersii*), a globally threatened species, should be closely monitored to ensure its conservation.
- Fauna: The monitoring actions outlined in the BMP should be implemented, with progress reports.

- 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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6.6 Bird Survey Conditions

Spring

Date	Surveyor	VP	Cloud %	WindDir	WindSp (m/s)	Prec(mm)	Temp (°)	Vis (km)
12/04	MÜ	VP1	30	N	7	0	20	10
12/04	YÖG	VP2	30	N	6	0	18	10
12/04	NY	VP3	30	NE	13	0	21	15
12/04	NY	VP3	30	N	7	0	18	15
12/04	MY	VP6	0	NE	14	0	22	10
12/04	CG	VP7	10	NE	14	0	22	10
13/04	YÖG	VP2	30	N	7	0	19	10
13/04	MÜ	VP1	30	NE	6	0	16	10
13/04	MY	VP4	0	NE	15	0	21	10
13/04	BD/CG	VP5	0	N	26	0	22	10
14/04	MY	VP6	0	NE	12	0	23	10
14/04	CG	VP7	0	NE	14	0	23	10
15/04	CG	VP4	0	NE	4	0	25	10
15/04	BD	VP5	0	N	4	0	27	10
16/04	CG	VP6	20	SW	4	0	25	10
16/04	CG	VP7	50	SW	8	0	25	10
10/05	MY	VP6	100	NE	11	2	20	10
10/05	CG	VP7	100	NE	11	5	19	5
11/05	CG	VP7	100	NE	12	0	17	5
11/05	MY	VP6	100	NE	13	0	17	10
12/05	CG	VP4	20	NE	10	0	19	10
12/05	BD	VP5	20	NE	7	0	20	10
13/05	BD	VP5	50	NE	8	0	17	10
13/05	CG	VP4	70	NE	9	0	17	10
21/05	MÜ	VP1	0	NE	2	-	22	20
21/05	YÖG	VP2	10	N	2	-	21	10
21/05	NY	VP3	10	N	2	2	21	10
22/05	MÜ	VP1	50	W	4	-	30	15
22/05	YÖG	VP2	50	W	5	2	24	15
22/05	NY	VP3	50	W	5	2	24	10
07/06	CG	VP7	70	N	8	0	30	10
07/06	MY	VP6	60	NE	8	0	29	10
08/06	CG	VP7	10	N	11	0	28	10
08/06	MY	VP6	10	NE	9	0	30	10
09/06	CG	VP4	40	N	8	0	28	10
09/06	BD	VP5	0	N	5	0	29	10
10/06	BD	VP5	10	N	2	0	35	10
10/06	CG	VP4	0	N	5	0	35	10
12/06	NY	VP3	0	S	4	-	35	15
12/06	MÜ	VP1	0	S	2	-	31	20
12/06	YÖG	VP2	0	S	2	-	35	16
13/06	MÜ	VP1	10	W	4	-	31	20

13/06	YÖG	VP2	20	W	5	-	35	18
13/06	NY	VP3	20	W	5	-	35	20

Summer

Date	Surveyor	VP	Cloud %	WindDir	WindSp (m/s)	Prec(mm)	Temp (°)	Vis (km)
29/06	NK	VP1	10	NE	22	0	27	4
29/06	KK	VP2	10	NE	22	0	27	4
30/06	NK	VP2	10	NE	19	0	27	5
30/06	KK	VP3	10	NE	19	0	27	5
01/07	NK	VP2	10	NE	14	0	30	5
01/07	KK	VP3	10	NE	14	0	30	5
09/07	MY	VP6	0	NE	13	0	34	10
09/07	CG	VP7	0	NE	12	0	35	10
09/07	NK	VP1	10	NE	18	0	32	5
09/07	KK	VP3	10	NE	18	0	32	5
10/07	CG	VP7	0	NE	13	0	33	10
10/07	MY	VP6	0	NE	12	0	32	10
10/07	KK	VP1	10	NE	19	0	30	4
10/07	NK	VP3	10	NE	19	0	30	5
11/07	BD	VP5	50	N	13	2	29	10
11/07	CG	VP4	60	NE	12	0	30	10
12/07	CG	VP4	40	NE	11	0	30	10
12/07	BD	VP5	40	N	14	0	31	10
13/07	MÜ	VP1	10	NE	6	-	27	10
13/07	YÖG	VP2	30	NE	6	-	30	15
13/07	NY	VP3	30	NE	6	-	30	20
14/07	MÜ	VP1	10	NE	7	-	30	10
14/07	YÖG	VP2	30	N	7	-	30	15
14/07	NY	VP3	30	NE	7	-	31	20
26/07	MY	VP6	40	NE	8	0	31	10
26/07	CG	VP7	40	NE	9	0	32	10
27/07	CG	VP7	40	NE	11	0	31	10
27/07	MY	VP6	40	NE	10	0	30	10
28/07	CG	VP4	0	NE	10	0	32	10
28/07	BD	VP5	0	N	7	0	32	10
29/07	CG	VP4	10	NE	11	0	33	10
29/07	BD	VP5	10	N	7	0	33	10
30/07	BD	VP5	0	N	14	0	29	10
30/07	CG	VP4	10	NE	12	0	32	10
30/07	MY	VP6	0	NE	8	0	31	10
11/08	CG	VP7	0	NE	13	0	33	10
11/08	MY	VP6	0	NE	12	0	32	10
12/08	MÜ	VP1	0	NE	5	-	26	20
12/08	NY	VP3	0	NE	5	-	31	20
12/08	YÖG	VP2	0	NE	5	-	30	15
12/08	MY	VP7	0	NE	11	0	34	10

12/08	CG	VP4	0	NE	10	0	32	10
13/08	MÜ	VP1	0	NE	4	-	28	20
13/08	NY	VP3	0	E	3	-	30	20
13/08	YÖG	VP2	0	E	3	-	30	20
13/08	BD	VP5	0	NE	8	0	35	10
13/08	CG	VP4	0	NE	8	0	36	10

Autumun

Date	Surveyor	VP	Cloud %	WindDir	WindSp (m/s)	Prec(mm)	Temp (°)	Vis (km)
03/09	CG	VP7	40	NE	8	0	31	10
03/09	MY	VP6	60	NE	6	0	30	10
04/09	MY	VP6	50	NE	9	0	31	10
04/09	CG	VP7	50	NE	10	0	30	10
05/09	CG	VP4	0	NE	8	0	30	10
05/09	BD	VP5	10	NE	6	0	31	10
06/09	YÖG	VP2	0	NE	4	-	28	20
06/09	MÜ	VP1	0	NE	6	-	31	20
06/09	NY	VP3	30	NE	5	-	27	20
06/09	CG	VP4	10	NE	9	0	31	10
06/09	BD	VP5	0	NE	8	0	30	10
07/09	YÖG	VP2	50	NE	5	-	27	15
07/09	MÜ	VP1	10	NE	5	-	28	15
07/09	NY	VP3	50	NE	4	-	26	20
21/09	MY	VP6	80	NE	10	0	23	10
21/09	CG	VP7	70	NE	10	0	24	10
22/09	CG	VP7	60	NE	9	0	26	10
22/09	MY	VP6	70	NE	10	0	25	10
23/09	BD	VP5	30	NE	9	0	25	10
23/09	CG	VP4	60	NE	7	0	26	10
24/09	BD	VP5	70	SW	2	0	26	10
24/09	CG	VP4	70	NE	5	0	27	10
06/10	MÜ	VP2	50	SW	5	-	25	20
06/10	NY	VP3	50	SW	5	-	27	20
06/10	YÖG	VP1	50	SW	6	-	22	17
07/10	MÜ	VP2	80	NW	2	5	23	15
07/10	NY	VP3	50	S	4	-	23	15
07/10	YÖG	VP1	50	S	4	-	23	15
15/10	CG	VP7	20	NE	8	0	25	10
15/10	MY	VP6	30	NE	7	0	24	10
16/10	CG	VP7	10	NE	10	0	23	10
16/10	MY	VP6	0	NE	10	0	22	10
17/10	BD	VP5	80	NE	11	0	16	10
17/10	CG	VP4	80	NE	10	0	18	10
18/10	CG	VP4	70	NE	9	0	17	10
18/10	BD	VP5	70	NE	11	0	16	10
02/11	CG	VP1	0	S	2	0	21	10

02/11	MY	VP2	0	S	2	0	21	10
02/11	BD	VP3	0	SW	5	0	22	10
03/11	BD/MY	VP5	70	NE	10	0	16	10
03/11	CG	VP4	70	NE	11	0	18	5
04/11	BD	VP3	0	NE	10	0	13	10
04/11	MY	VP2	0	NE	8	0	13	10
04/11	CG	VP1	10	NE	11	0	13	10
05/11	MY	VP6	0	NE	14	0	14	10
05/11	CG	VP7	10	NE	14	0	15	10

6.7 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
12/04	VP1	11:23	Butbu	1	60	bccc----------	patrolling	Resident
12/04	VP1	14:32	Butbu	1	75	ccccc----------	patrolling	Resident
12/04	VP1	14:32	Butbu	2	270	ccccbccccccccccb--	hunting/foraging	Resident
12/04	VP1	16:09	Butbu	1	90	bbccbb----------	patrolling	Resident
12/04	VP2	15:38	Accni	1	15	b----------	migrating	Migrant
12/04	VP2	16:10	Butbu	1	30	ba----------	patrolling	Resident
12/04	VP2	16:37	Cicci	1	15	c----------	other	Resident
12/04	VP2	16:57	Accni	1	30	ab----------	migrating	Migrant
13/04	VP2	11:59	Cicni	2	30	cc----------	migrating	Migrant
13/04	VP2	12:01	Butbu	1	15	c----------	migrating	Migrant
13/04	VP2	12:02	Falsp	1	30	bc----------	migrating	Migrant
13/04	VP2	12:27	Butbu	2	15	a----------	soaring	Resident
13/04	VP2	12:42	Butbu	3	45	cbc----------	other	Resident
13/04	VP2	12:44	Accni	1	45	abc----------	migrating	Migrant
13/04	VP2	12:49	Accxx	1	15	a----------	soaring	U
13/04	VP2	13:01	Accni	1	30	bc----------	migrating	Migrant
13/04	VP2	13:11	Accni	1	45	cbc----------	migrating	Migrant
13/04	VP2	13:20	Cirga	1	90	abcccb----------	hunting/foraging	Resident
13/04	VP2	13:57	Butbu	4	60	bcbc----------	soaring	Resident
13/04	VP2	14:23	Cirga	1	45	aba----------	hunting/foraging	Resident
13/04	VP2	15:15	Accni	1	45	cbc----------	soaring	Resident
….								

Summer

Date	VP	Time	Spec*	Number	Dur (sec)	Flight_Height	Behaviour	Status
13/07	VP1	10:02	Cirga	1	60	cbba----------	patrolling	Resident
13/07	VP1	10:27	Butbu	1	30	ba----------	soaring	Resident
13/07	VP1	10:37	Butbu	2	270	ccccccccccccccccbb--	patrolling	Resident
13/07	VP1	11:32	Butbu	1	30	cc----------	patrolling	Resident
13/07	VP1	11:32	Butbu	1	30	ba----------	hunting/foraging	Resident
13/07	VP1	11:47	Butbu	1	30	bc----------	soaring	Resident
13/07	VP1	13:19	Butbu	2	60	ccbb----------	patrolling	Resident
14/07	VP1	13:41	Butbu	1	30	bc----------	soaring	Resident
14/07	VP1	13:58	Cirga	1	30	bc----------	patrolling	Resident
14/07	VP1	16:07	Butbu	2	30	ba----------	other	Resident
13/07	VP2	11:04	Cirga	1	15	c----------	other	Resident
13/07	VP3	11:24	Butbu	1	60	cccc----------	patrolling	Resident
13/07	VP3	13:17	Butbu	1	90	cccccc----------	patrolling	Resident

13/07	VP3	13:42	Butbu	1	60	bbbb----------	patrolling	Resident
13/07	VP3	16:10	Butbu	1	120	cccccccc----------	patrolling	Resident
14/07	VP3	13:02	Butbu	1	90	cccccc----------	patrolling	Resident
14/07	VP3	14:17	Falti	1	90	bbbbcc----------	other	Resident
14/07	VP3	15:54	Butbu	1	60	bbbb----------	patrolling	Resident
12/08	VP1	10:02	Butbu	1	30	ba----------	patrolling	Resident
12/08	VP1	10:27	Butbu	1	60	aabc----------	patrolling	Resident
12/08	VP1	10:28	Butbu	2	120	bbcccccc----------	patrolling	Resident
….								

Autumn

Date	VP	Time	Spec*	Number	Dur (sec)	Flight_Height	Behaviour	Status
06/09	VP2	12:02	Butbu	1	15	a----------	other	Resident
06/09	VP1	11:23	Accni	1	30	ba----------	hunting/foraging	Resident
06/09	VP1	11:43	Butbu	1	45	bbc----------	soaring	Resident
06/09	VP1	13:32	Cirga	1	45	bab----------	hunting/foraging	U
06/09	VP3	11:40	Falti	1	60	bbbb----------	other	Resident
06/09	VP3	13:11	Butbu	1	90	ccbbcc----------	patrolling	Resident
06/09	VP3	15:47	Butbu	1	180	cccccccccccc--------	patrolling	Resident
07/09	VP1	09:47	Accni	2	15	a----------	other	Resident
07/09	VP1	09:59	Butbu	1	15	b----------	patrolling	Resident
07/09	VP1	10:54	Butbu	1	30	ba----------	other	Resident
07/09	VP1	11:48	Accni	1	60	bccc----------	patrolling	Resident
07/09	VP1	12:59	Cirga	1	150	bbcccccccc----------	hunting/foraging	Resident
07/09	VP3	13:44	Butbu	1	90	ccbbbb----------	patrolling	Resident
06/10	VP3	13:01	Accni	2	45	bbb----------	migrating	Migrant
06/10	VP3	14:23	Accni	1	30	bb----------	migrating	Migrant
06/10	VP3	15:58	Butbu	1	90	cccccc----------	patrolling	Resident
07/10	VP3	14:03	Accni	1	45	bbb----------	migrating	Migrant
06/10	VP1	12:07	Butbu	2	45	aba----------	patrolling	Resident
06/10	VP1	12:46	Perap	1	120	cccbcccc----------	migrating	Migrant
06/10	VP1	15:45	Accni	1	45	ccc----------	migrating	U
06/10	VP1	15:53	Accxx	1	15	b----------	other	U
….								

6.8 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

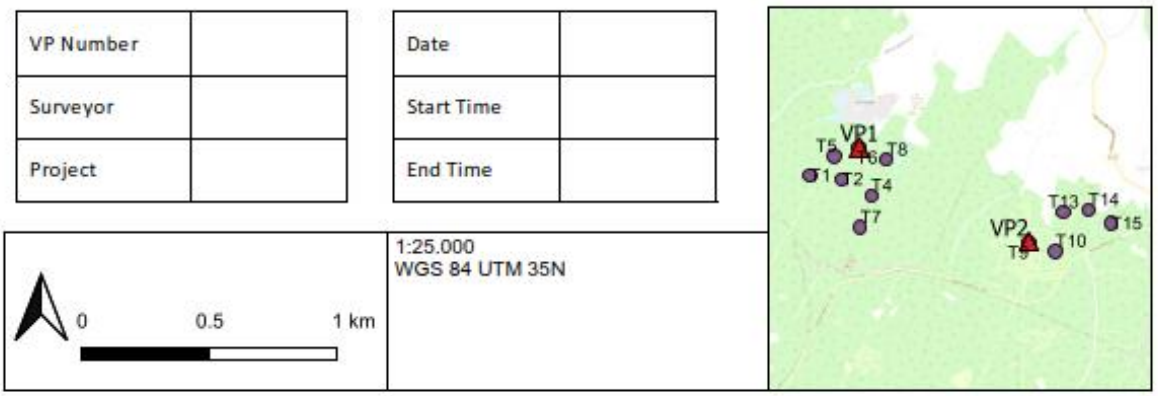
Calculation of alpha and p(collision) as a function of radius

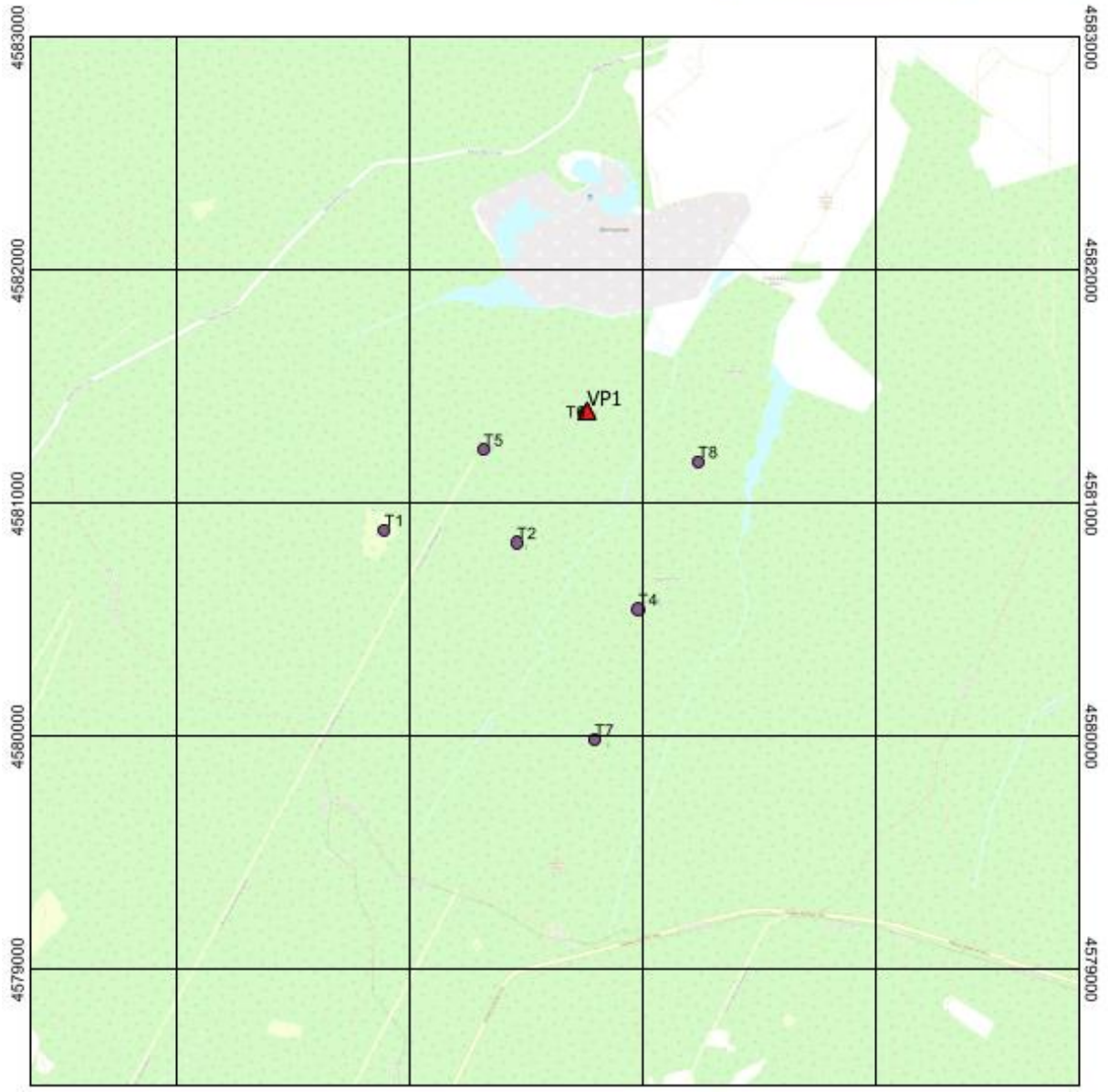
			Upwind:			Downwind:		
r/R	c/C	a	collide		contribution	collide		contribution
radius	chord	alpha	length	p(collision)	from radius r	length	p(collision)	from radius r
0,025	0,575	5,35	17,07	0,88	0,00110	14,65	0,76	0,00095
0,075	0,575	1,78	6,49	0,34	0,00252	4,08	0,21	0,00158
0,125	0,702	1,07	5,14	0,27	0,00332	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%			

6.9 Sample Field Recording Sheets

6.9.1 VP Map and Sheet

VP Number		Date	
Surveyor		Start Time	
Project		End Time	





Project		VP		Cloud cover	%	Precipitation	mm
Date		Start1-Finish1-		Wind Direction		Temp. (max)	℃
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																				

6.9.2 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

6.9.3 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
☐	☐	☐	___/___/___	___:___					☐	☐	
☐	☐	☐	___/___/___	___:___					☐	☐	
☐	☐	☐	___/___/___	___:___					☐	☐	
☐	☐	☐	___/___/___	___:___					☐	☐	
☐	☐	☐	___/___/___	___:___					☐	☐	

6.10 Flight Line Maps

[Maps were provided in a separate document.]