Zorlu Enerji Biodiversity Risk Report

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1. Introduction

The preservation of biodiversity is a cornerstone of sustainable development, crucial for maintaining the health of our planet and the well-being of its inhabitants. Our dependency on vibrant ecosystems is profound, as they are integral to the air we breathe, the food we eat, our economic stability, and our resilience against climate change. Addressing both climate change and biodiversity loss with equal urgency is essential for creating a sustainable future.

Healthy ecosystems are vital for the global economy, contributing to half of the global GDP and supporting a significant portion of the global workforce. These ecosystems play a crucial role in carbon sequestration and temperature regulation, while also providing natural defenses against environmental hazards such as storm surges, coastal erosion, and flooding.

Water ecosystems hold immense importance. As the planet's largest carbon sink and a significant source of economic prosperity, oceans are especially vulnerable to the impacts of climate change. Offshore wind energy, one of the leading renewable energy sources, depends on the health of our oceans. Therefore, maintaining robust water ecosystems is essential for a sustainable and prosperous future.

Transition to sustainable energy systems is a key strategy for reducing emissions, a major contributor to biodiversity decline. However, our responsibility extends beyond mitigating the direct impacts of energy systems through resource transition. It is imperative for us to actively enhance and restore biodiversity within these environments, ensuring that our operations bring lasting benefits for both people and nature.

At Zorlu Enerji, our commitment to sustainability is reflected in our proactive approach to integrating biodiversity conservation into our operations to enable biodiversity-positive energy transition. We are dedicated to aligning with the Kunming-Montreal Global Biodiversity Framework's visionary target of achieving a world living in harmony with nature by 2050. To realize this goal, we are implementing comprehensive Biodiversity Action Plans (BAPs) and engaging in initiatives such as habitat restoration and species protection, we aim to create a positive impact on biodiversity. Through these efforts, we strive to contribute meaningfully to global climate goals while safeguarding the natural habitats that are vital for our collective future.

This report has been prepared in 2024 to explain Zorlu Enerji's impacts and risks on biodiversity and ecosystems to all stakeholders, and to demonstrate the actions and strategies planned to create value for the ecosystem.

2. Background and Integration of the Risk Assessment Studies

In this report, Zorlu Enerji addresses the biodiversity and water based (dependency and impact related) risks it has studied within the context of Enterprise Risk Managment activities, which are conducted interdisciplinary (finance, operations, environment, OHS, quality, sustainability) across the company. These risks are considered under the category of physical risks within the sectoral risks section of Zorlu Holding's Risk Management processes and are integrated into risk mapping studies. For more information about Enterprise Risk Management, please refer to Zorlu Enerji Enterprise Risk Management.

3. Leadership & Commitments

At Zorlu Enerji, our leadership team is committed to sustainability and environmental stewardship, with the Board of Directors actively endorsing efforts in biodiversity conservation and deforestation prevention. Comprehensive policies and initiatives align with global best practices, driven by a clear vision from the top, ensuring operations and projects protect and enhance natural ecosystems. The Board shapes our strategic direction, integrating sustainability into the core of our business strategy, fostering a culture of responsibility and innovation.

Our Biodiversity Governance Mechanism, overseen by the Sustainability Committee chaired by the CEO, ensures a holistic approach to sustainability and biodiversity issues. This committee, including top-level representatives from various departments, reviews current operations, tracks ongoing initiatives, and provides guidance on business plans with biodiversity considerations. It sets and monitors performance objectives and determines regulatory actions where needed. Specialized Working Groups, such as the Nature Stewardship and Value Chain Working Group, focus on specific areas like forest-related biodiversity issues, strategy, goal setting, and risk assessments

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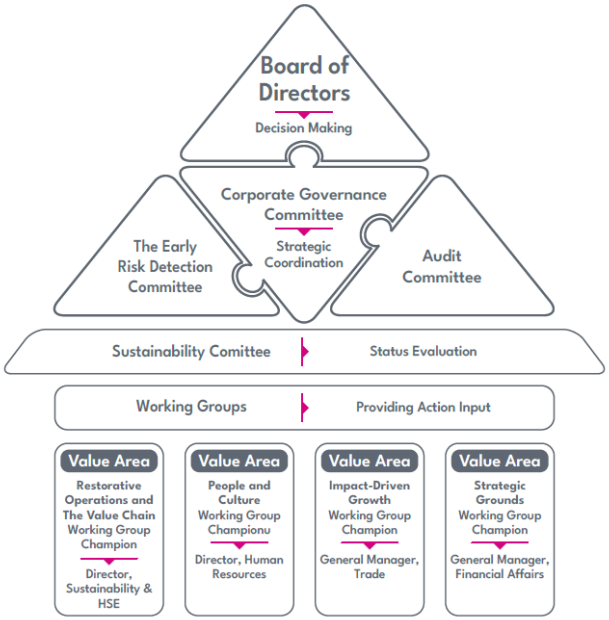


Figure 1.Zorlu Enerji Governance Units for Sustainability and Biodiversity Related Issues

Figure 1 illustrates Zorlu Enerji's Governance Units for Sustainability and Biodiversity Related Issues. The Board includes at least one member with expertise in biodiversity, leading the Zero Carbon Footprint Forests Project to plant 90,000 saplings annually and prevent 1.2 million tCO2e emissions by 2072. The CEO manages public policy engagements, assesses biodiversity-related risks and opportunities, and reports annually to the Board. To incentivize biodiversity performance, Zorlu Enerji implements both monetary and non-monetary rewards based on environmental performance metrics. In Figure 2 is stated below; Zorlu Enerji has already defined its goals of investing in ongoing efforts to protect biodiversity and ecosystems in business areas while monitoring process on this objective on an annual basis.

Value Areas	Top Material Issues	Goals	Base	Progress			2023 Assessment
				2021	2022	2023	
NATURE STEWARDSHIP AND VALUE CHAIN	Climate Action	Achieving net zero in operations and energy production by 2030	2020	1.3 million tCO_2e	1.2 million tCO_2e	991 thousand tCO_2e	
		Achieving net zero across the entire value chain by 2040	2020	6.5 million tCO_2e	6.1 million tCO_2e	6 million tCO_2e	
	Green and Reliable Energy Supply	Increase the share of renewable energy in total generation to 100% by 2030.*	2020	99.9%	99.9%	99.9%	
	Biodiversity	Investing 10 million TRY for the protection and improvement of biodiversity until 2030	2020	575 thousand TRY	1.4 million TRY	3.2 million TRY	

Figure 2.Zorlu Enerji Governance Units for Sustainability and Biodiversity Related Issues

Under the Smart Life 2030 vision of Zorlu Holding, ambitious sustainability goals focus on conserving natural resources and transitioning to a low-carbon economy. The CEO drives the sustainability agenda forward, ensuring biodiversity considerations are integrated into operations and strategic decision-making processes, supporting our broader commitment to sustainability and corporate responsibility.

In 2022, the Biodiversity and Ecosystem Management System was successfully implemented into business processes. The system is meticulously documented through the Quality Document Management System (QDMS). At each facility, species at risk of extinction were identified, and strategic action plans for their protection were developed and submitted to relevant units.

As part of these efforts, endangered species were identified, and the "Endangered Species Brochure" was prepared. The species in the brochure were evaluated under the Berne Convention, which focuses on the conservation of wildlife and natural habitats in Europe and CITES (the Convention on International Trade in Endangered Species of Wild Fauna and Flora). The brochure is planned to be distributed across all power plants in 2024.

Training sessions were organized to raise awareness among power plant personnel. Progress on these actions is transparently communicated to senior management and the Sustainability Board through detailed annual reports. This approach ensures continuous improvement in operations, effectively fulfilling commitments to biodiversity and ecosystem management.

3.1. Zorlu Enerji Biodiversity Protection Policy

As Zorlu Enerji, in line with Zorlu Enerji's values and priorities in scope of Sustainability and Environmental Policies, we care about the protection of the ecosystem, natural landscape, biological species diversity and are committed to safeguarding the environment and nature in the regions where we operate.

We recognize that economic and social development is intricately linked to the responsible use of natural resources. However, such use can negatively impact the integrity of ecosystems and biodiversity. Zorlu Enerji considers the protection of these elements as fundamental for global sustainability.

The scientific community, consisting of scientists from countries party to the United Nations Convention on Biological Diversity, accepts that there is a serious decrease in biological diversity and a deterioration in ecosystems. The loss of biodiversity, which is a direct result of the impact of human activities, occurs quite rapidly and poses serious environmental, economic and social risks. As a leading company in the energy sector, we are aware of these risks and responsibilities. We are committed to achieving a net positive impact on biodiversity. We will go beyond mitigating our footprint to actively enhance ecosystems and biodiversity within our areas of operation. We will establish measurable targets for habitat restoration, species population increases, and ecosystem service improvements.

As Zorlu Enerji, we accept that the sustainability of economic and social development will be possible with the protection of ecosystems and biological diversity in line with the United Nations Convention on Biological Diversity, the National Biological Diversity Plan, and get guidance from these conventions and action plans. We transparently share all our actions with our stakeholders to comply with the UN Sustainable Development Goals (SDGs), acknowledges the strategic value represented by policy, protection and promotion in line with the relevant SDGs, and confirms its company' commitment to sustainable development.

Biodiversity provides the environment necessary for the continuity of the economic and social life of humanity. Biodiversity is also important for the services nature provides, such as pollination, climate regulation, flood protection, soil fertility, and ecosystem services such as food, fuel, fiber and medicine production. Zorlu Enerji's activities cause interactions with various ecosystems, natural landscapes and species throughout their life cycle. For this reason, Zorlu Enerji accepts and undertakes to protect the integrity and biodiversity of ecosystems, which are a natural heritage, and to promote a balanced coexistence and the development and growth of natural heritage. For this purpose, it creates projects that will contribute to research, conservation, mitigation and biodiversity conservation in a sustainable way. As Zorlu Enerji, we are also committed to promoting a social culture that focuses on raising awareness among all its stakeholders.

Through this commitment, we encourage the protection of biodiversity, planning and subsequent implementation of activities, determination of impact analysis methods, development of actions and contribution to the issues that employees should pay attention to in their daily work, and the achievement of targets set in this area, at various levels of Zorlu Enerji organization and other Zorlu Enerji companies.

To fulfill our commitment to biodiversity, Zorlu Enerji will be guided by the following principles, implemented progressively across all activities and businesses:

- **Integration into Business Strategy:** We will integrate biodiversity protection into Zorlu Enerji's Business Strategy.
- **Prioritization in All Activities:** Biodiversity evaluation will be prioritized throughout all our activities, encompassing construction, operation, and decommissioning phases, particularly in power generation plants, electricity distribution, natural gas distribution, and infrastructure projects.
- **Preventive Approach:** We will implement a preventive approach to minimize the negative impacts of new infrastructure on biodiversity.
- **Environmental Guidelines:** We will develop environmental guidelines for each new infrastructure project, meticulously considering biodiversity and species life cycles. These guidelines will ensure that our infrastructure and operations not only meet but exceed the performance thresholds set by the ministry.
- **Impact Assessments:** This preventive approach and the environmental guidelines will be incorporated into environmental and social impact assessments, particularly for projects in sensitive ecosystems and protected areas.
- **Protection of Flora and Fauna:** We will develop practices that prioritize the protection of flora and fauna, especially endangered or vulnerable species, in all projects undertaken by our companies.
- **Balancing Negative Impacts and Restoration:** We are committed to finding solutions that balance the potential negative effects arising from our activities with the restoration of natural capital.
- **Stakeholder Collaboration:** We will actively encourage our stakeholders to collaborate with us towards biodiversity protection.
- **Value Chain Integration:** We recognize that our impact on biodiversity extends beyond our direct operations. We will integrate biodiversity considerations throughout our entire value chain. This includes requiring our suppliers and partners to adhere to biodiversity-conscious practices. We will not engage in operational activities near sites containing globally or nationally significant biodiversity unless exceptional circumstances exist, and a robust mitigation plan is in place.

İbrahim Sinan AK
Sector President
Sustainability Committee Member

Betül Ebru EDİN
Independent Board Member
Sustainability Committee President

3.2. Deforestation Combat Policy

Forests are critical components of o healthy environment and serve as significant carbon sinks. Deforestation hinders the forest's ability to sequester carbon dioxide, plays o substantial role İn contributing to global warming, that is the main driver of the climate crisis. Scientific reports clearly demonstrate that protecting and restoring natural ecosystems are İntegrated to mitigate the impacts of climate change and limiting global temperature rise to 1.5˚C. The Global Biodiversity Framework aims to halt and reverse nature loss by 2030. This framework includes the sustainable management of forests to ensure long-term productivity, efficiency, and food security, as well as the preservation, restoration, and maintenance of biodiversity, ecosystem functions, and the contributions of nature to human well-being.

Zorlu Enerji's Approach to Combating Deforestation

- At Zorlu Enerji, we prioritize sustainability at the core of our activities. We focus on investments in renewable and dean energy while accelerating efforts to reduce carbon emissions.
- We are dedicated to mitigating the adverse effects of climate change and preserving natural ecosystems. Asa company operating İn the energy sector with o renewable energy portfolio, we are aware of our responsibility to contribute to the protection of the natural environment and the efficient use of natural resources.
- Under the topic of biodiversity loss and deforestation, we work on deforestation issues within our working groups and act plans at top management and committee levels.

- In all our endeavors, we adhere to national and international standards, aiming to comply with expectations and requirements.
- We contribute to reforestation efforts in areas affected by deforestation or land degradation. Through partnerships with local communities, environmental organizations, and government agencies, we actively participate in sapling planting initiatives to protect and enrich forest ecosystems.
- We conduct informative activities to increase awareness among our stakeholders about the İmportance of significant carbon sinks, such as forests, and the impacts of climate change.
- Through our Zero Carbon Footprint Forests Project, we aim to plant 1.2 million saplings by 2030, with 90,000 saplings plantings each year,

Our Commitments to Zorlu Enerji

- We are committed to achieving no gross deforestation by 2030 across all our operating sites, actively striving to protect and preserve forests.
- We promote forest conservation and no deforestation to our employees, shareholders, customers, suppliers and/or partners, other internal and external stakeholders.
- We are committed to ensuring that our activities, both directly and throughout our supply chain, do not contribute to deforestation. As part of our business strategy, we will address deforestation combat within our operations.
- We recognize the critical role of forests in maintaining ecological balance and combating climate change. As part of our environmental responsibility, we commit to developing and supporting reforestation projects that preserve biodiversity, restore ecosystems, and sequester carbon dioxide in the atmosphere. Our reforestation project aims to plant 1.2 million saplings by 2030.
- In line with global goals, we commit to focusing on the sustainable use of natural resources, particularly forests, to prevent the destruction of natura! habitats and manage deforestation related risks in our supply chain by 2030. We work towards preserving the value of our equipment dependent on forest resources through a circular economy approach.

- We believe in the power of collaboration and knowledge sharing to drive positive change. Accordingly, we commit to working in collaboration with stakeholders, promoting research and awareness. We collaborate with other industry players, research institutions, and environmental experts to exchange information and contribute to the development of best practices in reforestation and ecosystem regeneration.
- We are dedicated to strengthening our fight against deforestation by embracing new technologies, innovative approaches, and scientific advancements. We invest in R&D and innovation to advance our efforts in this field.

İbrahim Sinan AK	Betül Ebru EDİN
Sector President	Independent Board Member
Sustainability Committee Member	Sustainability Committee President

4. Biodiversity Risk Assessment

4.1. Biodiversity Risk Assessment Methodologies

At Zorlu Enerji, our biodiversity risk assessment is a critical component of our sustainability strategy, designed to align with the Taskforce on Nature-related Financial Disclosures (TNFD) guidelines. Our approach integrates several advanced tools and processes to ensure a thorough and effective assessment of biodiversity risks associated with our operations.

To assess risks related to biodiversity and water crises, we utilize the **WWF Biodiversity Risk Filter and WWF Water Risk Filter**. Both tools are designed to provide a broad overview of potential biodiversity and water-related risks across various geographical locations. It helps us to understand our potential impacts and dependencies on natural resources, enabling us to identify high-risk areas and prioritize actions to mitigate these risks. The WWF Risk Filter is particularly useful for its ability to offer a macro-level assessment, which is essential for strategic decision-making and prioritization. Zorlu Enerji uses these tools for dependency-related assessment for both biodiversity and water.

In addition to the WWF Risk Filter, we employ the **Integrated Biodiversity Assessment Tool (IBAT)** for more detailed and impact-related risks assessments. IBAT provides essential information on globally recognized areas of biodiversity importance, such as protected areas and key biodiversity areas (KBAs). This tool allows us to evaluate the potential impacts of our operations on these sensitive areas at a granular level, facilitating informed

decisions to minimize adverse effects on biodiversity. The detailed insights from IBAT are crucial for project-specific assessments and ensuring compliance with international biodiversity standards.

Our **Biodiversity and Ecosystem Management System (BEMS) Project** complements these tools by involving biodiversity experts in field observations, sample collection, and detailed analyses. This hands-on approach allows us to assess the real exposure of our sites to biodiversity risks and develop site-specific action plans. The BEYS Project ensures that our risk assessments are grounded in practical, on-the-ground data and tailored to the unique biodiversity challenges and opportunities at each location.

By integrating the WWF Risk Filter, IBAT and the WRI Aqueduct Risk Atlas, we achieve a balanced and comprehensive understanding of biodiversity and water-related risks at macro levels, and through BEMS, at micro levels as well.

Adhering to the TNFD framework, our biodiversity risk assessment methodology ensures transparency, accountability, and comprehensive risk management. By integrating the WWF Risk Filter and IBAT tools, we achieve a balanced and comprehensive understanding of biodiversity risks at both macro and micro levels. This dual approach allows us to identify and address risks effectively, ensuring sustainable and responsible operations.

Continuous monitoring and regular reporting are integral to our approach, keeping stakeholders informed about our progress and the effectiveness of our risk management efforts. By leveraging these advanced tools and processes, Zorlu Enerji ensures a comprehensive and proactive approach to biodiversity risk assessment, aligning with international best practices and contributing to global efforts in biodiversity conservation and sustainability.

4.1.1. Integrated Biodiversity Assessment Tool (IBAT) Methodology

The biodiversity impact of Zorlu Enerji's operations, including surrounding areas and both upstream and downstream activities, is evaluated using a location-specific approach. This method maps Zorlu Enerji's sites against critical biodiversity areas and land-use maps. Geospatial tools are employed to identify national protected areas or regions with high biodiversity value near the site, even if they are outside protected zones.

The selection of these areas is based on the international database developed by the International Union for Conservation of Nature (IUCN) and the United Nations Environmental Program (UNEP). Sensitive species, as classified by the IUCN, within these high biodiversity areas that could be affected by site activities are identified. These species are then cross-referenced with the International Finance Corporation (IFC) Performance Standard 6 (PS6)

Criterion 1 and 2 using the Integrated Biodiversity Assessment Tool (IBAT) database. Zorlu Enerji used IBAT Methodology for impact-related risk assessment process.

Data is systematically analyzed using a Geographic Information System (GIS) program. This involves importing the locations of Zorlu Enerji's operational sites, including upstream and downstream activities, along with critical biodiversity areas and land-use maps. The location data layers are then superimposed with layers of critical biodiversity areas or land-use maps. The distance from the power plants to the nearest critical biodiversity areas is subsequently calculated. The results are consolidated and visualized through maps generated by the GIS program.

For Zorlu Enerji's operation sites, the assessment focuses on the relationship between the locations of the power plants and critical biodiversity areas. These areas include protected areas (PA), Alliance for Zero Extinction (AZE) sites, World Heritage Areas, National Parks, and Reserved Forests, including Turkey Reserved Forest Areas. Land use and land cover in these areas are also considered in the assessment process.

4.1.2. WWF Biodiversity Risk Filter (WWF BRF) Methodology

The WWF Biodiversity Risk Filter (BRF) tool is a comprehensive, web-based, spatially explicit tool designed to help companies and financial institutions assess and manage biodiversity-related risks. Developed by the World Wildlife Fund (WWF), it builds on the expertise gained from the WWF Water Risk Filter (WRF) and leverages a vast array of global data sets to evaluate biodiversity risks. The WWF BRF is a comprehensive tool developed by the World Wildlife Fund (WWF), designed to help organizations assess and prioritize biodiversity risks. This tool is instrumental in evaluating risks at both corporate and portfolio levels, enabling companies to understand and respond to biodiversity risks within their operational and supplier locations.

The methodology used to create the BRF tool involves a detailed process of data collection, processing, and classification. The following sections describe the methodologies in detail.

The steps to identify biodiversity-related risks, and their related dependencies are;

- **Step 0: Site & Boundary Determination**

After identifying the exposure area in the critical biodiversity area using IBAT, only EGCO's own operating site in the critical area is then used to identify dependency risks in the WWF BRF.

- **Step 1: Scoping the assessment**

Using a location-specific approach, the tool gauges the importance and state of biodiversity through various global datasets assessing biodiversity's importance and integrity in specific land or seascapes. The assessment relies on 33 biodiversity risk indicators. The Explore Module presents maps showing global risk levels, offering users insights into potential biodiversity risks in various regions.

- **Step 2: Collecting location-specific company and supply chain data**

This step involves collecting the geographical coordinates (latitude and longitude) of all operational sites of a company and its critical tier-1 suppliers. This includes a diverse range of business locations, such as resource extraction sites, factories, warehouses, and retail outlets. The location data helps identify the intersection between economic activity and biodiversity.

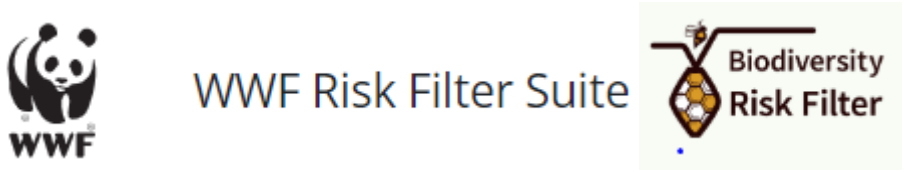
- **Step 3: Assessing biodiversity-related risks**

After the initial scoping assessment and gathering location-specific data, this information is input into the WWF BRF Assess Module. This module calculates biodiversity-related physical and reputational risk scores for each site. These risk scores stem from a complex interaction of a company's impacts, dependencies, and the local and global state of biodiversity. The BRF Assess Module combines the industry materiality rating with the biodiversity importance or integrity rating to create a 'scape risk' score, ranging from 0 to 5. This score evaluates specific aspects of biodiversity at a particular site for a specific industry, based on an array of biodiversity importance indicators. and integrity indicators.

As a responsible power-generating company, Zorlu Enerji recognizes the critical importance of biodiversity, as outlined by the Convention on Biological Diversity (CBD): *"The variability among living organisms from all sources including, among others, terrestrial, marine, and other aquatic ecosystems and the ecological complexes they are part of; this includes diversity within species, between species, and of ecosystems."* Our perspective on biodiversity includes not only the variety of life forms but also the crucial ecological and evolutionary processes that support life, maintain the planet's chemical balance, moderate climate, regenerate soil, and preserve species diversity.

In this regard, Zorlu Enerji is conducting an extensive biodiversity assessment. Our goal is to reduce the negative impacts of our operations on biodiversity while recognizing its essential role in life and human well-being. Additionally, we are committed to identifying and managing biodiversity

risks, aiming to integrate biodiversity preservation into our operational strategies. Through these efforts, we seek to contribute to global conservation initiatives and promote ecological responsibility across the industry.



4.1.3. WWF Water Risk Filter Methodology

The WWF Water Risk Filter is designed to help businesses and investors assess water-related risks and develop strategies to mitigate these risks. This comprehensive tool provides insights into both basin and operational water risks through a structured methodology.

Basin water risks are evaluated based on the conditions of the river basins where the sites operate. The tool uses 32 basin-specific indicators, covering physical, regulatory, and reputational aspects. These indicators assess factors such as water scarcity, pollution levels, regulatory environment, and community water needs. By examining these elements, the WWF Water Risk Filter provides a clear picture of the external water-related challenges a site might face due to its geographic location.

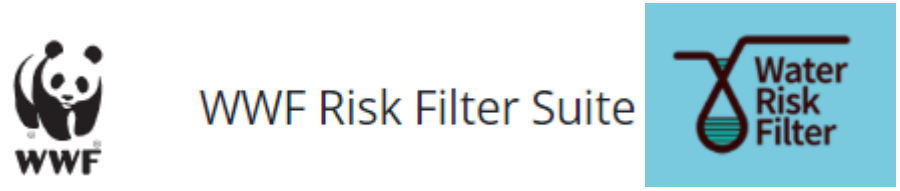
Operational water risks are assessed by looking at how a company's individual sites depend on and impact water resources. This includes evaluating the efficiency of water use, pollution control measures, and adherence to local regulations. The tool requires companies to complete a questionnaire about their water management practices at each site, which is then used to calculate risk scores based on specific industry and site characteristics.

The Water Risk Filter combines the assessments of basin and operational risks to provide a comprehensive understanding of water-related vulnerabilities. This dual approach ensures that companies can identify both external risks (such as basin conditions) and internal risks (such as operational practices) that might affect their water security.

The tool also offers **scenario analysis**, projecting how water risks might evolve under different climate and socio-economic conditions by 2030 and 2050. This feature helps companies prepare for future water challenges and integrate long-term water risk management into their strategic planning.

The methodology leverages high-quality, peer-reviewed global datasets and regional data where available. This ensures that the risk assessments are based on the best available scientific information. The integration of data from the WRI Aqueduct Risk Atlas and other reputable sources enhances the robustness of the assessments.

For more detailed information, please refer to the full methodology documentation provided by WWF here.



4.1.4. Aqueduct Water Risk Atlas Methodology

The World Resources Institute (WRI) provides the Aqueduct Water Risk Atlas, a publicly accessible online database. This platform contains data on various water risk indicators at the local level for locations worldwide. It is recognized as a global standard for identifying and communicating water-related risks across different geographic areas. Zorlu Enerji analyzes impacts and dependencies on water by using Aqueduct Water Risk Atlas Methodology. Additionally, to identify water-related risks at Zorlu Enerji's operational sites, we use a location-specific approach. The risk identification process using this tool involves the following stages:

Step 1: Initiation with Indicators

The process begins with 13 indicators that include physical risk quantity, physical risk quality, and regulatory and reputation risk. Each of these indicators signifies a unique aspect of water risk.

Step 2: Grouping and Calculation

This step involves the categorization of these indicators into groups. Subsequently, composite scores, also known as grouped water risk scores, are calculated.

Step 3: Combination of Groups

Finally, these separate groups are merged to generate a single, comprehensive water risk score. This final score encapsulates the overall water risk, considering all types of risks as symbolized by the initial set of 13 indicators.

4.1.5. The Biodiversity and Ecosystem Management System (BEMS) Methodology

The Biodiversity and Ecosystem Management System (BEMS) project conducted by EkoGen for Zorlu Enerji in 2022 involves a detailed methodology to assess and manage the biodiversity and ecosystem impacts of their power plants and business areas. This methodology aligns with the guidelines and standards of the International Finance Corporation (IFC) to ensure comprehensive and sustainable environmental practices.

The primary objective of this assessment is to implement and operationalize the Biodiversity and Ecosystem Management System (BEMS) at Zorlu Enerji. This system is designed to comply with national regulations, international conventions, and IFC Performance Standards (PS-6) to ensure sustainable biodiversity and ecosystem management across Zorlu Enerji's projects and facilities.

The scope of the assessment includes projects and facilities listed in Table 2 located in the Scoping the Assessment section, under subtitle "BEMS Assessment" of the report. Focusing on their impacts on natural habitats, flora, and fauna. The BEMS project entails creating a comprehensive biodiversity and ecosystem management plan, establishing monitoring, auditing, and reporting tools, and setting up a robust record system to manage these activities effectively. It involves identifying species affected by project activities, with a particular focus on endangered and endemic species, and evaluating critical habitats.

Field surveys are conducted to identify flora and fauna in the project impact areas. This includes direct observations, sample collection, and habitat mapping. Previous research reports, specific project location details, and comprehensive literature reviews are also utilized to gather relevant data. This multi-faceted approach ensures a thorough understanding of the biodiversity present in each project area.

Habitats are classified into three main categories based on their condition ("quality" or "state") and biodiversity importance as per IFC PS-6,: **modified, natural, and critical habitats**. Critical habitats are identified as those with high biodiversity value, including areas supporting endangered species, endemic species, migratory species, threatened ecosystems, and areas crucial for evolutionary processes. This is tabluated in Table 1.

- Modified Habitat: Areas significantly altered by human activities, often dominated by non-native species or significantly changed in their ecological function and species composition.
- Natural Habitat: Areas primarily composed of native species with minimal human alteration, maintaining their original ecological functions and species composition.
- Critical Habitat: Critical habitats are those supporting high biodiversity values, including:
    - Habitats crucial for critically endangered (CR) and endangered species (EN) (IUCN Red List).
    - Habitats significant for endemic and/or restricted-range species.
    - Habitats supporting globally significant concentrations of migratory species or species congregations.
    - Highly threatened and/or unique ecosystems.
    - Areas associated with significant evolutionary processes.

Areas Defined in PS6		**Area Condition**	
		Natural	**Modified**
High Biodiversity Values	Present	Critical Habitat	Critical Habitat
	Not Present	Natural Habitat	Modified Habitat

Table 1. Habitat Classes

EUNIS Habitat Classification Method

European countries have developed various classification methods to categorize natural areas, efficiently utilize natural resources, and identify existing resources. To create a unified system, these different national classification systems have been consolidated at the EU level into the European Nature Information System (EUNIS). EUNIS classifies habitats based on physical characteristics (topography, physiognomy of plants or animals, soil characteristics, climate, water quality) and the species that inhabit them. Despite some EUNIS habitats not fitting the traditional definition of a habitat (e.g., cave entrances, bare rocks), they are included for completeness. Additionally, areas used for urban, agricultural, or industrial purposes are classified within this system.

The hierarchical classification system of EUNIS ranges from general to detailed levels, allowing for classification steps tailored to specific purposes. Turkey, as an EU candidate country, has adapted its regulations in the environmental sector in alignment with EU standards. This process involves detailed scientific studies under the Natura 2000 ecological network project, which is central to the EUNIS Habitat Directives.

The EUNIS Habitat Classification, using its most updated version, facilitates broad habitat analysis, considering ecological regions, climate, soil, and environmental pressures. It also enables data comparison with other countries through standardized terminology. The system is currently organized into 10 main categories and their subcategories.

For mapping the habitats in the project area and its surroundings, ArcGIS Pro and the EUNIS habitat classification system (Davies et al., 2004) were utilized. Each map includes EUNIS habitat codes and descriptions to simplify interpretation. All projects and facilities within the BEYS process have been classified using the EUNIS system, and the resulting data have been used as a basis for habitat assessments in relevant IFC guideline documents.

Fauna Assessment (Amphibians, Reptiles and Mammals)

Field studies, existing research reports, project location data, and literature reviews were conducted to identify the faunal composition of the project areas. Special focus was given to species at risk of being affected by project activities, endangered species, and endemic species. IFC PS-6 and Guidance Note 6 criteria were used to assess critical species and habitats. Based on these assessments, Biodiversity Action Plans and Monitoring Plans were developed.

a. Field Studies

Field studies were carried out by experts, including Professor Mustafa SÖZEN and EkoGen Ltd. staff. Amphibians, reptiles, birds, and mammals were surveyed through transect and point observation methods. Data collection involved direct observation, identification of tracks, droppings, and nests.

b. Data Analysis and Reporting

The fauna lists were compiled from field observations, literature reviews, and local information. These lists included species observed directly and those likely to be present based on habitat characteristics and local knowledge. Recommendations for impact mitigation measures and project revisions were provided based on potential impacts on fauna groups.

Photo 1. A view from the faunistic studies

Flora Assessment

Field studies, existing research reports, project location data, and literature reviews were conducted to identify the floral composition of the project areas. Endangered, sensitive, endemic, and critical plant species were identified and assessed using IFC PS-6 and Guidance Note 6 criteria. Biodiversity Action Plans and Monitoring Plans were developed based on these assessments.

a. Field Studies and Data Collection

Field studies were conducted by Dr. Kerim GÜNEY and EkoGen Ltd. staff. The floral composition was compared with data from "Flora of Turkey and East Aegean Islands" and the Turkey Plants Data Service (Tübitak-Tübives). Critical plant species lists were created based on sensitivity, rarity, endemism, and IUCN criteria.

b. Habitat Mapping

Habitat maps were created using ArcGIS Pro and EUNIS habitat classification system. The maps included EUNIS habitat codes and their representations. The classification of each habitat type as natural, modified, or critical was assessed based on IFC GN6 and PS6 documents.

Photo 2. A view from the floristic studies

Ornithology Assessment

Field studies, existing project documents, project location data, and literature reviews were conducted to identify the avian composition of the project areas. Endangered, sensitive, and endemic bird species were identified and assessed using IFC PS-6 and Guidance Note 6 criteria. Biodiversity Action Plans and Monitoring Plans were developed for these species.

a. Field Studies and Data Collection

Field studies were conducted by Doctoral candidate İ. Kaan ÖZGENCİL and EkoGen Ltd. staff. Observations were recorded using binoculars and digital cameras. Data from global bird observation databases like eBird and iNaturalist were analyzed using R software and spatial tools.

b. Data Analysis and Reporting

The avian lists included species observed directly and those likely to be present based on habitat characteristics and local knowledge. The conservation status of bird species was assessed using IUCN Red List, BERN Convention, CITES, and MAK decisions.

Hydrobiology Assessment

Field studies, existing research reports, project location data, and literature reviews were conducted to identify the hydrobiological composition of the project areas. Endangered, sensitive, and endemic aquatic species were identified and assessed using IFC PS-6 and Guidance Note 6 criteria. Biodiversity Action Plans and Monitoring Plans were developed based on these assessments.

a. Algae Sampling

Phytoplankton samples were collected using a 33 µm mesh plankton net. Epipelic algae were sampled using glass tubes, and attached algae were scraped from stones and plants.

b. Zooplankton Sampling

Zooplankton samples were collected using a plankton net with 33 µm mesh size. Samples were preserved in formaldehyde and identified using temporary and permanent preparations.

c. Benthic Sampling

Benthic invertebrates were collected using a benthic net and sieved through a series of mesh screens. Samples were preserved in formaldehyde and identified.

d. Fish Sampling

Fish samples were collected using electro-shockers and casting nets. Samples were preserved in formaldehyde and transferred to alcohol for further analysis. Existing literature and previous studies were also reviewed to complete the hydrobiological assessment.

Photo 3. A View from the Hydrobiological Studies

4.2. Scoping the Assessment

Own Operations: Includes any business activity which directly impacts natural capital through its own operations—own employees, business, subsidiaries, products and services, business units, regions, sites, plants, and facilities. This also includes indirect impacts that depend on critical commodities in its supply chain. Such activities may include production, extraction, plantation, construction, power generation, transmission, or development activities.

Joint Ventures: Includes partnerships and shareholder assets with different business entities.

Adjacent areas to own operations: Value chain sites which are adjacent (between 0 and 50 km from nearest site) to landscapes, seascapes, and watersheds critical to biodiversity.

The scope of the biodiversity risk assessment for Zorlu Enerji comprehensively encompasses our own operation sites and joint ventures. Furthermore, this scope extends to include adjacent areas situated within a 1km radius of these sites. Zorlu Enerji's scope of own operations and adjacent areas including

Zorlu Enerji implemented Biodiversity Risk Assessment in detailed levels of risk categories for physical assets and joint ventures as stated below;

#	Operation Year	Activity	Type	Country	Location	Ownership	Ownership Type
1	2008	Kızıldere 1-2-3 GPP	Geothermal Power Plant	Turkey	Buharkent Denizli	100%	Asset
2	2008	Kuzgun HPP	Hydroelectric Power Plant	Turkey	Kuzgun Erzurum	100%	Asset
3	2008	Mercan HPP	Hydroelectric Power Plant	Turkey	Erzincan Mercan	100%	Asset
4	2008	Çıldır HPP	Hydroelectric Power Plant	Turkey	Çıldır Kars	100%	Asset
5	2008	Beyköy HPP	Hydroelectric Power Plant	Turkey	Eskişehir Beyköy	100%	Asset
6	2008	Ataköy HPP	Hydroelectric Power Plant	Turkey	Ataköy Tokat	100%	Asset
7	2008	Tercan HPP	Hydroelectric Power Plant	Turkey	Tercan Erzincan	100%	Asset
8	2008	İkizdere HPP	Hydroelectric Power Plant	Turkey	İkizdere Rize	100%	Asset
9	2009	Gökçedağ WPP	Wind Power Plant	Turkey	Bahçe Osmaniye	100%	Asset
10	2013	OEDAŞ ED OHL	Electricity Distribution Network	Turkey	Eskişehir, Uşak, Bilecik, Afyon, Kütahya	100%	Asset
11	2013	Jhimpir WPP	Wind Power Plant	Pakistan	Jhimpir Sindh	100%	Asset
12	2014	Dorad CCNGS	Combined Cycled Natural Gas Plant	Israel	Ashkelon	42,5%	JV
13	2015	Alaşehir GPP	Geothermal Power Plant	Turkey	Alaşehir Manisa	100%	Asset
14	2017	Deadsea SPP	Solar Power Plant	Palestine	Jericho Deadsea	100%	Asset

Table 2. Scope of Assessment, Zorlu Enerji's Own Operations

** As part of Zorlu Group's investment policies and strategies to focus on renewable energy projects, Zorlu Enerji has decided to exit its stated operations in Israel. Following the sale of all our shares in Ezotech Electric Ltd., Solad Energy Ltd., and Adnit Real Estate Ltd., these operations,*

including the associated natural gas power plants in Ashdod and Ramat Negev, have been transferred to Edeltech Ltd. Consequently, these projects are no longer within the scope of our biodiversity risk assessments and related activities.

BEMS Assessment: The purpose of the Biodiversity and Ecosystem Management System (BEMS) report is to establish and operationalize the mentioned system and all its associated tools within the framework of national legislation, international agreements, and IFC Performance Standards (PS-6) for the projects/facilities listed in Table 2.
In line with the objectives of BEMS, this "Biodiversity and Ecosystem Management System" project has been prepared for the projects/facilities listed in Table 2 under Zorlu Enerji. The project involves considering all impacts on natural habitats, fauna, and flora related to the activities of the facilities mentioned in the The Biodiversity and Ecosystem Management System (BEMS) Methodology section of this report, creating a biodiversity and ecosystem management plan, and defining the corporate procedures necessary for the implementation of this plan. This includes establishing monitoring, auditing, and reporting tools, and creating a recording system.

It should be noted that distribution facilities (electricity or natural gas) and distribution routes listed in Table 2 are planned annually or biennially and have not been subjected to critical species and critical habitat assessment. Therefore, they are not included in the biodiversity study section of this report. Similarly, ZES charging stations, being located within existing petrol stations, rest areas, and shopping centers, do not involve the use of natural habitats. However, all projects/facilities listed in Table 3 are included in the BEMS system through BEMS procedures.

Additionally, there is an Ecological and Ornithological Research and Evaluation Report prepared by Ekogen Ltd. for the 2018-2022 period for the electrical distribution lines of Osmangazi Elektrik Dağıtım A.Ş. (OEDAŞ). Detailed action plans specific to OEDAŞ are provided in this report.

#	Operation Year	Activity	Type	Country	Location	Ownership	Ownership Type
1	2008	Kızıldere 1-2-3 GPP	Geothermal Power Plant	Turkey	Buharkent Denizli	100%	Asset
2	2008	Kuzgun HPP	Hydroelectric Power Plant	Turkey	Kuzgun Erzurum	100%	Asset
3	2008	Mercan HPP	Hydroelectric Power Plant	Turkey	Erzincan Mercan	100%	Asset
4	2008	Çıldır HPP	Hydroelectric Power Plant	Turkey	Çıldır Kars	100%	Asset
5	2008	Beyköy HPP	Hydroelectric Power Plant	Turkey	Eskişehir Beyköy	100%	Asset
6	2008	Ataköy HPP	Hydroelectric Power Plant	Turkey	Ataköy Tokat	100%	Asset
7	2008	Tercan HPP	Hydroelectric Power Plant	Turkey	Tercan Erzincan	100%	Asset
8	2008	İkizdere HPP	Hydroelectric Power Plant	Turkey	İkizdere Rize	100%	Asset

9	2009	Gökçedağ WPP	Wind Power Plant	Turkey	Bahçe Osmaniye	100%	Asset
10	2013	OEDAŞ ED OHL	Electricity Distribution Network	Turkey	Eskişehir, Uşak, Bilecik, Afyon, Kütahya	100%	Asset
11	2013	Jhimpir WPP	Wind Power Plant	Pakistan	Jhimpir Sindh	100%	Asset
12	2014	Dorad CCNGS	Combined Cycled Natural Gas Plant	Israel	Ashkelon	42,5%	JV
13	2015	Alaşehir GPP	Geothermal Power Plant	Turkey	Alaşehir Manisa	100%	Asset
14	2017	Deadsea SPP	Solar Power Plant	Palestine	Jericho Deadsea	100%	Asset

Table 3 . Scope of BEMS Assessment, Zorlu Enerji's Own Operations

Critical Supplier Upstream & Downstream Activities

Critical suppliers are taken into consideration for the assessment.

Upstream Activities: Activities that encompass the early stages of producing a good or service, such as material sourcing, processing, and supplier activities. This includes brokers, consultants, contractors, distributors, franchisees or licenses, home workers, independent contractors, manufacturers, primary producers, sub-contractors, tier-1 and tier-2 suppliers, and wholesalers.

Downstream Activities: Activities that include operations that relate to processing materials into a finished product and delivering it to the end user (e.g., transportation, distribution and consumption).

#	Supplier	Activity Direction	Business Activity	Location
1	Astor Enerji	Upstream	Electrical Equipments Supply	İstanbul Turkey
2	BTC Bilişim	Upstream	IT & Telecommunication Service Provider	İstanbul Turkey
3	Buran Teknoloji	Upstream	IT & Telecommunication Service Provider	Ankara Turkey
4	Deutsche Telekom	Upstream	IT & Telecommunication Service Provider	İstanbul Turkey

5	Dowell Schlumberger	Upstream	Mechanical Equipment Supply	Cairo Egypt
6	Ernst Schad GmbH	Upstream	Mechanical Equipment Supply	Westfalen Germany
7	Novomet	Upstream	Mechanical Equipment Supply	Perm Russia
8	Schaffler	Upstream	Mechanical Equipment Supply	İstanbul Turkey
9	Sezenler Üretim	Upstream	Chemical Material Supply	İstanbul Turkey
10	Vestel	Upstream	Electrical Equipment Supply	Manisa Turkey
11	Zorlu Tekstil	Downstream	Steam Sales	Lüleburgaz Turkey
12	Public	Downstream	Electricity Consumers	Various
13	Special Sector	Downstream	Electricity Consumers	Various
14	OEDAŞ Distribution Area	Downstream	Electricity Transmission Stations	Eskişehir, Uşak, Bilecik, Afyon, Kütahya

Table 4. Scope Of Assessment, Zorlu Enerji's Critical Suppliers

4.3. Biodiversity Risk Assessment Results

4.3.1. IBAT Assessment Results & Impact Related Risks

Impact-related risks refer to the potential negative effects that a company's activities, products, or services can have on the environment, society, economy, or other external factors. These risks focus on the consequences of the company's operations and how they might harm external stakeholders or ecosystems. Please refer table 5 and 4.3 results section for details.

#	**Year**	**Activity**	**Country**	**Location**	**Critical Species in Area (CR)**	**Species on IUCN Red List**	**Protected Areas**	**Key Biodiversity Areas (KBA)**
1	2008	Kızıldere 1-2-3 GPP	Turkey	Buharkent Denizli	1	18	1	3
2	2008	Kuzgun HPP	Turkey	Kuzgun Erzurum	0	29	0	3
3	2008	Mercan HPP	Turkey	Erzincan Mercan	0	49	0	3
4	2008	Çıldır HPP	Turkey	Çıldır Kars	0	41	8	12

5	2008	Beyköy HPP	Turkey	Eskişehir Beyköy	0	38	0	2
6	2008	Ataköy HPP	Turkey	Ataköy Tokat	0	31	0	1
7	2008	Tercan HPP	Turkey	Tercan Erzincan	0	42	0	0
8	2008	İkizdere HPP	Turkey	İkizdere Rize	0	26	0	3
9	2009	Gökçedağ WPP	Turkey	Bahçe Osmaniye	0	37	0	6
10	2013	OEDAŞ ED OHL	Turkey	Bilecik, Eskişehir, Afyon, Kütahya, Uşak	1	27	0	0
11	2013	Jhimpir WPP	Pakistan	Jhimpir Sindh	5	643	10	3
12	2014	Dorad CCNGS	Israel	Ashkelon	17	1007	54	6
13	2015	Alaşehir GPP	Turkey	Alaşehir Manisa	0	10	0	2
15	2017	Deadsea SPP	Palestine	Jericho Deadsea	5	699	62	27

Table 5. IBAT Assessment Results

Critical Species in Area (CR)

The Critical Species in Area (CR) in the Integrated Biodiversity Assessment Tool (IBAT) refers to species that are identified as being of high conservation concern within a specific area. These species are typically listed under various international, regional, or national conservation statuses and agreements, such as the International Union for Conservation of Nature (IUCN) Red List, the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), and the Bern Convention. These species are considered critical due to their endangered or threatened status. They are prioritized for conservation efforts to prevent further decline or extinction.

IUCN Red List (within 50km)

This shows the number of species assessed on the IUCN Red List of Threatened Species that potentially occur within 50km of this site. These data should be used to guide any further assessment (desktop review, expert consultation, field surveys), with the aim of confirming the known or likely occurrence of these species within your project area. Further assessment may also confirm the occurrence of additional species not identified here. Only Critically Endangered Species (CR) are taken into consideration.

Protected Areas (within 50km)

The World Database on Protected Areas (WDPA) is the most comprehensive global database on terrestrial and marine protected areas. Data for the WDPA is collected from international convention secretariats, governments, and collaborating NGOs. The WDPA uses the IUCN definition of a protected area as the main criteria for entries to be included in the database. Protected areas are classified into different scopes such as national protected areas, "Natura2000", Regional Seas, World Heritage, Ramsar, MAB and Emerald Network.

Key Biodiversity Areas (within 50km)

Key Biodiversity Areas (KBA) are 'sites contributing significantly to the global persistence of biodiversity', in terrestrial, freshwater and marine ecosystems. Sites qualify as global KBAs if they meet one or more of 11 criteria, clustered into five categories: threatened biodiversity; geographically restricted biodiversity; ecological integrity; biological processes; and, irreplaceability. KBAs cover important bird and biodiversity areas and Alliance for zero extinction sites.

According to IBAT results, Zorlu Enerji's operations exhibit varying degrees of biodiversity risk, with significant risks in the remaining operation in Israel and Pakistan due to high numbers of critical species, IUCN Red List species, protected areas, and KBAs. In Turkey, while some projects show moderate to high biodiversity risks, others have relatively lower risks but still require diligent monitoring and management to mitigate potential impacts on local biodiversity. Robust biodiversity management plans, continuous monitoring, and active engagement with conservation efforts are essential to ensure sustainable operations across all sites.

4.3.2. WWF Biodiversity Risk Filter (WWF BRF) Results

Zorlu Enerji uses the WWF Biodiversity Risk Filter and the Aqueduct Water Risk Atlas to evaluate dependencies and impacts on biodiversity and water, respectively. The assessment focuses on operational sites located in critical biodiversity areas such as National Reserved Forests and World Heritage sites. The results of these assessments are presented in the form of an Impact and Dependency Heatmap, where colour coding is used to depict varying levels of dependency and impact based on risk indicators.

Scope Adjustment: As part of Zorlu Group's strategic focus on renewable energy projects, Zorlu Enerji has decided to divest majority of its operations in Israel. We have successfully sold all shares in Ezotech Electric Ltd., Solad Energy Ltd., and Adnit Real Estate Ltd., transferring these operations, including the natural gas power plants in Ashdod and Ramat Negev, to Edeltech Ltd. Consequently, these projects are no longer within the scope of

our biodiversity risk assessments and related activities. However, due to the timing of the assessment relative to the sale, these assets still appear in the biodiversity risk filter results, reflecting our ongoing commitment to comprehensive reporting and transparency.

Risk assessment has been conducted in 5 different risk categories that have been summarized as **physical risk** and **reputational risks.**

Physical Risk is driven by the ways in which a business depends on nature and can be affected by both natural and human-induced conditions of land- and seascapes. It comprises the risk categories:

1) **Provisioning Services:** Many industries or companies rely directly on natural inputs for their operations or production. As such, declines in the quantity or quality of direct inputs for feed, raw material, genetic materials, etc., can result in increased costs or disruption of production. This risk category identifies the main categories of natural resources needed for production.
   It comprises the indicators:
   - **Water Scarcity:** Water scarcity refers to the physical abundance or lack of freshwater resources.
     It can significantly impact business such as production/supply chain disruption, higher operating costs, and growth constraints. Water scarcity is human-driven, and can be aggravated by natural conditions (e.g., aridity, drought periods). It is generally calculated as a function of the volume of water use/demand relative to the volume of water available in a given area. However, water scarcity does not consider whether water is accessible and/or fit for use, as defined by the UN Global Compact CEO Water Mandate (2014).
     This indicator has already been calculated in the Water Risk Filter (WRF) and has been integrated into the Biodiversity Risk Filter without changes. The Water Risk Filter risk category scarcity is a comprehensive and robust metric as it integrates a total of 7 best available and peer-reviewed datasets covering different aspects of scarcity as well as different modelling approaches: aridity, water depletion, baseline water stress, blue water scarcity, available water remaining, drought frequency probability, and projected change in drought occurrence.
   - **Limited Timber Availability:** This indicator refers to aspects of productivity and commercial access to timber – more specifically the total potential sustainable supply of timber as well as aspects of accessibility for commercial timber harvesting and availability of infrastructure for the subsequent transport to markets.
     Forests, both natural and managed, provide timber for construction as well as wood and paper products for domestic use and export. Globally, forests provide over USD 600 billion, or 1% of global GDP, through wood-based products (World Bank 2020). At low extraction rates it is sustainable and can continue to be provided at the rates consumed. At high extraction rates it is consumptive of the ecosystem and may damage the co-benefits for other services provided by forests. A lack of timber supply or a lack of accessibility to markets can significantly impact business through production/supply chain disruption, higher operating costs, and growth constraints.

This indicator was calculated on the basis of relatively realized timber services indices (RRTS) - a function of potential commercial timber (calculated from dry matter productivity, above-ground carbon stock and fractional tree cover) within 6 hours travel time of a population center of >50K people and on slope gradients <31.5 degrees (70%) considered to be workable for logging. Please note that this is a global indicator and may not be applicable in certain conditions, e.g. in sparsely populated areas such as some boreal regions and for plantations with connection to infrastructure that is independent of population centers.

- **Limited Wild Flora & Fauna Availability:** This indicator refers to the unavailability of commercially harvested species. Wild species are used in many applications, including for medicinal, cosmetic, aromatic and genetic purposes. They are used globally as feed, fiber (e.g., for clothing, building materials, etc.), fuel, medicines and food ingredients.

  Overexploitation is one of the main threats to nature, but the intensity of this threat varies geographically. To approximate where availability of wild flora and fauna might be limited, De Minin et al.'s (2019) global centers of unsustainable commercial harvest paper has been used. The paper identified global concentrations, on land and at sea, of 4,543 species threatened by unsustainable commercial harvesting, to identify regions under threat.

- **Limited Marine Fish Availability:** This indicator refers to the stock status of marine fish.

  As the largest traded food commodity in the world, seafood provides sustenance to billions of people worldwide. More than 85% of the world's fisheries have been pushed to or beyond their biological limits.

  Overfishing occurs in areas that have been exploited at levels that exceed the capacity for replacement by reproduction and growth of the exploited species. Species that are being overfished are producing catches that are below the level that could be sustainably derived. As a result of intense exploitation, most fisheries generally follow sequential stages of development: undeveloped, developing, fully exploited, overfished, and collapsed. To assess areas where marine fish availability is limited, all fish stocks that were assessed by the Sea Around Us project as anything other than 'developing' were considered.

2) **Regulating & Supporting Services – Enabling;** Many businesses rely on ecosystem services that regulate or support production processes, including the cultivation of crops or breeding of animals. Declines in enabling ecosystem services such as soil health, water quality, and habitat provision can result in increased costs of production or inability to operate.

   It comprises the indicators:

   - **Soil Condition:** Soil condition indicates whether soil can perform basic functions to benefit human use and ecosystems alike. This indicator is based on soil organic carbon (SOC) content.

     SOC is the main component of soil organic matter and is a prerequisite for soil functions and food production, mitigation and adaptation to climate change, and the achievement of the Sustainable Development Goals (SDGs).

While there are many other aspects that can influence soil condition, SOC has also long been used as an indicator of soil health, due to its capacity to improve soil structural stability, which affects porosity, aeration and water filtration capacities to supply clean water. GSOCmap is the first global SOC map, produced through a consultative and participatory process involving Global Soil Partnership member countries, which makes this map unique.

- **Water Condition:** Water condition indicates whether the water quality is fit for human use and ecosystems alike.
  Poor water quality – water pollution – can impact a company by causing serious health issues, as well as through increased operating costs and a reduction in production or growth.
  The water condition indicator has been calculated separately for freshwater and marine areas.
  This indicator has already been calculated in the Water Risk Filter (WRF) and has been integrated into the Biodiversity Risk Filter without changes. It considers parameters with well documented direct and indirect negative effects on water security for both humans and freshwater biodiversity, which are aligned to the Sustainable Development Goal (SDG) 6.3.2: biological oxygen demand (BOD); electrical conductivity (EC); and nitrogen. See the specific risk indicator layers in the WRF methodology for more details.
  Marine water quality was estimated using: OHIs nutrient pollution and ocean acidification datasets and WRI's Eutrophication and Hypoxia data.
- **Air Condition,** Air condition indicates whether the air quality is fit for human use and ecosystems. This indicator is based on PM2.5 concentrations.
  PM 2.5 is the annual global surface concentrations (micrograms per cubic meter) of all composition ground-level fine particulate matter of 2.5 micrometers or smaller. Exposure to high average concentrations of PM2.5 over time has been a reliable predictor of heightened mortality.
  It was measured by Hammer et.al. (2022) combining Aerosol Optical Depth retrievals from multiple satellite algorithms.
- **Ecosystem Condition:** Ecosystem condition indicates whether the natural environment is intact and connected.
  Poor ecosystem conditions can result in businesses having restricted access in the long-term to the quantity and quality of resources and enablers needed for their activities as well as other ecosystem services they rely on. The preservation and restoration of terrestrial, freshwater and marine habitat is a key component in addressing biodiversity risk, and to achieve sustainable development goals.
  The ecosystem condition indicator has been calculated separately for terrestrial, freshwater and marine areas. Terrestrial: Biodiversity Intactness Index and Functional Connectivity of the Worlds Protected Areas were used. Freshwater: The Water Risk Filter's (WRF) Fragmentation Status of Rivers has been integrated into the Biodiversity Risk Filter without changes. See the specific risk indicator layers

in the WRF methodology for more details. Marine areas: Ocean Health Index' habitat condition data for six marine ecosystems was considered.

- **Pollination:** This indicator assesses whether there is enough natural habitat surrounding cropland to support natural pollination.
  Up to two-thirds of all crops require some degree of animal pollination to reach their maximum yields, and natural habitat around farmlands can support healthy populations of wild pollinators by providing them with foraging and nesting resources.
  As part of the mapping of the planet's critical natural assets for people (NCP), the crop pollination dataset models the potential contribution of wild pollinators to nutrition production, based on pollination sufficiency of habitat surrounding farmland and the pollination dependency of crops. NCP for crop pollination is expressed in terms of the average equivalent number of people fed per acre of natural habitat.

3) **Regulating Services - Mitigating;** The occurrence of natural hazards such as landslides, fires and storms can disturb or disrupt projects, operations, or entire value chains, and can in some cases result in severe damage to or loss of assets. Intact ecosystems can help to mitigate the impact of some natural hazards. It comprises the risk sub-categories:

- **Landslides,** this indicator assesses the potential threat of rainfall- and earthquake-triggered landslides.
  Landslides impose significant risks to human lives and economic activities. Landslides have become more prevalent because of anthropogenic disturbances, such as land-cover changes, land degradation and expansion of infrastructure. These are further exacerbated by more extreme precipitation due to climate change, which is predicted to trigger more landslides and threaten sustainable development in vulnerable regions.
  The Global Landslide Hazard Map has been used as the basis for this indicator. It presents a qualitative representation of global landslide hazard on a global scale. It is a combination of the Global Landslide Hazard Map: Median Annual Rainfall-Triggered Landslide Hazard and the Global Landslide Hazard Map: Earthquake-Triggered Landslide Hazard.
- **Wildfire Hazard,** this indicator assesses the potential threat of wildfire due to fire weather intensity.
  Wildfires impose significant risks to human lives and economic activities. In extreme fire weather events, strong winds and wind-born debris may even weaken the integrity of infrastructure. Climate change may further increase the frequency of fire weather occurrences, including an increase in temperature, greater variance in rainfall and increase in fire season duration. Climate projections indicate that there could also be an increase in the severity of fire.
  This indicator is based on the Global Facility for Disaster Reduction and Recovery's (GFDRR) global wildfire hazard levels. The approach to classifying wildfire hazard levels used is based solely on fire weather index climatology. These intensities are classified based on thresholds using conventions to provide hazard classes that correspond to conditions that can support problematic fire spread in the landscape, if an ignition and sufficient fuel were to be present.

- **Plant/Forest/Aquatic Pests and Diseases,** this indicator assesses the potential threat from transboundary animals and plant pests and diseases.

  As genetic and species diversity is lost and ecosystems are degraded, the complexity of the overall system can be compromised, making it more vulnerable and potentially creating new opportunities for disease emergence. Emerging diseases include transboundary animal and plant pests and diseases, including forest/timber pests and aquatic animal diseases. Food safety threats can have a large impact on food security, human health, livelihoods and trade.

  To estimate the frequency of zoonotic, vector-borne and water-borne diseases, data from the FAO's Food Chain Crisis Early Warning Bulletin (2018-2020) was used. The purpose of the dataset is to inform of forecasted threats to animal and plant health and food safety that may have a significant impact on food and nutrition security. Please note that the source data for this indicator is only available on a country level.
- **Herbicide Resistance,** this indicator assesses the number of occurrences of herbicide resistant weeds.

  Herbicide resistance is the ability of a weed to survive an herbicide application that had been used to contain that population. As unwanted plants compete with crops, issues of crop loss and contamination arise.

  To estimate antimicrobial and agrochemical resistance, data from the Weed resistance database (International Survey of Herbicide Resistant Weeds) was used. Please note that the source data for this indicator is only available on a country level.
- **Extreme Heat:** This indicator assesses the threat of extreme heat during a 5-year return period.

  Extreme heat has an obvious impact on human health, but it is also relevant to a wide array of economic activities and industries, including the built environment. With climate change, the frequency and the intensity of abnormal weather and extreme temperature patterns have dramatically increased, and the shift to warmer temperatures, driven by climate change, will only exacerbate this phenomenon.

  For this indicator, GFDRR's extreme heat hazard has been used. It is classified based on an existing and widely accepted heat-stress indicator, the daily maximum wet bulb globe temperature (WBGT, in ˚C). A short return period (five years) reflects more frequent extreme heat events.
- **Tropical Cyclones:** This indicator assesses the predicted maximum wind speed (mph) on a 50-year return period.

  Storms can impact companies and value chains through a variety of ways, including building and property damage, flooding or power outages, which may lead to temporary or permanent company closures and loss of revenue.

  This indicator is based on GFDRR's tropical cyclonic strong wind and storm surge model, using information from 2,594 historical tropical cyclones, topography, rough terrain and bathymetry. This database is the most up-to-date repository of information associated with tropical cyclones.

4) **Cultural Services:** Some industries such as tourism, real estate can depend highly on the presence of culturally valuable land-/seascapes or specific sites. Tourism is an engine for jobs and investments. The degradation or loss of key attractive features in an area can negatively impact businesses that rely on these characteristics.

   It comprises the indicator:

   - **Tourism Attractiveness:** This indicator measures the availability of natural and cultural resources.

     Some industries, such as tourism, real estate and education, can depend highly on the presence of touristic valuable land or seascapes or specific sites. Tourism is an engine for jobs and investment. The degradation or loss of key attractive features in an area can negatively impact companies that rely on them.

     The Travel and Tourism Demand Drivers subindex of WEF's Travel & Tourism Development Index 2021 Edition captures the principal "reasons to travel". For this analysis, natural resource indicators and cultural resource indicators were included. The natural resources pillar measures the available natural capital as well as the development of outdoor tourism activities. The cultural resource pillar measures the availability of cultural resources such as archaeological sites and entertainment facilities. Please note that the source data for this indicator is only available on a country level.

5) **Pressures on Biodiversity;** Businesses may negatively impact biodiversity and reduce ecosystem services through a few direct drivers or pressures. It comprises the industries:

   - **Land, Freshwater and Sea Use Change,** This indicator measures cropland expansion, river fragmentation and pressures on marine environments through shipping and direct human impact.

     Land- and sea-use change is the major human influence on habitats. Habitat loss is one of the biggest threats to biodiversity and is the number one reason species go extinct. Clearcutting forests to create agricultural lands, creating dams that change river flow and intensifying shipping in marine environments are all examples of land- and sea-use change that cause habitat destruction.

     This indicator includes data from terrestrial, freshwater and marine environments. Terrestrial: Potapov's global maps of cropland extent gain were used to assess conversion of land cover to cropland. Please note that forest canopy loss (another important aspect of land-use change) is covered in indicator 5.2. Freshwater: The Water Risk Filter's Fragmentation Status of Rivers has been integrated into the Biodiversity Risk Filter without changes. See the specific risk indicator layers in the WRF methodology for more details. Marine areas: Halpern's shipping and direct human impact score were used.

   - **Forest Canopy Loss,** This indicator measures tree cover loss. Land- and sea-use change is the major human influence on habitats. Habitat loss is one of the biggest threats to biodiversity and is the number one reason species go extinct. Around half of the world's original forests have disappeared, and they are still being removed at a rate 10x higher than any possible level of regrowth.

Hansen et al. (2021) examined global Landsat data at a 30-metre spatial resolution to characterize tree cover extent, loss and gain from 2000 to 2021. Tree cover loss was defined as a stand-replacement disturbance, or the complete removal of tree cover at the Landsat pixel scale (30m). Recently harvested areas using clear cutting practices are thus included. For this indicator, only tree cover loss since 2020 was considered.

- **Invasives; This** indicator is based on the presence of the world's worst invasive species.
  Invasive and alien species have been reported around the world, resulting in loss of biodiversity at local and regional scales and causing significant economic damage. Invasive species may be indigenous and/or exotic or alien. They occur mostly in terrestrial and aquatic ecosystems, both marine and freshwater, and can disrupt the ecological functioning of natural systems. Invasive species can out-compete local and indigenous species for natural resources, with negative implications for biodiversity.
  The basis for this indicator is the Invasive Species Specialist Group's Global Invasive Species Database, which lists 100 of the world's worst invasive alien species as well as in which countries they are considered invasive. Please note that the source data for this indicator is only available on a country level.
- **Pollution.** This indicator is based on nutrients, pesticide and air pollution.
  Pollution is an important driver of biodiversity and ecosystem change throughout all biomes. While terrestrial ecosystems have been affected by nitrogen-phosphorous fertilizers, these have had a far more pernicious effect on the biodiversity of freshwater and marine habitats, leading to eutrophication and hypoxic or 'dead' zones that support no aquatic life. PM 2.5 is the annual global surface concentrations (micrograms per cubic meter) of all composition ground-level fine particulate matter of 2.5 micrometers or smaller. Exposure to high average concentrations of PM2.5 over time has been a reliable predictor of heightened mortality. There are multiple sources of air pollution, including emissions from industries, using fossil fuels, agricultural processes, and vehicular emissions.
  The BRF only focusses on nutrients, pesticide (for terrestrial, freshwater and marine environments) and air pollution at this point. Terrestrial: FAO data has been used to calculate total nitrogen and pesticides per hectare of cropland. Please note that this source of data is only available on a country level. Freshwater: McDowell's (2020) projected median concentrations for total nitrogen concentrations during the growing season for catchments across the globe were used. Marine areas: Halpern's impact score for nutrient pollution (from fertilizer runoff) has been used. Air: Hammer et.al. (2022) measured average concentrations of PM2.5 by combining Aerosol Optical Depth retrievals from multiple satellite algorithms.

Reputational Risk can result from a company's actual or perceived impacts on nature and people. Reputational risk represents stakeholders' and local communities' perceptions on whether companies conduct business sustainably or responsibly with respect to biodiversity, and can ultimately

affect brand value and market share, among other factors. While a considerable amount of reputational risk is operational (not scape-related), there are some pre-conditions that make reputational biodiversity risk more likely to manifest. It comprises the risk categories:

6) **Environmental Factors:** Reputational risk can be driven by negative impacts on local environmental assets and the local prevalence of biodiversity-related issues. This risk category comprises the following indicators:

- **Protected/Conserved Areas,** Reputational risk will be influenced heavily by proximity to protected areas, particularly as these two designations are used in corporate and financial safeguards. Protected and conserved areas have long been considered the cornerstones of biodiversity conservation and have an important role to play in achieving many of the Aichi global biodiversity targets and the SDGs and in safeguarding the health of people and planet for generations to come.

  For this indicator, UNEP-WCMC's World Database of Protected Areas (WDPA) was used. It is the most authoritative source of data on protected areas globally. We were generously given permission to utilize the WDPA data in the BRF by the Integrated Biodiversity Assessment Tool (IBAT) partners. Currently the BRF only includes data on protected areas, as the global database on conserved areas (Other Area Based Effective Conservation Measures) is not yet globally representative.
- **Key Biodiversity Areas,** this indicator is based on overlap of the assessment units with Key Biodiversity Areas (KBA). Reputational risk will be influenced heavily by proximity to Key Biodiversity Areas, particularly as these two designations are used in corporate and financial safeguards. Key Biodiversity Areas (KBAs) are the most important places in the world for species and their habitats. Faced with a global environmental crisis we need to focus our collective efforts on conserving the places that matter most. The KBA Program supports the identification, mapping, monitoring and conservation of KBAs to help safeguard the most critical sites for nature on our planet – from rainforests to reefs, mountains to marshes, deserts to grasslands and to the deepest parts of the oceans. For this indicator, we were given generous permission to access the KBA data through the Integrated Biodiversity Assessment Tool (IBAT).
- **Other Important Delineated Areas, this** indicator is based on a range of areas other than protected areas and Key Biodiversity Areas (KBA), that have been delineated due to their contribution to different aspects of biodiversity.

  Reputational risk will be influenced heavily by proximity to protected areas and KBAs. However, the delineation of these areas is not yet complete, being restricted by administrative, logistical and funding constraints. For example, KBAs which must be identified 'bottom up' by local experts, use detailed local data, meaning that many sites exist that may meet the KBA criteria, but have not yet been formally identified. In addition, whilst KBAs represent the most significant sites for the global persistence of biodiversity, other areas of importance are highly important regionally or nationally, and for biomes such as marine or forests.

  This indicator therefore includes a range of other designations of importance: WWF Global 200, Intact Forest Landscapes, Ecologically or Biologically Significant Marine Areas (EBSA) and Vulnerable marine ecosystems (VMEs).

- **Ecosystem Condition,** Ecosystem condition indicates whether the natural environment is intact and connected.
  Reputational risk is likely to be higher in scopes that are still intact/connected/etc. (as the impact of corporate activities will be more significant) and of higher profile (as the social / cultural response and critique will be greater). This indicator aims to evaluate intactness and connectivity of ecosystems as an aspect of biodiversity - independent of any legal or administrative delineation. To this end, data for the following aspects of biodiversity have been included: terrestrial, freshwater and marine ecosystem intactness and connectivity.
  The ecosystem condition indicator has been calculated separately for terrestrial, freshwater and marine areas. Terrestrial: Biodiversity Intactness Index and Functional Connectivity of the Worlds Protected Areas were used. Freshwater: The Water Risk Filter's (WRF) Fragmentation Status of Rivers has been integrated into the Biodiversity Risk Filter without changes. See the specific risk indicator layers in the WRF methodology for more details. Marine areas: Ocean Health Index' habitat condition data for six marine ecosystems was considered.
- **Range Rarity,** this indicator is based on range rarity measuring the degree of endemism of mammals, amphibians and bird species.
  Reputation risk will likely be highest where corporate actions cause or contribute significantly to a species extinction. Range-size rarity is a measure of species endemism – a state of a species being found in a single and/or restricted geographic range. This indicator specifies those areas where impact on a species might more easily cause extinction.
  It is calculated from the area of the pixel divided by the area of the range for each species, i.e., the proportion of the species' range contained within the given pixel. These values are summed across all species to show the aggregate importance of each pixel to the species occurring there. For this indicator, we were given generous permission to utilize the IUCN Red List of Threatened Species data in the BRF by the IBAT partners.

7) **Socioeconomic Factors:** Reputational risk can be driven by negative impacts on local socioeconomic conditions and the local prevalence of socioeconomic issues. This risk category comprises the following indicators:
   - **Indigenous Peoples (IPs); Local Communities (LCs) Lands and Territories**, whilst global data on IPLC territories exists, this indicator has not yet been included in the map visualization and the risk assessment. Inclusion of this indicator will be a priority for the next phase.
   - **Resource Scarcity: Food - Water - Air,** the indicator is a composite of food insecurity, water scarcity and air quality data. Sometimes named 'The Big Three' air, water and food are essential for human survival. This trifecta of indicators was included in the BRF to measure where the most basic conditions were at risk, which can compromise working conditions and could potentially reflect badly on businesses operating in regions where these conditions might not be met.
     For food insecurity, FAO data on prevalence of moderate or severe food insecurity in the total population on a country-by-country basis was used. Please note this data source is only available on a country level. For water scarcity, the Water Risk Filter's (WRF) data has been

integrated into the Biodiversity Risk Filter without changes. See the specific risk indicator layers in the WRF methodology for more details. For air quality, Hammer's average concentrations of PM2.5 were used. PM 2.5 is the annual global surface concentrations (micrograms per cubic meter) of all composition ground-level fine particulate matter of 2.5 micrometers or smaller.

- **Labor/Human Rights,** the indicator is a composite of data on internationally ratified human rights instruments and the International Trade Union's Global Rights Index. Labor and human rights are at the basis of just working conditions for employees. The objective of labor and human rights risk management is to prevent, mitigate or end negative impacts of business activity on people. This indicator aims to give a first insight into regional discrepancies in labor and human rights situations.

  The number of international human rights instruments ratified per country by the UN Human Rights Office of the High Commissioner has been used to give a first assessment of human rights. Labor rights have been evaluated using the International Trade Union Congress (ITUC) Global Rights Index, which depicts the world's worst countries for workers. Please note that the source data for this indicator is only available on a country level.
- **Financial Inequality,** this indicator uses the GINI index to estimate financial inequality. For businesses, systemic financial inequality is a great source of risk. It limits productivity and has the potential to destabilize supply chains, trigger political instability, and jeopardize their social license to operate.

  The World Banks' GINI index measures the extent to which the distribution of income (or, in some cases, consumption expenditure) among individuals or households within an economy deviates from a perfectly equal distribution. A GINI index of 0 represents perfect equality, while an index of 100 implies perfect inequality. Please note that the source data for this indicator is only available on a country level.

8) **Additional Reputational Factors:** Reputational risk can be driven by the actual or perceived importance or value of ecological assets and socioeconomic conditions, and the level of public scrutiny of businesses operating in each geography. This risk category comprises the following indicators:

- **Media Scrutiny,** for this indicator, RepRisk's country weighed score of negative news for all ecological and social tags was used. Media scrutiny indicates whether there has been documented negative news (e.g., incidents, criticism and controversies) related to environmental and social issues that can affect a company's reputational risk.

  Media scrutiny scores were calculated as the product of the number of incidents and the severity of these incidents. For this indicator, we were given generous permission to utilize the data collected by RepRisk for 2020 and 2021. Please note that the source data for this indicator is only available on a country level.

- **Political Situation,** this indicator is based on four datasets assessing the level of freedom, corruption, governance and violence against land and environmental defenders. Unstable and ineffective institutions & governance can potentially undermine business viability and increase potential for reputational risks.

  Freedom House's annual global report on political rights and civil liberties, composed of numerical ratings and descriptive texts for each country and a select group of territories. Transparency International's Corruption Perceptions Index 2020 aggregates data from different sources that provide perceptions of business, people and country experts on the level of corruption in the public sector. These two datasets have already been calculated in the Water Risk Filter (WRF) and have been integrated into the Biodiversity Risk Filter without changes. To estimate governance, the World Bank's worldwide 'government effectiveness in percentile's governance indicator was used. Government effectiveness captures perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies. For violence against land and environmental defenders, Global Witness's record of total number of killings of land environmental defenders per country was used. Please note that the source datasets for this indicator are only available on a country level.
- **Sites of International Interest,** this indicator is based on overlap of Natural World Heritage Sites and RAMSAR sites with assessment units. Wetlands are among the most diverse and productive ecosystems. They provide essential services and supply all our fresh water. RAMSAR sites highlight important wetlands and encourage their wise use. World Heritage sites are a collection of unique and diverse places that encourage nature conservation and the preservation of cultural properties. Both RAMSAR and World Heritage sites are adopted by intergovernmental processes (the RAMSAR Convention and the World Heritage Convention). To give both RAMSAR and World Heritage sites additional weight, they are considered both as part of the protected areas indicator, and as a unique indicator. For this indicator, UNEP-WCMC's World Database of Protected Areas (WDPA) was used. It is the most authoritative source of data on protected areas globally and features Natural World Heritage Sites and RAMSAR sites in its collection. We were generously given permission to utilize the WDPA data in the BRF by the Integrated Biodiversity Assessment Tool (IBAT) partners.
- **Risk Preparation.** For this indicator, the World Bank's Index of Risk Preparation was used. The level of risk preparation has implications for the kind of response needed to address the realization of (biodiversity) risks which, in turn, can contribute to vicious or virtuous circles in risk management. When effective preparation limits the damage from adverse shocks, coping can be minimal, leaving more resources available for further investments in risk management, reducing vulnerability to future shocks, and so on. Preparation for risk at the country level includes actions by and contributions from all social and economic groups and institutions, including the state. The index, developed for the World Development Report 2014, comprises measures of assets and services across four important categories – human capital,

physical and financial assets, social support and state support – that influence preparation for risk. Please note that the source data for this indicator is only available on a country level.

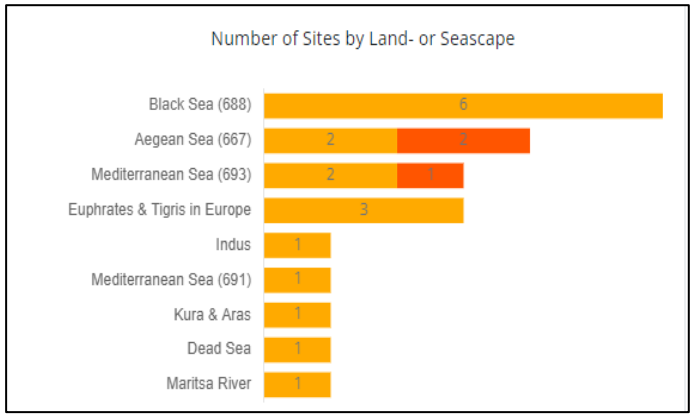


Figure 2. Number of Sites by Land or Seascape

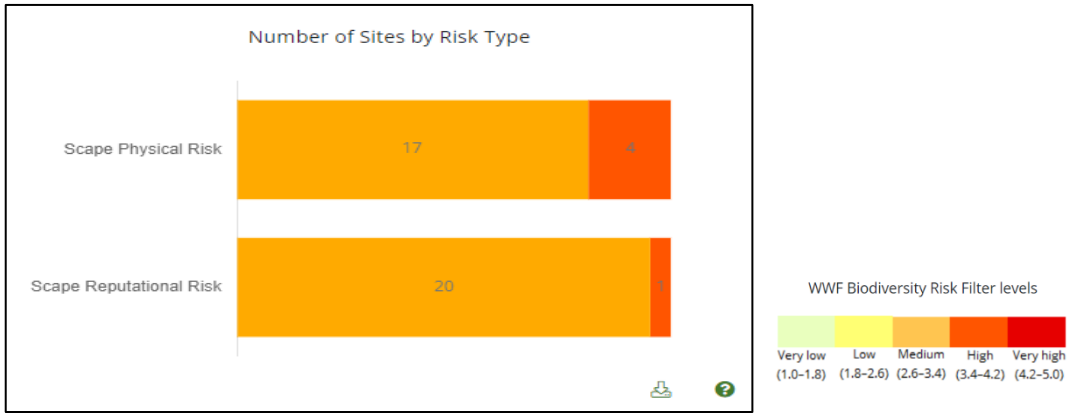


Figure 3. Number of Sites by Risk Type

Figure 1 illustrates up to ten land- or seascapes with the highest number of sites and displays the number of sites associated with physical risk scores. This graphic provides insights into land- or seascapes with a significant concentration of high-risk sites, thereby highlighting areas where scape-level biodiversity stewardship activities may be necessary. According to the tool's results, two sites within the Aegean Sea region and one site within the Mediterranean region are classified as high risk. The remaining sites are categorized as medium risk.

Figure 2 presents the distribution of the number of sites across various risk levels for all sites within Zorlu Enerji. The degree of impact or dependency an industry has on different aspects of biodiversity, as well as the local integrity and importance of these aspects, exposes companies to varying physical and reputational risks. By entering information about the industry and location of the sites, the tool automatically assesses the risk for each site. According to the tool's results,

four sites are under high-scape physical risk and one site is under scape reputational risk. The remaining sites are categorized as medium risk for both types of risk.

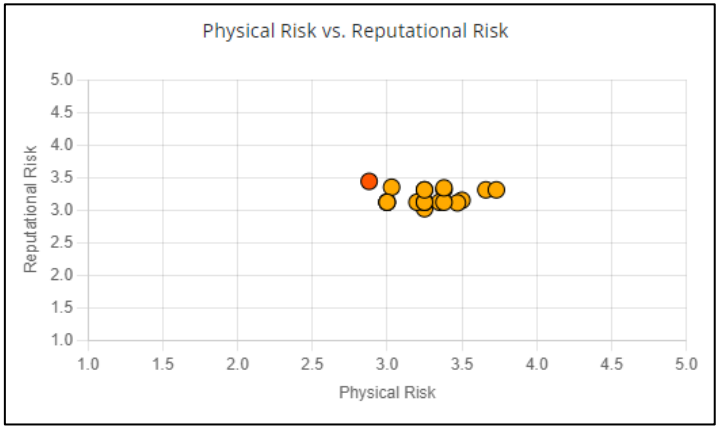


Figure 4. Physical Risk vs. Reputational Risk

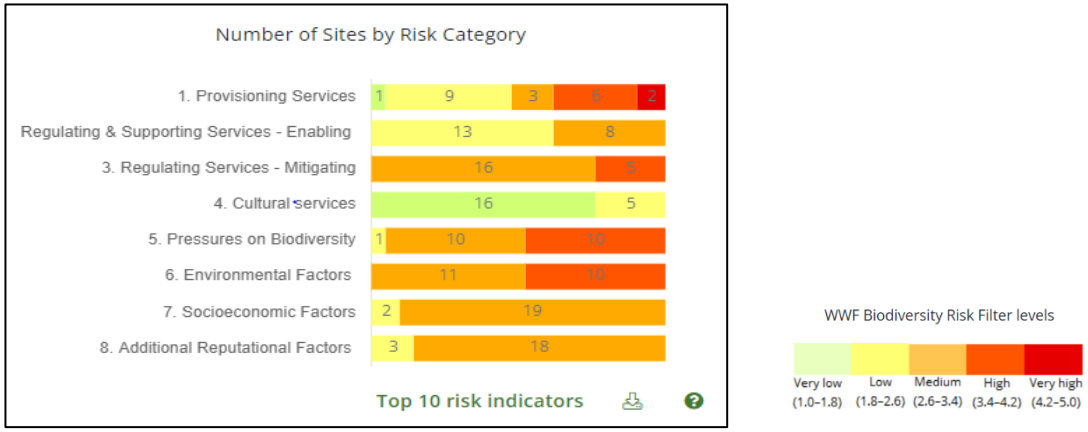


Figure 5. Number of Sites by Risk Category

Figure 4 illustrates the comparison between physical risk scores and reputational risk scores for all sites within Zorlu Enerji's operations. The İkizdere HPP emerges as the riskiest asset. This graphic depicts the distribution of risk across eight categories for all Zorlu Enerji sites. Examining risk ratings at lower levels of aggregation can provide insights into the underlying factors contributing to high physical or reputational risk scores.

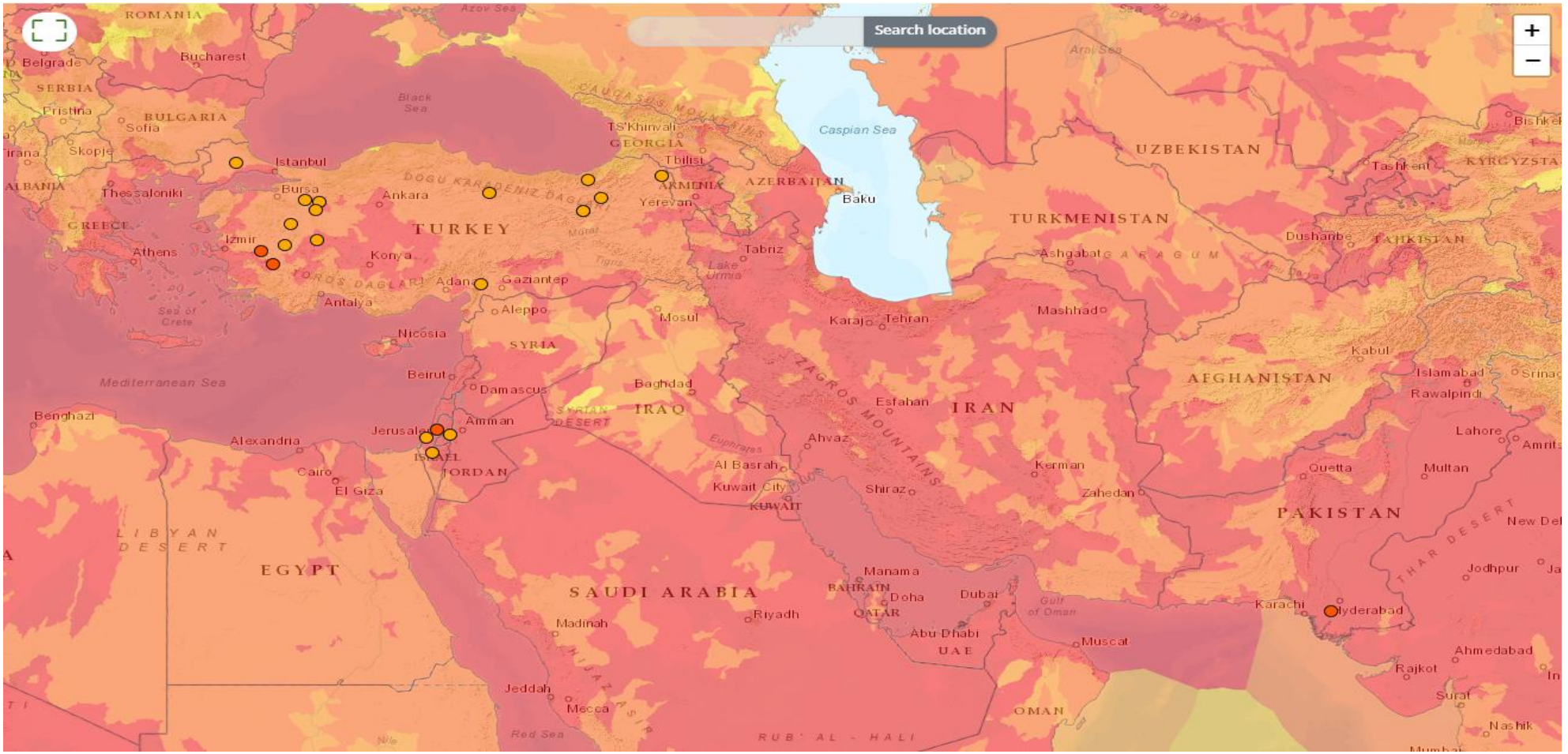


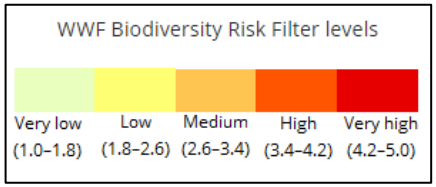
Figure 6. Scape Physical Risk Map for Zorlu Enerji

Biodiversity Risk Filter
Scape Risk Results

Dataset: 24.05.2024

Company Name	Site Name	Industry	Business Importance	Country	Province	Scape Physical Risk SPH	1. Provisioning Services SRC1	2. Regulating & Supporting Services - Enabling SRC2	3. Regulating Services - Mitigating SRC3	4. Cultural Services SRC4	5. Pressures on Biodiversity SRC5	Scape Reputational Risk SRP	6. Environmental Factors SRC6	7. Socioeconomic Factors SRC7	8. Additional Reputational Factors SRC8
Zorlu Enerji	Jhimpir WPP	Electric Energy Produ	High	Pakistan	Sindh	3,47	1,65	3	3,88	No depend	3,47	3,11	3	2,38	3,22
Zorlu Enerji	Ashdod CoNGS	Electric Energy Produ	Medium	Israel		3,5	4,17	2,5	3,5	No depend	2,97	3,15	3,5	2,8	2,72
Zorlu Enerji	Dorad CCNGS	Electric Energy Produ	Medium	Israel	Mahoz Darom	3,38	4,42	3	3,38	No depend	3,03	3,34	4	2,67	2,31
Zorlu Enerji	Deadsea SPP	Electric Energy Produ	Low		Judea and Samaria	3,25	1,92	3	3,88	No depend	3,25	3,02	3,5	2,5	2,53
Ernst Schad GmbH	Ernst Schad GmbH Fabrika	Automotive, Electrica	High	Germany	Nordrhein-Westfaler	3,12	3,12	2	2,88	No depend	3,25	2,19	2,5	1,88	1,88
Zorlu Enerji	Ramat Negev CoNGS	Electric Energy Produ	Medium	Israel	Mahoz Darom	3,03	4,45	3	3	No depend	3,03	3,35	4	2,7	2,31
Zorlu Enerji	Kızıldere 1-2-3 GPP	Electric Energy Produ	High	Turkey	Denizli	3,73	3,73	2,5	3,5	No depend	4,03	3,31	3,5	2,88	3,12
Zorlu Enerji	Alaşehir GPP	Electric Energy Produ	High	Turkey	Manisa	3,66	3,98	2,5	3,5	No depend	3,66	3,31	3,5	2,88	3,12
Astor Enerji	Astor Enerji Fabrika	Electric Energy Produ	High	Turkey	İstanbul	3,58	3,58	2,5	3,38	No depend	4,03	3,56	4	2,88	3,12
Zorlu Enerji	Lüleburgaz CoNGS	Electric Energy Produ	Low	Turkey	Kırklareli	3	3,95	2,5	3	No depend	2,91	3,12	3,12	2,88	3,12
Zorlu Enerji	Gökçedağ WPP	Electric Energy Produ	High	Turkey	Osmaniye	3,38	2,15	2	3,38	No depend	3,94	3,31	3,5	2,88	3,12
Dowell Schlumberger	Dowell Schlumberger Fabrika	Automotive, Electrica	High	Egypt	Cairo	3,38	3,62	3	3,38	No depend	2,75	2,84	2	3	2,69
Zorlu Enerji	Ataköy HPP	Electric Energy Produ	Low	Turkey	Tokat	3,25	2,12	2	3,25	No depend	3,47	3,12	3,12	2,88	3,12
Zorlu Enerji	Beyköy HPP	Electric Energy Produ	Medium	Turkey	Eskişehir	3,25	2,1	2	3,25	No depend	3,62	3,31	3,5	2,88	3,12
Zorlu Enerji	Kuzgun HPP	Electric Energy Produ	Medium	Turkey	Erzurum	3,25	1,95	2	3,25	No depend	3,69	3,12	3,12	2,88	3,12
Zorlu Enerji	Mercan HPP	Electric Energy Produ	Medium	Turkey	Erzincan	3,25	1,95	2	3,25	No depend	3,62	3,12	3,12	2,88	3,12
Zorlu Enerji	Tercan HPP	Electric Energy Produ	Medium	Turkey	Erzincan	3,25	1,95	2	3,25	No depend	3,62	3,12	3,12	2,88	3,12
Zorlu Enerji	Çıldır HPP	Electric Energy Produ	Medium	Turkey	Kars	3,25	2,05	2	3,25	No depend	3,59	3,31	3,5	2,88	3,12
Sezenler Üretim	Sezenler Üretim Fabrika	Chemicals & Other M	High	Turkey	İstanbul	3,25	3,5	2,5	3,25	No depend	2,53	3,25	2,75	2,88	3,62
Deutsche Telekom	Deutsche Telekom	Telecommunication s	High	Turkey	İstanbul	3,06	2,75	No depend	3,25	No depend	3,06	3	2,75	2,88	3,12
Vestel	Manisa Fabrikası "Vestel City"	Appliances & Genera	High	Turkey	Manisa	2,91	2,08	2,5	3,38	No depend	2,91	3,19	2,5	2,88	3,5
Zorlu Enerji	İkizdere HPP	Electric Energy Produ	Medium	Turkey	Rize	2,88	1,82	2	2,88	No depend	3,28	3,44	3,75	2,88	3,12
Novomet	Novomet Perm Fabrika	Automotive, Electrica	High	Russian Federation	Permskiy kray	2,59	2,85	2	2,5	No depend	2,59	2,64	1,88	2,38	2,91
Zorlu Enerji	Afyon OEDAŞ	Other	High	Turkey	Afyonkarahisar	3,38	3,52	3	3,38	2,5	2,62	3,12	3	3,12	3,12
Zorlu Enerji	Bilecik OEDAŞ	Other	High	Turkey	Bilecik	3,35	3,35	2,5	3,38	2,5	3	3,12	3	3,12	3,12
Schaeffler	Schaeffler Türkiye Fabrikası	Automotive, Electrica	High	Turkey	İstanbul	3,25	3,83	2,5	3,25	No depend	2,91	2,94	3	2,88	2,62
Zorlu Enerji	Kütahya OEDAŞ	Other	High	Turkey	Kütahya	3,2	3,2	3	3,38	2,5	2,94	3,12	2,88	3,12	3,12
BTC Bilişim	BTC Bilişim Merkez Ofis	Telecommunication s	High	Turkey	İstanbul	3,09	2,33	No depend	3,25	No depend	3,09	2,94	3	2,88	2,62
Zorlu Enerji	Eskişehir OEDAŞ	Other	High	Turkey	Eskişehir	3	3,48	3	3	2,5	2,25	3,12	3	3,12	3,12
Zorlu Enerji	Uşak OEDAŞ	Other	High	Turkey	Uşak	3	3	3	3,38	2,5	3	3,12	2,62	3,12	3,12
Buran Teknoloji	Buran Teknoloji Ofis	Telecommunication s	High	Turkey	Ankara	2,88	2,67	No depend	2,88	No depend	3,12	2,75	2,5	2,88	2,62
Viking	Viking International Ltd Türkiye Fabrika	Automotive, Electrica	High	Turkey	Tekirdağ	2,88	3,52	2,5	2,88	No depend	2,53	2,75	2,5	2,88	2,62

Table 6. BRF Scape Risk Results



The Biodiversity Risk Filter results for Zorlu Enerji's operations, as depicted in Figure 3, provide a comprehensive assessment of the physical and reputational risks across various sites. The analysis covers eight key risk categories, divided into physical risk (SPH, SRC1-SRC5) and reputational risk (SRP, SRC6-SRC8), enabling a detailed understanding of biodiversity-related vulnerabilities.

The results in Table 6 show:

Own operation/subsidiaries/joint ventures

The Biodiversity Risk Filter results for Zorlu Enerji's operations are summarized in Table 6, highlighting the distribution of physical and reputational risks across various sites. The table presents detailed risk scores across eight categories, with physical risk (SPH, SRC1-SRC5) and reputational risk (SRP, SRC6-SRC8) clearly delineated. Notably, İkizdere HPP emerges as the most critical site, exhibiting the highest risk levels. The physical risk scores, averaging around 3.21, are particularly elevated in the categories of Provisioning Services (SRC1) and Pressures on Biodiversity (SRC5), which reach maximum values of 4.45 and 4.03, respectively. Reputational risks, with an average score of 3.10, are most pronounced in Environmental Factors (SRC6), peaking at 4.00. The wide range of scores across different categories highlights the diverse nature of risks faced by Zorlu Enerji's operations.

The overall physical risk scores average 3.21, with the highest recorded score being 3.73 at Kızıldere 1-2-3 GPP, indicating significant variability across different locations. Kızıldere 1-2-3 stands out as the riskiest asset in terms of physical risk, particularly in SRC1 (Provisioning Services), SRC3 (Regulating Services - Mitigation), and SRC5 (Pressures on Biodiversity). It also holds a significant reputational risk score of 3.31, mainly due to high risks in SRC6 (Environmental Factors).

High-combined-risk sites, particularly İkizdere HPP, demonstrate substantial dependencies and impacts on local ecosystems. İkizdere HPP's most substantial risk is through SRC6 (Environmental Factors) with a score of 3.75, making it the riskiest site in this category. This site also holds the highest reputational risk score of 3.44 within Zorlu Enerji's operations.

Provisioning Services (SRC1) scores range from 1.65 to 4.45, with an average of 2.96, highlighting critical dependencies on local ecosystem services. Similarly, Regulating and Supporting Services (SRC2 and SRC3) show significant variations, with average scores of 3.25 and 3.26, respectively. The Pressures on Biodiversity (SRC5) category also reflects high scores, with an average of 3.18, underscoring the operational pressures on biodiversity.

In terms of reputational risk, the overall scores average 3.10, with the highest being 3.44 within Zorlu Enerji's operations. The Environmental Factors (SRC6) category exhibits the highest variability, with scores ranging from 2.15 to 4.00 and an average of 3.09, indicating notable concerns that could affect public perception. Socioeconomic Factors (SRC7) and Additional Reputational Factors (SRC8) also show significant impacts, with average scores of 2.83 and 2.95, respectively, reflecting varying degrees of influence on local communities and external stakeholder perceptions.

Upstream & Downstream

The overall physical risk scores for upstream and downstream sites average 3.09, with the highest score reaching 3.58, indicating a moderate level of risk variability. Notably, the highest physical risks are observed in categories such as Provisioning Services (SRC1), Regulating Services - Mitigation (SRC3), and Pressures on Biodiversity (SRC5). Provisioning Services scores range from 1.65 to 3.83, with an average of 3.08, highlighting substantial dependencies on local ecosystems. Regulating Services - Mitigation shows an average score of 3.12, reflecting significant impacts on ecosystem stability. The Pressures on Biodiversity category averages 2.98, underscoring the operational pressures on biodiversity. In terms of reputational risk, the overall scores average 2.91, with a peak score of 3.56, indicating moderate but varied reputational concerns. Environmental Factors (SRC6) exhibit high variability, with scores ranging from 2.15 to 4.00 and an average of 2.67, suggesting notable environmental concerns that could affect public perception. Socioeconomic Factors (SRC7) and Additional Reputational Factors (SRC8) show average scores of 2.75 and 2.85, respectively, reflecting varying degrees of influence on local communities and external stakeholder perceptions.

4.3.3. WWF Water Risk Filter Results & Dependency Related Risk

Zorlu Enerji uses the WWF Biodiversity Risk Filter and the Aqueduct Water Risk Atlas to evaluate dependencies and impacts on biodiversity and water, respectively. The assessment focuses on operational sites located in critical biodiversity areas such as National Reserved Forests and World Heritage sites. The results of these assessments are presented in the form of an Impact and Dependency Heatmap, where colour coding is used to depict varying levels of dependency and impact based on risk indicators.

Color Code	Level of Dependency and Impact based on Risk Indicators
	Very low risk
	Low risk
	Medium risk
	Hight risk
	Very high risk
	No Dependency

Scope Adjustment: As part of Zorlu Group's strategic focus on renewable energy projects, Zorlu Enerji has decided to divest majority of its operations in Israel. We have successfully sold all shares in Ezotech Electric Ltd., Solad Energy Ltd., and Adnit Real Estate Ltd., transferring these operations, including the natural gas power plants in Ashdod and Ramat Negev, to Edeltech Ltd. Consequently, these projects are no longer within the scope of our biodiversity risk assessments and related activities. However, due to the timing of the assessment relative to the sale, these assets still appear in the biodiversity risk filter results, reflecting our ongoing commitment to comprehensive reporting and transparency.

Basins were prioritized with risk indicators such as;

- Baseline Water Stress
- Baseline Water Depletion
- Groundwater Table Decline
- Coastal Eutrophication Potential
- Unimproved/No Drinking Water
- Unimproved/No Sanitation

Aquaduct 4.0 database, embedded in Water Risk Atlas, is used for mapping and risk comparisons for WRI based assessments. A common risk level legend used for both tools.

4.3.3.1. Baseline Analysis

Baseline analysis was resoluted for the annual view. Different risk indicators are used as stated below;

<u>- Overall Water Risk</u>

Overall water risk measures all water-related risks, by aggregating all selected indicators from the Physical Quantity, Quality and Regulatory & Reputational Risk categories. Higher values indicate higher water risk. Overall Water Risks are categorized in 2- Tier as described below.

- Physical Risks Quantity: Physical risks quantity measures risk related to too little or too much water, by aggregating all selected indicators from the Physical Risk Quantity category. Higher values indicate higher water quantity risks.
- Water Stress: Baseline water stress measures the ratio of total water demand to available renewable surface and groundwater supplies. Water demand includes domestic, industrial, irrigation, and livestock uses. Available renewable water supplies include the impact of upstream consumptive water users and large dams on downstream water availability. Higher values indicate more competition among users.

- Water Depletion: Baseline water depletion measures the ratio of total water consumption to available renewable water supplies. Total water consumption includes domestic, industrial, irrigation, and livestock consumptive uses. Available renewable water supplies include the impact of upstream consumptive water users and large dams on downstream water availability. Higher values indicate a larger impact on the local water supply and decreased water availability for downstream users. Baseline water depletion is like baseline water stress; however, instead of looking at total water demand (consumptive plus nonconsumptive), baseline water depletion is calculated using consumptive withdrawal only
- Interannual Variability: Interannual variability measures the average between year variability of available water supply, including both renewable surface and groundwater supplies. Higher values indicate wider variations in available supply from year to year.
- Seasonal Variability: Seasonal variability measures the average within-year variability of available water supply, including both renewable surface and groundwater supplies. Higher values indicate wider variations of available supply within a year.
- Groundwater Table Decline: Groundwater table decline measures the average decline of the groundwater table as the average change for the period of study (1990–2014). The result is expressed in centimeters per year (cm/yrs.). Higher values indicate higher levels of unsustainable groundwater withdrawals.
- Riverine Flood Risk: Riverine flood risk measures the percentage of population expected to be affected by Riverine flooding in an average year, accounting for existing flood-protection standards. Flood risk is assessed using hazard (inundation caused by river overflow), exposure (population in flood zone), and vulnerability. The existing level of flood protection is also incorporated into the risk calculation. It is important to note that this indicator represents flood risk not in terms of maximum possible impact but rather as average annual impact. The impacts from infrequent, extreme flood years are averaged with more common, less newsworthy flood years to produce the "expected annual affected population." Higher values indicate that a greater proportion of the population is expected to be impacted by Riverine floods on average.
- Coastal Flood Risk: Coastal flood risk measures the percentage of the population expected to be affected by coastal flooding in an average year, accounting for existing flood protection standards. Flood risk is assessed using hazard (inundation caused by storm surge), exposure (population in flood zone), and vulnerability. The existing level of flood protection is also incorporated into the risk calculation. It is important to note that this indicator represents flood risk not in terms of maximum possible impact but rather as average annual impact. The impacts from infrequent, extreme flood years are averaged with more common, less newsworthy flood years to produce the "expected annual affected population." Higher values indicate that a greater proportion of the population is expected to be impacted by coastal floods on average.
- Drought Risk: Drought risk measures where droughts are likely to occur, the population and assets exposed, and the vulnerability of the population and assets to adverse effects. Higher values indicate higher risk of drought.

- Physical Risks Quality: Physical risks quality measures risk related to water that is unfit for use, by aggregating all selected indicators from the Physical Risk Quality category. Higher values indicate higher water quality risks.
- Untreated Connected Wastewater: Untreated connected wastewater measures the percentage of domestic wastewater that is connected through a sewerage system and not treated to at least a primary treatment level. Wastewater discharge without adequate treatment could expose water bodies, the public, and ecosystems to pollutants such as pathogens and nutrients. The indicator compounds two crucial elements of wastewater management: connection and treatment. Low connection rates reflect households' lack of access to public sewerage systems; the absence of at least primary treatment reflects a country's lack of capacity (infrastructure, institutional knowledge) to treat wastewater. Together these factors can indicate the level of a country's current capacity to manage its domestic wastewater through two main pathways: extremely low connection rates (below 1 percent), and high connection rates with little treatment. Higher values indicate higher percentages of point source wastewater discharged without treatment.
- Coastal Eutrophication Potential: Coastal eutrophication potential (CEP) measures the potential for riverine loadings of nitrogen (N), phosphorus (P), and silica (Si) to stimulate harmful algal blooms in coastal waters. The CEP indicator is a useful metric to map where anthropogenic activities produce enough point-source and nonpoint-source pollution to potentially degrade the environment. When N and P are discharged in excess over Si with respect to diatoms, a major type of algae, undesirable algal species often develop. The stimulation of algae leading to large blooms may in turn result in eutrophication and hypoxia (excessive biological growth and decomposition that reduces oxygen available to other organisms). It is therefore possible to assess the potential for coastal eutrophication from a river's N, P, and Si loading. Higher values indicate higher levels of excess nutrients with respect to silica, creating more favorable conditions for harmful algal growth and eutrophication in coastal waters downstream.
- Regulatory & Reputational Risk: Regulatory and reputational risks measures risk related to uncertainty in regulatory change, as well as conflicts with the public regarding water issues. Higher values indicate higher regulatory and reputational water risks.
- Unimproved/No Drinking Water: Unimproved/no drinking water reflects the percentage of the population collecting drinking water from an unprotected dug well or spring, or directly from a river, dam, lake, pond, stream, canal, or irrigation canal (WHO and UNICEF 2017). Specifically, the indicator aligns with the unimproved and surface water categories of the Joint Monitoring Programme (JMP)the lowest tiers of drinking water services. Higher values indicate areas where people have less access to safe drinking water supplies.
- Unimproved/No Sanitation: Unimproved/no sanitation reflects the percentage of the population using pit latrines without a slab or platform, hanging/bucket latrines, or directly disposing human waste in fields, forests, bushes, open bodies of water, beaches, other open spaces, or with solid waste (WHO and UNICEF 2017). Specifically, the indicator aligns with JMP's unimproved and open defecation categories— the lowest tier of sanitation services. Higher values indicate areas where people have less access to improved sanitation services.

- Peak RepRisk Country ESG Risk Index: The Peak RepRisk country ESG risk index quantifies business conduct risk exposure related to environmental, social, and governance (ESG) issues in the corresponding country. The index provides insights into potential financial, reputational, and compliance risks, such as human rights violations and environmental destruction. RepRisk is a leading business intelligence provider that specializes in ESG and business conduct risk research for companies, projects, sectors, countries, ESG issues, NGOs, and more, by leveraging artificial intelligence and human analysis in 20 languages. WRI has elected to include the Peak RepRisk country ESG risk index in Aqueduct to reflect the broader regulatory and reputational risks that may threaten water quantity, quality, and access. While the underlying algorithm is proprietary, we believe that our inclusion of the Peak RepRisk country ESG risk index, normally unavailable to the public, is a value-add to the Aqueduct community. The peak value equals the highest level of the index in each country over the last two years. The higher the value, the higher the risk exposure.

3.3.3.2 Future Trend Analysis by WRI

Timeframe & Scenarios

Each year represents the long-term trend over a 30-year period.

2030: 2015-2045, 2050: 2035-2065, 2080: 2065-2095

Optimistic

The "optimistic" scenario (SSP1 RCP2.6) represents a future that limits the rise in average global surface temperatures by 2100 to 1.3˚C to 2.4˚C compared to preindustrial levels (1850-1900). SSP1 is characterized by sustainable socioeconomic growth: stringent environmental regulations and effective institutions, rapid technological change and improved water use efficiencies, and low population growth.

Business as usual

The "business as usual" scenario (SSP3 RCP7.0) represents a middle-of-the-road future where temperatures increase by 2.8˚C to 4.6˚C by 2100. SSP3 is a socioeconomic scenario characterized by regional competition and inequality, including slow economic growth, weak governance and institutions, low investment in the environment and technology, and high population growth, especially in developing countries.

Pessimistic

The "pessimistic" scenario (SSP5 RCP8.5) represents a future where temperatures increase up to 3.3˚C to 5.7˚C by 2100. SSP5 describes fossil-fueled development: rapid economic growth and globalization powered by carbon-intensive energy, strong institutions with high investment in education and technology but a lack of global environmental concern, and the population peaking and declining in the 21st century.

Global Circulation Models

For each scenario, we ran five GCMs to account for the uncertainty in climate models: GFDL-ESM4, IPSL-CM6A-LR, MPI-ESM1-2-HR, MRI-ESM2-0, and UKESM1-0-LL. They were chosen because they represent a span of temperature-precipitation variations (e.g., wet-cold). We display the median of the 5 GCMs for each scenario.

4.3.3.2. WWF Water Risk Assessment

Zorlu Enerji used WWF Water Risk Assessment tool for more detailed risk categories, aligned with SDGs and for more up-to-date versions of mapping databases. WWF Water Risk Assessment is done in scope of basin physical risk that cascades the tier risk layers as stated below;

1. **Basin Physical Risk:** the main physical risk layer represents both natural and human-induced conditions of river basins. It comprises four risk categories covering different aspects of physical risks: water scarcity, flooding, water quality, and ecosystem services status. Therefore, physical risks account for if water is too little, too much, unfit for use, and/or the surrounding ecosystems are degraded, and in turn, negatively impacting water ecosystem services.

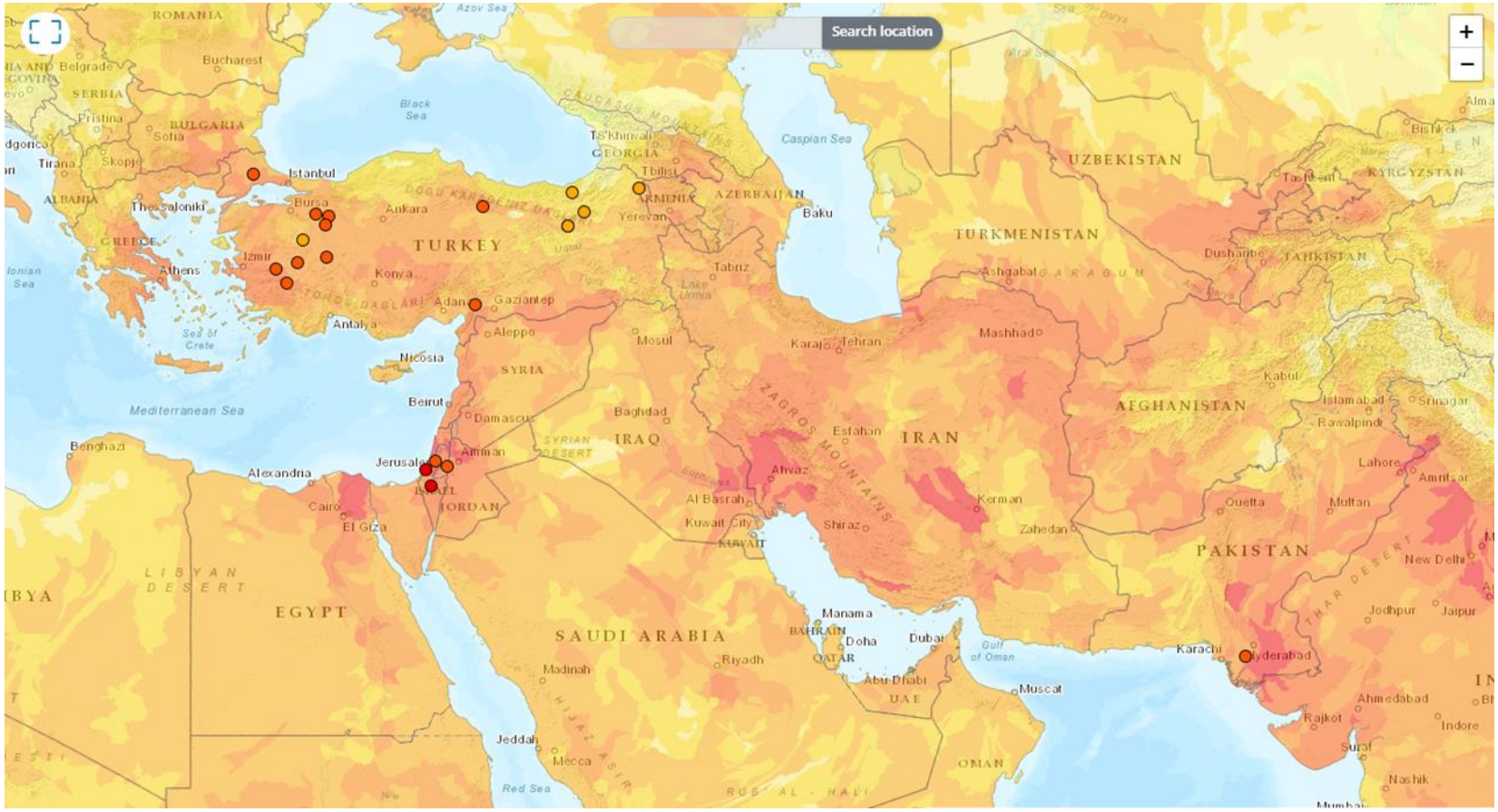


Figure 7. Basin Physical Risk Map of Zorlu Enerji Sites

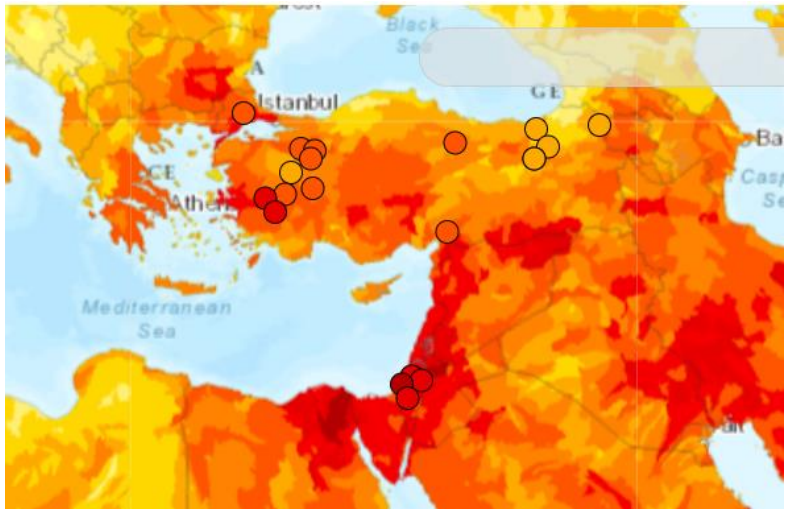


Figure 8. Basin Physical Risk Map of Zorlu Enerji Sites, 2030-Current Trend

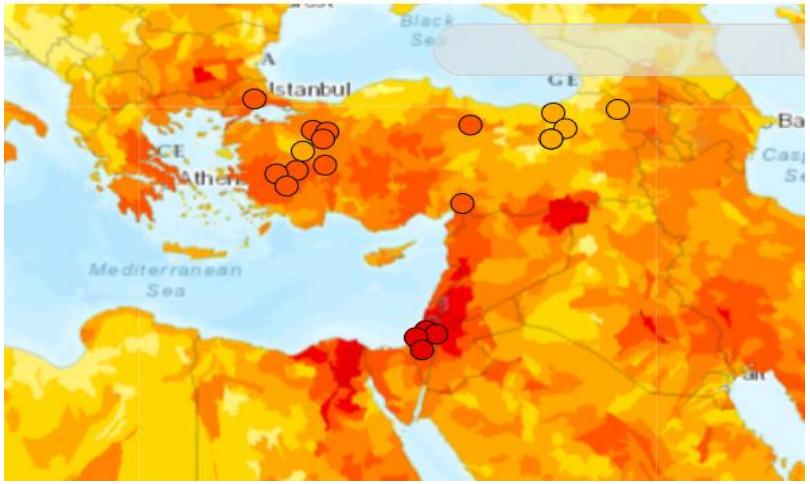


Figure 9. Basin Physical Risk Map of Zorlu Enerji Sites, 2030-Optimistic Scenario

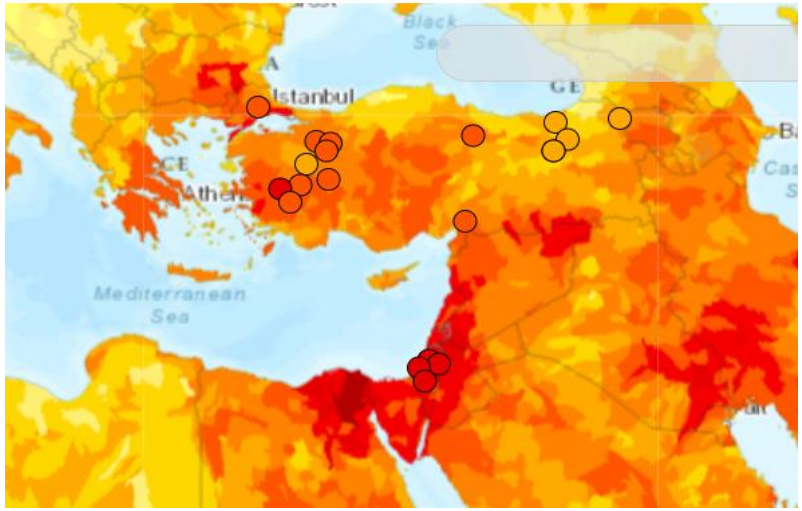


Figure 10. Basin Physical Risk Map of Zorlu Enerji Sites, 2030-Pessimistic Scenario

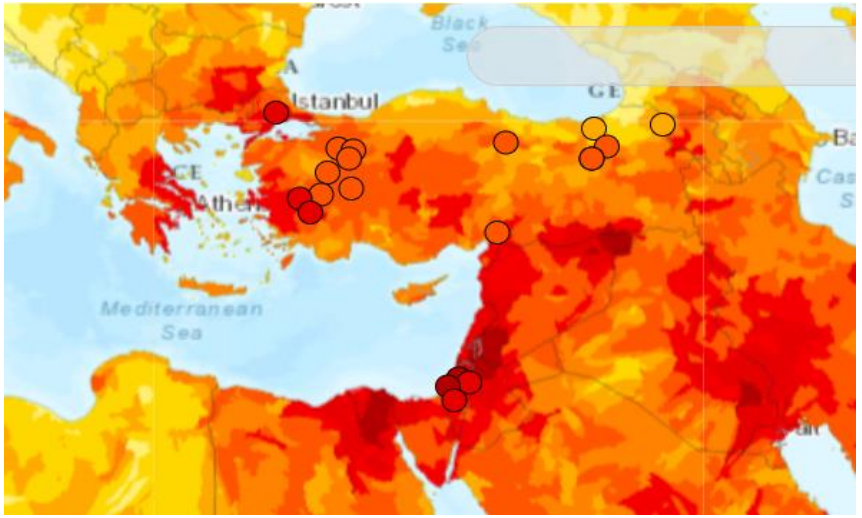


Figure 11. Basin Physical Risk Map of Zorlu Enerji Sites, 2050-Current Trend

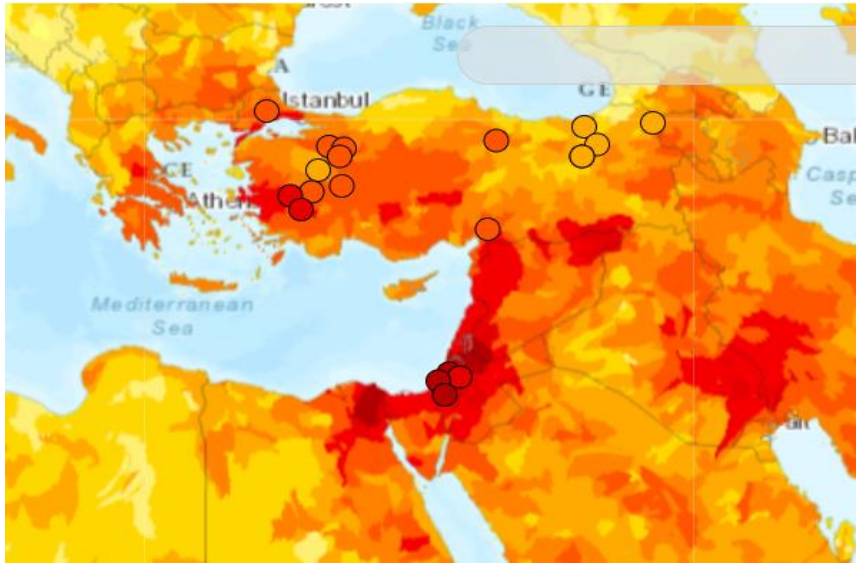


Figure 12. Basin Physical Risk Map of Zorlu Enerji Sites, 2050-Optimistic Scenario

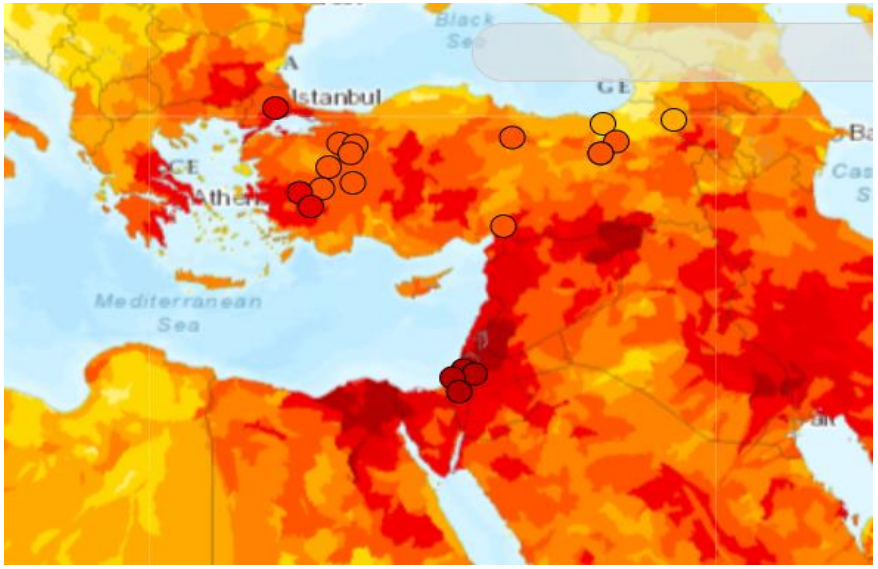


Figure 13. Basin Physical Risk Map of Zorlu Enerji Sites, 2050-Pessimistic Scenario

1.1. **Water Scarcity Risk:** Water scarcity refers to the physical abundance or lack of freshwater resources, which significantly impact business such as production/supply chain disruption, higher operating costs, and growth constraints. Water scarcity is human-driven and can be aggravated by natural conditions (e.g. aridity, drought periods), and it is generally calculated as a function of the volume of water use/demand relative to the volume of water available in each area.

1.2. **Flooding Risk:** Flooding is when there is an overflowing of water on land that is normally dry. Floods can happen due to overflowing rivers, lakes, or oceans, and are often caused by heavy rainfall, rapid snowmelt, when dams or levees break, or a storm surge from a tropical cyclone or tsunami in coastal areas. Flood events can impact businesses' operations as well as across their value chain by causing closure of operations, supply chain disruptions and transportation or increased capital costs.

The Water Risk Filter risk category flooding considers historical patterns and future trends. The historical patterns are based on empirical evidence of large flood events from 1985 to present, derived from a wide variety of news, governmental, instrumental, and remote sensing sources. Future trends are based on ensemble projections that apply both global climate and hydrological models to compute projected changes in frequency of floods in a 2˚C scenario.

1.3. **Water Quality Risk:** Water quality indicates whether water resources are fit for human use and ecosystems alike. Poor water quality – water pollution – can impact business indirectly by causing ecosystems destabilization or serious health issues as well as directly through increased operating costs, and as reduction in production or growth.

The Water Risk Filter risk category water quality considers parameters with well documented direct and indirect negative effects on water security for both humans and freshwater biodiversity, which are aligned to the Sustainable Development Goal (SDG) 6.3.2: biological oxygen demand (BOD) as a widely used umbrella proxy for overall water quality; electrical conductivity (EC) as proxy for salinity balance and pH alteration; and nitrogen, to capture nutrient loading in water bodies.

1.4. **Ecosystem Services Status Risk:** Ecosystems provide business, people and communities with a wide range of goods and services such as climate and streamflow regulation, water purification, species habitats maintenance, balance of soil biodiversity, pests and diseases, among many others. Therefore, the degradation of ecosystems can result in businesses having restricted access in the long-term to the quantity and quality of water needed for their activities as well as other ecosystem services they rely on.

The Water Risk Filter risk category ecosystem services status is informed by indicators of fragmentation status of rivers (i.e. Connectivity Status Index – CSI); catchment degradation (i.e. forest loss, as forests play an essential role in terms of water regulation, supply and pollution control); and projected change in freshwater fish extinction.

2. **Basin Regulatory Risk:** The Water Risk Filter regulatory risk layer is heavily tied to the concept of good governance and that businesses thrive in a stable, effective and properly implemented regulatory environment. It is aligned to the UN Sustainable Development Goal Target 6.5 (SDG 6.5.1) framework and comprises four risk categories: enabling environment, institutions & governance, management instruments, and infrastructure & finance.

According to the model outputs, when future predictions for regulatory risks are evaluated, no risks have been identified for Zorlu Enerji. However, in a pessimistic scenario, regulatory risks are expected to become critical by the year 2050.

Figure 14. Basin Regulatory Risks of Zorlu Enerji Sites

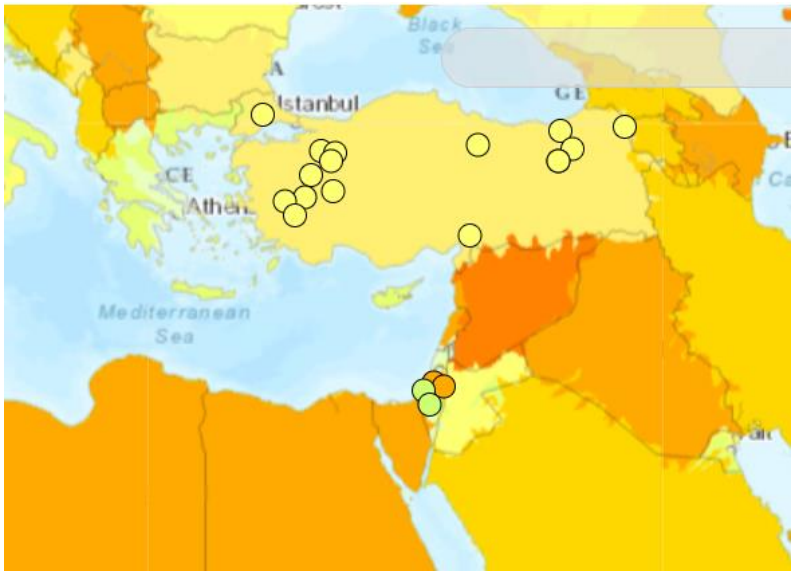


Figure 15. Basin Regulatory Risks of Zorlu Enerji Sites, 2030-Current Trend

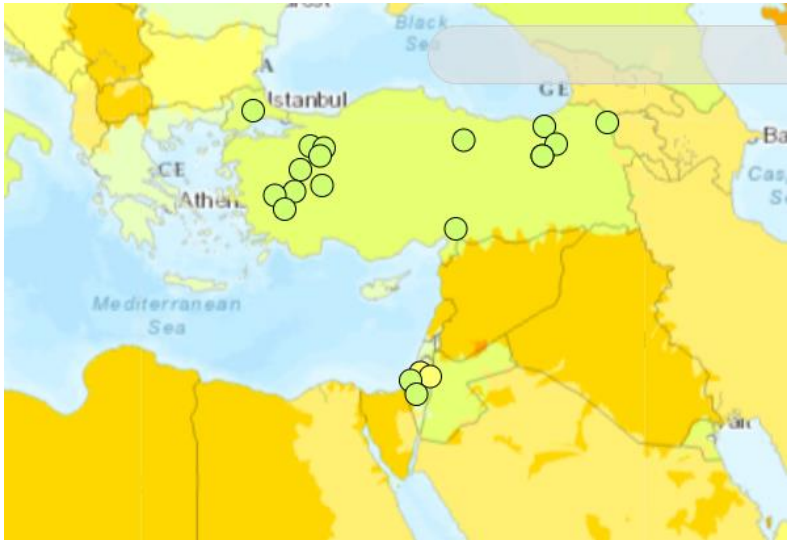


Figure 16. Basin Regulatory Risks of Zorlu Enerji Sites, 2030-Optimistic Scenario

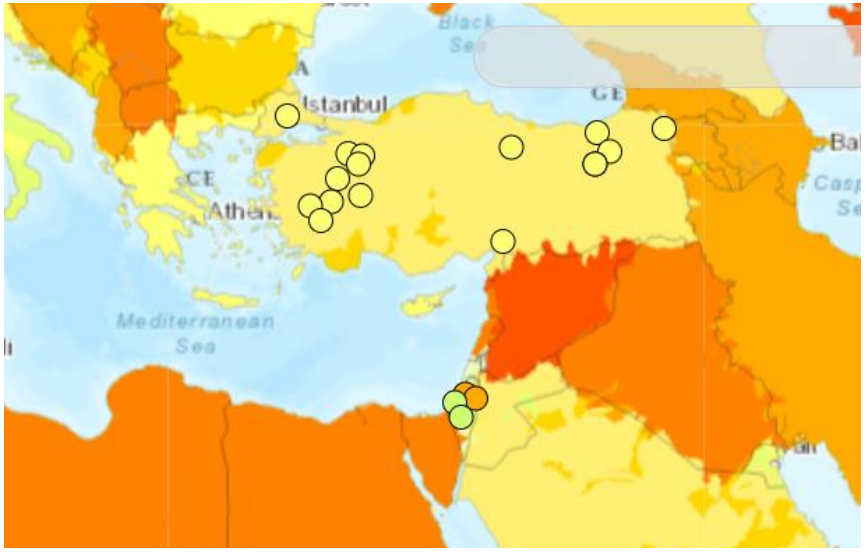


Figure 17. Basin Regulatory Risks of Zorlu Enerji Sites, 2030-Pessimistic Scenario

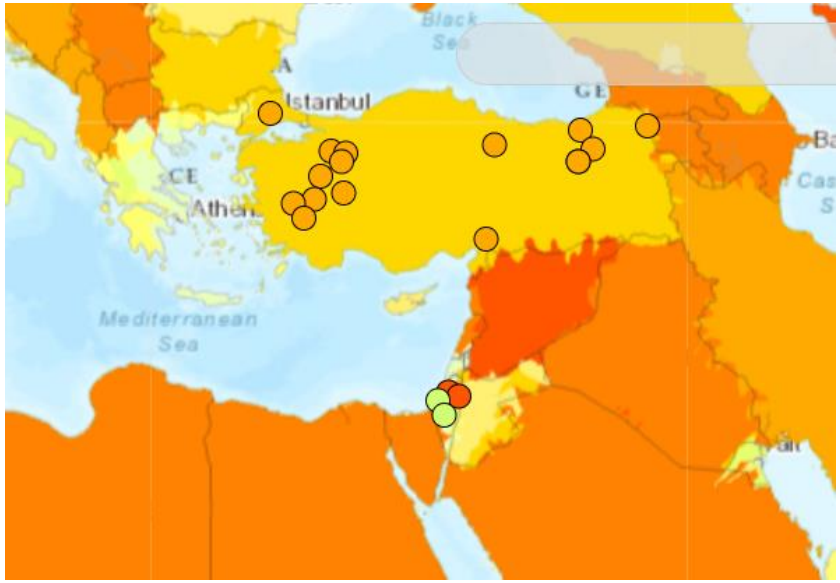


Figure 18. Basin Regulatory Risks of Zorlu Enerji Sites, 2050-Current Trend

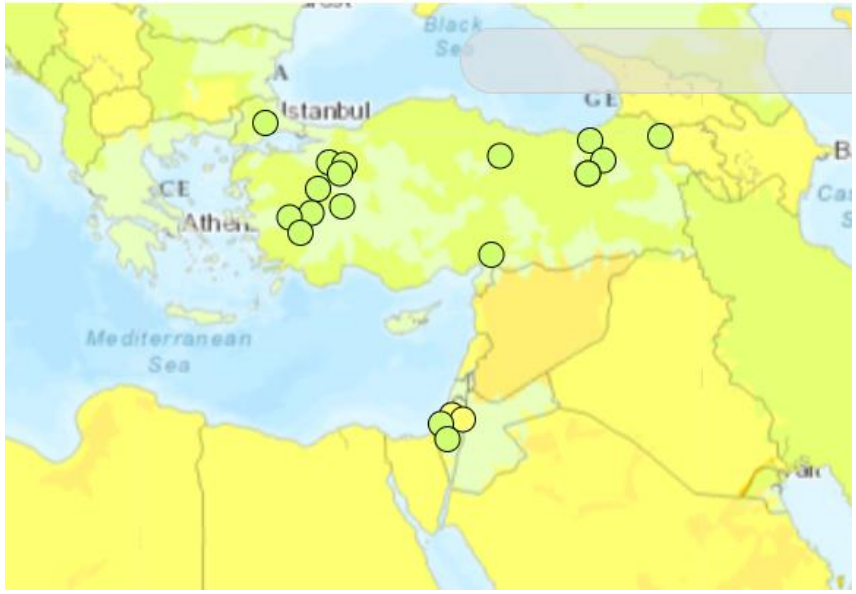


Figure 19. Basin Regulatory Risks of Zorlu Enerji Sites, 2050-Optimistic Scenario

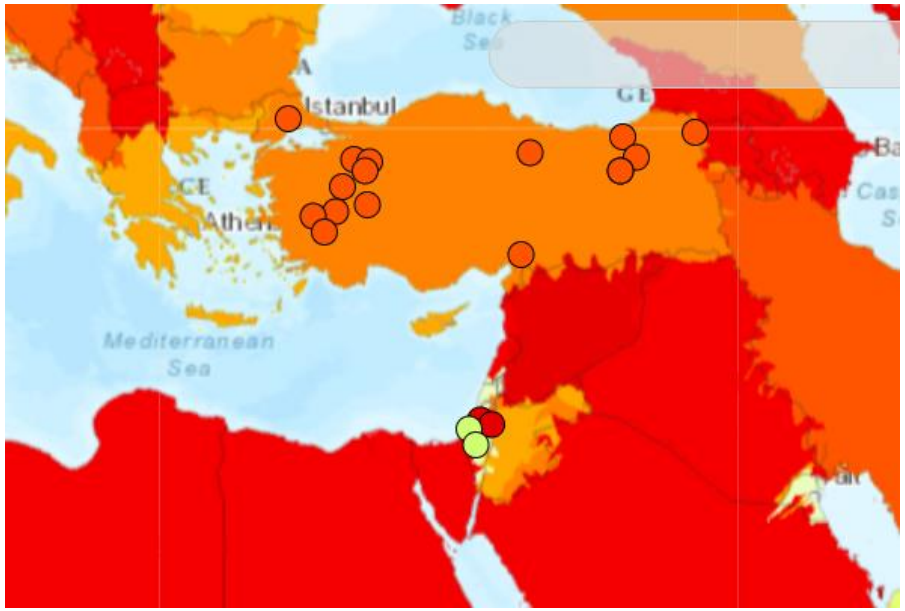


Figure 20. Basin Regulatory Risks of Zorlu Enerji Sites, 2050-Pessimistic Scenario

2.1. **Enabling Environment Risk:** Enabling the environment measures existing policies, laws and plans to support Integrated Water Resources Management (IWRM) implementation. Unstable, ineffective and poorly implemented enabling environment can potentially undermine business viability.
The Water Risk Filter risk category enabling environment is informed by Sustainable Development Goal (SDG) 6.5.1 indicators: freshwater policy status (i.e. national water resources policy); freshwater law status (i.e. national water resources law(s)); and implementation status of water management plans (i.e. national IWRM plans).

2.2. **Institutions & Governance Risk:** Institutions & Governance measures the range and roles of political, social, economic and administrative institutions, and the ability to convene and engage other stakeholder groups that help to support Integrated Water Resources Management (IWRM) implementation. Unstable and ineffective institutions & governance can potentially undermine business viability. The Water Risk Filter risk category institutions & governance is informed by three indicators: the corruption perceptions index; the freedom in the world index; and the Sustainable Development Goal (SDG) 6.5.1 indicator on private sector participation in water management.

2.3. **Management Instruments:** Management instruments measures data availability, tools and activities that enable decision-makers and users to make rational and informed choices between alternative actions that help to support Integrated Water Resources Management (IWRM) implementation. Ineffective and poorly implemented management instruments can potentially undermine business viability. The Water Risk Filter risk category management instruments is informed by three indicators: Sustainable Development Goal (SDG) 6.5.1 indicator on sustainable and efficient water use management; groundwater monitoring data availability and management; and density of runoff monitoring stations.

2.4. **Infrastructure & Finance Risk:** Infrastructure & Finance measures access to clean water and sanitation as well as existing budgeting and financing made available and used for water resources development and management. Low funding for water resources development and water infrastructure can potentially undermine business viability. The Water Risk Filter risk category infrastructure & finance is informed by three indicators: percentage of population with access to safe drinking water; access to basic sanitation services; and the Sustainable Development Goal (SDG) 6.5.1 indicator on financing for water resource development and management.

3. **Basin Reputational Risk:** The Water Risk Filter reputational risk layer represents stakeholders' and local communities' perceptions on whether companies conduct business sustainably or responsibly with respect to water. It comprises four risk categories: cultural importance of water to local communities, freshwater biodiversity importance, media scrutiny/coverage of water-related issues, and risk of hydro-political conflicts in the river basins.

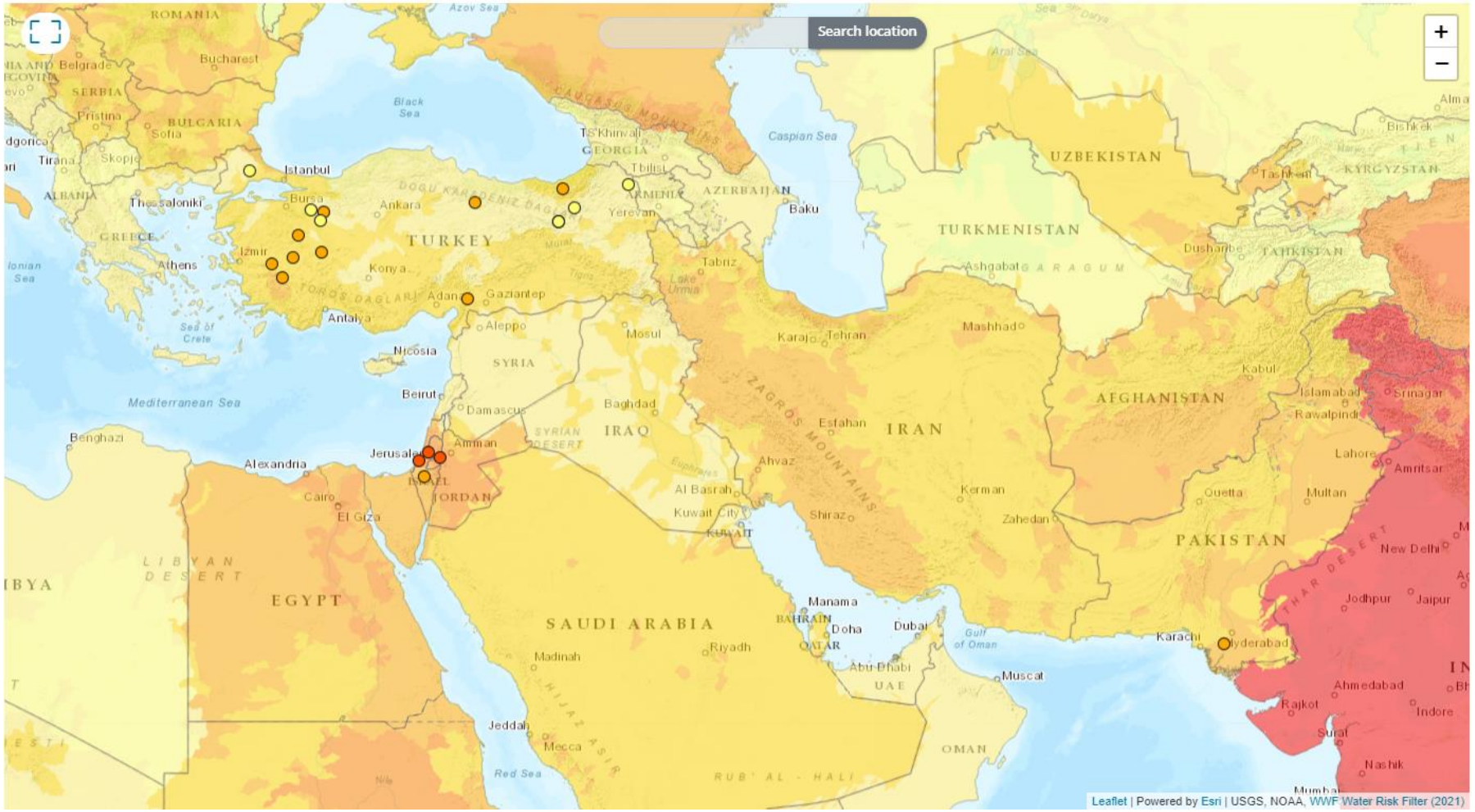


Figure 21. Basin Reputational Risks of Zorlu Enerji Sites

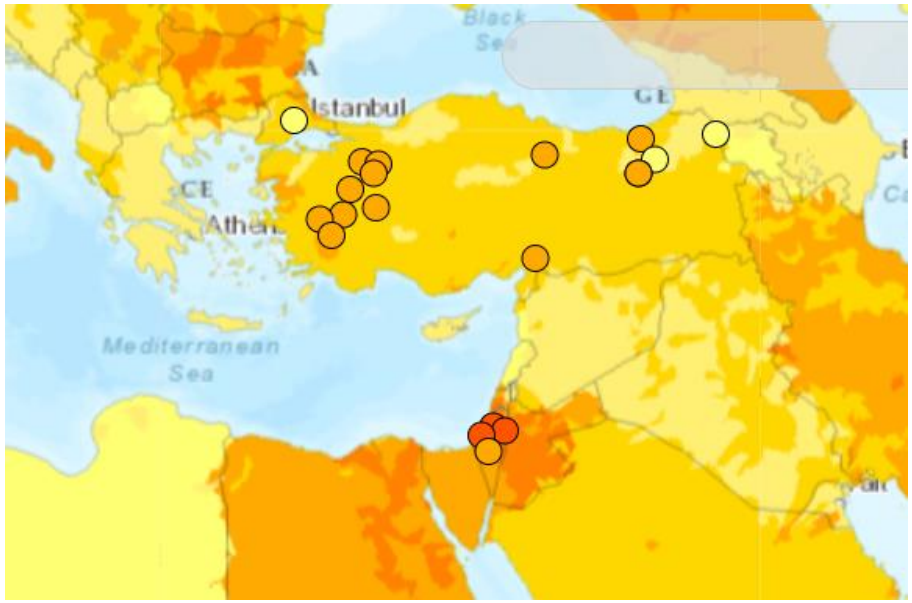


Figure 22. Basin Reputational Risks of Zorlu Enerji Sites, 2030-Current Trend

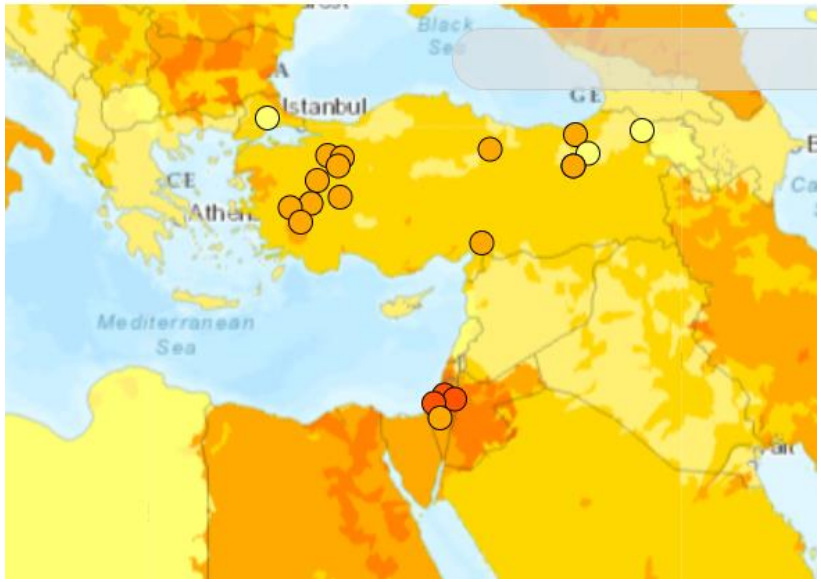


Figure 23. Basin Reputational Risks of Zorlu Enerji Sites, 2030-Optimistic Scenario

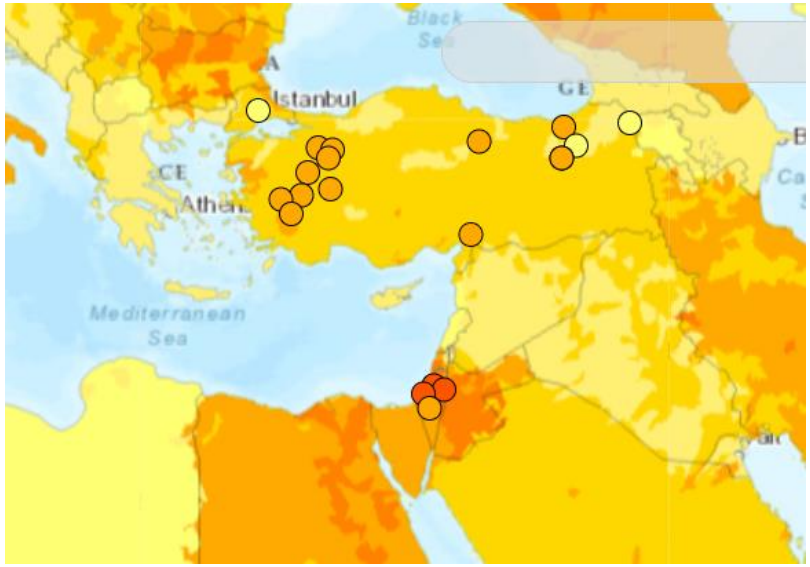


Figure 24. Basin Reputational Risks of Zorlu Enerji, 2030-Pessimistic Scenario

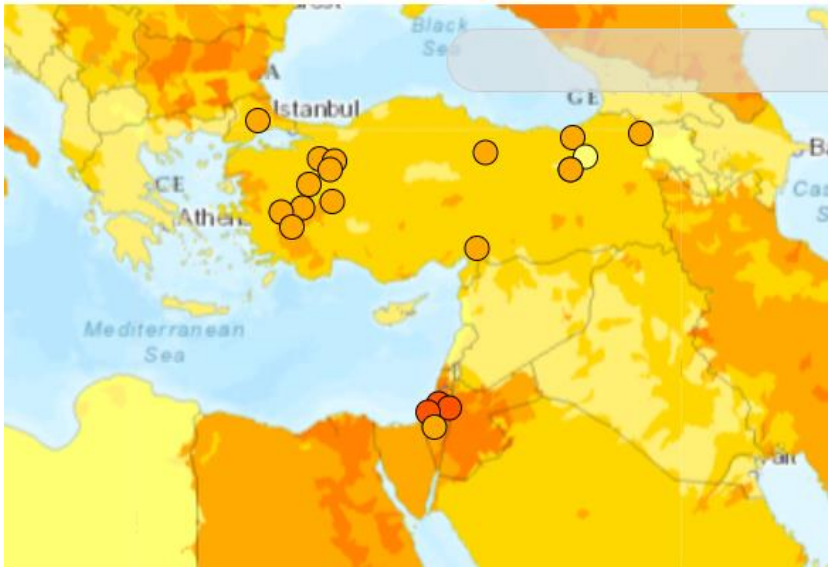


Figure 25. Basin Reputational Risks of Zorlu Enerji Sites, 2050-Current Trend

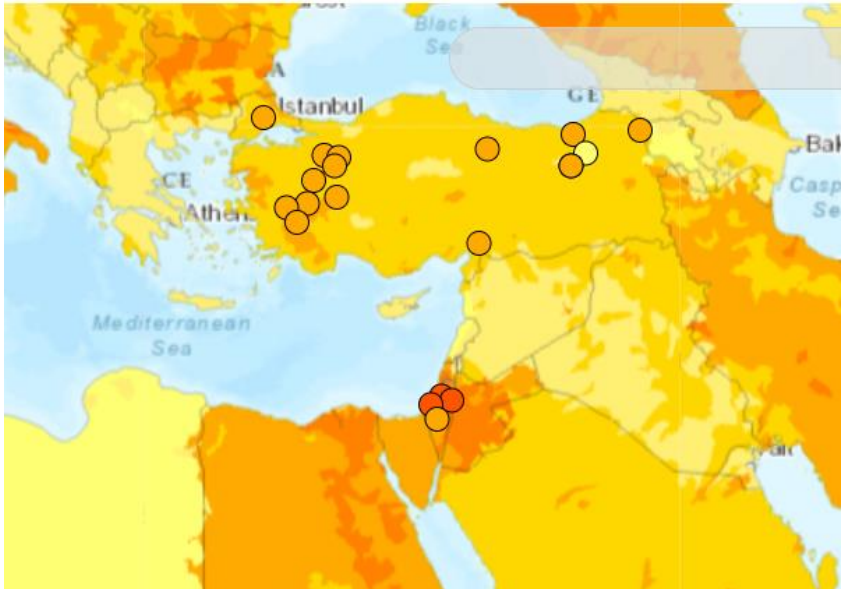


Figure 26. Basin Reputational Risks of Zorlu Enerji Sites, 2050-Optimistic Scenario

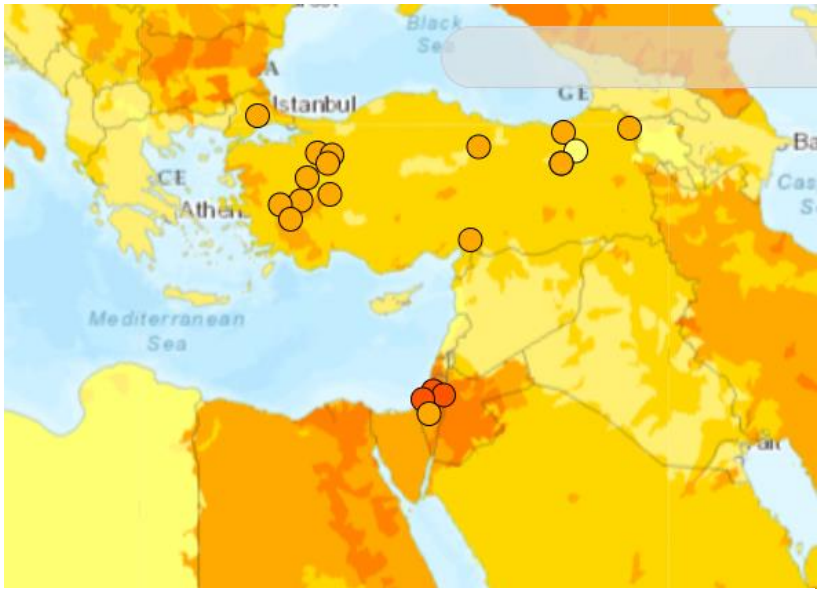


Figure 27. Basin Reputational Risks of Zorlu Enerji Sites, 2050-Pessimistic Scenario

3.1. **Cultural Importance Risk:** Water is a social and cultural good for local communities, indigenous and traditional people in their daily life, religion and culture. Businesses can potentially face reputational risk if a cultural good is perceived as negatively impacted or violated.

3.2. **Biodiversity Importance Risk:** Biodiversity importance indicates whether a basin is home to a rich, diverse and healthy ecosystem. Businesses operating in basins of high biodiversity importance are likely to be exposed to higher reputational risks.

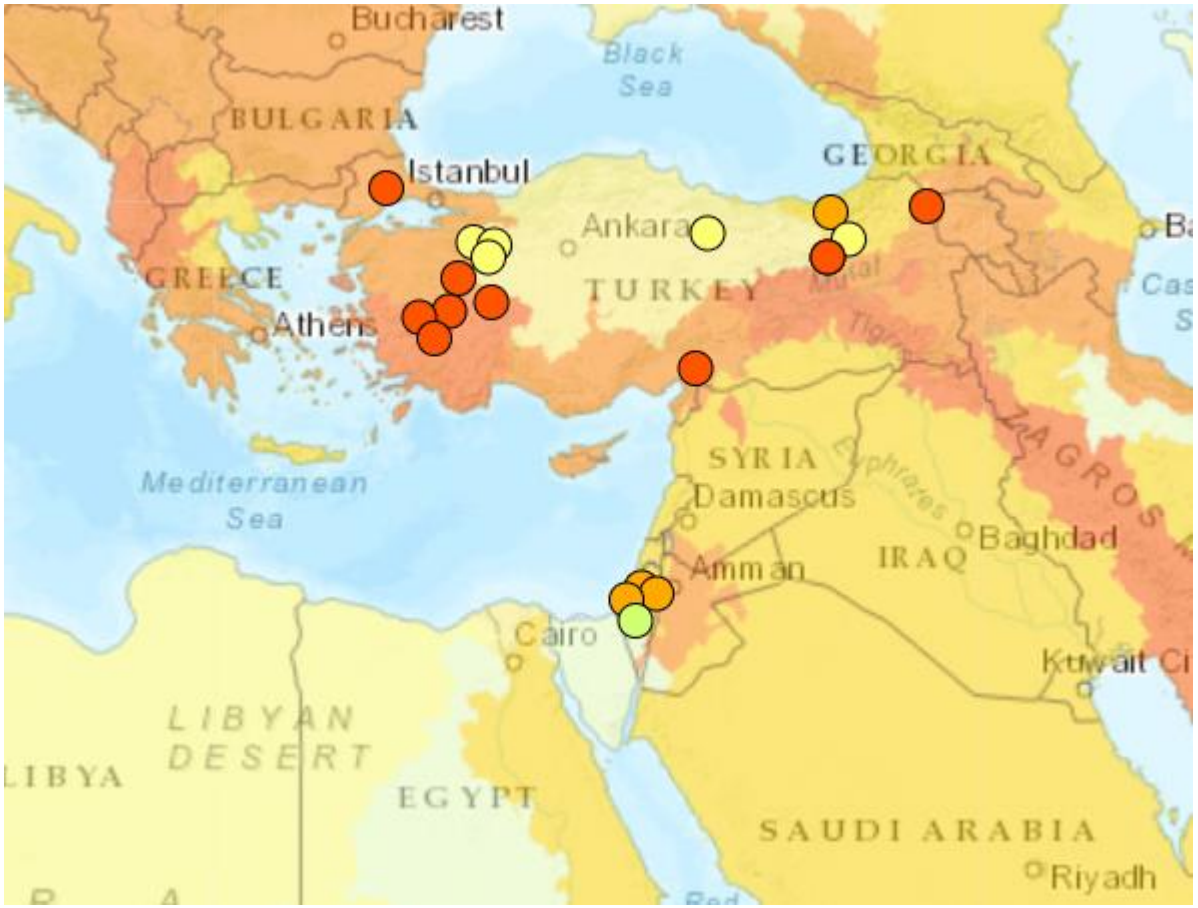


Figure 28. Biodiversity Importance at Zorlu Enerji Sites

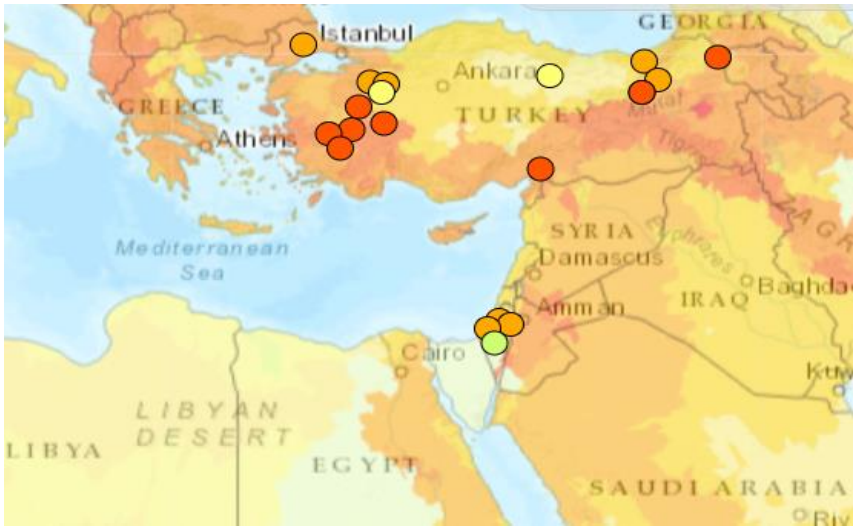


Figure 29. Biodiversity Importance at Zorlu Enerji Sites, 2030-Current Trend

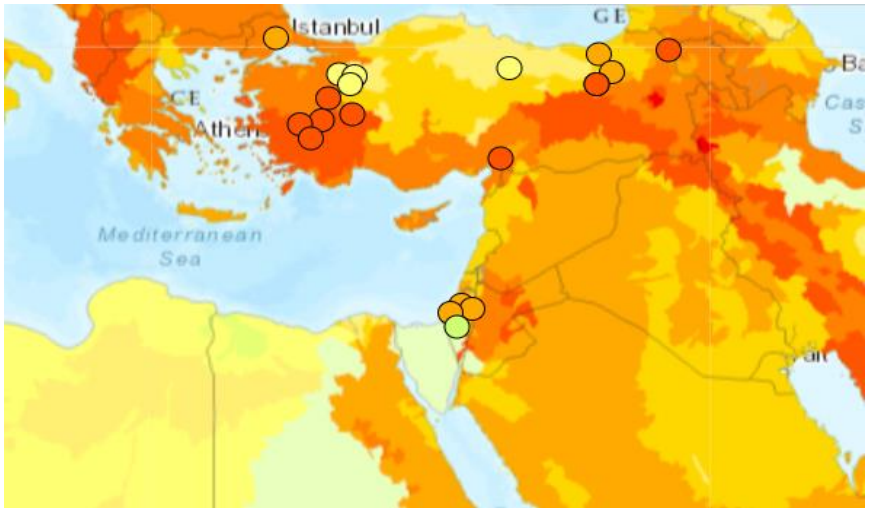


Figure 30. Biodiversity Importance at Zorlu Enerji Sites, 2030-Optimistic Scenario

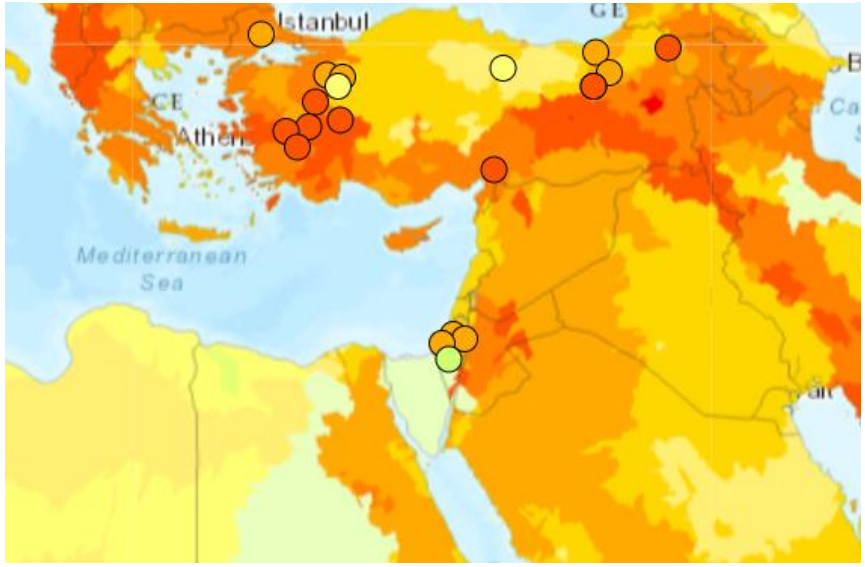


Figure 31. Biodiversity Importance at Zorlu Enerji Sites, 2030-Pessimistic Scenario

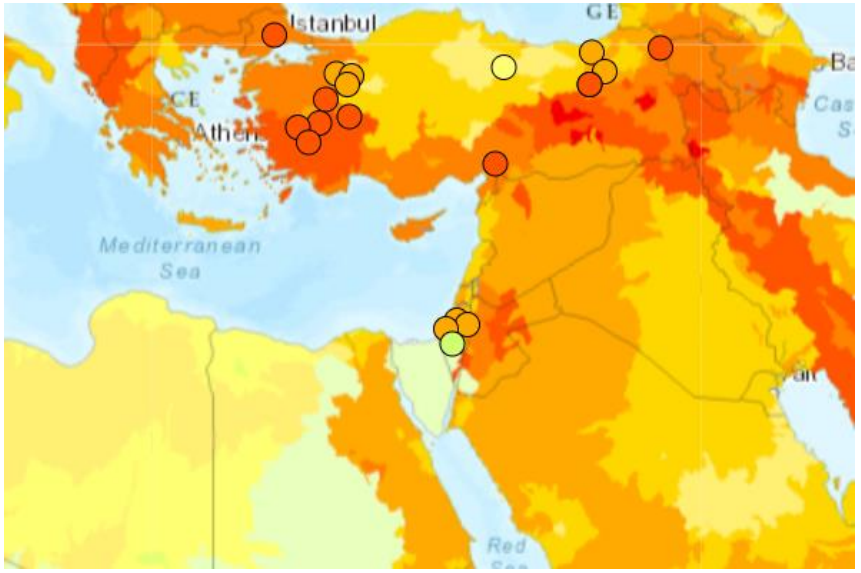


Figure 32. Biodiversity Importance at Zorlu Enerji Sites, 2050-Current Trend

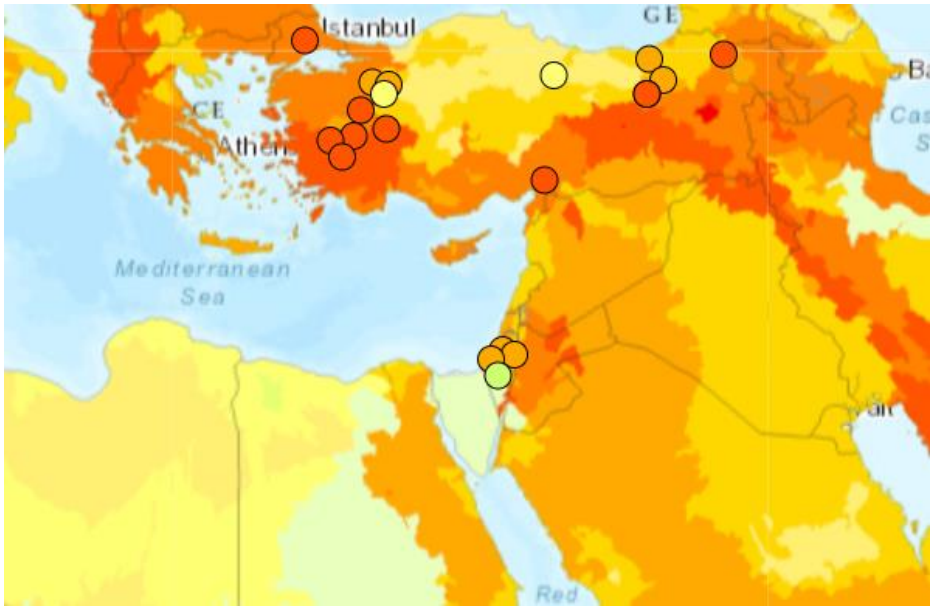


Figure 33. Biodiversity Importance at Zorlu Enerji Sites, 2050-Optimistic Scenario

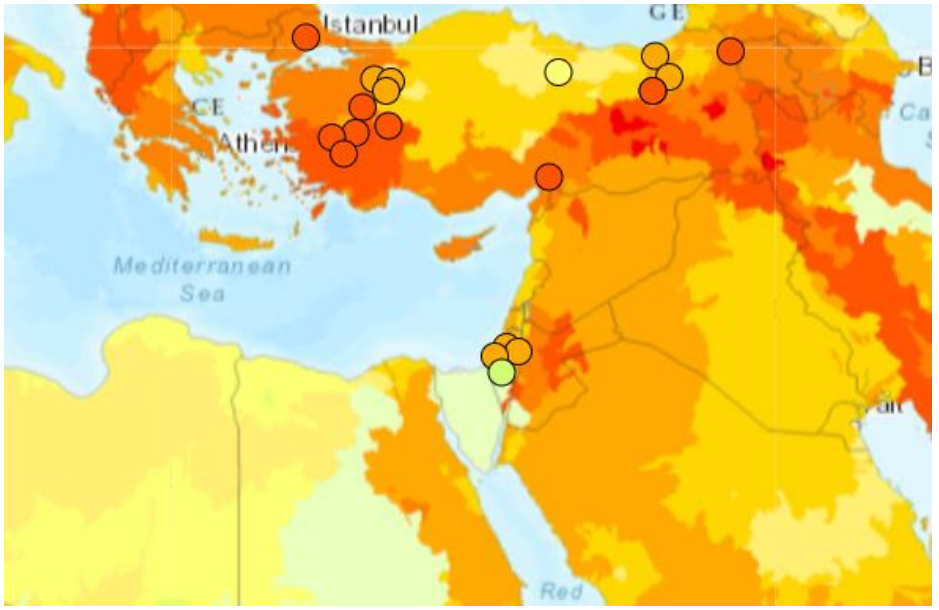


Figure 34. Biodiversity Importance at Zorlu Enerji Sites, 2050-Pessimistic Scenario

3.3. **Media Scrutiny:** Media scrutiny indicates how aware stakeholders and local communities typically are about water-related issues due to national and international media coverage. Businesses can potentially face reputational risk when operating in countries with high media coverage.

3.4. **Conflict Risk:** Conflict indicates whether there has been documented negative news (e.g. incidents, criticism and controversies) that can affect a company's reputational risk as well as historical political conflicts due to competition over limited water resources.

Each site in the portfolio is evaluated against these indicators, resulting in a comprehensive risk profile that highlights the primary concerns for each location.

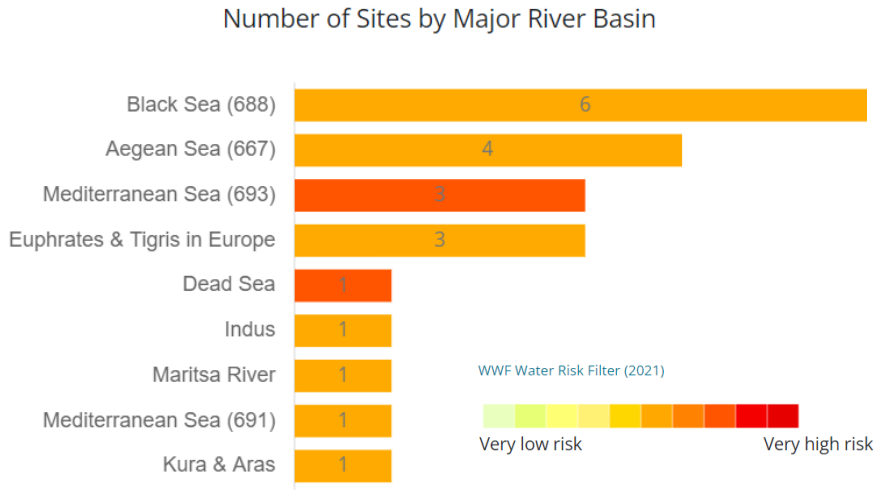


Figure 35. Number of Zorlu Enerji Sites by Major River Basin

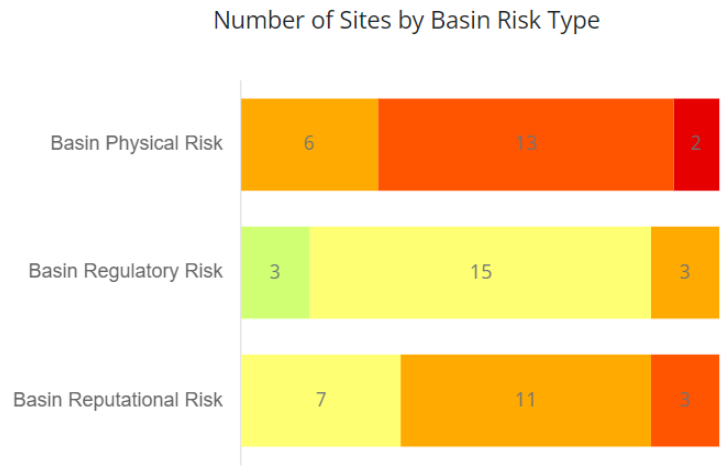


Figure 36. Number of Zorlu Enerji Sites by Basin Risk Type

Figure 35 shows the number of Zorlu Enerji's sites in different major river basins along with the associated basin physical risk scores. This information is critical for identifying areas where there is a high concentration of sites and potentially high water-related risks, thus guiding where to focus basin-level water stewardship activities.

With the highest number of sites, that is six, the Black Sea Basin (688) is a critical area for Zorlu Enerji. High site density could mean cumulative impacts on water resources, necessitating focused water stewardship efforts to manage and mitigate risks.

The Aegean Sea Basin (667) is another significant area with a notable number of sites, that is four sites. Similar to the Black Sea Basin, concentrated efforts in water management and risk mitigation are essential here.

The Mediterranean basin (693), with three sites, also requires attention, particularly because the Mediterranean region is generally known for water scarcity issues, which could exacerbate risks.

Figure 36 presents the distribution of Zorlu Enerji's sites across different risk levels for physical, regulatory, and reputational risks. The information helps to understand the nature and conditions of the basins in which the company operates, and the associated risks they face.

A significant portion of the sites (13) fall under medium physical risk, indicating a need for robust physical risk mitigation strategies, especially since 2 sites are at high risk. Physical risks are influenced by the natural characteristics of the basins, such as water scarcity, flooding, and ecosystem health. The higher number of sites in medium to high-risk categories indicates potential vulnerabilities in water availability and quality. Implementing water-efficient technologies, enhancing water storage capacities, and adopting sustainable water management practices can help mitigate physical risks. Regular monitoring and early warning systems for flood risks can also be beneficial.

The majority of the sites (15) are under medium regulatory risk. This suggests a balanced regulatory environment but highlights the need for compliance and adaptive management strategies to address evolving regulations. Regulatory risks stem from the legal and institutional frameworks governing water use and management. The predominance of medium-risk sites suggests that while regulations are generally stable, there may be challenges in compliance and enforcement. Staying updated with local and national water regulations, investing in compliance infrastructure, and engaging in policy dialogues can help manage regulatory risks. Developing contingency plans for potential regulatory changes is also advisable.

With 11 sites under medium reputational risk and 3 under high risk, maintaining good community relations and corporate social responsibility initiatives are critical for Zorlu Enerji to manage and mitigate reputational risks. Reputational risks are associated with the public perception of the company's water management practices and its impact on local communities and ecosystems. Medium to high-risk ratings indicate potential concerns about environmental and social responsibility. Enhancing community engagement, transparency in reporting environmental performance, and investing in corporate social responsibility initiatives can mitigate reputational risks. Building partnerships with local stakeholders and environmental organizations can also improve public perception and trust.

Water Risk Filter
Basin Risk Results

Dataset: 24.05.2024

Company Name	Site Name	Industry	Business Importance	Country	Province	River Basin	Basin Physical Risk	1. Water Scarcity	2. Flooding	3. Water Quality	4. Ecosystem Services Status	Basin Regulatory Risk	5. Enabling Environment	6. Institutions & Governance	7. Management Instruments	8. Infrastructure & Finance	Basin Reputational Risk	9. Cultural Importance	10. Biodiversity Importance	11. Media Scrutiny	12. Conflict
							BPH	BRC1	BRC2	BRC3	BRC4	BRG	BRC5	BRC6	BRC7	BRC8	BRP	BRC9	BRC10	BRC11	BRC12
Zorlu Enerji	Afyon OEDAŞ	Other	High	Turkey	Afyonkarahisar	Black Sea (688)	3,72	4,3	2	5	2,6	1,86	1	2,75	2,3	1,1	2,76	2	4	2,55	3
Zorlu Enerji	Alaşehir GPP	Electric Energy Produ	High	Turkey	Manisa	Aegean Sea (667)	3,94	3,9	2,95	5	3,55	1,83	1	2,75	2,15	1,1	2,94	2	4	2,55	3,5
Zorlu Enerji	Ashdod CoNGS	Electric Energy Produ	Medium	Israel		Mediterranean Sea (	4,2	4,7	2,9	4	2,5	2,81	3	3,5	2,7	1,2	3,58	3	3	4	3,5
Zorlu Enerji	Ataköy HPP	Electric Energy Produ	Low	Turkey	Tokat	Black Sea (688)	3,58	3,7	2,95	5	3,3	1,86	1	2,75	2,3	1,1	2,62	2	2,5	2,55	3
Zorlu Enerji	Beyköy HPP	Electric Energy Produ	Medium	Turkey	Eskişehir	Black Sea (688)	3,54	3,4	2,95	5	4	1,86	1	2,75	2,3	1,1	2,62	2	2,5	2,55	3
Zorlu Enerji	Bilecik OEDAŞ	Other	High	Turkey	Bilecik	Black Sea (688)	3,67	3,4	2,95	5	4	1,86	1	2,75	2,3	1,1	2,59	2	2,5	2,55	3
Zorlu Enerji	Deadsea SPP	Electric Energy Produ	Low		Judea and Samaria	Dead Sea	4,2	4,7	3,85	4	3,2	2,73	3	3,25	2,7	1,2	3,85	3	3	4	3,5
Zorlu Enerji	Dorad CCNGS	Electric Energy Produ	Medium	Israel	Mahoz Darom	Mediterranean Sea (	4,45	4,7	3,85	5	2,55	1,33	1,35	1,5	1,3	1	3,6	2	3	4	4
Zorlu Enerji	Eskişehir OEDAŞ	Other	High	Turkey	Eskişehir	Black Sea (688)	3,63	3,9	2,05	5	3,3	1,86	1	2,75	2,3	1,1	2,59	2	2,5	2,55	3
Zorlu Enerji	Gökçedağ WPP	Electric Energy Produ	High	Turkey	Osmaniye	Mediterranean Sea (	3,5	3,6	2,9	4	3,8	1,83	1	2,75	2,15	1,1	2,71	2	3,5	2,55	3
Zorlu Enerji	Jhimpir WPP	Electric Energy Produ	High	Pakistan	Sindh	Indus	3,72	3,6	3,9	4	3,8	2,83	2	3,5	3	2,9	3,3	2	3,5	3	3
Zorlu Enerji	Kuzgun HPP	Electric Energy Produ	Medium	Turkey	Erzurum	Euphrates & Tigris in	3,01	2,8	2,9	4	3,25	1,86	1	2,75	2,3	1,1	2,42	2	2,5	2,55	2,5
Zorlu Enerji	Kütahya OEDAŞ	Other	High	Turkey	Kütahya	Aegean Sea (667)	3,21	2,8	2,95	5	2,85	1,83	1	2,75	2,15	1,1	2,7	2	3,5	2,55	3
Zorlu Enerji	Kızıldere 1-2-3 GPP	Electric Energy Produ	High	Turkey	Denizli	Aegean Sea (667)	3,96	3,9	2,95	5	3,8	1,83	1	2,75	2,15	1,1	3,12	2	4	2,55	4
Zorlu Enerji	Lüleburgaz CoNGS	Electric Energy Produ	Low	Turkey	Kırklareli	Maritsa River	3,69	3,8	2,95	4	3,3	1,79	1	2,75	2	1,1	2,54	2	3,5	2,55	2,5
Zorlu Enerji	Mercan HPP	Electric Energy Produ	Medium	Turkey	Erzincan	Euphrates & Tigris in	3,01	2,8	2,9	4	3,25	1,86	1	2,75	2,3	1,1	2,51	2	3,5	2,55	2,5
Zorlu Enerji	Ramat Negev CoNGS	Electric Energy Produ	Medium	Israel	Mahoz Darom	Mediterranean Sea (	4,42	4,8	2,9	5	2,55	1,33	1,35	1,5	1,3	1	3,22	2	1	4	3,5
Zorlu Enerji	Tercan HPP	Electric Energy Produ	Medium	Turkey	Erzincan	Euphrates & Tigris in	3,01	2,8	2,9	4	3,25	1,86	1	2,75	2,3	1,1	2,51	2	3,5	2,55	2,5
Zorlu Enerji	Uşak OEDAŞ	Other	High	Turkey	Uşak	Aegean Sea (667)	3,71	4	2	5	3,55	1,83	1	2,75	2,15	1,1	2,76	2	4	2,55	3
Zorlu Enerji	Çıldır HPP	Electric Energy Produ	Medium	Turkey	Kars	Kura & Aras	3,24	3,2	3	4	3,25	1,83	1	2,75	2,15	1,1	2,51	2	3,5	2,55	2,5
Zorlu Enerji	İkizdere HPP	Electric Energy Produ	Medium	Turkey	Rize	Black Sea (688)	2,9	2,5	3,9	4	1,85	1,86	1	2,75	2,3	1,1	2,67	2	3	2,55	3
Astor Enerji	Astor Enerji Fabrika	Electric Energy Produ	High	Turkey	İstanbul	Aegean Sea (667)	3,37	3,3	3,9	4	2,35	1,83	1	2,75	2,15	1,1	2,89	2	3,5	2,55	3,5
BTC Bilişim	BTC Bilişim Merkez O	Telecommunication S	High	Turkey	İstanbul	Aegean Sea (667)	3,38	3,3	3,9	4	2,35	1,83	1	2,75	2,15	1,1	2,82	2	3,5	2,55	3,5
Buran Teknoloji	Buran Teknoloji Ofis	Telecommunication S	High	Turkey	Ankara	Black Sea (688)	3,57	3,7	2,9	5	3,3	1,86	1	2,75	2,3	1,1	2,57	2	2,5	2,55	3
Deutsche Telekom	Deutsche Telekom	Telecommunication S	High	Turkey	İstanbul	Aegean Sea (667)	3,94	4	3,9	5	3,1	1,83	1	2,75	2,15	1,1	2,67	2	3,5	2,55	3
Dowell Schlumberge	Dowell Schlumberge	Automotive, Electrica	High	Egypt	Cairo	Nile	4,29	4,5	3,05	5	3,85	2,85	2,55	4,25	2,45	1,3	3,3	1	3	4	4
Ernst Schad GmbH	Ernst Schad GmbH Fa	Automotive, Electrica	High	Germany	Nordrhein-Westfaler	Rhine (635)	3,56	2,5	3	5	4,6	1	1	1	1	1	3,22	3	4,5	3,55	2,5
Novomet	Novomet Perm Fabri	Automotive, Electrica	High	Russian Fede	Permskiy kray	Kama	1,99	1,4	2	2	4,35	2	1	3,5	1,45	1,9	3,12	4	2,5	2,55	3,5
Schaeffler	Schaeffler Türkiye Fa	Automotive, Electrica	High	Turkey	İstanbul	Aegean Sea (667)	3,54	3,3	3,9	4	2,35	1,83	1	2,75	2,15	1,1	2,82	2	3,5	2,55	3,5
Sezenler Üretim	Sezenler Üretim Fabr	Chemicals & Other M	High	Turkey	İstanbul	Aegean Sea (667)	4,14	4	3,9	5	3,1	1,83	1	2,75	2,15	1,1	2,77	2	3,5	2,55	3
Vestel	Manisa Fabrikası "Ve	Appliances & Genera	High	Turkey	Manisa	Aegean Sea (667)	3,99	4,3	2,9	5	3,8	1,83	1	2,75	2,15	1,1	2,88	2	4	2,55	4
Viking	Viking International L	Automotive, Electrica	High	Turkey	Tekirdağ	Maritsa River	3,81	4,1	2,95	4	3,8	1,79	1	2,75	2	1,1	2,67	2	3,5	2,55	3

Table 7. WRF Basin Risk Results

The Water Risk Filter results for Zorlu Enerji's operations, as depicted in Table 7, provide a comprehensive assessment of the basin's physical, regulatory, and reputational risks for both dependency and impact related. Aqueduct results are embedded in the WRF Basin Risk Results table. The analysis covers twelve key risk categories, divided into physical risk (BPH, BRC1-BRC4), regulatory risk (BRG, BRC5-BRC8) and reputational risk (BRP, BRC9-BRC12), enabling a detailed understanding of water-related vulnerabilities.

The results in Table 7 show:

Own operation/subsidiaries/joint ventures

The table presents detailed risk scores across twelve categories, with physical risk (SPH, BRC1, BRC3) and reputational risk (BRC, BRC10, BRC12) clearly being prominent. Notably, Israel and Egypt operations emerges as the most critical site regarding basin physical risks, exhibiting the highest risk levels. The physical risk scores, averaging around 3.62, are particularly elevated in the categories of Water Scarcity (BRC1) and Water Quality (BRC3), which reach maximum values of 4.8 and 5.00, respectively. Regulatory risks, with an average score of 1.9, are most pronounced in Institutions & Governance (BRC6), peaking at 4.25. The wide range of scores across different categories highlights the diverse nature of risks faced by Zorlu Enerji's operations. Reputational Risks, with an average of 2.87, are most pronounced in Biodiversity Importance (BRC 10), peaking at 4.5 with an average of 3.23.

High-combined-risk sites, particularly Dorad CCNGS, demonstrate substantial dependencies and impacts on water resources. Dorad CCNGS's most substantial risk is through BRC1,3 (Water Scarcity and Water Quality respectively) with a score of 4.7 and 5, making it the riskiest site in this category. This site also holds the second highest reputational risk score of 3.6 within Zorlu Enerji's operations.

Upstream & Downstream

The overall physical risk scores for upstream and downstream sites average 3.59, with the highest score reaching 4.29, indicating a moderate-high level of risk variability. Notably, the highest physical risks are observed in categories such as Water Scarcity (BRC1), Water Quality (BRC3). Water Scarcity scores range from 1.4 to 4.5, with an average of 3.49, highlighting substantial dependencies on local resources. Water Quality shows an average score of 4.36, reflecting significant impacts on water resource stability. In terms of regulatory risks, the overall scores average 1.86, with a peak score of 2.85, indicating low to moderate regulatory concerns. Institutions & Governance exhibit high variability, with scores ranging from 1 to 4.25 and an average of 2.80. In terms of reputational risk, the overall scores average 2.88, with a peak score of 3.3, indicating moderate but varied reputational concerns. Biodiversity Importance (BRC10) exhibit high variability and predominant importance, with scores ranging from 2.5 to 4.5 and an average of 3.40, suggesting notable biodiversity concerns that could affect public perception.

Water Risk Filter Operational Risk Results		Dataset:		13.06.2024			Operational Physical Risk	1. Water Scarcity	3. Water Quality	Operational Regulatory Risk	5. Enabling Environment	6. Institutions & Governan	Operational Reputational Risk	11. Media Scrutiny	12. Conflict
Company Name	**Site Name**	**Industry**	**Business Importance**	**Country**	**Province**	**River Basin**	**OPH**	**ORC1**	**ORC3**	**ORG**	**ORC5**	**ORC6**	**ORP**	**ORC11**	**ORC12**
Zorlu Enerji	Afyon OEDAŞ	Other	High	Turkey	Afyonkarahisar	Black Sea (688)	1,9	2,1	1,6	1,5	2	1	2,6		2,6
Zorlu Enerji	Alaşehir GPP	Electric Energy Produ	High	Turkey	Manisa	Aegean Sea (667)	2,73	2,9	2	3	5	1	3,8		3,8
Zorlu Enerji	Ashdod CoNGS	Electric Energy Produ	Medium	Israel		Mediterranean Sea (	4,07	4,55	2	3	5	1	3,8		3,8
Zorlu Enerji	Ataköy HPP	Electric Energy Produ	Low	Turkey	Tokat	Black Sea (688)	4,49	5	2	3	5	1	4,2		4,2
Zorlu Enerji	Beyköy HPP	Electric Energy Produ	Medium	Turkey	Eskişehir	Black Sea (688)	2,98	3,2	1,9	2,5	4	1	4,6		4,6
Zorlu Enerji	Bilecik OEDAŞ	Other	High	Turkey	Bilecik	Black Sea (688)	1,73	1,55	2	1,5	2	1	2,6		2,6
Zorlu Enerji	Deadsea SPP	Electric Energy Produ	Low		Judea and Samaria	Dead Sea	2,03	2	2,4	2,5	2	3	3,4		3,4
Zorlu Enerji	Dorad CCNGS	Electric Energy Produ	Medium	Israel	Mahoz Darom	Mediterranean Sea (	3,62	4	2	3	5	1	4,2		4,2
Zorlu Enerji	Eskişehir OEDAŞ	Other	High	Turkey	Eskişehir	Black Sea (688)	1,61	1,55	1,7	1	1	1	2,4		2,4
Zorlu Enerji	Gökçedağ WPP	Electric Energy Produ	High	Turkey	Osmaniye	Mediterranean Sea (	1,58	1,55	1,7	1,5	2	1	2,6		2,6
Zorlu Enerji	Jhimpir WPP	Electric Energy Produ	High	Pakistan	Sindh	Indus	1,63	1,55	2,5	2,5	2	3	2,4		2,4
Zorlu Enerji	Kuzgun HPP	Electric Energy Produ	Medium	Turkey	Erzurum	Euphrates & Tigris in	4,49	5	2	3	5	1	4,2		4,2
Zorlu Enerji	Kütahya OEDAŞ	Other	High	Turkey	Kütahya	Aegean Sea (667)	1,73	1,55	2	1	1	1	2,6		2,6
Zorlu Enerji	Kızıldere 1-2-3 GPP	Electric Energy Produ	High	Turkey	Denizli	Aegean Sea (667)	3,68	4	2,3	3	5	1	3,8		3,8
Zorlu Enerji	Lüleburgaz CoNGS	Electric Energy Produ	Low	Turkey	Kırklareli	Maritsa River	3,68	4	2,3	2,5	4	1	3,8		3,8
Zorlu Enerji	Mercan HPP	Electric Energy Produ	Medium	Turkey	Erzincan	Euphrates & Tigris in	4,49	5	2	3	5	1	4,2		4,2
Zorlu Enerji	Ramat Negev CoNGS	Electric Energy Produ	Medium	Israel	Mahoz Darom	Mediterranean Sea (	3,62	4	2	3	3	3	3,4		3,4
Zorlu Enerji	Tercan HPP	Electric Energy Produ	Medium	Turkey	Erzincan	Euphrates & Tigris in	4,49	5	2	3	5	1	4,2		4,2
Zorlu Enerji	Uşak OEDAŞ	Other	High	Turkey	Uşak	Aegean Sea (667)	1,73	1,55	2	1,5	2	1	3		3
Zorlu Enerji	Çıldır HPP	Electric Energy Produ	Medium	Turkey	Kars	Kura & Aras	4,49	5	2	3	5	1	4,2		4,2
Zorlu Enerji	İkizdere HPP	Electric Energy Produ	Medium	Turkey	Rize	Black Sea (688)	4,49	5	2	3	5	1	4,2		4,2

Table 8. Water Risk Filter Operational Risk Results of Zorlu Enerji

Table 8 depicts that Overall Physical Risk (OPH) scores range from 1.58 to 4.49. Sites such as those with an OPH score of 4.49, being Ataköy HPP, Kuzgun HPP, Mercan HPP, Tercan HPP, Çıldır HPP and İkizdere HPP face the highest physical risks, indicating significant challenges related to water availability, quality, and ecosystem health. These high-risk scores necessitate immediate and focused mitigation strategies. Water scarcity (ORC1) scores range from 1.55 to 5, with several sites scoring above 4.0, indicating severe water scarcity. This necessitates urgent water conservation measures and the implementation of water-efficient technologies. Water quality (ORC3) scores range from 1.6 to 2.5, indicating varying concerns about water quality. Sites with higher scores need continuous monitoring and stringent water quality management practices to prevent contamination and ensure safe water for operations.

Overall Regulatory Risk (ORG) scores range from 1 to 3, indicating varying degrees of regulatory challenges. Sites with higher scores face significant challenges in regulatory compliance, highlighting the need for improved regulatory frameworks and enforcement mechanisms. A significant number of sites scored 3, predominantly by enabling environment category (ORC5). Almost half the sites are socred 5 for this category, suggesting varying policy and regulatory environments. Sites with higher scores may face policy-related challenges that require engagement with policymakers to improve support for sustainable water management. For Institutions & Governance (ORC6), consistent scores of 1.0 indicate low concerns about the effectiveness of institutions and governance. This suggests generally favorable conditions for institutional and governance frameworks

Overall Reputational Risk (ORP) scores range from 2.4 to 4.6, indicating varying reputational risks across the sites. Sites with higher scores, which const,tutes almost half of all sites, with Beyköy HPP being the riskiest, need focused efforts to maintain and improve public perception and stakeholder trust. Media Scrutiny results came out to be not available, thus the overall reputation scores all rely on Conflict (ORC12) results and the discussion can be held in parallel with the category results, that is Beyköy HPP being the riskiest of all assets but the majority of assests hold a significant amount of reputational/ local conflict risk. Sites with the highest scores necessitate the development and implementation of conflict resolution strategies to address and mitigate local disputes effectively.

Summary of Scenario Analysis

Scenario analysis of WWF Water Risk Assessment are done by 3 main risk aspects that cover different sub-risk areas that are stated below;

#	Basin Physical Risks	Basin Regulatory Risks	Basin Reputational Risks
1	Water Scarcity	Enabling Environment	Cultural Importance
2	Flooding	Insturions & Governance	Biodiversity Importance
3	Water Quality	Management Instruments	Media Scrutiny
4	Ecosystem Service S.	Infrastructure & Finance	Conflict

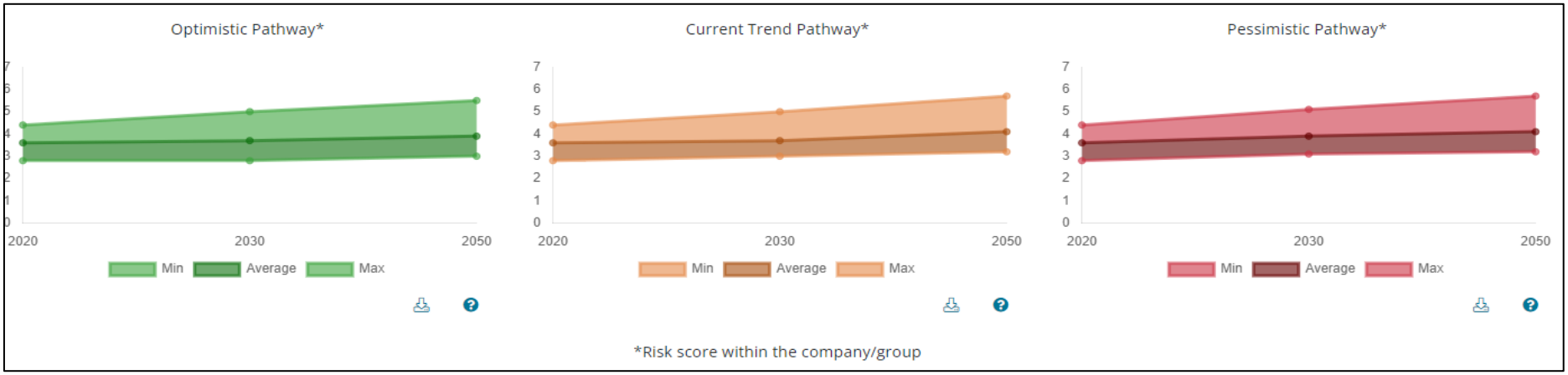
Pathways are divided into 3 different timeframes as 2020; 2030 and 2050.

Optimistic Pathway: The optimistic scenario pathway represents a world with sustainable socio-economic development (SSP1) and moderate reduction of GHG emissions (RCP2.6 /RCP4.5), leading to an increase of global mean surface temperature of approximately 1.5˚C by the end of the 21st century.

Current Trend Pathway: The current trend pathway represents a world like current socio-economic development trends (SSP2) and intermediate GHG emission levels (RCP4.5 /RCP6.0), leading to an increase of global mean surface temperature of approximately 2˚C by the end of the 21st century.

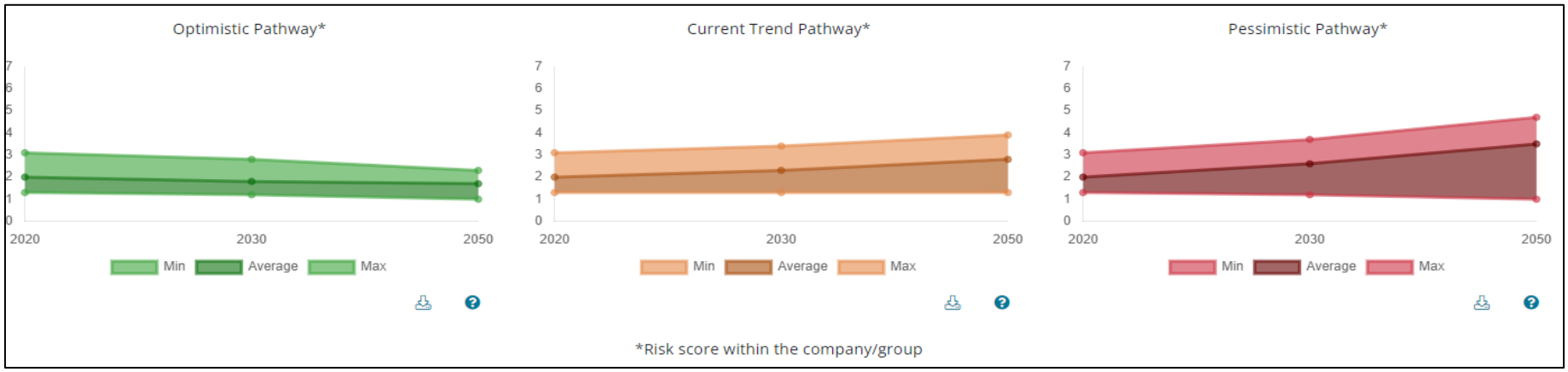
Pessimistic Pathway: The pessimistic scenario represents a world with unequal and unstable socio-economic development (SSP3) and high GHG emission levels (RCP6.0 /RCP8.5), leading to an increase of global mean surface temperature of approximately 3.5/4˚C by the end of the 21st century.

1. Basin Physical Risk Forecast Results



- Optimistic Pathway: Shows minimal increase in physical risks with average scores stabilizing around 4 out of 7 by 2050.
- Current Trend Pathway: Reflects a moderate increase in risks, with average scores rising towards 5 out of 7 by 2050.
- Pessimistic Pathway: Indicates a significant rise in physical risks, with average scores reaching approximately 6 out of 7 by 2050.

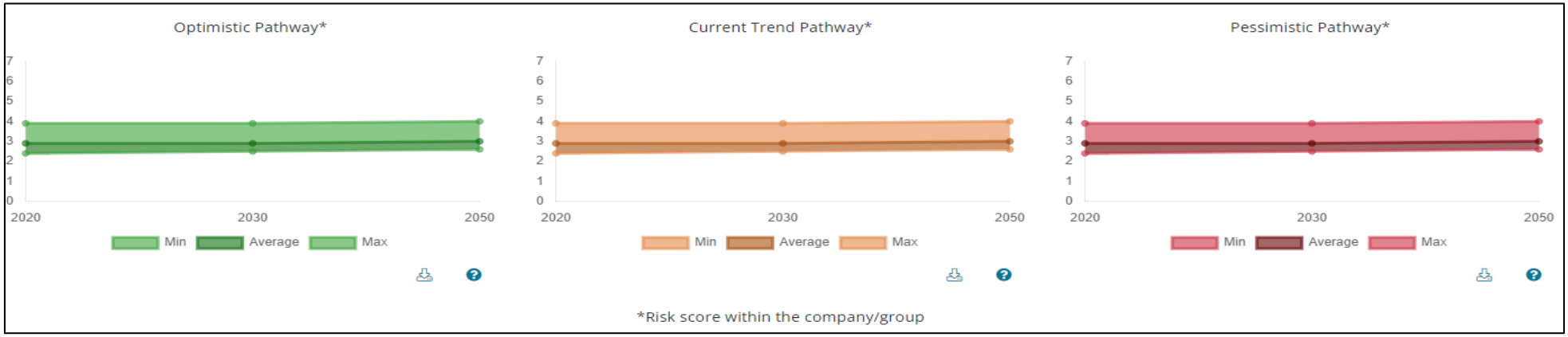
2. Basin Regulatory Risk Forecast Results



- Optimistic Pathway: Suggests regulatory risks are relatively stable with minimal fluctuations, maintaining an average score around 3 out of 7 by 2050.

- Current Trend Pathway: Shows a gradual increase in regulatory risks, with average scores approaching 4 out of 7 by 2050.
- Pessimistic Pathway: Reflects a substantial rise in regulatory risks, with average scores nearing 5 out of 7 by 2050.

3. Basin Reputational Risk Forecast Results



- Optimistic Pathway: Demonstrates stable reputational risks, with average scores remaining around 3 out of 7 by 2050.
- Current Trend Pathway: Indicates a steady increase in reputational risks, with average scores rising towards 4 out of 7 by 2050.
- Pessimistic Pathway: Projects a significant increase in reputational risks, with average scores reaching about 5 out of 7 by 2050.

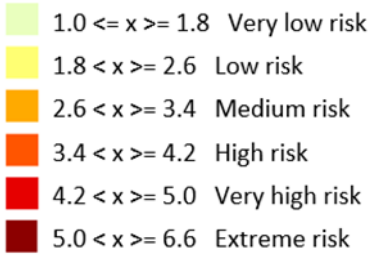
The scenario analysis reveals that under the optimistic pathway, Zorlu Enerji faces relatively stable risks across all categories, indicating the benefits of sustainable socio-economic development and moderate GHG emission reductions. However, under the current trend pathway, there is a noticeable increase in risks, reflecting the consequences of intermediate GHG emissions and current socio-economic trends. The pessimistic pathway shows a significant escalation in risks, underscoring the severe impacts of high GHG emissions and unstable socio-economic conditions.

For Zorlu Enerji, these results highlight the importance of adopting sustainable practices and proactive water management strategies to mitigate risks. Prioritizing investments in resilient infrastructure, improving regulatory frameworks, and fostering a culture of sustainability are essential to navigate these risks effectively and ensure long-term environmental and operational stability.

4.3.4. Assessment of Future Water Quality & Quantity Related Risks

Introduction to the Scenarios Risk Assessment Results Export

General information: This file displays scenarios risk results for the assessed site(s) selected within your portfolio (i.e. selected individual site, sites within a selected company, sites within a selected group). The risk score classification is consistent throughout all risk categories and risk types, with caveat that risk scores in Baseline 2020 can be up to 5 (Very high risk), while risk scores in Scenarios 2030 or 2050 can be up to 6.6 (Extreme risk):



Baseline 2020: This tab lists the assessed site(s) and provides their respective basin risk results based on the Water Risk Filter 2020 global dataset. Risk scores are provided for all Water Risk Filter aggregated risk layers, i.e. risk types (Physical, Regulatory, Reputational), and risk categories (1. Water Scarcity, 2. Flooding, 3. Water Quality, 4. Ecosystem Services Status, 5. Enabling Environment, 6. Institutions & Governance, 7. Management Instruments, 8. Infrastructure & Finance, 9. Cultural Importance, 10. Biodiversity Importance, 11. Media Scrutiny, 12. Conflict). Note that the aggregated risk layers are computed based on specific industry of each site. For more details, please refer to the Water Risk Filter Methodology available at https://riskfilter.org/water/explore/data-and-methods

Scenarios [Year]: This tab lists the assessed site(s) and provides their respective basin risk results, as projections for [Year], in the three pathways: Optimistic, Current trend, and Pessimistic. Risk scores are provided for all Water Risk Filter aggregated risk layers, and are computed based on specific industry of each site. For more details, please refer to the Water Risk Filter Methodology available at at https://riskfilter.org/water/explore/data-and-methods

Notes: The information of Country (column J) and Province (column K) are retrieved from Esri's Geocoding service (https://developers.arcgis.com/rest/geocode/api-reference/overview-world-geocoding-service.htm), and the information of River basin (column L) is based on the WMO Basins and Sub-Basins, 3rd ed. (https://www.bafg.de/GRDC/EN/02_srvcs/22_gslrs/223_WMO/wmo_regions_node.html), with the caveat that when

basins are subdivided into sub-basins these are signalized with the sub-basin's WMOBB id after the basin's name, for example, Amazon (322). However, the boundaries and names shown and the designations used do not imply official endorsement or acceptance by WWF.

How to read column headers?

Column headers indicate the scenario pathway and the year as suffix after the risk layer key.

Column header Description

- [Risk Layer]_C20 [Risk Layer] in the Baseline 2020
- [Risk Layer]_O30 Scenario of [Risk Layer] in the Optimistic pathway, for the year 2030
- [Risk Layer]_C30 Scenario of [Risk Layer] in the Current trend pathway, for the year 2030
- [Risk Layer]_P30 Scenario of [Risk Layer] in the Pessimistic pathway, for the year 2030
- [Risk Layer]_O50 Scenario of [Risk Layer] in the Optimistic pathway, for the year 2050
- [Risk Layer]_C50 Scenario of [Risk Layer] in the Current trend pathway, for the year 2050
- [Risk Layer]_P50 Scenario of [Risk Layer] in the Pessimistic pathway, for the year 2050

Overview of the narratives of the Water Risk Filter Scenarios pathways

	OPTIMISTIC	CURRENT TREND	PESSIMISTIC
CLIMATE ASPECTS [1]	**Moderate emissions RCP2.6 / RCP4.5**	**Intermediate emissions RCP4.5 / RCP6.0**	**High emissions RCP6.0 / RCP8.5**
	· Moderate mitigation measures so that GHG emissions are halved by 2050 · Increase of global mean surface temperature is unlikely to exceed 2°C by the end of the 21st century	· Intermediate mitigation measures so that GHG emissions peak around mid-century, then start declining · Increase of global mean surface temperature is likely to exceed 2°C by the end of the 21st century	· Business-as-usual so that GHG emissions continue to rise throughout the 21st century · Increase of global mean surface temperature is likely to exceed 4°C by the end of the 21st century
SOCIO-ECONOMIC ASPECTS, [2] EXTENDED TOWARDS WATER AVAILABILITY AND USE [3]	**Sustainability SSP1**	**Middle of the road SSP2**	**Regional rivalry SSP3**
	· Emphasis on human and nature well-being · Effective and persistent cooperation and collaboration across the local, national, regional international scales and between public organizations, private sector and civil society within and across all scales of governance · Rapid technological change · Improved resource efficiency · Sustainability concerns; more stringent environmental regulation implemented · Research and technology development reduce the challenges of access to safe water and improved sanitation	· Current social and economic trends continue · Relatively weak coordination and cooperation among national and international institutions, the private sector, and civil society for achieving sustainable development goals · Technological progress but no major breakthroughs · Modest decline in resource use intensity · Moderate awareness of the environmental consequences of choices when using natural resources. Environmental systems experience degradation · Access to safe water and improved sanitation in low-income countries makes unsteady progress	· Emphasis on national issues due to regional conflicts and nationalism · Societies are becoming more skeptical about globalization. Global governance, institutions and leadership are relatively weak · Low investment in technology development · Increase in resource use intensity · Environmental policies have very little importance. Serious degradation of environmental systems in some regions · Growing population and limited access to safe water and improved sanitation challenge human and natural systems

[1] IPCC (2014). Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, R.K. Pachauri and L.A. Meyer (eds.)]. IPCC, Geneva, Switzerland, 151 pp. https://www.ipcc.ch/report/ar5/syr/

[2] O'Neill, B., Kriegler, E., & Ebi, K. L. (2017). Supporting information. Supplementary content to: the roads ahead: narratives for shared socioeconomic pathways describing world futures in the 21st century. Glob Environ Chang, 42, 169-180. https://doi.org/10.1016/j.gloenvcha.2015.01.004

[3] Wada, Y., Flörke, M., Hanasaki, N., Eisner, S., Fischer, G., Tramberend, S., ... & Wiberg, D. (2016). Modeling global water use for the 21st century: The Water Futures and Solutions (WFaS) initiative and its approaches. Geoscientific Model Development, 9(1), 175-222. https://doi.org/10.5194/gmd-9-175-2016

Baseline 2020

Water Risk Filter
Basin Risk Results
Baseline 2020

Dataset:

Site Name	Industry	Business Importance	River Basin	Basin Physical Risk	1. Water Scarcity	2. Flooding	3. Water Quality	4. Ecosystem Services Status	Basin Regulatory Risk	5. Enabling Environment	6. Institutions & Governance	7. Management Instruments	8. Infrastructure & Finance	Basin Reputational Risk	9. Cultural Importance	10. Biodiversity Importance	11. Media Scrutiny	12. Conflict
				BPH_C20	BRC1_C20	BRC2_C20	BRC3_C20	BRC4_C20	BRG_C20	BRC5_C20	BRC6_C20	BRC7_C20	BRC8_C20	BRP_C20	BRC9_C20	BRC10_C2	BRC11_C2	BRC12_C2
Afyon OEDAŞ	Other	High	Black Sea (688)	3,62	4,1	2	5	2,6	1,98	1,35	3,25	1,75	1,1	2,76	2	4	2,55	3
Alaşehir GPP	Electric Energy Produ	High	Aegean Sea (667)	3,94	3,9	2,95	5	3,55	1,98	1,35	3,25	1,75	1,1	2,94	2	4	2,55	3,5
Ashdod CoNGS	Electric Energy Produ	Medium	Mediterranean Sea (6	4,2	4,7	2,9	4	2,5	2,77	3	3	3,15	1,2	3,58	3	3	4	3,5
Ataköy HPP	Electric Energy Produ	Low	Black Sea (688)	3,48	3,5	2,95	5	3,3	1,98	1,35	3,25	1,75	1,1	2,62	2	2,5	2,55	3
Beyköy HPP	Electric Energy Produ	Medium	Black Sea (688)	3,54	3,4	2,95	5	4	1,98	1,35	3,25	1,75	1,1	2,62	2	2,5	2,55	3
Bilecik OEDAŞ	Other	High	Black Sea (688)	3,67	3,4	2,95	5	4	1,98	1,35	3,25	1,75	1,1	2,59	2	2,5	2,55	3
Deadsea SPP	Electric Energy Produ	Low	Dead Sea	4,2	4,7	3,85	4	3,2	2,77	3	3	3,15	1,2	3,85	3	3	4	3,5
Dorad CCNGS	Electric Energy Produ	Medium	Mediterranean Sea (6	4,45	4,7	3,85	5	2,55	1,34	1	1,5	1,75	1	3,6	2	3	4	4
Eskişehir OEDAŞ	Other	High	Black Sea (688)	3,63	3,9	2,05	5	3,3	1,98	1,35	3,25	1,75	1,1	2,59	2	2,5	2,55	3
Gökçedağ WPP	Electric Energy Produ	High	Mediterranean Sea (6	3,5	3,6	2,9	4	3,8	1,95	1,35	3,25	1,6	1,1	2,71	2	3,5	2,55	3
Jhimpir WPP	Electric Energy Produ	High	Indus	3,72	3,6	3,9	4	3,8	3,13	2,7	3,5	3	3,45	3,3	2	3,5	3	3
Kuzgun HPP	Electric Energy Produ	Medium	Euphrates & Tigris in	3,01	2,8	2,9	4	3,25	1,98	1,35	3,25	1,75	1,1	2,42	2	2,5	2,55	2,5
Kütahya OEDAŞ	Other	High	Aegean Sea (667)	3,21	2,8	2,95	5	2,85	1,98	1,35	3,25	1,75	1,1	2,7	2	3,5	2,55	3
Kızıldere 1-2-3 GPP	Electric Energy Produ	High	Aegean Sea (667)	3,96	3,9	2,95	5	3,8	1,98	1,35	3,25	1,75	1,1	3,12	2	4	2,55	4
Lüleburgaz CoNGS	Electric Energy Produ	Low	Maritsa River	3,69	3,8	2,95	4	3,3	1,98	1,35	3,25	1,75	1,1	2,54	2	3,5	2,55	2,5
Mercan HPP	Electric Energy Produ	Medium	Euphrates & Tigris in	3,01	2,8	2,9	4	3,25	1,95	1,35	3,25	1,6	1,1	2,51	2	3,5	2,55	2,5
Ramat Negev CoNGS	Electric Energy Produ	Medium	Mediterranean Sea (6	4,42	4,8	2,9	5	2,55	1,34	1	1,5	1,75	1	3,22	2	1	4	3,5
Tercan HPP	Electric Energy Produ	Medium	Euphrates & Tigris in	3,01	2,8	2,9	4	3,25	1,95	1,35	3,25	1,6	1,1	2,51	2	3,5	2,55	2,5
Uşak OEDAŞ	Other	High	Aegean Sea (667)	3,71	4	2	5	3,55	1,98	1,35	3,25	1,75	1,1	2,76	2	4	2,55	3
Çıldır HPP	Electric Energy Produ	Medium	Kura & Aras	3,24	3,2	3	4	3,25	1,95	1,35	3,25	1,6	1,1	2,51	2	3,5	2,55	2,5
İkizdere HPP	Electric Energy Produ	Medium	Black Sea (688)	2,8	2,3	3,9	4	1,85	1,98	1,35	3,25	1,75	1,1	2,67	2	3	2,55	3

Scenarios 2030

Water Risk Filter
Basin Risk Results
Scenarios 2030

Dataset:

Site Name	Industry	Business Importance	River Basin	Basin Physical Risk			1. Water Scarcity			2. Flooding			3. Water Quality			4. Ecosystem Services Status		
				BPH_O30	BPH_C30	BPH_P30	BRC1_O30	BRC1_C30	BRC1_P30	BRC2_O30	BRC2_C30	BRC2_P30	BRC3_O30	BRC3_C30	BRC3_P30	BRC4_O30	BRC4_C30	BRC4_P30
Afyon OEDAŞ	Other	High	Black Sea (688)	3,69	3,67	3,79	4,2	4,2	4,4	1,6	1,6	1,6	5,1	5,1	5,1	3,2	3	3,2
Alaşehir GPP	Electric Energy Produ	High	Aegean Sea (667)	4,08	4,25	4,4	4,1	4,3	4,5	2,55	2,95	2,55	5,1	5,1	5,2	3,95	3,95	4,35
Ashdod CoNGS	Electric Energy Produ	Medium	Mediterranean Sea (6	4,69	4,71	4,9	5,3	5,3	5,5	2,9	2,9	2,9	4,3	4,4	4,4	3,1	3,1	3,7
Ataköy HPP	Electric Energy Produ	Low	Black Sea (688)	3,42	3,41	3,6	3,6	3,5	3,7	2,15	2,55	2,55	5	5	5	3,9	3,5	4,1
Beyköy HPP	Electric Energy Produ	Medium	Black Sea (688)	3,51	3,48	3,64	3,4	3,4	3,6	2,55	2,55	2,55	5,1	5,1	5,1	4,4	4,2	4,6
Bilecik OEDAŞ	Other	High	Black Sea (688)	3,66	3,63	3,79	3,4	3,4	3,6	2,55	2,55	2,55	5,1	5,1	5,1	4,4	4,2	4,6
Deadsea SPP	Electric Energy Produ	Low	Dead Sea	4,56	4,62	4,68	4,9	5	5,1	3,85	3,85	3,85	4,2	4,3	4,4	4,4	4,4	4,4
Dorad CCNGS	Electric Energy Produ	Medium	Mediterranean Sea (6	4,96	4,96	5,15	5,3	5,3	5,5	3,85	3,85	3,85	5,3	5,4	5,4	3,35	3,15	3,75
Eskişehir OEDAŞ	Other	High	Black Sea (688)	3,45	3,6	3,76	3,9	3,9	4,2	1	1,65	1,65	5	5,1	5,2	3,5	3,5	3,5
Gökçedağ WPP	Electric Energy Produ	High	Mediterranean Sea (6	3,52	3,5	3,63	3,6	3,6	3,8	2,5	2,5	2,5	4,1	4,1	4,2	4,6	4,4	4,6
Jhimpir WPP	Electric Energy Produ	High	Indus	3,2	3,36	3,09	3	3	3	4,1	4,1	3,9	4,2	4,2	4,4	2,6	3,4	2,2
Kuzgun HPP	Electric Energy Produ	Medium	Euphrates & Tigris in	2,91	3,07	3,36	2,8	2,9	3,3	2,5	2,7	2,7	4	4	4	3,25	3,65	4,25
Kütahya OEDAŞ	Other	High	Aegean Sea (667)	3,15	3,3	3,36	2,8	2,8	3	2,15	3,15	2,55	5,1	5,1	5,1	3,45	3,05	3,65
Kızıldere 1-2-3 GPP	Electric Energy Produ	High	Aegean Sea (667)	4,1	4,08	4,23	4	4	4,2	2,75	2,75	2,55	5,1	5,1	5,2	4,6	4,4	4,6
Lüleburgaz CoNGS	Electric Energy Produ	Low	Maritsa River	3,75	3,86	4,12	4	4,1	4,4	1,75	2,15	2,55	4	4,1	4,2	3,7	3,7	3,7
Mercan HPP	Electric Energy Produ	Medium	Euphrates & Tigris in	2,84	3,07	3,35	2,6	2,9	3,3	2,5	2,7	2,9	4	4	4	3,45	3,65	3,85
Ramat Negev CoNGS	Electric Energy Produ	Medium	Mediterranean Sea (6	4,77	4,77	4,94	5,2	5,2	5,4	2,9	2,9	2,9	5,1	5,1	5,1	3,35	3,35	3,75
Tercan HPP	Electric Energy Produ	Medium	Euphrates & Tigris in	2,84	3,07	3,35	2,6	2,9	3,3	2,5	2,7	2,9	4	4	4	3,45	3,65	3,85
Uşak OEDAŞ	Other	High	Aegean Sea (667)	3,8	3,82	4,02	4,1	4,1	4,3	1,6	1,8	2,2	5,1	5,1	5,1	4,35	4,15	4,35
Çıldır HPP	Electric Energy Produ	Medium	Kura & Aras	3,14	3,09	3,25	3,1	3,3	3,4	2,8	2,2	2,6	4	4	4,1	3,25	3,25	3,25
İkizdere HPP	Electric Energy Produ	Medium	Black Sea (688)	2,91	3,03	3,17	2,3	2,3	2,5	3,7	4,3	4,3	4,1	4,1	4,2	2,85	2,65	2,85

Water Risk Filter
Basin Risk Results
Scenarios 2030

Dataset:

Site Name	Industry	Business Importance	River Basin	Basin Regulatory Risk			5. Enabling Environment			6. Institutions & Governance			7. Management Instruments			8. Infrastructure & Finance			Basin Reputational Risk			9. Cultural Importance			10. Biodiversity Importance			11. Media Scrutiny			12. Conflict		
				BRG_O30	BRG_C30	BRG_P30	BRC5_O30	BRC5_C30	BRC5_P30	BRC6_O30	BRC6_C30	BRC6_P30	BRC7_O30	BRC7_C30	BRC7_P30	BRC8_O30	BRC8_C30	BRC8_P30	BRP_O30	BRP_C30	BRP_P30	BRC9_O30	BRC9_C30	BRC9_P30	BRC10_O3	BRC10_C3	BRC10_P3	BRC11_O3	BRC11_C3	BRC11_P3	BRC12_O3	BRC12_C3	BRC12_P3
Afyon OEDAŞ	Other	High	Black Sea (688)	1,71	2,28	2,58	1,05	1,65	1,95	2,95	3,55	3,85	1,45	2,05	2,35	1	1,4	1,7	2,84	2,84	2,84	2	2	2	4,2	4,2	4,2	2,55	2,55	2,55	3,2	3,2	3,2
Alaşehir GPP	Electric Energy Produ	High	Aegean Sea (667)	1,71	2,28	2,58	1,05	1,65	1,95	2,95	3,55	3,85	1,45	2,05	2,35	1	1,4	1,7	2,94	2,92	2,92	2	2	2	4	3,8	3,8	2,55	2,55	2,55	3,5	3,5	3,5
Ashdod CoNGS	Electric Energy Produ	Medium	Mediterranean Sea (6	2,48	3,07	3,37	2,7	3,3	3,6	2,7	3,3	3,6	2,85	3,45	3,75	1	1,5	1,8	3,59	3,58	3,58	3	3	3	3,2	3	3	4	4	4	3,5	3,5	3,5
Ataköy HPP	Electric Energy Produ	Low	Black Sea (688)	1,71	2,28	2,58	1,05	1,65	1,95	2,95	3,55	3,85	1,45	2,05	2,35	1	1,4	1,7	2,77	2,75	2,75	2	2	2	2,5	2,3	2,3	2,55	2,55	2,55	3,4	3,4	3,4
Beyköy HPP	Electric Energy Produ	Medium	Black Sea (688)	1,71	2,28	2,58	1,05	1,65	1,95	2,95	3,55	3,85	1,45	2,05	2,35	1	1,4	1,7	2,77	2,79	2,79	2	2	2	2,5	2,7	2,7	2,55	2,55	2,55	3,4	3,4	3,4
Bilecik OEDAŞ	Other	High	Black Sea (688)	1,71	2,28	2,58	1,05	1,65	1,95	2,95	3,55	3,85	1,45	2,05	2,35	1	1,4	1,7	2,71	2,73	2,73	2	2	2	2,5	2,7	2,7	2,55	2,55	2,55	3,4	3,4	3,4
Deadsea SPP	Electric Energy Produ	Low	Dead Sea	2,48	3,07	3,37	2,7	3,3	3,6	2,7	3,3	3,6	2,85	3,45	3,75	1	1,5	1,8	3,85	3,89	3,89	3	3	3	3	3,2	3,2	4	4	4	3,5	3,5	3,5
Dorad CCNGS	Electric Energy Produ	Medium	Mediterranean Sea (6	1,17	1,34	1,17	1	1	1	1,2	1,5	1,2	1,45	1,75	1,45	1	1	1	3,62	3,6	3,6	2	2	2	3,2	3	3	4	4	4	4	4	4
Eskişehir OEDAŞ	Other	High	Black Sea (688)	1,71	2,28	2,58	1,05	1,65	1,95	2,95	3,55	3,85	1,45	2,05	2,35	1	1,4	1,7	2,65	2,65	2,65	2	2	2	2,5	2,5	2,5	2,55	2,55	2,55	3,2	3,2	3,2
Gökçedağ WPP	Electric Energy Produ	High	Mediterranean Sea (6	1,68	2,24	2,54	1,05	1,65	1,95	2,95	3,55	3,85	1,3	1,9	2,2	1	1,4	1,7	2,79	2,79	2,79	2	2	2	3,5	3,5	3,5	2,55	2,55	2,55	3,2	3,2	3,2
Jhimpir WPP	Electric Energy Produ	High	Indus	2,83	3,43	3,73	2,4	3	3,3	3,2	3,8	4,1	2,7	3,3	3,6	3,15	3,75	4,05	3,36	3,4	3,4	2	2	2	3,3	3,5	3,5	3	3	3	3,2	3,2	3,2
Kuzgun HPP	Electric Energy Produ	Medium	Euphrates & Tigris in	1,71	2,28	2,58	1,05	1,65	1,95	2,95	3,55	3,85	1,45	2,05	2,35	1	1,4	1,7	2,52	2,52	2,52	2	2	2	2,7	2,7	2,7	2,55	2,55	2,55	2,7	2,7	2,7
Kütahya OEDAŞ	Other	High	Aegean Sea (667)	1,71	2,28	2,58	1,05	1,65	1,95	2,95	3,55	3,85	1,45	2,05	2,35	1	1,4	1,7	2,82	2,82	2,82	2	2	2	3,5	3,5	3,5	2,55	2,55	2,55	3,4	3,4	3,4
Kızıldere 1-2-3 GPP	Electric Energy Produ	High	Aegean Sea (667)	1,71	2,28	2,58	1,05	1,65	1,95	2,95	3,55	3,85	1,45	2,05	2,35	1	1,4	1,7	3,12	3,1	3,1	2	2	2	4	3,8	3,8	2,55	2,55	2,55	4	4	4
Lüleburgaz CoNGS	Electric Energy Produ	Low	Maritsa River	1,71	2,28	2,58	1,05	1,65	1,95	2,95	3,55	3,85	1,45	2,05	2,35	1	1,4	1,7	2,59	2,59	2,59	2	2	2	3,3	3,3	3,3	2,55	2,55	2,55	2,7	2,7	2,7
Mercan HPP	Electric Energy Produ	Medium	Euphrates & Tigris in	1,68	2,24	2,54	1,05	1,65	1,95	2,95	3,55	3,85	1,3	1,9	2,2	1	1,4	1,7	2,69	2,69	2,69	2	2	2	3,7	3,7	3,7	2,55	2,55	2,55	2,9	2,9	2,9
Ramat Negev CoNGS	Electric Energy Produ	Medium	Mediterranean Sea (6	1,17	1,34	1,17	1	1	1	1,2	1,5	1,2	1,45	1,75	1,45	1	1	1	3,25	3,25	3,25	2	2	2	1,2	1,2	1,2	4	4	4	3,5	3,5	3,5
Tercan HPP	Electric Energy Produ	Medium	Euphrates & Tigris in	1,68	2,24	2,54	1,05	1,65	1,95	2,95	3,55	3,85	1,3	1,9	2,2	1	1,4	1,7	2,69	2,69	2,69	2	2	2	3,7	3,7	3,7	2,55	2,55	2,55	2,9	2,9	2,9
Uşak OEDAŞ	Other	High	Aegean Sea (667)	1,71	2,28	2,58	1,05	1,65	1,95	2,95	3,55	3,85	1,45	2,05	2,35	1	1,4	1,7	2,82	2,82	2,82	2	2	2	4	4	4	2,55	2,55	2,55	3,2	3,2	3,2
Çıldır HPP	Electric Energy Produ	Medium	Kura & Aras	1,68	2,24	2,54	1,05	1,65	1,95	2,95	3,55	3,85	1,3	1,9	2,2	1	1,4	1,7	2,59	2,59	2,59	2	2	2	3,5	3,5	3,5	2,55	2,55	2,55	2,7	2,7	2,7
İkizdere HPP	Electric Energy Produ	Medium	Black Sea (688)	1,71	2,28	2,58	1,05	1,65	1,95	2,95	3,55	3,85	1,45	2,05	2,35	1	1,4	1,7	2,75	2,75	2,75	2	2	2	3	3	3	2,55	2,55	2,55	3,2	3,2	3,2

Scenarios 2050

Water Risk Filter
Basin Risk Results
Scenarios 2050

Dataset:

Site Name	Industry	Business Importance	River Basin	Basin Physical Risk			1. Water Scarcity			2. Flooding			3. Water Quality			4. Ecosystem Services Status		
				BPH_O50	BPH_C50	BPH_P50	BRC1_O50	BRC1_C50	BRC1_P50	BRC2_O50	BRC2_C50	BRC2_P50	BRC3_O50	BRC3_C50	BRC3_P50	BRC4_O50	BRC4_C50	BRC4_P50
Afyon OEDAŞ	Other	High	Black Sea (688)	3,9	3,97	4,03	4,3	4,4	4,7	2,2	1,6	1,2	5,3	5,3	5,3	3,2	4,2	4,2
Alaşehir GPP	Electric Energy Produ	High	Aegean Sea (667)	4,45	4,57	4,61	4,5	4,6	4,7	2,95	2,55	2,15	5,3	5,4	5,5	4,35	5,15	5,15
Ashdod CoNGS	Electric Energy Produ	Medium	Mediterranean Sea (6	5,19	5,32	5,46	5,9	5,9	6,1	2,9	2,9	2,9	4,9	5,2	5,3	3,3	4,1	4,1
Ataköy HPP	Electric Energy Produ	Low	Black Sea (688)	3,58	3,7	3,75	3,7	3,7	3,8	2,55	2,55	2,55	5,1	5,1	5,1	3,9	4,7	4,7
Beyköy HPP	Electric Energy Produ	Medium	Black Sea (688)	3,62	3,66	3,72	3,4	3,5	3,6	2,95	2,55	2,55	5,2	5,2	5,3	4,4	5	5
Bilecik OEDAŞ	Other	High	Black Sea (688)	3,76	3,81	3,88	3,4	3,5	3,6	2,95	2,55	2,55	5,2	5,2	5,3	4,4	5	5
Deadsea SPP	Electric Energy Produ	Low	Dead Sea	4,91	5	5,12	5,5	5,5	5,7	3,85	3,85	3,85	4,7	4,9	5,1	4,4	4,8	4,8
Dorad CCNGS	Electric Energy Produ	Medium	Mediterranean Sea (6	5,47	5,68	5,71	5,9	6,1	6,1	3,85	3,85	3,85	5,8	6,1	6,3	3,75	4,15	4,15
Eskişehir OEDAŞ	Other	High	Black Sea (688)	3,69	3,81	3,95	4	4,1	4,3	1,85	1,65	1,65	5,1	5,3	5,5	3,5	4,1	4,1
Gökçedağ WPP	Electric Energy Produ	High	Mediterranean Sea (6	3,79	3,76	3,63	3,7	3,8	3,9	3,1	2,5	1,7	4,2	4,3	4,5	5	5,4	5,4
Jhimpir WPP	Electric Energy Produ	High	Indus	3,1	4,46	4,36	2,8	4,8	4,8	4,1	4,3	3,9	4,5	4,7	5,1	2,6	3,6	3,4
Kuzgun HPP	Electric Energy Produ	Medium	Euphrates & Tigris in	3,22	3,53	3,56	2,9	3,3	3,6	3,3	3,1	2,5	4	4,1	4,1	3,65	4,65	4,85
Kütahya OEDAŞ	Other	High	Aegean Sea (667)	3,32	3,52	3,57	2,9	3	3,1	2,55	2,55	2,55	5,3	5,4	5,4	3,45	4,45	4,45
Kızıldere 1-2-3 GPP	Electric Energy Produ	High	Aegean Sea (667)	4,23	4,34	4,38	4,1	4,2	4,3	3,15	2,55	2,15	5,3	5,4	5,5	4,6	5,4	5,4
Lüleburgaz CoNGS	Electric Energy Produ	Low	Maritsa River	3,99	4,25	4,37	4,3	4,4	4,6	2,15	2,55	2,15	4,1	4,3	4,5	3,7	4,9	4,9
Mercan HPP	Electric Energy Produ	Medium	Euphrates & Tigris in	3,17	3,42	3,56	2,8	3,3	3,6	3,3	2,7	2,5	4	4	4,1	3,65	4,65	4,85
Ramat Negev CoNGS	Electric Energy Produ	Medium	Mediterranean Sea (6	5,35	4,95	5,03	6	5,3	5,4	2,9	2,9	2,9	5,2	5,3	5,4	3,75	4,15	4,15
Tercan HPP	Electric Energy Produ	Medium	Euphrates & Tigris in	3,17	3,42	3,56	2,8	3,3	3,6	3,3	2,7	2,5	4	4	4,1	3,65	4,65	4,85
Uşak OEDAŞ	Other	High	Aegean Sea (667)	3,97	4,05	4,1	4,2	4,3	4,4	2	1,6	1,6	5,3	5,3	5,3	4,35	5,15	5,15
Çıldır HPP	Electric Energy Produ	Medium	Kura & Aras	3,2	3,2	3,31	3,3	3,3	3,5	2,6	2,6	2,6	4,1	4,1	4,2	3,25	3,25	3,25
İkizdere HPP	Electric Energy Produ	Medium	Black Sea (688)	3,04	3,17	3,19	2,4	2,4	2,5	4,1	4,1	3,9	4,2	4,3	4,5	2,65	3,45	3,45

Water Risk Filter
Basin Risk Results
Scenarios 2050

Dataset:

Site Name	Industry	Business Importance	River Basin	Basin Regulatory Risk			5. Enabling Environment			6. Institutions & Governance			7. Management Instruments			8. Infrastructure & Finance			Basin Reputational Risk			9. Cultural Importance			10. Biodiversity Importance			11. Media Scrutiny			12. Conflict		
				BRG_O50	BRG_C50	BRG_P50	BRC5_O50	BRC5_C50	BRC5_P50	BRC6_O50	BRC6_C50	BRC6_P50	BRC7_O50	BRC7_C50	BRC7_P50	BRC8_O50	BRC8_C50	BRC8_P50	BRP_O50	BRP_C50	BRP_P50	BRC9_O50	BRC9_C50	BRC9_P50	BRC10_O5	BRC10_C5	BRC10_P5	BRC11_O5	BRC11_C5	BRC11_P5	BRC12_O5	BRC12_C5	BRC12_P5
Afyon OEDAŞ	Other	High	Black Sea (688)	1,44	2,78	3,58	1	2,15	2,95	2,45	4,05	4,85	1	2,55	3,35	1	1,9	2,7	2,9	2,9	2,9	2	2	2	4,2	4,2	4,2	2,55	2,55	2,55	3,4	3,4	3,4
Alaşehir GPP	Electric Energy Produ	High	Aegean Sea (667)	1,44	2,78	3,58	1	2,15	2,95	2,45	4,05	4,85	1	2,55	3,35	1	1,9	2,7	3	3,01	3,01	2	2	2	3,8	4	4	2,55	2,55	2,55	3,7	3,7	3,7
Ashdod CoNGS	Electric Energy Produ	Medium	Mediterranean Sea (6	2,06	3,57	4,37	2,2	3,8	4,6	2,2	3,8	4,6	2,35	3,95	4,75	1	2	2,8	3,59	3,59	3,67	3	3	3	3,2	3,2	3,2	4	4	4	3,5	3,5	3,7
Ataköy HPP	Electric Energy Produ	Low	Black Sea (688)	1,78	2,78	3,58	1,35	2,15	2,95	3,25	4,05	4,85	1	2,55	3,35	1	1,9	2,7	2,94	2,94	2,94	2	2	2	2,5	2,5	2,5	2,55	2,55	2,55	3,8	3,8	3,8
Beyköy HPP	Electric Energy Produ	Medium	Black Sea (688)	1,78	2,78	3,58	1,35	2,15	2,95	3,25	4,05	4,85	1	2,55	3,35	1	1,9	2,7	2,96	2,96	2,96	2	2	2	2,7	2,7	2,7	2,55	2,55	2,55	3,8	3,8	3,8
Bilecik OEDAŞ	Other	High	Black Sea (688)	1,78	2,78	3,58	1,35	2,15	2,95	3,25	4,05	4,85	1	2,55	3,35	1	1,9	2,7	2,85	2,85	2,85	2	2	2	2,7	2,7	2,7	2,55	2,55	2,55	3,8	3,8	3,8
Deadsea SPP	Electric Energy Produ	Low	Dead Sea	2,06	3,57	4,37	2,2	3,8	4,6	2,2	3,8	4,6	2,35	3,95	4,75	1	2	2,8	3,99	3,99	3,99	3	3	3	3,2	3,2	3,2	4	4	4	3,7	3,7	3,7
Dorad CCNGS	Electric Energy Produ	Medium	Mediterranean Sea (6	1	1,34	1	1	1	1	1	1,5	1	1	1,75	1	1	1	1	3,69	3,69	3,69	2	2	2	3,2	3,2	3,2	4	4	4	4,2	4,2	4,2
Eskişehir OEDAŞ	Other	High	Black Sea (688)	1,78	2,78	3,58	1,35	2,15	2,95	3,25	4,05	4,85	1	2,55	3,35	1	1,9	2,7	2,71	2,73	2,73	2	2	2	2,5	2,7	2,7	2,55	2,55	2,55	3,4	3,4	3,4
Gökçedağ WPP	Electric Energy Produ	High	Mediterranean Sea (6	1,78	2,74	3,54	1,35	2,15	2,95	3,25	4,05	4,85	1	2,4	3,2	1	1,9	2,7	2,88	2,9	2,9	2	2	2	3,5	3,7	3,7	2,55	2,55	2,55	3,4	3,4	3,4
Jhimpir WPP	Electric Energy Produ	High	Indus	2,33	3,93	4,73	1,9	3,5	4,3	2,7	4,3	5,1	2,2	3,8	4,6	2,65	4,25	5,05	3,5	3,46	3,46	2	2	2	3,5	3,3	3,3	3	3	3	3,4	3,4	3,4
Kuzgun HPP	Electric Energy Produ	Medium	Euphrates & Tigris in	1,78	2,78	3,58	1,35	2,15	2,95	3,25	4,05	4,85	1	2,55	3,35	1	1,9	2,7	2,59	2,59	2,59	2	2	2	2,7	2,7	2,7	2,55	2,55	2,55	2,9	2,9	2,9
Kütahya OEDAŞ	Other	High	Aegean Sea (667)	1,78	2,78	3,58	1,35	2,15	2,95	3,25	4,05	4,85	1	2,55	3,35	1	1,9	2,7	2,94	2,94	2,94	2	2	2	3,5	3,5	3,5	2,55	2,55	2,55	3,8	3,8	3,8
Kızıldere 1-2-3 GPP	Electric Energy Produ	High	Aegean Sea (667)	1,78	2,78	3,58	1,35	2,15	2,95	3,25	4,05	4,85	1	2,55	3,35	1	1,9	2,7	3,19	3,19	3,19	2	2	2	4	4	4	2,55	2,55	2,55	4,2	4,2	4,2
Lüleburgaz CoNGS	Electric Energy Produ	Low	Maritsa River	1,44	2,78	3,58	1	2,15	2,95	2,45	4,05	4,85	1	2,55	3,35	1	1,9	2,7	2,68	2,68	2,68	2	2	2	3,5	3,5	3,5	2,55	2,55	2,55	2,9	2,9	2,9
Mercan HPP	Electric Energy Produ	Medium	Euphrates & Tigris in	1,78	2,74	3,54	1,35	2,15	2,95	3,25	4,05	4,85	1	2,4	3,2	1	1,9	2,7	2,85	2,85	2,85	2	2	2	3,7	3,7	3,7	2,55	2,55	2,55	3,3	3,3	3,3
Ramat Negev CoNGS	Electric Energy Produ	Medium	Mediterranean Sea (6	1	1,34	1	1	1	1	1	1,5	1	1	1,75	1	1	1	1	3,25	3,25	3,25	2	2	2	1,2	1,2	1,2	4	4	4	3,5	3,5	3,5
Tercan HPP	Electric Energy Produ	Medium	Euphrates & Tigris in	1,78	2,74	3,54	1,35	2,15	2,95	3,25	4,05	4,85	1	2,4	3,2	1	1,9	2,7	2,85	2,85	2,85	2	2	2	3,7	3,7	3,7	2,55	2,55	2,55	3,3	3,3	3,3
Uşak OEDAŞ	Other	High	Aegean Sea (667)	1,78	2,78	3,58	1,35	2,15	2,95	3,25	4,05	4,85	1	2,55	3,35	1	1,9	2,7	2,85	2,88	2,88	2	2	2	3,8	4	4	2,55	2,55	2,55	3,4	3,4	3,4
Çıldır HPP	Electric Energy Produ	Medium	Kura & Aras	1,78	2,74	3,54	1,35	2,15	2,95	3,25	4,05	4,85	1	2,4	3,2	1	1,9	2,7	2,67	2,69	2,69	2	2	2	3,5	3,7	3,7	2,55	2,55	2,55	2,9	2,9	2,9
İkizdere HPP	Electric Energy Produ	Medium	Black Sea (688)	1,78	2,78	3,58	1,35	2,15	2,95	3,25	4,05	4,85	1	2,55	3,35	1	1,9	2,7	2,83	2,83	2,83	2	2	2	3	3	3	2,55	2,55	2,55	3,4	3,4	3,4

Assessment Results

For Scenarios 2030

As a result of the forecast study conducted for the year 2030, under optimistic, pessimistic, and current trend scenarios, water quality and water scarcity risks diverge negatively from other risk categories and are observed as the most critical risks. It has been determined that the risk of water quality should be considered the most significant water risk for all water basins across Turkey, and Zorlu Enerji will plan corrective actions aimed at improving water quality.

For Scenarios 2050

According to the forecast study conducted for the year 2050, under optimistic, pessimistic, and current trend scenarios, risks related to water quality, water scarcity, and ecosystems diverge negatively from other risk categories and are identified as the most critical risks. Additionally, in the pessimistic scenario, governance-related risks will gain importance. It has been determined that water quality risk should continue to be regarded as the most significant water risk for all water basins across Turkey, and Zorlu Enerji will maintain its efforts to plan corrective actions aimed at mitigating high-risk aspects.

4.3.5. Assessment of Future Water Quantity & Quality Related Risks

Introduction to the Scenarios Risk Assessment Results Export

General information: This file displays scenarios risk results for the assessed site(s) selected within your portfolio (i.e. selected individual site, sites within a selected company, sites within a selected group). The risk score classification is consistent throughout all risk categories and risk types, with caveat that risk scores in Baseline 2020 can be up to 5 (Very high risk), while risk scores in Scenarios 2030 or 2050 can be up to 6.6 (Extreme risk):

- 1.0 <= x >= 1.8 Very low risk
- 1.8 < x >= 2.6 Low risk
- 2.6 < x >= 3.4 Medium risk
- 3.4 < x >= 4.2 High risk
- 4.2 < x >= 5.0 Very high risk
- 5.0 < x >= 6.6 Extreme risk

Baseline 2020: This tab lists the assessed site(s) and provides their respective basin risk results based on the Water Risk Filter 2020 global dataset. Risk scores are provided for all Water Risk Filter aggregated risk layers, i.e. risk types (Physical, Regulatory, Reputational), and risk categories (1. Water Scarcity, 2. Flooding, 3. Water Quality, 4. Ecosystem Services Status, 5. Enabling Environment, 6. Institutions & Governance, 7. Management Instruments, 8. Infrastructure & Finance, 9. Cultural Importance, 10. Biodiversity Importance, 11. Media Scrutiny, 12. Conflict). Note that the aggregated risk layers are computed based on specific industry of each site. For more details, please refer to the Water Risk Filter Methodology available at https://riskfilter.org/water/explore/data-and-methods

Scenarios [Year]: This tab lists the assessed site(s) and provides their respective basin risk results, as projections for [Year], in the three pathways: Optimistic, Current trend, and Pessimistic. Risk scores are provided for all Water Risk Filter aggregated risk layers and are computed based on specific industry of each site. For more details, please refer to the Water Risk Filter Methodology available at at https://riskfilter.org/water/explore/data-and-methods

Notes: The information of Country (column J) and Province (column K) are retrieved from Esri's Geocoding service (https://developers.arcgis.com/rest/geocode/api-reference/overview-world-geocoding-service.htm), and the information of River basin (column L) is based on the WMO Basins and Sub-Basins, 3rd ed. (https://www.bafg.de/GRDC/EN/02_srvcs/22_gslrs/223_WMO/wmo_regions_node.html), with the caveat that when basins are subdivided into sub-basins these are signalized with the sub-basin's WMOBB id after the basin's name, for example, Amazon (322). However, the boundaries and names shown and the designations used do not imply official endorsement or acceptance by WWF.

How to read column headers?

Column headers indicate the scenario pathway and the year as suffix after the risk layer key.

Column header Description

- [Risk Layer]_C20 [Risk Layer] in the Baseline 2020
- [Risk Layer]_O30 Scenario of [Risk Layer] in the Optimistic pathway, for the year 2030
- [Risk Layer]_C30 Scenario of [Risk Layer] in the Current trend pathway, for the year 2030
- [Risk Layer]_P30 Scenario of [Risk Layer] in the Pessimistic pathway, for the year 2030
- [Risk Layer]_O50 Scenario of [Risk Layer] in the Optimistic pathway, for the year 2050
- [Risk Layer]_C50 Scenario of [Risk Layer] in the Current trend pathway, for the year 2050
- [Risk Layer]_P50 Scenario of [Risk Layer] in the Pessimistic pathway, for the year 2050

Overview of the narratives of the Water Risk Filter Scenarios pathways

	OPTIMISTIC	CURRENT TREND	PESSIMISTIC
CLIMATE ASPECTS [1]	Moderate emissions RCP2.6 / RCP4.5	Intermediate emissions RCP4.5 / RCP6.0	High emissions RCP6.0 / RCP8.5
	· Moderate mitigation measures so that GHG emissions are halved by 2050 · Increase of global mean surface temperature is unlikely to exceed 2°C by the end of the 21st century	· Intermediate mitigation measures so that GHG emissions peak around mid-century, then start declining · Increase of global mean surface temperature is likely to exceed 2°C by the end of the 21st century	· Business-as-usual so that GHG emissions continue to rise throughout the 21st century · Increase of global mean surface temperature is likely to exceed 4°C by the end of the 21st century
SOCIO-ECONOMIC ASPECTS, [2] EXTENDED TOWARDS WATER AVAILABILITY AND USE [3]	Sustainability SSP1	Middle of the road SSP2	Regional rivalry SSP3
	· Emphasis on human and nature well-being · Effective and persistent cooperation and collaboration across the local, national, regional international scales and between public organizations, private sector and civil society within and across all scales of governance · Rapid technological change · Improved resource efficiency · Sustainability concerns; more stringent environmental regulation implemented · Research and technology development reduce the challenges of access to safe water and improved sanitation	· Current social and economic trends continue · Relatively weak coordination and cooperation among national and international institutions, the private sector, and civil society for achieving sustainable development goals · Technological progress but no major breakthroughs · Modest decline in resource use intensity · Moderate awareness of the environmental consequences of choices when using natural resources. Environmental systems experience degradation · Access to safe water and improved sanitation in low-income countries makes unsteady progress	· Emphasis on national issues due to regional conflicts and nationalism · Societies are becoming more skeptical about globalization. Global governance, institutions and leadership are relatively weak · Low investment in technology development · Increase in resource use intensity · Environmental policies have very little importance. Serious degradation of environmental systems in some regions · Growing population and limited access to safe water and improved sanitation challenge human and natural systems

[1] IPCC (2014). Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, R.K. Pachauri and L.A. Meyer (eds.)]. IPCC, Geneva, Switzerland, 151 pp. https://www.ipcc.ch/report/ar5/syr/

[2] O'Neill, B., Kriegler, E., & Ebi, K. L. (2017). Supporting information. Supplementary content to: the roads ahead: narratives for shared socioeconomic pathways describing world futures in the 21st century. Glob Environ Chang, 42, 169-180. https://doi.org/10.1016/j.gloenvcha.2015.01.004

[3] Wada, Y., Flörke, M., Hanasaki, N., Eisner, S., Fischer, G., Tramberend, S., ... & Wiberg, D. (2016). Modeling global water use for the 21st century: The Water Futures and Solutions (WFaS) initiative and its approaches. Geoscientific Model Development, 9(1), 175-222. https://doi.org/10.5194/gmd-9-175-2016

Baseline 2020

Water Risk Filter
Basin Risk Results
Baseline 2020

Dataset:

Site Name	Industry	Business Importance	River Basin	Basin Physical Risk	1. Water Scarcity	2. Flooding	3. Water Quality	4. Ecosystem Services Status	Basin Regulatory Risk	5. Enabling Environment	6. Institutions & Governance	7. Management Instruments	8. Infrastructure & Finance	Basin Reputational Risk	9. Cultural Importance	10. Biodiversity Importance	11. Media Scrutiny	12. Conflict
				BPH_C20	BRC1_C20	BRC2_C20	BRC3_C20	BRC4_C20	BRG_C20	BRC5_C20	BRC6_C20	BRC7_C20	BRC8_C20	BRP_C20	BRC9_C20	BRC10_C2	BRC11_C2	BRC12_C2
Afyon OEDAŞ	Other	High	Black Sea (688)	3,62	4,1	2	5	2,6	1,98	1,35	3,25	1,75	1,1	2,76	2	4	2,55	3
Alaşehir GPP	Electric Energy Produ	High	Aegean Sea (667)	3,94	3,9	2,95	5	3,55	1,98	1,35	3,25	1,75	1,1	2,94	2	4	2,55	3,5
Ashdod CoNGS	Electric Energy Produ	Medium	Mediterranean Sea (6	4,2	4,7	2,9	4	2,5	2,77	3	3	3,15	1,2	3,58	3	3	4	3,5
Ataköy HPP	Electric Energy Produ	Low	Black Sea (688)	3,48	3,5	2,95	5	3,3	1,98	1,35	3,25	1,75	1,1	2,62	2	2,5	2,55	3
Beyköy HPP	Electric Energy Produ	Medium	Black Sea (688)	3,54	3,4	2,95	5	4	1,98	1,35	3,25	1,75	1,1	2,62	2	2,5	2,55	3
Bilecik OEDAŞ	Other	High	Black Sea (688)	3,67	3,4	2,95	5	4	1,98	1,35	3,25	1,75	1,1	2,59	2	2,5	2,55	3
Deadsea SPP	Electric Energy Produ	Low	Dead Sea	4,2	4,7	3,85	4	3,2	2,77	3	3	3,15	1,2	3,85	3	3	4	3,5
Dorad CCNGS	Electric Energy Produ	Medium	Mediterranean Sea (6	4,45	4,7	3,85	5	2,55	1,34	1	1,5	1,75	1	3,6	2	3	4	4
Eskişehir OEDAŞ	Other	High	Black Sea (688)	3,63	3,9	2,05	5	3,3	1,98	1,35	3,25	1,75	1,1	2,59	2	2,5	2,55	3
Gökçedağ WPP	Electric Energy Produ	High	Mediterranean Sea (6	3,5	3,6	2,9	4	3,8	1,95	1,35	3,25	1,6	1,1	2,71	2	3,5	2,55	3
Jhimpir WPP	Electric Energy Produ	High	Indus	3,72	3,6	3,9	4	3,8	3,13	2,7	3,5	3	3,45	3,3	2	3,5	3	3
Kuzgun HPP	Electric Energy Produ	Medium	Euphrates & Tigris in	3,01	2,8	2,9	4	3,25	1,98	1,35	3,25	1,75	1,1	2,42	2	2,5	2,55	2,5
Kütahya OEDAŞ	Other	High	Aegean Sea (667)	3,21	2,8	2,95	5	2,85	1,98	1,35	3,25	1,75	1,1	2,7	2	3,5	2,55	3
Kızıldere 1-2-3 GPP	Electric Energy Produ	High	Aegean Sea (667)	3,96	3,9	2,95	5	3,8	1,98	1,35	3,25	1,75	1,1	3,12	2	4	2,55	4
Lüleburgaz CoNGS	Electric Energy Produ	Low	Maritsa River	3,69	3,8	2,95	4	3,3	1,98	1,35	3,25	1,75	1,1	2,54	2	3,5	2,55	2,5
Mercan HPP	Electric Energy Produ	Medium	Euphrates & Tigris in	3,01	2,8	2,9	4	3,25	1,95	1,35	3,25	1,6	1,1	2,51	2	3,5	2,55	2,5
Ramat Negev CoNGS	Electric Energy Produ	Medium	Mediterranean Sea (6	4,42	4,8	2,9	5	2,55	1,34	1	1,5	1,75	1	3,22	2	1	4	3,5
Tercan HPP	Electric Energy Produ	Medium	Euphrates & Tigris in	3,01	2,8	2,9	4	3,25	1,95	1,35	3,25	1,6	1,1	2,51	2	3,5	2,55	2,5
Uşak OEDAŞ	Other	High	Aegean Sea (667)	3,71	4	2	5	3,55	1,98	1,35	3,25	1,75	1,1	2,76	2	4	2,55	3
Çıldır HPP	Electric Energy Produ	Medium	Kura & Aras	3,24	3,2	3	4	3,25	1,95	1,35	3,25	1,6	1,1	2,51	2	3,5	2,55	2,5
İkizdere HPP	Electric Energy Produ	Medium	Black Sea (688)	2,8	2,3	3,9	4	1,85	1,98	1,35	3,25	1,75	1,1	2,67	2	3	2,55	3

Scenarios 2030

Water Risk Filter
Basin Risk Results
Scenarios 2030

Dataset:

Site Name	Industry	Business Importance	River Basin	Basin Physical Risk			1. Water Scarcity			2. Flooding			3. Water Quality			4. Ecosystem Services Status		
				BPH_O30	BPH_C30	BPH_P30	BRC1_O30	BRC1_C30	BRC1_P30	BRC2_O30	BRC2_C30	BRC2_P30	BRC3_O30	BRC3_C30	BRC3_P30	BRC4_O30	BRC4_C30	BRC4_P30
Afyon OEDAŞ	Other	High	Black Sea (688)	3,69	3,67	3,79	4,2	4,2	4,4	1,6	1,6	1,6	5,1	5,1	5,1	3,2	3	3,2
Alaşehir GPP	Electric Energy Produ	High	Aegean Sea (667)	4,08	4,25	4,4	4,1	4,3	4,5	2,55	2,95	2,55	5,1	5,1	5,2	3,95	3,95	4,35
Ashdod CoNGS	Electric Energy Produ	Medium	Mediterranean Sea (E	4,69	4,71	4,9	5,3	5,3	5,5	2,9	2,9	2,9	4,3	4,4	4,4	3,1	3,1	3,7
Ataköy HPP	Electric Energy Produ	Low	Black Sea (688)	3,42	3,41	3,6	3,6	3,5	3,7	2,15	2,55	2,55	5	5	5	3,9	3,5	4,1
Beyköy HPP	Electric Energy Produ	Medium	Black Sea (688)	3,51	3,48	3,64	3,4	3,4	3,6	2,55	2,55	2,55	5,1	5,1	5,1	4,4	4,2	4,6
Bilecik OEDAŞ	Other	High	Black Sea (688)	3,66	3,63	3,79	3,4	3,4	3,6	2,55	2,55	2,55	5,1	5,1	5,1	4,4	4,2	4,6
Deadsea SPP	Electric Energy Produ	Low	Dead Sea	4,56	4,62	4,68	4,9	5	5,1	3,85	3,85	3,85	4,2	4,3	4,4	4,4	4,4	4,4
Dorad CCNGS	Electric Energy Produ	Medium	Mediterranean Sea (E	4,96	4,96	5,15	5,3	5,3	5,5	3,85	3,85	3,85	5,3	5,4	5,4	3,35	3,15	3,75
Eskişehir OEDAŞ	Other	High	Black Sea (688)	3,45	3,6	3,76	3,9	3,9	4,2	1	1,65	1,65	5	5,1	5,2	3,5	3,5	3,5
Gökçedağ WPP	Electric Energy Produ	High	Mediterranean Sea (E	3,52	3,5	3,63	3,6	3,6	3,8	2,5	2,5	2,5	4,1	4,1	4,2	4,6	4,4	4,6
Jhimpir WPP	Electric Energy Produ	High	Indus	3,2	3,36	3,09	3	3	3	4,1	4,1	3,9	4,2	4,2	4,4	2,6	3,4	2,2
Kuzgun HPP	Electric Energy Produ	Medium	Euphrates & Tigris in	2,91	3,07	3,36	2,8	2,9	3,3	2,5	2,7	2,7	4	4	4	3,25	3,65	4,25
Kütahya OEDAŞ	Other	High	Aegean Sea (667)	3,15	3,3	3,36	2,8	2,8	3	2,15	3,15	2,55	5,1	5,1	5,1	3,45	3,05	3,65
Kızıldere 1-2-3 GPP	Electric Energy Produ	High	Aegean Sea (667)	4,1	4,08	4,23	4	4	4,2	2,75	2,75	2,55	5,1	5,1	5,2	4,6	4,4	4,6
Lüleburgaz CoNGS	Electric Energy Produ	Low	Maritsa River	3,75	3,86	4,12	4	4,1	4,4	1,75	2,15	2,55	4	4,1	4,2	3,7	3,7	3,7
Mercan HPP	Electric Energy Produ	Medium	Euphrates & Tigris in	2,84	3,07	3,35	2,6	2,9	3,3	2,5	2,7	2,9	4	4	4	3,45	3,65	3,85
Ramat Negev CoNGS	Electric Energy Produ	Medium	Mediterranean Sea (E	4,77	4,77	4,94	5,2	5,2	5,4	2,9	2,9	2,9	5,1	5,1	5,1	3,35	3,35	3,75
Tercan HPP	Electric Energy Produ	Medium	Euphrates & Tigris in	2,84	3,07	3,35	2,6	2,9	3,3	2,5	2,7	2,9	4	4	4	3,45	3,65	3,85
Uşak OEDAŞ	Other	High	Aegean Sea (667)	3,8	3,82	4,02	4,1	4,1	4,3	1,6	1,8	2,2	5,1	5,1	5,1	4,35	4,15	4,35
Çıldır HPP	Electric Energy Produ	Medium	Kura & Aras	3,14	3,09	3,25	3,1	3,3	3,4	2,8	2,2	2,6	4	4	4,1	3,25	3,25	3,25
İkizdere HPP	Electric Energy Produ	Medium	Black Sea (688)	2,91	3,03	3,17	2,3	2,3	2,5	3,7	4,3	4,3	4,1	4,1	4,2	2,85	2,65	2,85

Water Risk Filter
Basin Risk Results
Scenarios 2030

Dataset:

Site Name	Industry	Business Importance	River Basin	Basin Regulatory Risk			5. Enabling Environment			6. Institutions & Governance			7. Management Instruments			8. Infrastructure & Finance			Basin Reputational Risk			9. Cultural Importance			10. Biodiversity Importance			11. Media Scrutiny			12. Conflict		
				BRG_O30	BRG_C30	BRG_P30	BRC5_O30	BRC5_C30	BRC5_P30	BRC6_O30	BRC6_C30	BRC6_P30	BRC7_O30	BRC7_C30	BRC7_P30	BRC8_O30	BRC8_C30	BRC8_P30	BRP_O30	BRP_C30	BRP_P30	BRC9_O30	BRC9_C30	BRC9_P30	BRC10_O3	BRC10_C3	BRC10_P3	BRC11_O3	BRC11_C3	BRC11_P3	BRC12_O3	BRC12_C3	BRC12_P3
Afyon OEDAŞ	Other	High	Black Sea (688)	1,71	2,28	2,58	1,05	1,65	1,95	2,95	3,55	3,85	1,45	2,05	2,35	1	1,4	1,7	2,84	2,84	2,84	2	2	2	4,2	4,2	4,2	2,55	2,55	2,55	3,2	3,2	3,2
Alaşehir GPP	Electric Energy Produ	High	Aegean Sea (667)	1,71	2,28	2,58	1,05	1,65	1,95	2,95	3,55	3,85	1,45	2,05	2,35	1	1,4	1,7	2,94	2,92	2,92	2	2	2	4	3,8	3,8	2,55	2,55	2,55	3,5	3,5	3,5
Ashdod CoNGS	Electric Energy Produ	Medium	Mediterranean Sea (E	2,48	3,07	3,37	2,7	3,3	3,6	2,7	3,3	3,6	2,85	3,45	3,75	1	1,5	1,8	3,59	3,58	3,58	3	3	3	3,2	3	3	4	4	4	3,5	3,5	3,5
Ataköy HPP	Electric Energy Produ	Low	Black Sea (688)	1,71	2,28	2,58	1,05	1,65	1,95	2,95	3,55	3,85	1,45	2,05	2,35	1	1,4	1,7	2,77	2,75	2,75	2	2	2	2,5	2,3	2,3	2,55	2,55	2,55	3,4	3,4	3,4
Beyköy HPP	Electric Energy Produ	Medium	Black Sea (688)	1,71	2,28	2,58	1,05	1,65	1,95	2,95	3,55	3,85	1,45	2,05	2,35	1	1,4	1,7	2,77	2,79	2,79	2	2	2	2,5	2,7	2,7	2,55	2,55	2,55	3,4	3,4	3,4
Bilecik OEDAŞ	Other	High	Black Sea (688)	1,71	2,28	2,58	1,05	1,65	1,95	2,95	3,55	3,85	1,45	2,05	2,35	1	1,4	1,7	2,71	2,73	2,73	2	2	2	2,5	2,7	2,7	2,55	2,55	2,55	3,4	3,4	3,4
Deadsea SPP	Electric Energy Produ	Low	Dead Sea	2,48	3,07	3,37	2,7	3,3	3,6	2,7	3,3	3,6	2,85	3,45	3,75	1	1,5	1,8	3,85	3,89	3,89	3	3	3	3	3,2	3,2	4	4	4	3,5	3,5	3,5
Dorad CCNGS	Electric Energy Produ	Medium	Mediterranean Sea (E	1,17	1,34	1,17	1	1	1	1,2	1,5	1,2	1,45	1,75	1,45	1	1	1	3,62	3,6	3,6	2	2	2	3,2	3	3	4	4	4	4	4	4
Eskişehir OEDAŞ	Other	High	Black Sea (688)	1,71	2,28	2,58	1,05	1,65	1,95	2,95	3,55	3,85	1,45	2,05	2,35	1	1,4	1,7	2,65	2,65	2,65	2	2	2	2,5	2,5	2,5	2,55	2,55	2,55	3,2	3,2	3,2
Gökçedağ WPP	Electric Energy Produ	High	Mediterranean Sea (E	1,68	2,24	2,54	1,05	1,65	1,95	2,95	3,55	3,85	1,3	1,9	2,2	1	1,4	1,7	2,79	2,79	2,79	2	2	2	3,5	3,5	3,5	2,55	2,55	2,55	3,2	3,2	3,2
Jhimpir WPP	Electric Energy Produ	High	Indus	2,83	3,43	3,73	2,4	3	3,3	3,2	3,8	4,1	2,7	3,3	3,6	3,15	3,75	4,05	3,36	3,4	3,4	2	2	2	3,3	3,5	3,5	3	3	3	3,2	3,2	3,2
Kuzgun HPP	Electric Energy Produ	Medium	Euphrates & Tigris in	1,71	2,28	2,58	1,05	1,65	1,95	2,95	3,55	3,85	1,45	2,05	2,35	1	1,4	1,7	2,52	2,52	2,52	2	2	2	2,7	2,7	2,7	2,55	2,55	2,55	2,7	2,7	2,7
Kütahya OEDAŞ	Other	High	Aegean Sea (667)	1,71	2,28	2,58	1,05	1,65	1,95	2,95	3,55	3,85	1,45	2,05	2,35	1	1,4	1,7	2,82	2,82	2,82	2	2	2	3,5	3,5	3,5	2,55	2,55	2,55	3,4	3,4	3,4
Kızıldere 1-2-3 GPP	Electric Energy Produ	High	Aegean Sea (667)	1,71	2,28	2,58	1,05	1,65	1,95	2,95	3,55	3,85	1,45	2,05	2,35	1	1,4	1,7	3,12	3,1	3,1	2	2	2	4	3,8	3,8	2,55	2,55	2,55	4	4	4
Lüleburgaz CoNGS	Electric Energy Produ	Low	Maritsa River	1,71	2,28	2,58	1,05	1,65	1,95	2,95	3,55	3,85	1,45	2,05	2,35	1	1,4	1,7	2,59	2,59	2,59	2	2	2	3,3	3,3	3,3	2,55	2,55	2,55	2,7	2,7	2,7
Mercan HPP	Electric Energy Produ	Medium	Euphrates & Tigris in	1,68	2,24	2,54	1,05	1,65	1,95	2,95	3,55	3,85	1,3	1,9	2,2	1	1,4	1,7	2,69	2,69	2,69	2	2	2	3,7	3,7	3,7	2,55	2,55	2,55	2,9	2,9	2,9
Ramat Negev CoNGS	Electric Energy Produ	Medium	Mediterranean Sea (E	1,17	1,34	1,17	1	1	1	1,2	1,5	1,2	1,45	1,75	1,45	1	1	1	3,25	3,25	3,25	2	2	2	1,2	1,2	1,2	4	4	4	3,5	3,5	3,5
Tercan HPP	Electric Energy Produ	Medium	Euphrates & Tigris in	1,68	2,24	2,54	1,05	1,65	1,95	2,95	3,55	3,85	1,3	1,9	2,2	1	1,4	1,7	2,69	2,69	2,69	2	2	2	3,7	3,7	3,7	2,55	2,55	2,55	2,9	2,9	2,9
Uşak OEDAŞ	Other	High	Aegean Sea (667)	1,71	2,28	2,58	1,05	1,65	1,95	2,95	3,55	3,85	1,45	2,05	2,35	1	1,4	1,7	2,82	2,82	2,82	2	2	2	4	4	4	2,55	2,55	2,55	3,2	3,2	3,2
Çıldır HPP	Electric Energy Produ	Medium	Kura & Aras	1,68	2,24	2,54	1,05	1,65	1,95	2,95	3,55	3,85	1,3	1,9	2,2	1	1,4	1,7	2,59	2,59	2,59	2	2	2	3,5	3,5	3,5	2,55	2,55	2,55	2,7	2,7	2,7
İkizdere HPP	Electric Energy Produ	Medium	Black Sea (688)	1,71	2,28	2,58	1,05	1,65	1,95	2,95	3,55	3,85	1,45	2,05	2,35	1	1,4	1,7	2,75	2,75	2,75	2	2	2	3	3	3	2,55	2,55	2,55	3,2	3,2	3,2

Scenarios 2050

Water Risk Filter
Basin Risk Results
Scenarios 2050

Dataset:

Site Name	Industry	Business Importance	River Basin	Basin Physical Risk			1. Water Scarcity			2. Flooding			3. Water Quality			4. Ecosystem Services Status		
				BPH_O50	BPH_C50	BPH_P50	BRC1_O50	BRC1_C50	BRC1_P50	BRC2_O50	BRC2_C50	BRC2_P50	BRC3_O50	BRC3_C50	BRC3_P50	BRC4_O50	BRC4_C50	BRC4_P50
Afyon OEDAŞ	Other	High	Black Sea (688)	3,9	3,97	4,03	4,3	4,4	4,7	2,2	1,6	1,2	5,3	5,3	5,3	3,2	4,2	4,2
Alaşehir GPP	Electric Energy Produ	High	Aegean Sea (667)	4,45	4,57	4,61	4,5	4,6	4,7	2,95	2,55	2,15	5,3	5,4	5,5	4,35	5,15	5,15
Ashdod CoNGS	Electric Energy Produ	Medium	Mediterranean Sea (6	5,19	5,32	5,46	5,9	5,9	6,1	2,9	2,9	2,9	4,9	5,2	5,3	3,3	4,1	4,1
Ataköy HPP	Electric Energy Produ	Low	Black Sea (688)	3,58	3,7	3,75	3,7	3,7	3,8	2,55	2,55	2,55	5,1	5,1	5,1	3,9	4,7	4,7
Beyköy HPP	Electric Energy Produ	Medium	Black Sea (688)	3,62	3,66	3,72	3,4	3,5	3,6	2,95	2,55	2,55	5,2	5,2	5,3	4,4	5	5
Bilecik OEDAŞ	Other	High	Black Sea (688)	3,76	3,81	3,88	3,4	3,5	3,6	2,95	2,55	2,55	5,2	5,2	5,3	4,4	5	5
Deadsea SPP	Electric Energy Produ	Low	Dead Sea	4,91	5	5,12	5,5	5,5	5,7	3,85	3,85	3,85	4,7	4,9	5,1	4,4	4,8	4,8
Dorad CCNGS	Electric Energy Produ	Medium	Mediterranean Sea (6	5,47	5,68	5,71	5,9	6,1	6,1	3,85	3,85	3,85	5,8	6,1	6,3	3,75	4,15	4,15
Eskişehir OEDAŞ	Other	High	Black Sea (688)	3,69	3,81	3,95	4	4,1	4,3	1,85	1,65	1,65	5,1	5,3	5,5	3,5	4,1	4,1
Gökçedağ WPP	Electric Energy Produ	High	Mediterranean Sea (6	3,79	3,76	3,63	3,7	3,8	3,9	3,1	2,5	1,7	4,2	4,3	4,5	5	5,4	5,4
Jhimpir WPP	Electric Energy Produ	High	Indus	3,1	4,46	4,36	2,8	4,8	4,8	4,1	4,3	3,9	4,5	4,7	5,1	2,6	3,6	3,4
Kuzgun HPP	Electric Energy Produ	Medium	Euphrates & Tigris in	3,22	3,53	3,56	2,9	3,3	3,6	3,3	3,1	2,5	4	4,1	4,1	3,65	4,65	4,85
Kütahya OEDAŞ	Other	High	Aegean Sea (667)	3,32	3,52	3,57	2,9	3	3,1	2,55	2,55	2,55	5,3	5,4	5,4	3,45	4,45	4,45
Kızıldere 1-2-3 GPP	Electric Energy Produ	High	Aegean Sea (667)	4,23	4,34	4,38	4,1	4,2	4,3	3,15	2,55	2,15	5,3	5,4	5,5	4,6	5,4	5,4
Lüleburgaz CoNGS	Electric Energy Produ	Low	Maritsa River	3,99	4,25	4,37	4,3	4,4	4,6	2,15	2,55	2,15	4,1	4,3	4,5	3,7	4,9	4,9
Mercan HPP	Electric Energy Produ	Medium	Euphrates & Tigris in	3,17	3,42	3,56	2,8	3,3	3,6	3,3	2,7	2,5	4	4	4,1	3,65	4,65	4,85
Ramat Negev CoNGS	Electric Energy Produ	Medium	Mediterranean Sea (6	5,35	4,95	5,03	6	5,3	5,4	2,9	2,9	2,9	5,2	5,3	5,4	3,75	4,15	4,15
Tercan HPP	Electric Energy Produ	Medium	Euphrates & Tigris in	3,17	3,42	3,56	2,8	3,3	3,6	3,3	2,7	2,5	4	4	4,1	3,65	4,65	4,85
Uşak OEDAŞ	Other	High	Aegean Sea (667)	3,97	4,05	4,1	4,2	4,3	4,4	2	1,6	1,6	5,3	5,3	5,3	4,35	5,15	5,15
Çıldır HPP	Electric Energy Produ	Medium	Kura & Aras	3,2	3,2	3,31	3,3	3,3	3,5	2,6	2,6	2,6	4,1	4,1	4,2	3,25	3,25	3,25
İkizdere HPP	Electric Energy Produ	Medium	Black Sea (688)	3,04	3,17	3,19	2,4	2,4	2,5	4,1	4,1	3,9	4,2	4,3	4,5	2,65	3,45	3,45

Water Risk Filter
Basin Risk Results
Scenarios 2050

Dataset:

Site Name	Industry	Business Importance	River Basin	Basin Regulatory Risk			5. Enabling Environment			6. Institutions & Governance			7. Management Instruments			8. Infrastructure & Finance			Basin Reputational Risk			9. Cultural Importance			10. Biodiversity Importance			11. Media Scrutiny			12. Conflict		
				BRG_O50	BRG_C50	BRG_P50	BRC5_O50	BRC5_C50	BRC5_P50	BRC6_O50	BRC6_C50	BRC6_P50	BRC7_O50	BRC7_C50	BRC7_P50	BRC8_O50	BRC8_C50	BRC8_P50	BRP_O50	BRP_C50	BRP_P50	BRC9_O50	BRC9_C50	BRC9_P50	BRC10_O5	BRC10_C5	BRC10_P5	BRC11_O5	BRC11_C5	BRC11_P5	BRC12_O5	BRC12_C5	BRC12_P5
Afyon OEDAŞ	Other	High	Black Sea (688)	1,44	2,78	3,58	1	2,15	2,95	2,45	4,05	4,85	1	2,55	3,35	1	1,9	2,7	2,9	2,9	2,9	2	2	2	4,2	4,2	4,2	2,55	2,55	2,55	3,4	3,4	3,4
Alaşehir GPP	Electric Energy Produ	High	Aegean Sea (667)	1,44	2,78	3,58	1	2,15	2,95	2,45	4,05	4,85	1	2,55	3,35	1	1,9	2,7	3	3,01	3,01	2	2	2	3,8	4	4	2,55	2,55	2,55	3,7	3,7	3,7
Ashdod CoNGS	Electric Energy Produ	Medium	Mediterranean Sea (6	2,06	3,57	4,37	2,2	3,8	4,6	2,2	3,8	4,6	2,35	3,95	4,75	1	2	2,8	3,59	3,59	3,67	3	3	3	3,2	3,2	3,2	4	4	4	3,5	3,5	3,7
Ataköy HPP	Electric Energy Produ	Low	Black Sea (688)	1,78	2,78	3,58	1,35	2,15	2,95	3,25	4,05	4,85	1	2,55	3,35	1	1,9	2,7	2,94	2,94	2,94	2	2	2	2,5	2,5	2,5	2,55	2,55	2,55	3,8	3,8	3,8
Beyköy HPP	Electric Energy Produ	Medium	Black Sea (688)	1,78	2,78	3,58	1,35	2,15	2,95	3,25	4,05	4,85	1	2,55	3,35	1	1,9	2,7	2,96	2,96	2,96	2	2	2	2,7	2,7	2,7	2,55	2,55	2,55	3,8	3,8	3,8
Bilecik OEDAŞ	Other	High	Black Sea (688)	1,78	2,78	3,58	1,35	2,15	2,95	3,25	4,05	4,85	1	2,55	3,35	1	1,9	2,7	2,85	2,85	2,85	2	2	2	2,7	2,7	2,7	2,55	2,55	2,55	3,8	3,8	3,8
Deadsea SPP	Electric Energy Produ	Low	Dead Sea	2,06	3,57	4,37	2,2	3,8	4,6	2,2	3,8	4,6	2,35	3,95	4,75	1	2	2,8	3,99	3,99	3,99	3	3	3	3,2	3,2	3,2	4	4	4	3,7	3,7	3,7
Dorad CCNGS	Electric Energy Produ	Medium	Mediterranean Sea (6	1	1,34	1	1	1	1	1	1,5	1	1	1,75	1	1	1	1	3,69	3,69	3,69	2	2	2	3,2	3,2	3,2	4	4	4	4,2	4,2	4,2
Eskişehir OEDAŞ	Other	High	Black Sea (688)	1,78	2,78	3,58	1,35	2,15	2,95	3,25	4,05	4,85	1	2,55	3,35	1	1,9	2,7	2,71	2,73	2,73	2	2	2	2,5	2,7	2,7	2,55	2,55	2,55	3,4	3,4	3,4
Gökçedağ WPP	Electric Energy Produ	High	Mediterranean Sea (6	1,78	2,74	3,54	1,35	2,15	2,95	3,25	4,05	4,85	1	2,4	3,2	1	1,9	2,7	2,88	2,9	2,9	2	2	2	3,5	3,7	3,7	2,55	2,55	2,55	3,4	3,4	3,4
Jhimpir WPP	Electric Energy Produ	High	Indus	2,33	3,93	4,73	1,9	3,5	4,3	2,7	4,3	5,1	2,2	3,8	4,6	2,65	4,25	5,05	3,5	3,46	3,46	2	2	2	3,5	3,3	3,3	3	3	3	3,4	3,4	3,4
Kuzgun HPP	Electric Energy Produ	Medium	Euphrates & Tigris in	1,78	2,78	3,58	1,35	2,15	2,95	3,25	4,05	4,85	1	2,55	3,35	1	1,9	2,7	2,59	2,59	2,59	2	2	2	2,7	2,7	2,7	2,55	2,55	2,55	2,9	2,9	2,9
Kütahya OEDAŞ	Other	High	Aegean Sea (667)	1,78	2,78	3,58	1,35	2,15	2,95	3,25	4,05	4,85	1	2,55	3,35	1	1,9	2,7	2,94	2,94	2,94	2	2	2	3,5	3,5	3,5	2,55	2,55	2,55	3,8	3,8	3,8
Kızıldere 1-2-3 GPP	Electric Energy Produ	High	Aegean Sea (667)	1,78	2,78	3,58	1,35	2,15	2,95	3,25	4,05	4,85	1	2,55	3,35	1	1,9	2,7	3,19	3,19	3,19	2	2	2	4	4	4	2,55	2,55	2,55	4,2	4,2	4,2
Lüleburgaz CoNGS	Electric Energy Produ	Low	Maritsa River	1,44	2,78	3,58	1	2,15	2,95	2,45	4,05	4,85	1	2,55	3,35	1	1,9	2,7	2,68	2,68	2,68	2	2	2	3,5	3,5	3,5	2,55	2,55	2,55	2,9	2,9	2,9
Mercan HPP	Electric Energy Produ	Medium	Euphrates & Tigris in	1,78	2,74	3,54	1,35	2,15	2,95	3,25	4,05	4,85	1	2,4	3,2	1	1,9	2,7	2,85	2,85	2,85	2	2	2	3,7	3,7	3,7	2,55	2,55	2,55	3,3	3,3	3,3
Ramat Negev CoNGS	Electric Energy Produ	Medium	Mediterranean Sea (6	1	1,34	1	1	1	1	1	1,5	1	1	1,75	1	1	1	1	3,25	3,25	3,25	2	2	2	1,2	1,2	1,2	4	4	4	3,5	3,5	3,5
Tercan HPP	Electric Energy Produ	Medium	Euphrates & Tigris in	1,78	2,74	3,54	1,35	2,15	2,95	3,25	4,05	4,85	1	2,4	3,2	1	1,9	2,7	2,85	2,85	2,85	2	2	2	3,7	3,7	3,7	2,55	2,55	2,55	3,3	3,3	3,3
Uşak OEDAŞ	Other	High	Aegean Sea (667)	1,78	2,78	3,58	1,35	2,15	2,95	3,25	4,05	4,85	1	2,55	3,35	1	1,9	2,7	2,85	2,88	2,88	2	2	2	3,8	4	4	2,55	2,55	2,55	3,4	3,4	3,4
Çıldır HPP	Electric Energy Produ	Medium	Kura & Aras	1,78	2,74	3,54	1,35	2,15	2,95	3,25	4,05	4,85	1	2,4	3,2	1	1,9	2,7	2,67	2,69	2,69	2	2	2	3,5	3,7	3,7	2,55	2,55	2,55	2,9	2,9	2,9
İkizdere HPP	Electric Energy Produ	Medium	Black Sea (688)	1,78	2,78	3,58	1,35	2,15	2,95	3,25	4,05	4,85	1	2,55	3,35	1	1,9	2,7	2,83	2,83	2,83	2	2	2	3	3	3	2,55	2,55	2,55	3,4	3,4	3,4

Assessment Results

For Scenarios 2030

As a result of the forecast study conducted for the year 2030, under optimistic, pessimistic, and current trend scenarios, water quality and water scarcity risks diverge negatively from other risk categories and are observed as the most critical risks. It has been determined that the risk of water quality should be considered the most significant water risk for all water basins across Turkey, and Zorlu Enerji will plan corrective actions aimed at improving water quality.

For Scenarios 2050

According to the forecast study conducted for the year 2050, under optimistic, pessimistic, and current trend scenarios, risks related to water quality, water scarcity, and ecosystems diverge negatively from other risk categories and are identified as the most critical risks. Additionally, in the pessimistic scenario, governance-related risks will gain importance. It has been determined that water quality risk should continue to be regarded as the most significant water risk for all water basins across Turkey, and Zorlu Enerji will maintain its efforts to plan corrective actions aimed at mitigating high-risk aspects.

4.3.6. Comprehensive Site-Based Biodiversity Risk Assessment Results for Zorlu Enerji through The Biodiversity and Ecosystem Management System (BEMS)

The Biodiversity and Ecosystem Management System (BEMS) project for Zorlu Enerji involved comprehensive assessments to evaluate the impacts of at various operational sites of Zorlu Enerji listed in Table 2 in the Scoping the Assessment section of the report, for biodiversity and ecosystems. The project included extensive field surveys, data collection, habitat classification, and species identification, focusing on key areas: flora, invasive species, fauna, ornithology and hydrobiology. These activities were conducted in accordance with national regulations and IFC Performance Standards (PS-6) to ensure sustainable and responsible environmental practices. The following sections will present the results of these assessments, detailing the findings related to each focus area.

İkizdere Regulator and Hydroelectric Power Plant (HPP)

The İkizdere Regulator and Hydroelectric Power Plant (HPP) project, managed by Zorlu Doğal Elektrik Üretimi A.Ş., is in the Eastern Black Sea Basin within Rize Province, İkizdere District. The construction of the İkizdere Regulator and HPP began in 1955, and it started production in 1961. The plant produces an average of 120 million kWh annually and is currently operated under a license from the Energy Market Regulatory Authority (EPDK).

Habitat Classification: The project area contains 12 distinct habitat types, of which 5 are natural and 7 are modified. The vegetation types developing in the natural areas are classified according to the EUNIS Habitat Classification System, with detailed Level 1, Level 2, and Level 3 codes provided for each vegetation type (Figures 37-38-39). This classification helps in understanding the ecological diversity and guiding appropriate conservation and management measures for each habitat type within the project area.

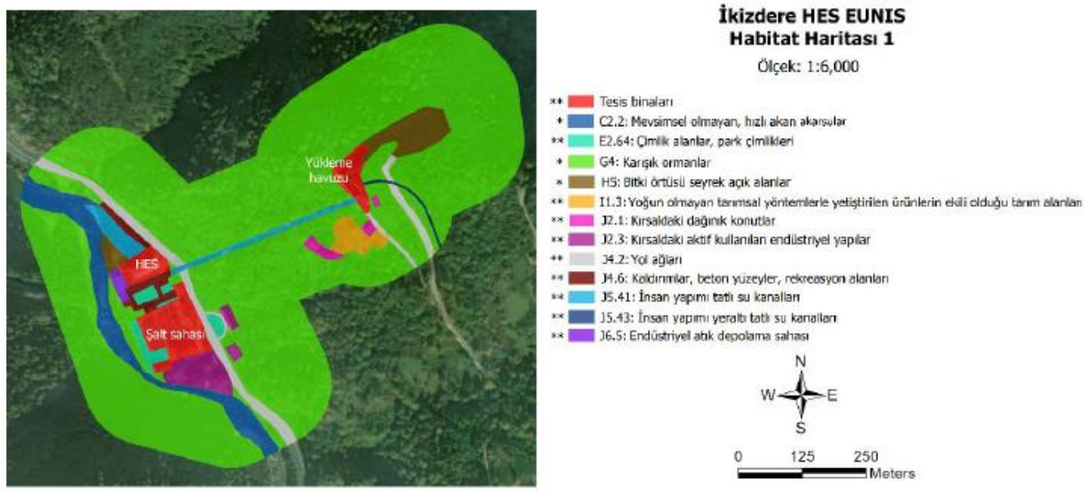


Figure 37. İkizdere HPP EUNIS Habitat Map Level 1

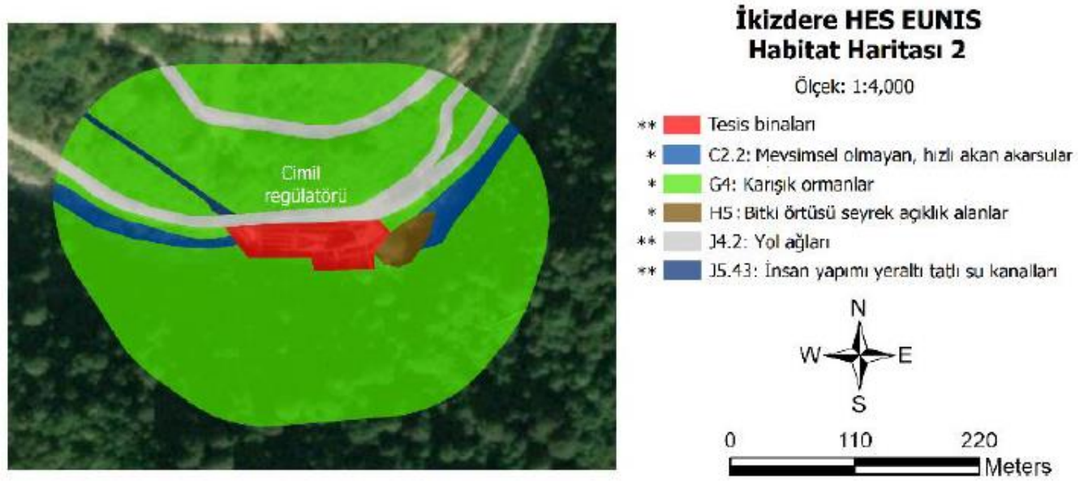


Figure 38. İkizdere HPP EUNIS Habitat Map Level 2

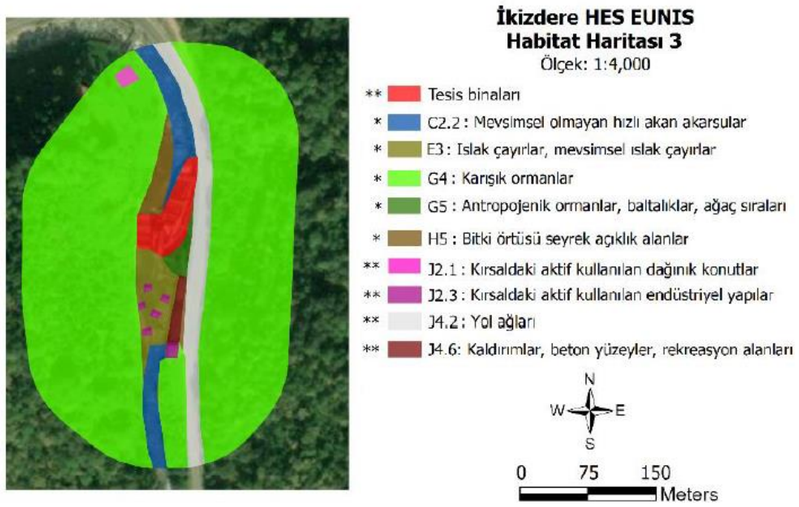


Figure 39. İkizdere HPP EUNIS Habitat Map Level 3

- **Flora**: The vegetation in the project area predominantly consists of riparian zones along the river, mixed forests, and anthropogenic landscapes such as grasslands created by human activities. While not critically endangered (CR) or endangered (EN) plant taxa were identified within the project site according to IFC PS-6 criteria, the area does host vulnerable (VU) endemic plant species such as Verbascum eriorrhabdon (Anzer mullein). This species, an endemic plant

with a limited distribution, signifies the need for critical habitat designation and adherence to the actions outlined in the Biodiversity Action Plan (BAP). The project site integrates well with the surrounding modified and natural areas, posing no significant risk to the existing floristic structure, provided that planned activities consider the identified target species' habitats.

- **Invasive Species**: The assessment identified several invasive alien species (IAS) within the project area that pose significant ecological and socio-economic threats. These species include Acer negundo (Box Elder) from North America, Ailanthus altissima (Tree of Heaven) from China, Cuscuta campestris (Field Dodder) from North America, Sicyos angulatus (Bur Cucumber) from North America, Solanum americanum (American Black Nightshade) from North America, Phytolacca americana (American Pokeweed) from North America, Paspalum distichum (Knotgrass) from South America, and Robinia pseudoacacia (Black Locust) from North America. These species have spread predominantly due to human activities and are found in various habitats, including grasslands, moist areas, water edges, stream beds, canals, roadsides, and mining areas. Effective management of these IAS involves early identification and removal before they produce seeds to protect the natural areas within the project site and prevent further ecological disruption. These control measures are critical for maintaining ecological balance and ensuring the integrity of the native biodiversity.
- **Fauna:** Based on IFC PS-6 and Guidance Note 6 criteria, the fauna assessment for the Ikizdere Regulator and Hydroelectric Power Plant (HPP) identified no critical species or habitats for amphibians, reptiles, or mammals. However, several sensitive species that could be affected by the project were highlighted. The European Otter (Lutra lutra), classified as Near Threatened (NT) by the IUCN, is likely present in the area, and the maintenance of adequate

Photo 4. Erupean Otter (Lutra lutra)

Photo 5. Caucasian Salamander (Mertensiella caucasica),

Photo 6. Baran's Viper (Vipera barani)

environmental flow in the river mitigates direct threats to this species. Similarly, the Caucasian Salamander (Mertensiella caucasica), found within the project's streams, relies on sufficient water flow for survival. Baran's Viper (Vipera barani), although not at risk during the operational phase, necessitates caution to avoid harm during human encounters, with strict speed limits to prevent accidental killings. These findings underscore the importance of maintaining river flow and implementing protective measures for the identified sensitive species to ensure their conservation.

- **Ornithology:** Based on IFC PS-6 and Guidance Note 6 criteria, the Steppe Eagle (*Aquila nipalensis*) has been identified as a critical species in the project area, necessitating adherence to actions outlined in the Biodiversity Action Plan. Additionally, soaring bird species have been observed around the facility, posing a risk of collision or electrocution with transmission lines. The plant's location in the valley base reduces this risk, but due to its proximity to the East Black Sea autumn migration route, weekly carcass surveys of the substation and transmission lines are recommended. Carcasses should be photographed, identified by experts, and documented for future reference. The plant's

Photo 7. Steppe Eagle (Aquila nipalensis)

water flow reduction affects riparian habitats, emphasizing the importance of maintaining adequate environmental flows to support bird species dependent on these habitats. Necessary assessments and mitigations should be implemented accordingly. Overall, the plant does not directly negatively impact bird diversity and populations outside these considerations.

- **Hydrobiology:** The hydrobiology assessment for the İkizdere Regulator and Hydroelectric Power Plant (HPP) highlighted the complexities and dynamics of river ecosystems. The project area is primarily characterized by lotic habitats, essential for various aquatic species. The construction of the HPP has led to significant habitat changes, potentially affecting breeding grounds for lotic species. Despite these modifications, the İkizdere stream does not exhibit unique sensitivity compared to other Eastern Black Sea streams. The study confirmed that environmental flow levels from the facility are adequate, maintaining necessary water volumes for ecological health. However, fish passages, crucial for species migration, were found to be obstructed by debris, necessitating regular maintenance to ensure effective ecological connectivity and compliance with the biodiversity action plan.

Mercan Regulator and Hydroelectric Power Station (HPP)

Mercan Regulator and Hydroelectric Power Plant (HPP), operated by Zorlu Doğal Elektrik Üretimi A.Ş., is located on the Mercan River in Tunceli, within the Upper Euphrates Basin. The facility, completed in 2003, has been operational since then, utilizing water from the Mercan River via a closed channel and penstock system. Initially managed by DSİ and EÜAŞ, it was privatized and transferred to Zorlu Doğal Elektrik Üretimi A.Ş. in 2008 for a 30-year period. The project is exempt from EIA regulations and is surrounded by several villages, with the nearest being Şahverdi at 0.9 km. The Munzur River, an important bird habitat, is 6.9 km away.

All units of the Mercan Regulator and HES facilities are located within Munzur Valley National Park, classified as IUCN Category II by the International Union for Conservation of Nature and Natural Resources. The site is approximately 35.2 km from Esentepe Nature Park and 30 km from Ekşisu Marsh Important Nature Area. The project area is within the Munzur Mountains Important Nature Area.)

Munzur Valley National Park

Munzur Valley National Park is known for its rich biodiversity, including endemic plants and unique animal species. Key features include rare trout species, mountain goats, and scenic attractions like crater lakes, springs, canyons, and waterfalls. Historical sites within and near the park, such as Kale Tepe and ancient mounds, indicate significant archaeological value. The park hosts 1518 plant species, with 43 endemic to Munzur Mountains and 227 to Turkey.

Munzur Valley National Park features significant archaeological sites, including Kale Tepe, designated as a **1st Degree Archaeological Site** by the Ministry of Culture and Tourism. Additionally, nearby historical areas like Tülin Tepe, Tepecik, and Pulur mounds indicate settlements from the Chalcolithic and Neolithic periods.

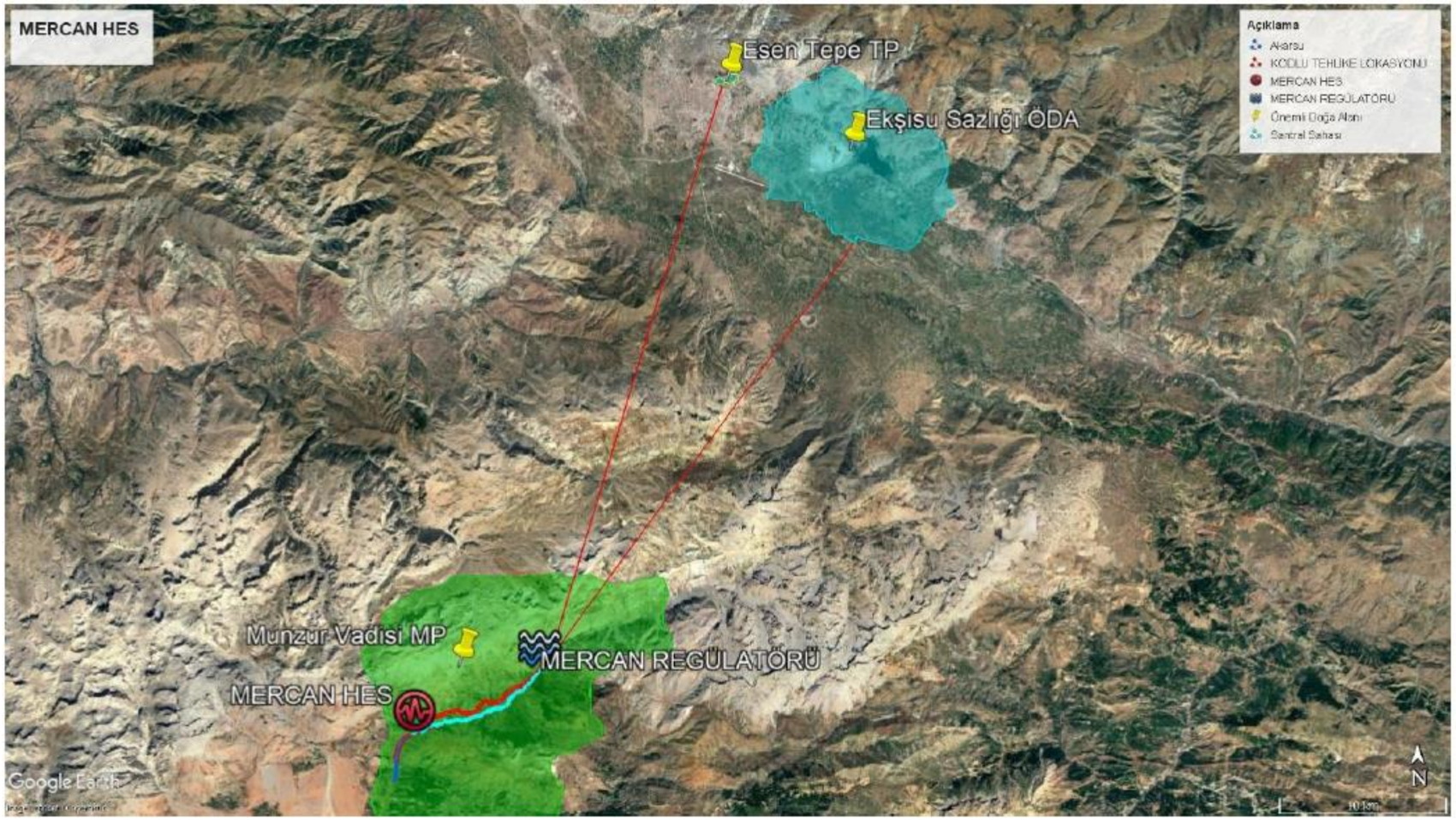


Figure 40. Satellite Imagery Depicting the Relationship Between Mercan HPP Project Sites and Protected Areas

- **Habitat Classification:** The project area contains 12 habitat types, of which 6 are natural and 6 are modified.

- **Flora:** In the Mercan Regulator and Hydroelectric Power Plant (HPP) project area, a comprehensive assessment identified 14 critical species, classified under Endangered (EN) and Vulnerable (VU) categories based on IUCN criteria. These species are essential for biodiversity and include notable plants such as the Munzur crocus (Colchicum munzurense), Tunceli garlic (Allium tuncelianum), and the Sultan karabaş (Stachys tundjeliensis). The critical habitats where these species thrive have been mapped and classified using the EUNIS Habitat Classification system. These habitats are crucial for the conservation of the species and include diverse ecological zones such as H3 (Inland cliffs, rock pavements, and outcrops), H5 (Screes), and G1 (Broad-leaved deciduous forests).

Photo 8. Munzur crocus (Colchicum munzurense)

Photo 9. Tunceli garlic (Allium tuncelianum)

Photo 10. Sultan karabaş (Stachys tundjeliensis)

- **Invasive Species:** In the project impact area, invasive flora species have been identified, such as, Acer negundo (Box elder) from North America, Ailanthus altissima (Tree of heaven) from China, Cuscuta campestris (Field dodder) from North America, and adherence to the Biodiversity Action Plan is necessary. Energy investment areas are typically human-altered landscapes, often rehabilitated with landscaping around construction sites. Some plants used in these areas can become invasive due to their survival and spread characteristics. Additionally, natural disasters or fauna can introduce invasive species. Therefore, it is crucial to remove these plants and their reproductive units from the natural areas within the energy investment sites before they seed.
- **Fauna:** The fauna assessment, in accordance with IFC PS-6 and Guidance Note 6, found no critical species or habitats in the project area but identified sensitive species requiring attention. Detailed risk assessments are necessary for species like the Munzur newt *(Neurergus strauchii munzurensis)*, which depends on aquatic habitats and requires further study to determine its presence and abundance during its active period. The Greek tortoise *(Testudo graeca),* while present, is unlikely to be impacted due to its terrestrial nature, but mitigation measures are recommended to prevent harm during human interactions. The lynx *(Lynx lynx)*, although difficult to spot due to its elusive behavior, inhabits suitable habitats and is not expected to be significantly affected by the project; however, protective actions are still advised. The wild goat *(Capra aegagrus)*, found in the region, does not face major threats from the project, but precautions are necessary to prevent disturbance from facility operations. The rock dormouse *(Dryomys laniger)* is not expected in the project area due to unsuitable habitat conditions.

Photo 11. Munzur newt (Neurergus strauchii munzurensis),

Photo 12. Greek tortoise (Testudo graeca),

Photo 13. The lynx (Lynx lynx)

Photo 14. The wild goat (Capra aegagrus),

- **Ornithology:** The ornithological assessment, based on IFC PS-6 and Guidance Note 6 criteria, identified the Egyptian Vulture *(Neophron percnopterus)* as a critical species in the project area. Mitigation measures outlined in the Biodiversity Action Plan must be strictly followed to protect this species. Additionally, soaring bird species around the facility face risks of collision and electrocution from transmission lines. The facility's location in the valley reduces these risks, but regular monitoring and carcass surveys are recommended, with findings documented for future reference. The regulation and reduction of water flow by the facility also affect riparian habitats and the bird species dependent on these water bodies, necessitating adequate water flow maintenance. Outside these specific concerns, the project does not significantly impact bird diversity and populations.

Photo 15. Egyptian Vulture (Neophron percnopterus)

- **Hydrobiology:** The Mercan HPP regulator dam has altered the habitat of fish species in the Mercan River, creating stagnant water conditions that necessitate adaptation. Aquatic organisms, including algae, zooplankton, and benthic species, form new communities and impact the food web. The lack of fish passages at the dam impedes the migration of catadromous and anadromous fish, essential for maintaining genetic diversity. Fish passages are crucial for supporting migratory species and maintaining ecological balance. Compliance with ecological flow rates has been ensured. Fishing is prohibited in the national park area, yet illegal fishing remains an issue, addressed in the Biodiversity Action Plan.

Tercan Dam and Hydroelectric Power Station (HPP)

The Tercan Dam and Hydroelectric Power Plant (HPP), operated by Zorlu Doğal Elektrik Üretimi A.Ş., is in Erzincan province on the Tuzla River, a tributary of the Euphrates. The facility generates 51 GWh annually, utilizing water from a 178 hm^3 capacity reservoir. The region features diverse topography, including the Munzur, Refahiye, and Kop Mountains, and is characterized by significant elevation differences and vital water resources essential for various uses. The project area, close to several villages and important water bodies, requires careful biodiversity management to preserve its ecological balance.

- **Habitat Classification:** The project area encompasses 11 different habitat types: 6 natural, 1 semi-natural, and 4 modified.

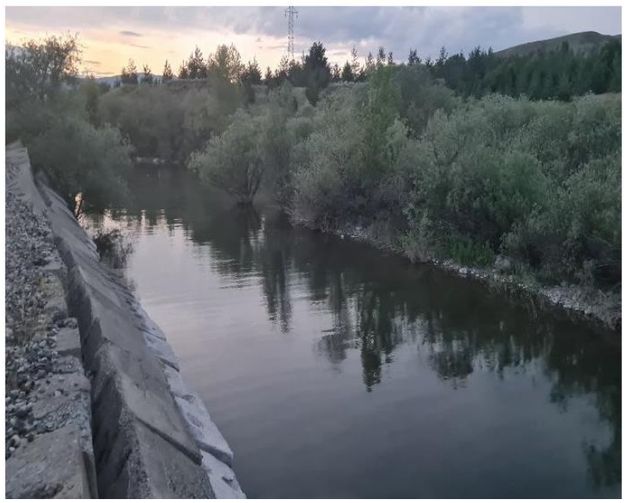


Photo 16. Semi-Natural Habitat Around the Discharge Area of Tercan HPP

- **Invasive Species:** Invasive flora species have been identified in the project's impact area, and adherence to the Biodiversity Action Plan is essential. Management practices include removing invasive plants before they seed and ensuring proper timing and techniques for their removal.
- **Flora:** The flora assessment within the project's Analysis Area (AoA) identified several critical flora species categorized as CR, EN, and VU, potentially triggering Criterion 1b. Comprehensive baseline data revealed seven target plant species in and around the project area, all classified as EN and endemic with restricted distribution. Identified critical species include Bellevalia crassa (Başak sümbül), Hesperis breviscapa (Yaylaakşamyıldızı), Sonchus erzincanicus (Kuzukürkü), Thymus convolutus (Eğin kekiği), Trigonosciadium intermedium (Özşemsiyeotu), and Verbascum leiocarpum (Gürbüz sığırkuyruğu), each associated with specific critical habitats.

Photo 17.), Hesperis breviscapa (Yaylaakşamyıldızı),

Photo 18. Sonchus erzincanicus (Kuzukürkü),

Photo 19. Verbascum leiocarpum (Gürbüz sığırkuyruğu)

- **Fauna:** The fauna assessment for Tercan Dam and HPP, conducted according to IFC PS-6 and Guidance Note 6 criteria, found no critical species or habitats for amphibians, reptiles, or mammals within the project area. However, certain sensitive species were identified and subjected to risk assessments. The Greek tortoise (Testudo graeca) was observed, with minimal expected impact from the project, though awareness measures are recommended. The lynx (Lynx lynx) inhabits suitable areas and is unlikely to be affected, but protective measures are advised. The otter (Lutra lutra) was confirmed in the area, necessitating minimized human activity and prohibition of fishing in key habitats. Additionally, the invasive red-eared slider turtle (Trachemys scripta) requires monitoring to mitigate its competitive impact on native species.

Photo 20. The Eurasion otter (Lutra lutra)

Photo 21. The lynx (lynx lynx)

Photo 22. The red-eared slider turtle (Trachemys scripta)

- **Ornithology:** The ornithological assessment for Tercan Dam and HPP, following IFC PS-6 and Guidance Note 6 criteria, identified the Egyptian Vulture (Neophron percnopterus) as a critical bird species in the area. Additionally, soaring bird species around the facility face risks of collision and electrocution from power lines. While the facility's valley floor location reduces these risks, regular carcass surveys and documentation are recommended to monitor and mitigate impacts. The reduced water flow from the facility impacts riparian habitats, emphasizing the need to ensure sufficient environmental flow to support bird species dependent on these habitats. Overall, no direct adverse effects on bird diversity and populations are expected outside of these specific concerns.

Photo 23. the Egyptian Vulture (Neophron percnopterus)

Hydrobiology: The hydrobiology assessment for Tercan Dam and HPP reveals that the project area hosts widely distributed fish species, but the dam's construction disrupts river habitats, affecting breeding grounds for lotic species and forcing them into competition with benthic species. The lack of a fish passage hinders migratory routes, reducing genetic diversity. Compliance with environmental flow requirements has been observed. Upstream pollution poses significant threats to fish populations, although no invasive species have been found. Ongoing social responsibility projects and biodiversity action plans are critical for maintaining ecological balance.

Beyköy Regulator and Hydroelectric Power Station (HPP)

Beyköy Regulator and HPP, located in Sarıcakaya, Eskişehir, on the Sakarya River, is operated by Zorlu Enerji with an installed capacity of 16.80 MWe. It generates around 48,441,458 kWh annually, sufficient for 13,337 people or 16,217 homes. The plant is near several villages and significant water bodies, including Yenice Dam, Gökçekaya Dam, Çamalan Pond, and Hamamboğazı Creek. The Sundiken Mountains Important Natural Area is 1.4 km away, and the Eskişehir Mihallıçık Çatacık Wildlife Development Area is 31 km away, making any impact on this distant area unlikely.

- **Habitat Classification:** Zorlu Doğal Elektrik Üretimi A.Ş. operates the Beyköy Regulator and HPP on the Sakarya River in Sarıcakaya, Eskişehir. Habitat classification was done using the latest EUNIS Habitat Classification system. The project area includes 10 habitat types: 6 natural and 4 modified, categorized by EUNIS 1st, 2nd, and 3rd level codes.
- **Flora:** The project site of Beyköy Regulator and HPP was assessed for flora in accordance with IFC PS-6 and Guidance Note 6 criteria. No plant taxa classified as CR, EN, or narrowly distributed VU under the IUCN were found, nor were any endemic plant species identified. The area includes coppice tree communities affected by human activity, and fast-flowing streams with reeds, rushes, and willows. The site does not exhibit unique evolutionary processes, nor does it have a special geological or historical significance that would support numerous critical and/or endemic species. Consequently, no critical habitats are present, and no critical habitat assessment was deemed necessary.
- **Invasive Species:** In the project's impact area, invasive flora species have been identified. Energy investment areas shaped by human activities can harbor invasive plants used in landscaping. These species can also spread through floods or fauna. It is essential to remove these plants and their reproductive units to protect natural areas within energy sites. Control efforts must occur before plants seed; if recognized by their above-ground parts before flowering, removal should happen in spring, otherwise, right after flowering.
- **Fauna:** No critical species or habitats for amphibians, reptiles, or mammals were found in the project area. However, sensitive species are present and have been assessed. The Greek tortoise (Testudo graeca) is unlikely to be affected by the project, but measures to prevent harm during human-tortoise encounters and full fencing of the water conveyance channel are recommended. The lynx (Lynx lynx) inhabits the area and may temporarily avoid humans but is expected to continue using the area. Awareness and precautionary measures are advised. The otter (Lutra lutra) is likely present and not directly threatened, provided riverbeds maintain adequate water levels. Awareness and precautionary measures for human-otter interactions are also recommended. These are detailed in the Biodiversity Action Plan.
- **Ornithology:** In accordance with IFC PS-6 and Guidance Note 6 criteria, the Egyptian vulture (Neophron percnopterus) is the critical bird species identified near Beyköy Regulator and HES. Field studies also detected several soaring birds like white storks, black storks, and sensitive raptors such as the eastern imperial eagle and red-footed falcon, which face risks from transmission lines. Weekly carcass surveys and documentation are recommended to mitigate these risks. Besides these measures, the facility does not significantly impact bird diversity or populations.
- **Hydrobiology:** In the project area, no invasive algae, zooplankton, benthic organisms, or fish species have been detected. Water intake for the plant is managed through the downstream gates of another company's Yenice plant, eliminating the need for fish passage. Additionally, due to the process, no environmental flow calculations are necessary for the facility.

Çıldır Dam and Hydroelectric Power Station (HPP)

Çıldır Dam and Hydroelectric Power Plant (HPP) is in Çıldır Lake, Kars Province, operational since 1975. The plant has an installed capacity of 15.36 MW, producing 48 million kWh annually. It sources water from Çıldır Lake via a tunnel and penstock. Nearby are several villages and important wetlands, including Yavaş Lake and Ot Lake. The intake structure is within the Çıldır Lake wetland, with protected areas like Kuyucuk Lake and Aygır Lake nearby. The Kars Plain, Allahuekber Mountains, and Ardahan Forests are also significant natural areas in the vicinity.

- **Habitat Classification:** The project area encompasses 9 different habitat types, 6 of which are natural and 3 modified, classified according to the EUNIS Habitat Classification's first, second, and third-level codes.

Photo 24. Natural Aquatic Habitat Structure Surrounding the Project Area

- **Flora:** The biodiversity risk assessment for flora at the Çıldır Dam and HPP site, conducted according to IFC PS-6 and Guidance Note 6 criteria, revealed no presence of target plant taxa with CR, EN, or narrow-range VU status per IUCN standards. Additionally, no endemic plant species with a narrow range were found within the area. The site does not exhibit a unique evolutionary process, and thus, critical habitats for these taxa do not exist. Consequently, a critical habitat assessment was deemed unnecessary.
- **Invasive Species:** Invasive flora species such as Acer negundo and Ailanthus altissima, have been identified within the project impact area. Energy projects often involve landscaping to rehabilitate construction areas, potentially introducing invasive species. Control measures should be taken before these plants produce seeds to protect native environments.

Photo 25. Acer negundo

Photo 26. Ailanthus altissima

- **Fauna:** Based on IFC PS-6 and Guidance Note 6 criteria, no critical species or habitats for amphibians, reptiles, or mammals are present in the project area. However, risk assessments have been conducted for certain sensitive species. The Spur-Thighed Tortoise, Lynx, and Otter are present but unlikely to be significantly impacted by the project, though awareness and precautionary measures are advised. Darevsky's Viper is potentially present, with no expected impact.
- **Ornithology:** In accordance with IFC PS-6 and Guidance Note 6 criteria, the Steppe Eagle (Aquila nipalensis) has been identified as a critical species in the project area. Actions outlined in the Biodiversity Action Plan must be followed for this species. Additionally, soaring bird species have been detected around the facility, posing risks of collision with transmission lines or electrocution. It is recommended to conduct weekly carcass surveys, document findings, and maintain an archive. Despite these risks, significant impact on migratory birds is not anticipated due to limited migration activity in the area. The facility's reduction of water flow can directly affect riparian habitats and associated bird species, always necessitating adequate water flow. Beyond these considerations, the facility does not significantly impact bird diversity or populations.

Photo 27. The Steppe Eagle (Aquila nipalensis)

- **Hydrobiology:** No invasive species have been detected in the project area. Aquatic species adapt to river conditions, forming biocenoses. Sufficient water flows from the environmental flow river, but minimal discharge hinders aquatic life. Fill material from railway construction obstructs the stream, impacting aquatic organisms, and needs removal. The facility lacks fish passages, which impedes fish migrations and reduces populations of migratory species. Maintaining genetic diversity and population dynamics requires effective fish passages, crucial for the Çıldır Dam and HES project. Ensuring river continuity is vital for species survival and genetic diversity.

Kuzgun Dam and Hydroelectric Power Station (HPP)

Kuzgun Dam and Hydroelectric Power Plant (HPP) are located on the Berçeme River within Erzurum Province, Turkey. The facility sources its water from the Kuzgun Dam reservoir and uses a tunnel system to transport water to the turbines. Erzurum Province, situated at the convergence of the Çoruh, Fırat, and Aras River basins, features a diverse landscape including the Kargapazarı, Dumlu, and Soğanlı mountains. The project area is surrounded by multiple villages and important wetlands, including Aygır Lake and Kazan Lake. There are no protected areas directly affected by the project, with the nearest being Tortum Basin Important Bird Area, approximately 9.8 km away.

- **Habitat Classification:** The project area comprises 12 habitat types: 8 natural and 4 modified, classified according to EUNIS's 1st, 2nd, and 3rd-level codes.
- **Flora:** During the assessment of the Kuzgun Dam and HPP site, no plant taxa classified as CR, EN, or narrow-range VU according to IFC PS-6 and Guidance Note 6 criteria and the IUCN were found. Additionally, no endemic plant species with a narrow distribution were identified. The area does not have a special geological structure or historical significance that would harbor a significant number of critical species. Therefore, a critical habitat assessment was deemed unnecessary. During the site visit, it was observed that there is surface movement of materials at points where the dam body contacts the inclined slopes and reservoir banks. Implementing terracing and afforestation to prevent this material movement will help stabilize vegetation and prevent the reservoir from filling up.

- **Invasive Species:** Invasive flora species have been identified in the project's impact area, such as Robinia pseudoacacia. Energy project sites, influenced by human activities, may become habitats for invasive species. Therefore, removing invasive plant individuals and their reproductive units from natural areas within the project site is crucial. Control efforts must be timed before seed formation, either in spring or immediately after flowering.

Photo 28. Invasive Species in the Project Area: Black Locust (Robinia pseudoacacia)

- **Fauna:** The assessment found no critical species or habitats for amphibians, reptiles, or mammals in the area according to IFC PS-6 and Guidance Note 6 criteria. However, sensitive species like the Greek tortoise (Testudo graeca), lynx (Lynx lynx), and otter (Lutra lutra) may be impacted by the project. The tortoise and lynx are unlikely to be negatively affected, but awareness and preventive measures are recommended to avoid harm during human encounters.

Photo 29. the Greek tortoise (Testudo graeca),

Photo 10. The otter (Lutra lutra)

Photo 31. The lynx (lynx lynx)

The otter's presence is confirmed, with sufficient post-production water flow, posing no direct threat

- **Ornithology:** The assessment, adhering to IFC PS-6 and Guidance Note 6 criteria, identified the Egyptian vulture (Neophron percnopterus) as a critical bird species in the area, necessitating actions outlined in the Biodiversity Action Plan. Additionally, soaring bird species around the facility face collision or electrocution risks from transmission lines. Regular carcass surveys at the substation and transmission lines are recommended, with findings documented for future reference. Ensuring adequate water flow is vital for riparian habitats and bird species dependent on the stream, necessitating continuous monitoring and potential intervention. Overall, the facility poses no direct adverse impact on bird diversity and populations.

- **Hydrobiology:** The Kuzgun Dam and HPP area is impacted by pollution from nearby residential and industrial sources, threatening local fish populations. These species thrive in dynamic river ecosystems, but the creation of dam reservoirs disrupts their habitats and breeding grounds. Aquatic species adapt to specific river conditions, forming bio-coenoses that significantly alter the food pyramid. Productive still water environments provide crucial feeding grounds. No invasive species have been found in the Kuzgun Dam and HPP area, but structures like dams obstruct migratory fish species, causing population declines. Constructing fish passages is critical for maintaining genetic diversity and population health. These structures also impede the dispersal of freshwater mollusks and aquatic insects. Compliance with environmental flow requirements ensures adequate water flow to sustain aquatic life.

Ataköy Dam and Hydroelectric Power Station (HPP)

Ataköy Dam and HPP is in the Black Sea Region of Turkey, in Tokat province, on the Yeşilırmak River. It is 2.6 km northwest of Almus Dam. The Tokat province is centrally located in the Black Sea Region, bordered by Samsun, Sivas, Yozgat, and Amasya. The site is accessible via roads along the Yeşilırmak River. Nearby settlements include Kadıvakfı, Derekışla, Çökelikkışla, and Üçgöl villages, with major centers like Niksar, Tokat, and Erbaa located within 33 km. There are no other significant wetlands besides the Yeşilırmak River and Almus Dam. The nearest protected areas include Kelkit Valley (6 km), Zivan Nature Park (32 km), Ballıca Cave Nature Park (48 km), and Kaz Lake (58 km).

Photo 32. Semi-Natural Habitat Structure Near the Outlet Water Area of Ataköy HPP

- **Habitat Classification:** The project area comprises 11 habitat types, of which 7 are natural and 5 are modified. The natural vegetation types have been categorized using EUNIS 1st, 2nd, and 3rd level codes.
- **Flora:** The area of Ataköy Dam and HPP has been assessed for flora according to IFC PS-6 and Guidance Note 6 criteria, and no plant taxa with CR, EN, or narrowly distributed VU status under IUCN were found. Additionally, no endemic plant species with a narrow distribution were identified in the area. The site does not exhibit a unique evolutionary process, nor does it have a special geological or historical significance that would support numerous critical and/or endemic species. Consequently, there are no critical habitats present that contain these taxa.
- **Fauna:** The dam impacts various species, especially aquatic life like the brown trout (Salmo trutta) and the Anatolian khramulya (Capoeta tinca). Measures to maintain environmental flow and habitat quality are essential.
- **Invasive Species:** In the project area, invasive flora species were identified, such as Cuscuta campestris and Robinia pseudoacacia. Energy project sites are shaped by human activities, with landscaping efforts sometimes introducing invasive plants. These species, as well as those transported by floods or animals, must be controlled to protect natural areas. Combatting invasive plants should occur before they seed, ideally in spring or immediately after flowering.

Photo 33. Cuscuta campestris

Photo 34. Robinia pseudoacacia

- **Fauna:** Based on IFC PS-6 and Guidance Note 6 criteria, there are no critical species or habitats for amphibians, reptiles, or mammals in the project area. However, sensitive species that could be affected by project activities were identified. The Greek Tortoise (Testudo graeca) is present but sparse, with no significant impact expected from the project. Awareness and preventive measures are advised to protect the species from human interaction. The Eurasian Lynx (Lynx lynx) inhabits the area, preferring to avoid humans, with minimal impact expected from the project. Awareness and preventive measures are also recommended for this species. The Eurasian Otter (Lutra lutra) is likely present, with no direct threats anticipated if sufficient water flow is maintained. The Anatolian Crested Newt *(Triturus anatolicus)* is known to inhabit the area, with measures suggested to prevent harm during human encounters.

Photo 35. The Anatolian Crested Newt (Triturus anatolicus)

- **Ornithology:** No critical bird species or habitats were identified in the project area according to IFC PS-6 and Guidance Note 6 criteria. However, soaring birds are present and at risk of collision and electrocution with power lines. Weekly carcass surveys and maintaining adequate environmental water flow are recommended to mitigate impacts. Other than these measures, the facility does not significantly affect bird diversity and populations.
- **Hydrobiology:** The Ataköy HES impacts fish migration and aquatic ecosystems by obstructing movement and altering habitats. Fish passages are essential to mitigate these effects and preserve genetic diversity. Local pollution also threatens fish populations. River ecosystem changes can significantly harm species dependent on flowing water. Ensuring adequate environmental flow and maintaining suitable habitats are critical for sustaining aquatic life and ecosystem balance.

Kızıldere Geothermal Power Plant (I) (GPP)

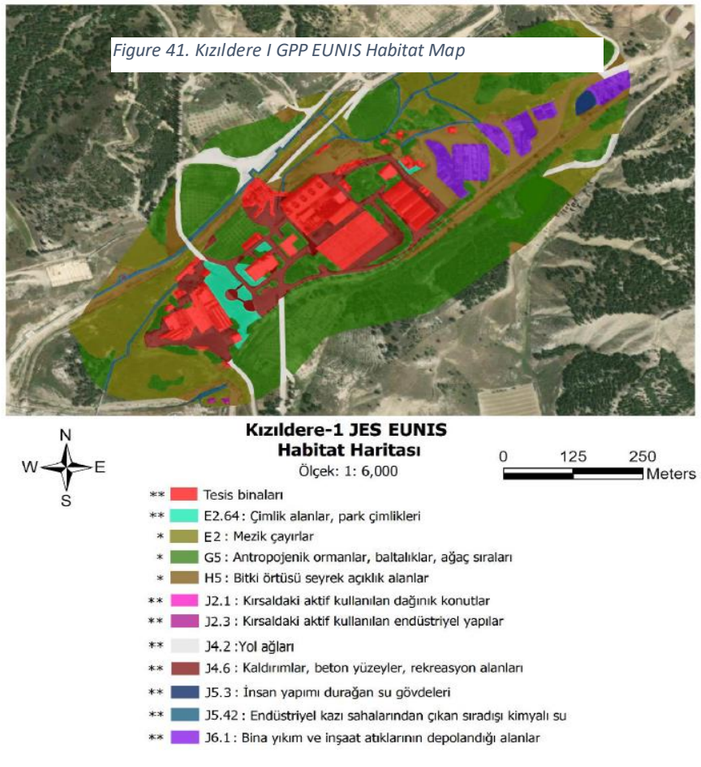
Kızıldere I-II-III geothermal plants in Denizli and Aydın are similar, but Kızıldere I requires separate evaluation due to distinct impacts and rehabilitation needs. Kızıldere I, managed by Zorlu Doğal Elektrik Üretimi A.Ş., has a 15 MWe capacity. It is 7 km from Sarayköy and near Buldan, Yayla, Denizli, Pamukkale, and Nazilli. Important wetlands include Afşar Dam, Derbent Dam, Adıgüzel Dam, Kemer Dam, Salda Lake, and Acıgöl Lake. The site is close to Honazdağı National Park, the ancient city of Collasea, Akdağ, and Bozdağlar Important Nature Areas.

- **Habitat Classification:** The project area includes 11 habitat types: 4 natural and 7 modified. These habitats are detailed with 1st, 2nd, and 3rd level vegetation types according to the EUNIS classification.

- **Flora:** Biodiversity risk assessment for the Kızıldere-I Geothermal Power Plant identified two target flora species in the project area: Heliotropium thermophilum (CR status, described in 2008) and Muscari mirum (EN status), both endemic and critically assessed per IFC standards. The area, rich in floristic diversity and endemic plants, hosts these critical species within specified habitats (E2, H5). Surface runoff impacts hill areas along the project's borders, necessitating terracing for stable vegetation cover, crucial in preventing soil erosion during heavy rains. Rehabilitation of dry seasonal stream beds is also essential to manage sediment and debris flow. Regular monitoring is vital to control the spread of invasive species, which are a risk due to intensive surface runoff.

Photo 36. Heliotropium thermophilum

Figure 41. Kızıldere I GPP EUNIS Habitat Map



- **Invasive Species:** The project area has identified invasive flora species, necessitating adherence to the Biodiversity Action Plan. Construction activities and landscaping in energy investment areas can introduce and spread invasive plants, requiring regular monitoring and removal efforts before they seed to protect natural habitats.
- **Fauna:** ccording to IFC PS-6 and Guidance Note 6, no critical fauna species or habitats are present. However, some sensitive species are present and need risk assessments. Specific measures are recommended for the Greek tortoise (Testudo graeca), Anatolian Rock Lizard (Anatololacerta anatolicus), and Ottoman viper (Montivipera xanthina) to raise awareness and prevent harm to these species.

Photo 37. the Greek tortoise (Testudo graeca)

Photo 38. Anatolian Rock Lizard (Anatololacerta anatolicus),

Photo 39. Ottoman viper (Montivipera xanthina)

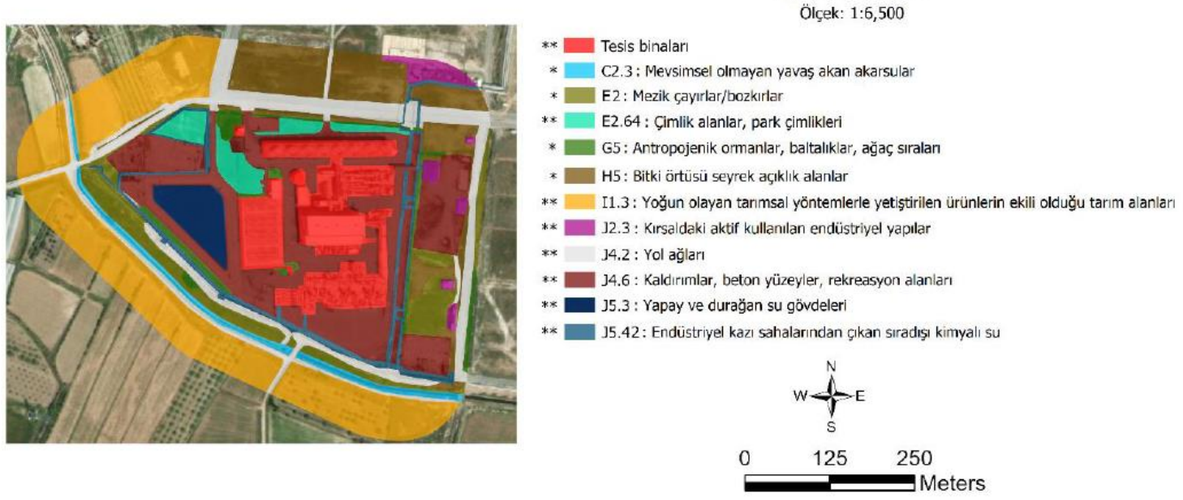
- **Ornithology:** Based on IFC PS-6 and Guidance Note 6 criteria, no critical bird species are present in the Kızıldere I GPP area. However, soaring bird species have been identified around the site, posing collision or electrocution risks with transmission lines. Despite the absence of endangered species, it is recommended to conduct weekly carcass surveys around the substation and transmission lines, photograph and identify any finds, and maintain a record. Overall, the plant has no direct negative impact on bird diversity and populations.
- **Hydrobiology:** In the study conducted at the Kızıldere I GPP facility, no algae, zooplankton, benthic aquatic organisms, or fish were found. However, seasonal flows were observed in the stream beds within the facility, occurring primarily in spring and drying up after rainfall ceases. Therefore, no signs of aquatic life were present. The facility does not have a direct negative impact on the aquatic ecosystem. However, it is recommended to educate the local community on what actions to take if hot water spreads into the surrounding area.

Kızıldere Geothermal Power Plants (II, III) (GPP)

Kızıldere II GPP is located in Sarayköy, Denizli, operated by Zorlu Doğal Elektrik Üretimi A.Ş., with an installed capacity of 80 MWe. Kızıldere III GPP, with a capacity of 165 MWe, is situated in Buharkent, Aydın. Key nearby locations include Buldan and Yayla villages, and significant centers like Denizli, Pamukkale, and Nazilli for Kızıldere II; and Kızıldere and Savcılı neighborhoods for Kızıldere III. Both facilities are near important water bodies. Kızıldere II is approximately 32 km from Honazdağı National Park, 34 km from the ancient city of Collasea, 29 km from Bozdağlar, and 1.5 km from Akdağ-Denizli Important Nature Area. Kızıldere III is about 40 km from Honazdağı National Park, 42 km from Collasea, 35 km from Bozdağlar, and 4,5 km from Akdağ-Denizli Important Nature Area.

- **Habitat Classification:** Kızıldere II GPP features 11 habitat types, 4 natural and 7 modified. Kızıldere III GPP has 10 habitat types, 4 natural and 6 modified. The classification includes vegetation types categorized by the EUNIS system into 1st, 2nd, and 3rd level codes.

Figure 42. Kızıldere II GPP EUNIS Habitat Map



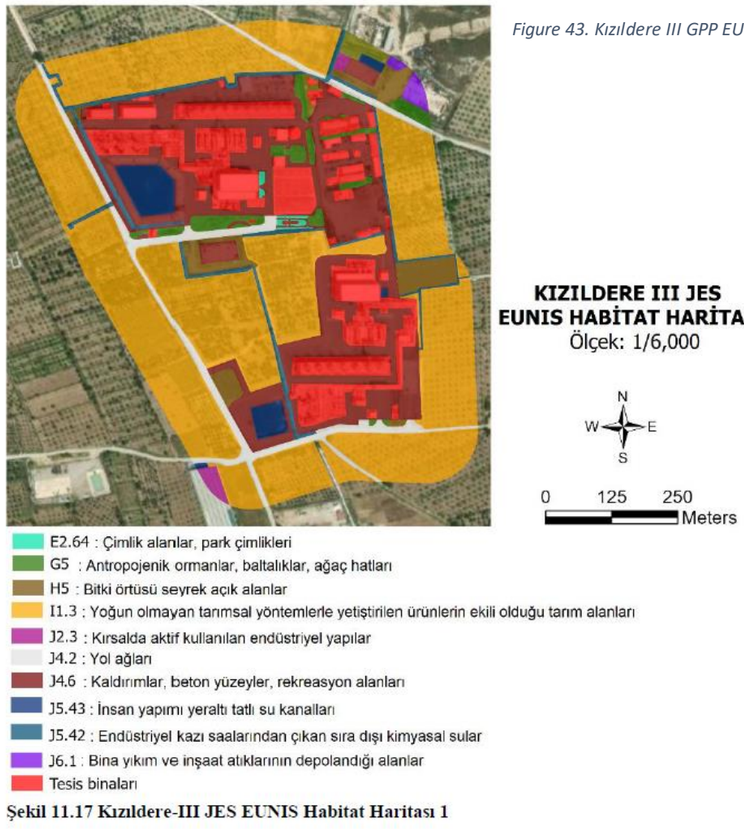


Figure 43. Kızıldere III GPP EUNIS Habitat Map

Şekil 11.17 Kızıldere-III JES EUNIS Habitat Haritası 1

Photo 40. Heliotropium thermophilum

Photo 41. Muscari mirum

- **Flora:** Surveys identified two target plant species in the project area: *Heliotropium thermophilum* (CR status) and *Muscari mirum* (EN status). Both species are narrow-range endemics. The area is rich in floristic diversity, containing rare and endemic plant taxa.

- **Invasive Species:** Invasive flora species have been identified. Energy investment areas, shaped by human activity, often involve rehabilitation efforts through landscaping around roads and buildings, which can facilitate the spread of invasive plants. Floods and faunistic sources can also transport these species. Therefore, to protect the natural areas within the energy investment zone, it is essential to remove these plants and their reproductive units. Control measures should be undertaken before the invasive plants seed, either by identifying them in spring if recognizable by their vegetative parts or immediately after they flowe**r.**

- **Fauna:** Based on IFC PS-6 and Guidance Note 6 criteria, no critical species or habitats were identified for amphibians, reptiles, or mammals in the project area. However, due to potential impacts from project activities, certain sensitive species were subjected to risk assessments. The Greek Tortoise (Testudo graeca), found infrequently in the area, requires measures to increase awareness and prevent harm during human-tortoise encounters. The Anatolian Lizard (Anatololacerta anatolicus), an endemic species categorized as LC by IUCN, is widespread in the region and avoids human contact, making negative impacts from the project unlikely. Nevertheless, awareness measures are suggested to protect this species. The Ottoman Viper (Montivipera xanthina), though possibly present in the area and not endemic, also categorized as LC by IUCN, is unlikely to be adversely affected by the project. However, awareness measures are recommended to safeguard this species. Overall, the implementation of awareness and protective actions as outlined in the BAP is crucial for mitigating risks to these sensitive species.

Photo 42. The Greek Tortoise (Testudo graeca),

Photo 43. The Anatolian Lizard (Anatololacerta anatolicus),

Photo 44. The Ottoman Viper (Montivipera xanthina),

- **Ornithology:** According to IFC PS-6 and Guidance Note 6 criteria, no critical bird species or habitats have been identified in the project area. However, some soaring bird species have been observed around the facility. These species face risks of collision with transmission lines or electrocution. Although no endangered target species were found, it is recommended to conduct weekly carcass surveys at the switchyard and transmission lines. Any found carcasses should be photographed, identified by an expert, and recorded to build a future reference archive. Beyond this, the facility does not have a direct negative impact on bird diversity and populations.
- **Hydrobiology:** In studies conducted at the Kızıldere II-III Geothermal Power Plants (GPP), no algae, zooplankton, benthic aquatic organisms, or fish were found. The groundwater used in the environment has a temperature of approximately 100°C. There are no species of significant biodiversity value in the geothermal water. Thus, the facility does not have a direct negative impact on the aquatic ecosystem. However, it is recommended to educate the local community on measures to take in case the hot water spreads to the surroundings.

Alaşehir Geothermal Power Plant (GPP)

The Alaşehir Geothermal Power Plant, operated by Zorlu Geothermal Energy Electricity Production Inc., is located in Alaşehir district, Manisa province. It covers 39,975 m^2 and has a capacity of 45 MWe, with 20 geothermal wells producing 300,000,000 kWh annually. The plant is within the Bozdağlar Important Natural Area and is near Marmara Lake wetland and Kula Fairy Chimneys (both 33 km away).

- **Habitat Classification:** There are 12 habitat types in the project area: 4 natural and 8 modified habitats.
- **Flora:** In accordance with IFC PS-6 and Guidance Note 6 criteria, no plant taxa with IUCN CR, EN, or narrow endemic VU status were found within the Alaşehir Geothermal Power Plant area. There are no narrowly endemic plant species present either. The area does not exhibit any special evolutionary processes, unique geological features, or a history supporting a high number of critical and/or endemic species. Therefore, no critical habitats containing such taxa are present, and a critical habitat assessment is unnecessary.
- **Invasive Species:** Invasive flora species have been identified. Energy investment sites are often shaped by human activities, and construction around roads and buildings involves landscaping that may use invasive plant species. Additionally, flood events or faunal sources can introduce invasive species. Therefore, it is essential to remove these plants and their reproductive units from the site.
- **Fauna:** According to IFC PS-6 and Guidance Note 6, no critical species or habitats were identified in the project area. However, certain sensitive species may be affected by project activities. The Greek tortoise (Testudo graeca) has been sighted around the area, but its population density is low. Mitigation measures are recommended to prevent harm during human interactions. The Anatolian Lizard (Anatololacerta anatolicus) is an endemic species with a wide distribution. Although there is a low likelihood of this species being negatively impacted by the project, awareness and protective measures are suggested. These measures aim to increase awareness and mitigate any potential harm to these species.
- **Ornithology:** According to IFC PS-6 and Guidance Note 6, no critical bird species or habitats were identified in the project area. However, soaring bird species have been observed around the facility, and these birds risk colliding with transmission lines or electrocution. It is recommended to conduct weekly carcass surveys at the substation and transmission lines, with any findings photographed, identified by experts, and recorded for future reference. Apart from these risks, the facility does not have a direct negative impact on bird diversity and populations.

- **Hydrobiology:** In the study conducted at the Alaşehir JES facility, no algae, zooplankton, benthic aquatic organisms, or fish were found. The geothermal groundwater does not contain any species of significant biodiversity importance. Therefore, the facility does not have a direct negative impact on the aquatic ecosystem. However, it is recommended to educate the local population on precautions to take in case of hot water spreading into the environment.

Gökçedağ Wind Power Plant (WPP)

Gökçedağ Wind Energy Plant (WEP) is operated by Rotor Elektrik Üretim A.Ş. and located in Osmaniye and Gaziantep provinces, within the Bahçe, Hasanbeyli, and Nurdağı districts. The facility includes 58 turbines with a total installed capacity of 150.6 MW and plans to add a Solar Energy Plant (SEP) with an additional 9.6088 MW capacity. The project area is near several villages and important centers, with significant wetlands like Aslantaş and Tahtaköprü dams within a 30 km radius. A part of the license area overlaps with the Amanos Mountains Important Nature Area (INA), though the SEP area does not.

- **Habitat Classification:** The project area includes 9 different habitat types, 4 of which are natural and 5 modified.
- **Flora:** The biodiversity risk assessment for flora at the Gökçedağ Wind Energy Plant (WEP) site found no critical or endemic plant species according to IUCN criteria. The area does not support unique evolutionary processes or significant geological or historical features that would promote a high number of critical species. However, several plant taxa protected under CITES and the Bern Convention were identified, including Foster's snowdrop

Photo 45. Foster's snowdrop (Galanthus fosteri)

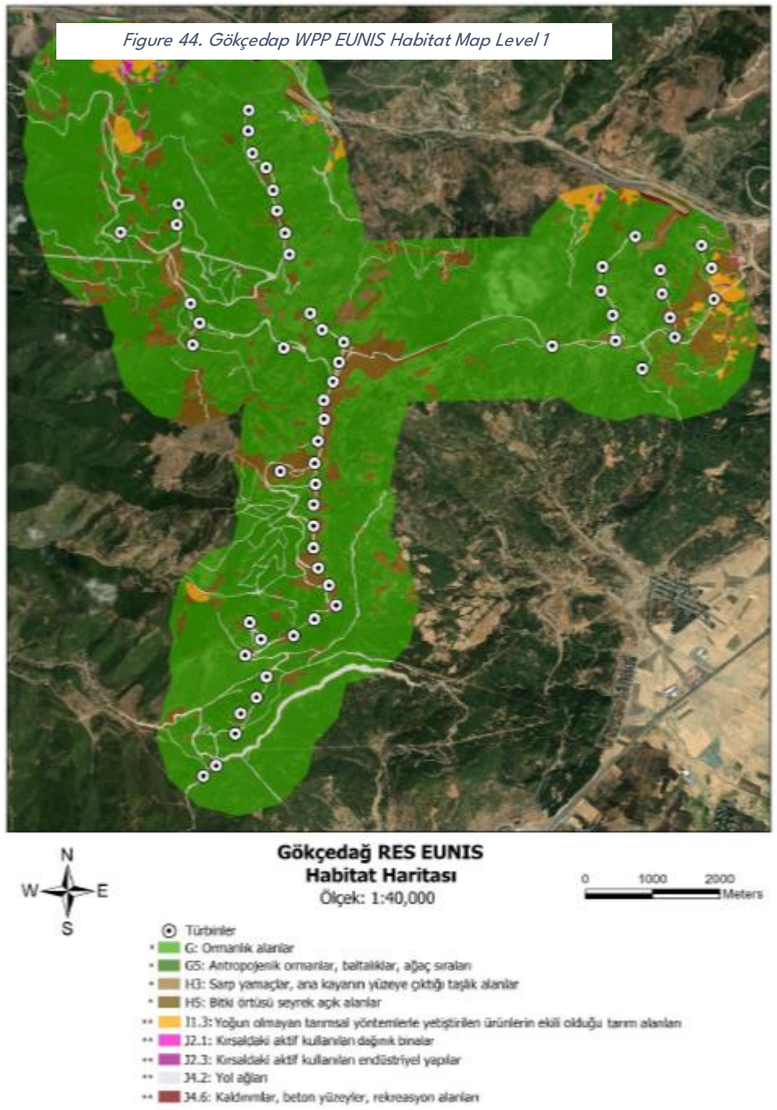
Photo 46. yellow snowdrop (Sternbergia fischeriana)

Photo 47. Persian cyclamen (Cyclamen persicum),

(Galanthus fosteri), yellow snowdrop (Sternbergia fischeriana), Persian cyclamen (Cyclamen persicum), the eastern sowbread (cyclamen coum), and Hardy cyclamen (Cyclamen cilicium). The collection and sale of these protected species are prohibited.

- **Invasive Species:** Invasive flora species have been identified within the project area. Energy investment sites, shaped by human activity, must manage invasive species through regular removal before seeding and by implementing rehabilitation efforts to prevent their spread.

Figure 44. Gökçedap WPP EUNIS Habitat Map Level 1



- **Fauna:** The biodiversity risk assessment for the Gökçedağ RES project area, conducted under IFC PS-6 and Guidance Note 6 criteria, identified no critical species or habitats. However, several sensitive species may be affected by project activities. The Amanos snake (Rhynchocalamus barani) and the Greek tortoise (Testudo graeca) require awareness and careful driving (max speed 30 km/h) to avoid harm. The lynx (Lynx lynx) might avoid the area due to human activity and noise but could still use the habitat if disturbances remain minimal, necessitating awareness and preventive measures. The wild goat (Capra aegagrus) is not expected to be negatively impacted but may require mitigation of disturbance risks. The brown bear (Ursus arctos) might occasionally be present, with no significant risk from the project. The striped hyena (Hyaena hyaena), known to traverse the Amanos mountains and Hatay province, faces no direct risk from the project but requires monitoring.

Photo 49. the Greek tortoise (Testudo graeca)

Photo 50. The Amanos snake (Rhynchocalamus barani)

Photo 51. The lynx (Lynx lynx)

- **Ornithology:** The biodiversity risk assessment for avian species at the Gökçedağ RES site identified critical species such as the Egyptian vulture (Neophron percnopterus) and the steppe eagle (Aquila nipalensis). The site is located north of the Amanos Mountains, an essential migratory bottleneck for birds traveling between Europe, the Middle East, and Africa. Although some raptors and storks use the eastern route through this area, monitoring data indicate low bird activity near the turbines, with most birds preferring nearby valleys or routes further east. While the overall bird passage is below 1% of the European population, necessitating minimal risk measures, the presence of endangered species like the Egyptian vulture and steppe eagle requires attention to the biodiversity action plan. Additionally, weekly carcass surveys around turbines and transmission lines are recommended to identify and mitigate collision risks. No significant adverse impact on bird diversity or populations has been observed outside these measures.

Photo 52. the Egyptian vulture (Neophron percnopterus)

Photo 53. The steppe eagle (Aquila nipalensis)

Bursa Natural Gas Combined Cycle Power Plant (NGCCPP)

The Bursa Natural Gas Combined Cycle Power Plant is located in Nilüfer District, Bursa, within the Bursa Organized Industrial Zone. It operates on a 25,503,91 m^2 plot with an 8,074 m^2 covered area. The plant generates electricity using natural gas, which powers a gas turbine. The waste heat from the gas turbine is utilized to produce steam that drives a steam turbine, contributing further to electricity production. In terms of protected areas, the plant is located 16.3 km from Ulubat Lake and 13.5 km from Uludağ National Park.

- **Habitat Classification:** The project area encompasses 5 different habitat types, 1 of which are natural and 4 modified.
- **Flora:** The project site, located within an organized industrial zone, lacks the conditions necessary for significant floristic diversity. According to IFC PS-6 and Guidance Note 6 criteria, no plant taxa with CR, EN, or VU statuses, nor any endemic species, are present. Therefore, no critical habitat assessment is required.

- **Fauna:** Based on IFC PS-6 and Guidance Note 6 criteria, there are no critical fauna species (amphibians, reptiles, mammals) or critical habitats within the project area.
- **Ornithology:** Due to the developed and anthropogenically impacted nature of the area, no target bird species are found. While songbirds are generally present, raptors and migratory birds are unlikely to be seen near the industrial zone, resulting in negligible impact on bird populations.

Lüleburgaz Natural Gas Power Plant (NGPP) The Lüleburgaz Plant, located in Kırklareli Province, Lüleburgaz District, Yeni Mahalle, operates on a 43,504 m^2 site with an 8,873 m^2 enclosed area. It produces electricity and steam, utilizing two coal-fired boilers, one natural gas-fired Erensan steam boiler, and a GT4-Deltak HRSG unit. The GT3-Desa HRSG, ST1, and ST2 licenses were terminated in 2018. The site is situated close to protected areas and nature parks such as

Şekil 15.10 Proje Sahası ve Korunan Alanların İlişkisini Gösterir Uydu Görüntüsü

Figure 45. Satellite Imagery Depicting the Relationship Between Lüleburgaz Natural Gas Project Sites and Protected Areas

Istanbul Çatalca Çilingoz Nature Park (4.5 km) and Danamandıra Nature Park (5 km). These areas are significant for their environmental and ecological value, requiring careful consideration in the plant's operations and impact assessments.

- **Habitat Classification:** The project area encompasses 11 different habitat types, 4 of which are natural and 7 modified/
- **Flora:** Within the project site, there are no plant taxa listed under CR and EN statuses according to IUCN, BERN, and CITES conventions and appendices. Consequently, there is no critical habitat for species protection based on IFC PS-6 and Guidance Note 6 criteria.
- **Fauna:** The critical species and habitat assessment conducted under IFC PS-6 and Guidance Note 6 criteria revealed no critical amphibian, reptilian, or mammalian species within the region. Thus, no critical habitats are present.
- **Ornithology:** Due to the area's developed state and significant anthropogenic impact, no target bird species are present within the site. While the area is situated on the main autumn migration route of the Marmara region, the project's impact on migration is minimal, and there are no suitable habitats for birds, leading to an insignificant effect on avian populations.

4. Biodiversity Exposure & Assessment

4.1. Aim of the Assessment

The aim of Biodiversity Exposure & Assessment is to identify and evaluate the extent to which an organization's activities are exposed to and potentially impact biodiversity. This process helps organizations understand the areas of high biodiversity value that their operations may affect and assess the potential direct and indirect impacts on these areas. By doing so, organizations can prioritize conservation efforts, mitigate negative impacts, and enhance their sustainability practices

4.2. Methodology

Terms on Biodiversity Critical Areas Used to Assess Zorlu Enerji's Biodiversity Exposure

Alliance for Zero Extinction (AZE)

The Alliance for Zero Extinction (AZE) sites are critical habitats that contain the entire population of one or more species listed as Endangered or Critically Endangered on the IUCN Red List. Comprised of 93 biodiversity conservation institutions across 37 countries, the Alliance aims to prevent species extinction by addressing local habitat degradation and the unique vulnerabilities of species with restricted global ranges. The Alliance works collaboratively to eliminate threats and restore habitats at these sites to enable species populations to recover.

Alliance for
Zero Extinction

Reserved Forest

The primary state agency responsible for forest conservation is the Ministry of Natural Resources and Environment. Its objectives include sustainable forest resource management, ecosystem balance maintenance, and community benefits. The agency's mandates encompass establishing protected forest areas, reforesting and rehabilitating degraded forestry research, and promoting local community participation in forest conservation.

UNESCO World Heritage Sites

UNESCO World Heritage Sites are landmarks or areas with legal protection due to their cultural, historical, scientific, or natural significance. These sites are designated for their outstanding value to humanity and are protected under an international convention administered by UNESCO. As of June 2020, there are 1,121 World Heritage Sites across 167 countries, including cultural, natural, and mixed properties. China and Italy have the highest number of World Heritage Sites, with 55 each.

UNESCO

National Forest Area

National forest areas are extensive, usually forested regions preserved by government decree from private exploitation. These areas are managed and harvested under the supervision of the Royal Thai Forest Department to ensure sustainable use and conservation.

4.3. Results

Zorlu Enerji conducts biodiversity assessments for its own operations and joint ventures to ensure that potential impact on biodiversity is identified and evaluated at the initial phase of project development and comply with the regulatory requirements.

Zorlu Enerji conducts biodiversity assessments for its operations and joint ventures to identify potential biodiversity impacts early in project development and comply with regulatory requirements.

- Coal and Natural Gas Power Plants: Biodiversity baseline studies and assessments are conducted through Environmental Impact Assessments (EIA), covering both terrestrial and aquatic resources.
- Wind Turbine Power Plants: Biodiversity assessments focus on terrestrial resources through Initial Environmental Examinations (IEE).
- Other Power Plants: Site-specific Environmental Impact Assessment (EIA) and Environmental Social Impact Assessment Plan (ESAP) include biodiversity baseline surveys and impact assessments.

To date, **93%** of Zorlu Enerji's power plants and operational sites are not located in World Heritage areas or IUCN Category I-IV protected areas, nor in national reserved forests.

Global AZE Map

These Alliance Zero Extinction Map sites are based on species groups that have been globally assessed by the IUCN Red List, including amphibians, birds, cacti, cone snails, conifers, corals, cycads, freshwater crabs, freshwater crayfish, freshwater shrimps, mammals, mangrove plants, selected marine fish (blennies, groupers, pufferfish, wrasses), selected reptiles (chameleons, crocodiles, iguanas, tortoises, turtles), sharks and rays, and selected birches.

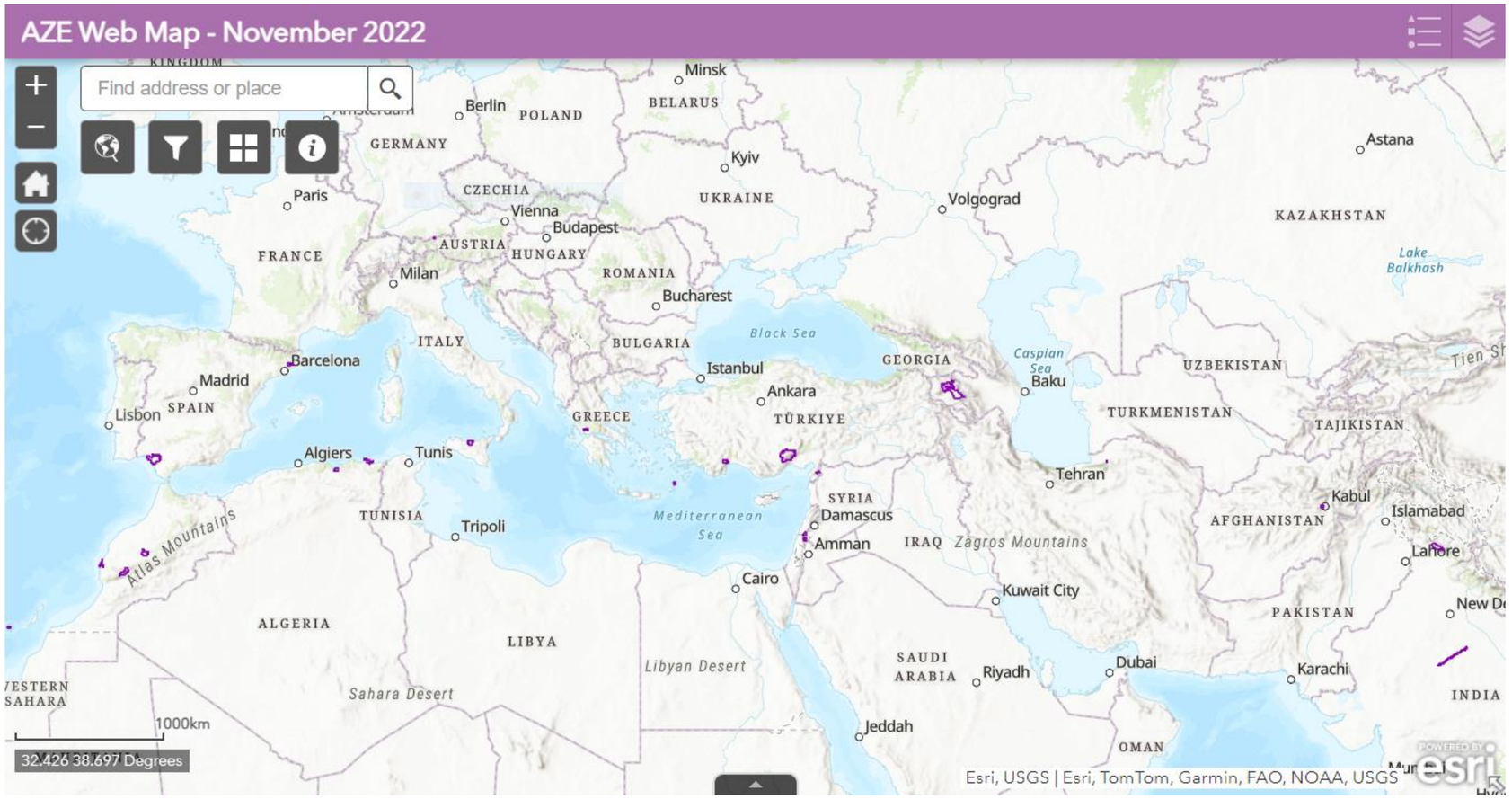


Figure 46. AZE Web Map

Key Biodiversity Areas (KBA)

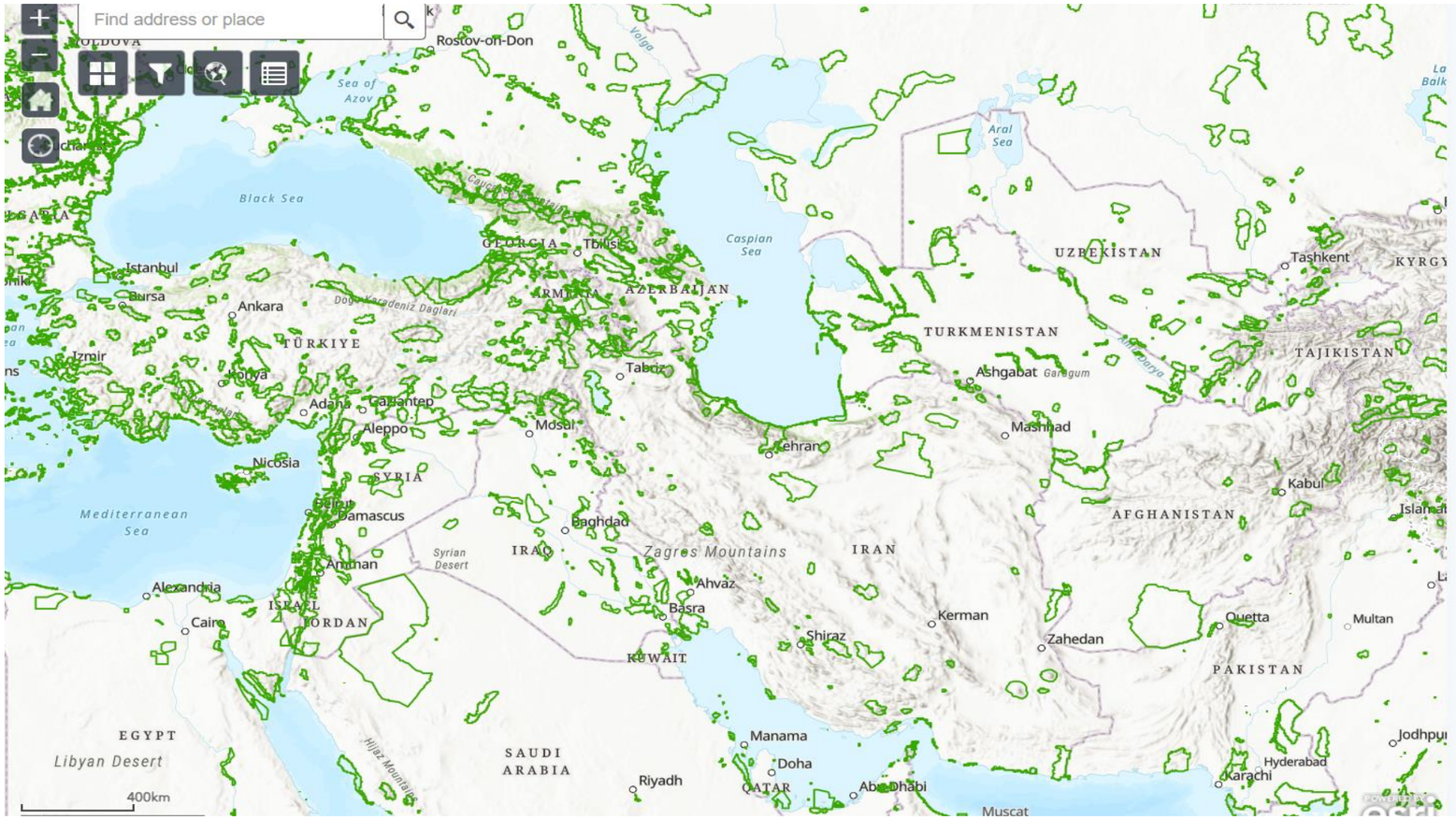


Figure 47. KBA Web Map

To date 2024, 93% of Zorlu Enerji's power plants and operation sites are not located in World Heritage areas and IUCN Category I-IV protected areas. 93% of Zorlu Enerji's power plants are not located in national reserved forest. None of the upstream or downstream critical suppliers reside in World Heritage areas, IUCN Category I-IV protected areas and national reserved forest.

Since the upstream and downstream activities of critical suppliers do not occur in key areas, the total exposure in those regions is zero.

The total area used for operational activities: 3.411.364,07 Hectares
The total area assessed: 3.411.364,07 Hectares
The total exposure: 6.439,46 Hectares

Zorlu Enerji Own Operations

#	Activity	Country	Location	Fuel	Area (Hectares)	National Reserved Forest	World Heritage Areas and IUCN Category I-IV protected areas
1	Kızıldere 1-2-3 GPP	Turkey	Buharkent Denizli	Geothermal	6383	No	Yes
2	Kuzgun HPP	Turkey	Kuzgun Erzurum	Hydro	38,23	No	No
3	Mercan HPP	Turkey	Tunceli Mercan	Hydro	56,46	Yes	No
4	Çıldır HPP	Turkey	Çıldır Kars	Hydro	39,42	No	No
5	Beyköy HPP	Turkey	Eskişehir Beyköy	Hydro	124	No	No
6	Ataköy HPP	Turkey	Ataköy Tokat	Hydro	36,26	No	No
7	Tercan HPP	Turkey	Tercan Erzincan	Hydro	6,35	No	No
8	İkizdere HPP	Turkey	İkizdere Rize	Hydro	1,52	No	No
9	Gökçedağ WPP	Turkey	Bahçe Osmaniye	Wind	3451	No	No
10	OEDAŞ ED OHL	Turkey	Bilecik, Eskişehir, Afyon, Kütahya, Uşak	Various	3.400.000,00	No	No
11	Jhimpir WPP	Pakistan	Jhimpir Sindh	Wind	466	No	No
12	Dorad CCNGS	Israel	Ashkelon	Coal	6,76	No	No
13	Alaşehir GPP	Turkey	Alaşehir Manisa	Geothermal	754	No	No
15	Deadsea SPP	Palestine	Jericho Deadsea	Solar	1,07	No	No
TOTAL HECTARES ASSESSED			**3.411.364,07**				

Upstream & Downstream Activities

#	Supplier	Activity Direction	Business Activity	Location	National Reserve Forest	World Heritage areas and IUCN Category I-IV protected areas
1	Astor Enerji	Upstream	Electrical Equipments Supply	İstanbul Turkey	No	No
2	BTC Bilişim	Upstream	IT & Telecommunication Service Provider	İstanbul Turkey	No	No
3	Buran Teknoloji	Upstream	IT & Telecommunication Service Provider	Ankara Turkey	No	No
4	Deutsche Telekom	Upstream	IT & Telecommunication Service Provider	İstanbul Turkey	No	No
5	Dowell Schlumberger	Upstream	Mechanical Equipment Supply	Cairo Egypt	No	No
6	Ernst Schad GmbH	Upstream	Mechanical Equipment Supply	Westfalen Germany	No	No
7	Novomet	Upstream	Mechanical Equipment Supply	Perm Russia	No	No
8	Schaffler	Upstream	Mechanical Equipment Supply	İstanbul Turkey	No	No
9	Sezenler Üretim	Upstream	Chemical Material Supply	İstanbul Turkey	No	No
10	Vestel	Upstream	Electrical Equipment Supply	Manisa Turkey	No	No
11	Zorlu Tekstil	Downstream	Steam Sales	Lüleburgaz Turkey	No	No
12	Public	Downstream	Electricity Consumers	Various	No	No
13	Special Sector	Downstream	Electricity Consumers	Various	No	No
14	OEDAŞ Distribution Area	Downstream	Electricity Transmission Stations	Eskişehir, Uşak, Bilecik, Afyon, Kütahya	No	No

Conservation of Endangered Species

Specific Biodiversity Action Plans are available for power plants aiming to protect endangered species in the operational sites. In line with these plans, periodic observations for affected species are carried out. When determining these species, the Red List of Threatened Species, also known as the IUCN Red List, is referred to, which includes species classified as Endangered, Threatened, or Extinct. This list provides information on species' population trends, habitats, and threats. The regulation of water flow in Hydroelectric Power Plants (HPPs) is crucial for aquatic species' survival in surrounding areas, while electricity distribution lines in Wind Power Plant (WPP) sites pose potential risks to bird species. Recognizing and monitoring the species affected by these activities is a priority.

As Zorlu Enerji, we acknowledge the potential impact our domestic operations may have on endemic species within our regions of operation. To address this, we conduct periodic observation studies to identify and assess these impacts. We implement and meticulously follow our action plans, managing them through continuous monitoring and regulation. Below, you will find a list of species at risk according to the International Union for Conservation of Nature (IUCN), specific to Zorlu Enerji sites.

Site	Species at Risk according to IUCN
Mercan HPP	Spotted Salamander (Neurergus strauchii munzurensis) Egyptian Vulture (Neophron percnopterus) European Turtle Dove (Streptopelia turtur)
Tercan HPP	Spur-thighed Tortoise (Testudo graeca) Eurasian Lynx (Lynx lynx)
Beyköy HPP	Redwing (Turdus iliacus) Bearded Vulture (Gypaetus barbatus) Red-footed Falcon (Falco vespertinus) Eastern Imperial Eagle (Aquila heliaca) Eurasian Otter (Lutra lutra)
Çıldır HPP	Common Carp (Cyprinus carpio) Bulatmai Barbel (Luciobarbus capito) White-headed Duck (Oxyura leucocephala) Common Pochard (Aythya ferina) Steppe Eagle (Aquila nipalensis(
İkizdere HPP	Crimean Barbel (Barbus tauricus) Baran's Adder (Vipera barani)
Kızıldere-I GPP	Lesser White-fronted Goose (Anser erythropus)
Kızıldere-II-III GPP	Ferruginous Duck (Aythya nyroca) Northern Lapwing (Vanellus vanellus)
Osmaniye WPP	Wild Goat (Capra aegagrus) Brown Bear (Ursus arctos) Striped Hyena (Hyaena hyaena) Greater Spotted Eagle (Clanga clanga)

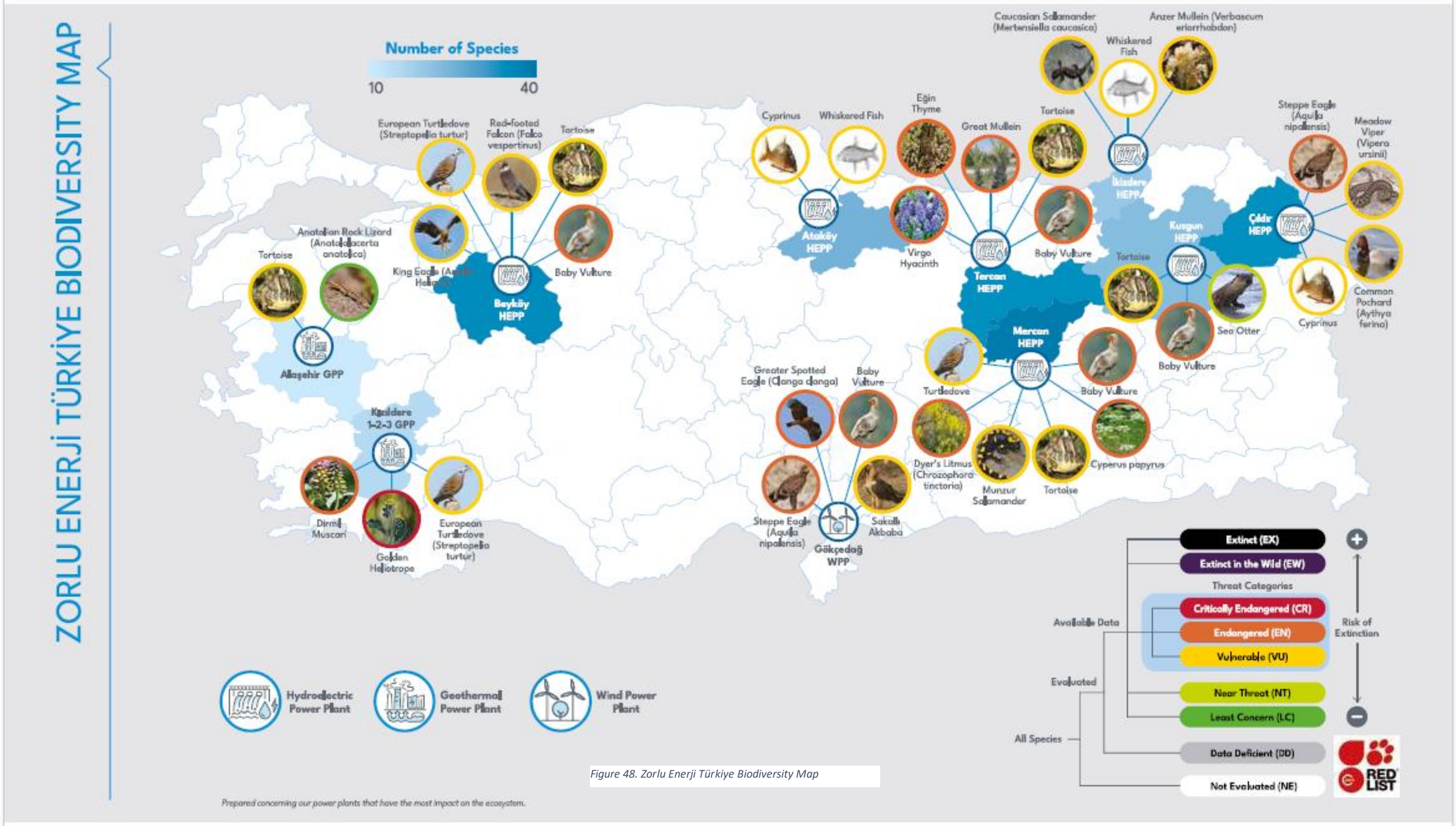


Figure 48. Zorlu Enerji Türkiye Biodiversity Map

The Figure 48 is a visual representation highlighting the endangered species across different regions where power plants of Zorlu Enerji operate, emphasizing diversity and conservation efforts in Turkey.

4.4. Performance Overview

4.4.1. Net Positive Impact

Net Positive Impact (NPI) on biodiversity is a commitment to ensure that the biodiversity benefits from our operations outweigh the impacts. This approach involves the implementation of biodiversity conservation activities that result in an overall gain for biodiversity compared to a baseline scenario. Net Positive Impact (NPI) on biodiversity is a commitment to ensure that the biodiversity benefits from our operations outweigh the impacts. This approach involves the implementation of biodiversity conservation activities that result in an overall gain for biodiversity compared to a baseline scenario.

Zorlu Enerji is committed to achieving Net Positive Impact on biodiversity by 2040. This ambitious target aligns with our broader sustainability goals and reflects our dedication to preserving and enhancing biodiversity in the regions where we operate. Each phase builds on the previous one, ensuring a structured and methodical approach to biodiversity conservation. By starting with a thorough baseline assessment and progressively scaling up efforts, Zorlu Enerji aims to embed biodiversity considerations deeply into its business operations.

Key Actions and Milestones

* 2024-2028: Baseline Assessment and Initial Mitigation Measures

    - Conduct comprehensive baseline biodiversity assessments.
    - Implement initial mitigation measures to address the most critical impacts.
    - Establish monitoring and reporting frameworks.

* 2028-2032: Scaling Up Conservation Efforts

    - Expand conservation initiatives and partnerships with local and international environmental organizations.
    - Enhance habitat restoration projects and species protection programs.
    - Increase stakeholder engagement and community involvement in biodiversity conservation.

* 2032-2036: Integrating Biodiversity into Business Operations

    - Fully integrate biodiversity considerations into all business operations and decision-making processes.
    - Achieve significant reductions in biodiversity impacts through innovative technologies and practices.
    - Continuously monitor, evaluate, and report on biodiversity performance.

* 2036-2040: Achieving Net Positive Impact

    - Ensure all mitigation and conservation measures result in a measurable Net Positive Impact on biodiversity.
    - Validate biodiversity gains through independent assessments and certifications.
    - Maintain and enhance biodiversity benefits through adaptive management and continuous improvement.

The provided Figure 49 outlines Zorlu Enerji's plan and timeline to achieve Net Positive Impact (NPI) on biodiversity. The table 9 details specific actions and milestones from the initial assessment phase to achieving the NPI target by 2040.

Table 9. Net Positive Impact Details

#	Year	Activity	Impact	Country	Location	Ownership	Ownership Type	Planted Samplings	Planted Area (ha)	Critical Species in Area (CR)	Species on IUCN Red List	Protected Areas	Key Biodiversity Areas (KBA)	Impact Calculation
1	Before 2017	"0 Carbon Footprint Project"	Positive		-			45.000	50					
1	2008	Kızıldere 1-2-3 GPP	Negative	Turkey	Buharkent Denizli	100%	Asset	N/A	N/A	1	18	1	3	-18
2	2008	Kuzgun HPP	Negative	Turkey	Kuzgun Erzurum	100%	Asset	N/A	N/A	0	29	0	3	-29
3	2008	Mercan HPP	Negative	Turkey	Erzincan Mercan	100%	Asset	N/A	N/A	0	49	0	3	-49
4	2008	Çıldır HPP	Negative	Turkey	Çıldır Kars	100%	Asset	N/A	N/A	0	41	8	12	-41
5	2008	Beyköy HPP	Negative	Turkey	Eskişehir Beyköy	100%	Asset	N/A	N/A	0	38	0	2	-38
6	2008	Ataköy HPP	Negative	Turkey	Ataköy Tokat	100%	Asset	N/A	N/A	0	31	0	1	-31
7	2008	Tercan HPP	Negative	Turkey	Tercan Erzincan	100%	Asset	N/A	N/A	0	42	0	0	-42
8	2008	İkizdere HPP	Negative	Turkey	İkizdere Rize	100%	Asset	N/A	N/A	0	26	0	3	-26
9	2009	Gökçedağ WPP	Negative	Turkey	Bahçe Osmaniye	100%	Asset	N/A	N/A	0	37	0	6	-37
10	2013	Jhimpir WPP	Negative	Pakistan	Jhimpir Sindh	100%	Asset	N/A	N/A	5	643	10	3	-643
11	2014	Dorad CCNGS	Negative	Israel	Ashkelon	42,5%	JV	N/A	N/A	17	1007	54	6	-428
12	2015	Alaşehir GPP	Negative	Turkey	Alaşehir Manisa	100%	Asset	N/A	N/A	0	10	0	2	-10
13	2017	"0 Carbon Footprint Project"	Positive	Turkey	İzmir Tire	100%	Asset	35.000	140	15	983	0	7	983
14	2017	Deadsea SPP	Negative	Palestine	Jericho Deadsea	100%	Asset	N/A	N/A	5	699	62	27	-699
15	2018	"0 Carbon Footprint Project"	Positive	Turkey	Denizli Sarayköy	100,0%	Asset	70000	55	3	560	1	4	560
16	2019	"0 Carbon Footprint Project"	Positive	Turkey	Manisa Salihli	100%	Asset	90.000	219	4	570	0	2	570
17	2020	"0 Carbon Footprint Project"	Positive	Turkey	Gaziantep Nurdağı	100%	Asset	90.000	75	7	688	0	7	688
18	2021	"0 Carbon Footprint Project"	Positive	Turkey	Gaziantep Nurdağı	100%	Asset	90.000	95	7	688	0	7	688
19	2022	"0 Carbon Footprint Project"	Positive	Turkey	Erzincan	100%	Asset	90.000	100	2	464	0	2	464
20	2023	"0 Carbon Footprint Project"	Positive	Turkey	Balıkesir Ayvalık	100%	Asset	90.000	100	16	1125	20	9	1125
21	2024	"Heliotropium thermophilum Protection Project"	Positive	Turkey	Denizli Sarayköy	100%	Asset	N/A	N/A	1	1	0	0	1
22	2024	"0 Carbon Footprint Project"	Positive	Turkey	Eskişehir Seyitgazi Oynaş	100%	Asset	N/A	N/A	3	510	0	3	510

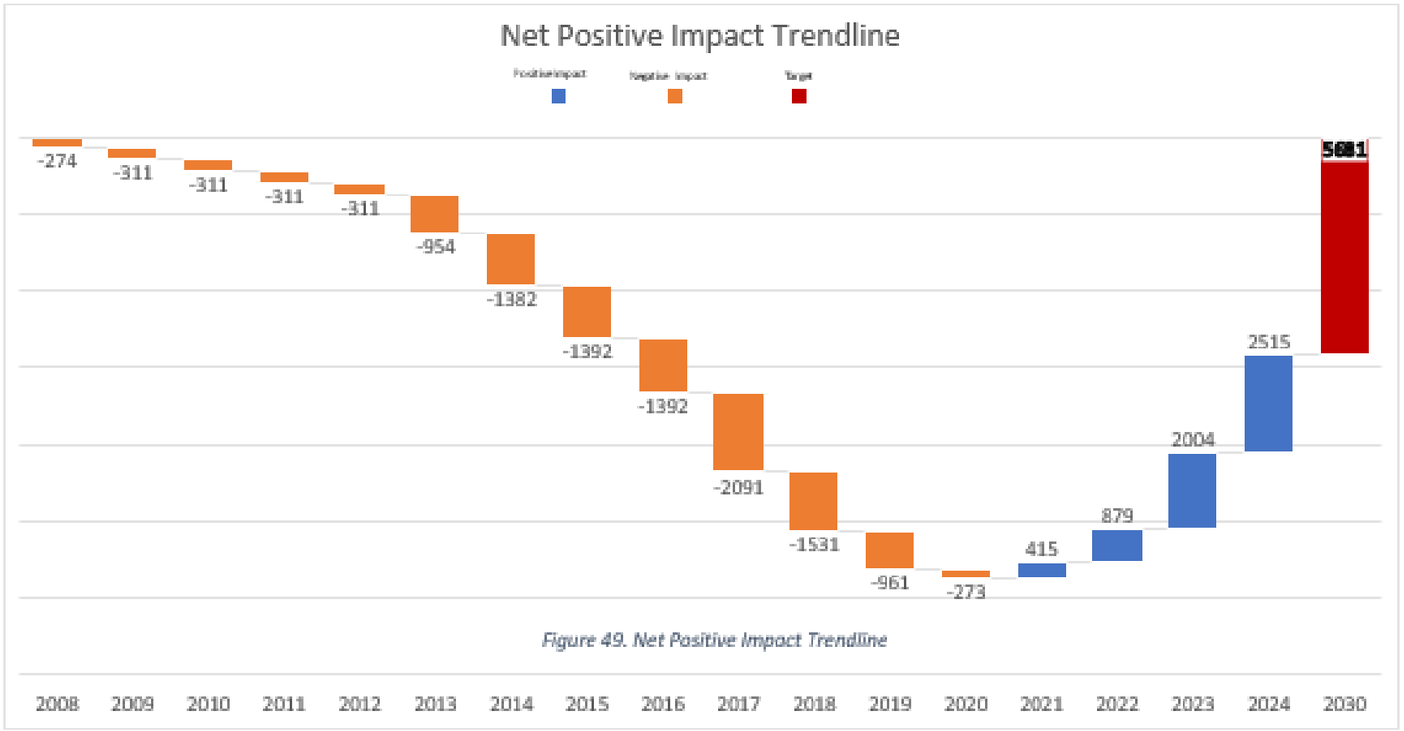


Figure 49. Net Positive Impact Trendline

Figure 49. Net Positive Impact Trendline

- *For positive impacts, IBAT platform is used for determining the impact areas*
- *For negative impacts, both IBAT and detailed site assesments are used for determining the impact areas. IBAT is used for determining the related protected areas and KBAs, critical species and other species listed in IUCN Red List were determined via detailed location-based site assesments by professionals on related discipline for Turkey operations. Impact assesment works for Joint ventures and other subsidiaries in other countries are done by desktop asessments by IBAT and WWF risk filters.*

5. Biodiversity Mitigating Action Overview

Zorlu Enerji's biodiversity mitigation strategies are comprehensive and multidimensional, aimed at preserving and enhancing local ecosystems across its various operational sites. These strategies are divided into avoidance, reduction, regeneration, and transformation measures, reflecting a holistic approach to environmental stewardship.

Zorlu Enerji has implemented a comprehensive approach to biodiversity mitigation, guided by the mitigation hierarchy. The following sections outline the five key mitigating actions to minimize negative impacts on biodiversity and contribute to No Net Loss. According to the outlined BAP. This is a plan thtat is submitted to Zorlu Enerji as a guidance to follow.

5.1 Avoidance Measures

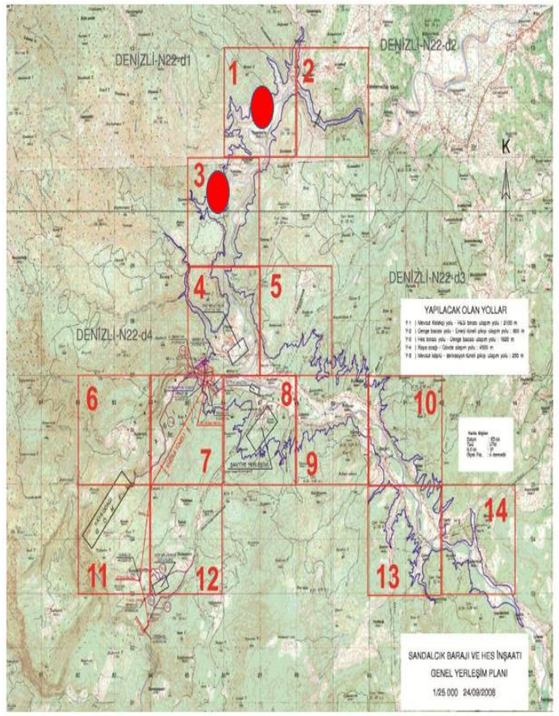
Avoidance measures are the first step in the mitigation hierarchy, and involves taking steps to prevent environmental impacts by not implementing activities that could negatively affect nature. This includes spatial actions (not implementing activities in certain areas), technological actions (using alternative project designs or technologies to minimize impacts), and temporal actions (avoiding activities during specific seasons or time periods).

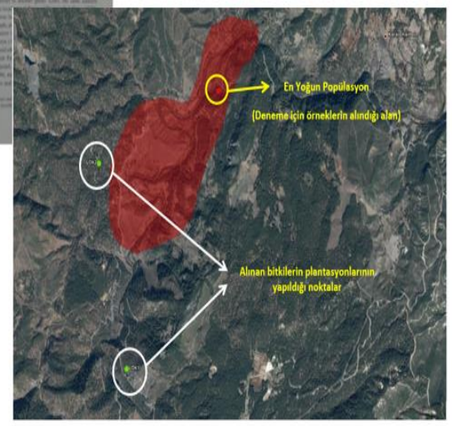
Avoid Conducting Operations in High Biodiversity Value Areas:

- **Scope:** All sites
- **Actions:**
    - Avoiding operations in areas recognized for high biodiversity value, such as UNESCO World Heritage Sites, Ramsar wetlands, UNESCO Man and the Biosphere reserves, Key Biodiversity Areas (KBAs), Alliance for Zero Extinction (AZE) sites, and IUCN Category I-IV protected areas.

○ Conducting EIA for all facilities (100%) before starting construction and operations to identify potential impacts on biodiversity including mitigation plan for a potential risk. If a project is found to significantly impact biodiversity, such as operation in high valuable biodiversity area, it will be withdrawn.
○ For instance, the Sami Soydan Dam Project was canceled due to the presence of critical species. During biodiversity research conducted within the scope of the Sami Soydam Sandalcık Dam and HPP project planned to be established within the borders of Acıpayam district in Denizli, a very limited endemic species that was not defined in the literature was detected. We continued species identification studies with academicians from Ege University and recorded a new species in the literature. We contributed to the inclusion of the species in the Biological Diversity Conservation Species Action Plan by reporting it to the Ministry of Agriculture and Forestry.
○ For instance, during the biodiversity research conducted within the scope of the Tirebolu Regulator and HPP project planned to be constructed within the borders of Tirebolu district in Giresun, an endemic species not defined in the literature was discovered. Collaborating with the academicians working on the project, we added this species to the literature.

- **Purpose:** By avoiding operations in these sensitive areas, Zorlu Enerji helps preserve critical habitats and species, preventing habitat degradation and loss of biodiversity. By avoiding operations in these sensitive areas, Zorlu Enerji helps preserve critical habitats and species, preventing habitat degradation and loss of biodiversity. This proactive approach ensures that the company's operations do not contribute to the decline of ecologically significant areas
- **Responsibility:** Zorlu Enerji's project planning and environmental management teams
- **Duration:** Ongoing





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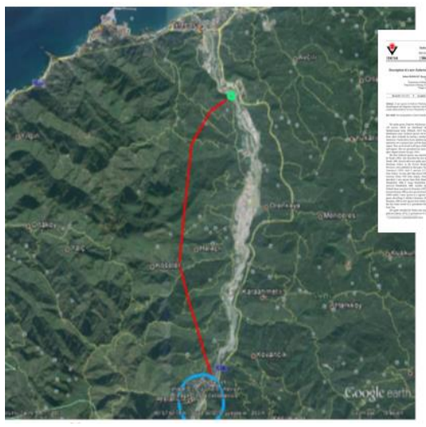


ZODARİON TİREBOLUENSİS

Renewable Energy Operations

- **Scope:** All sites
- **Actions:**
  - Prioritizing renewable energy production over fossil fuels to avoid contributing to greenhouse gas emissions and climate change. Zorlu Enerji's commitment to renewable energy sources, such as wind, solar, and geothermal power, inherently avoids the environmental impacts associated with fossil fuel extraction and combustion.
  - Implementing technologies and operational practices that enhance energy efficiency and reduce environmental footprints.
  - Zorlu Enerji has sold related shares for Israel operations in line with Net Zero Carbon Strategy in 2024.
- **Purpose:** By focusing on renewable energy, Zorlu Enerji not only mitigates the direct environmental impacts of energy production but also supports global efforts to combat climate change, reduce air pollution, and promote sustainable development. This shift from fossil fuels to renewable energy sources helps avoid significant environmental degradation.
- **Responsibility:** Zorlu Enerji's renewable energy division and sustainability teams.
- **Duration:** Ongoing

Protection of Critical Habitats:

- **Scope:** Mercan HPP, Tercan HPP, Kızıldere-I GPP, and Kızıldere-II-III GPP
- **Actions**:
  - Preventing tree cutting
  - Prohibiting waste disposal
  - Avoiding lighting fires
  - Mitigating vehicle dust emissions
- **Purpose:** By preserving natural habitats, especially those that are home to critical flora species, these measures ensure the continuity of ecosystem services and biodiversity. The prevention of tree cutting, waste disposal, and other detrimental activities helps maintain the ecological integrity of these areas.
- **Responsibility:** BEMS officials
- **Duration:** Ongoing during the operational period

Protection and Training on Flora and Fauna:

- **Scope**: Mercan HPP, Tercan HPP, Çıldır HPP, İkizdere HPP, Kuzgun HPP, Ataköy HPP, Kızıldere-I GPP, Kızıldere-II-III GPP, Alaşehir GPP, Gökçedağ WPP
- **Actions:**
    - Implementing training programs led by expert biologists.
    - Researching and monitoring endangered species like Testudo graeca (spur-thighed tortoise), Lutra lutra (Eurasian otter) and Anatololacerta anatolicus (Anatolian lizard). This includes population status research, habitat condition assessments, and the installation of warning signs in critical areas. These programs aim to enhance the knowledge and awareness of staff and local communities about the importance of biodiversity and the specific needs of endangered species.
    - Implementing awareness campaigns on special occasions
    - Providing external training support for employees requiring additional skills
- **Purpose:** Training programs and monitoring efforts are designed to enhance awareness and understanding of the importance of biodiversity among staff and local communities. These programs ensure that endangered species are protected through informed and conscientious actions. Regular training and awareness initiatives promote a culture of sustainability within the organization.
- **Responsibility:** Expert biologists, BEMS officials, Zorlu Enerji's training and development teams
- **Duration:** Monthly or annually, depending on the site

Managing Invasive Species:

- **Scope:** Mercan HPP, Tercan HPP, Beyköy HPP, Çıldır HPP, İkizdere HPP, Kuzgun HPP, Ataköy HPP, Kızıldere-I GPP, Kızıldere-II-III GPP, Alaşehir GPP, Gökçedağ WPP
- **Actions:**
    - Conducting research and monitoring of invasive species s with expert biologists preparing and implementing removal plans. These plans are executed during the summer months over a two-year period, ensuring that invasive species do not outcompete native flora and fauna. The control of invasive species is critical for maintaining the ecological balance and health of native ecosystems.
- **Purpose:** Controlling invasive species is crucial for protecting native biodiversity. By preventing the spread of invasive species, these actions help maintain the ecological balance and support the resilience of native ecosystems.
- **Responsibility:** Expert biologists and BEMS officials
- **Duration:** July to August for two years

5.2 Reduction Measures

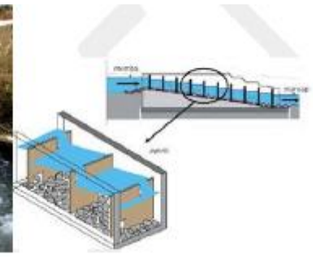
Reduction involves minimizing the impact or dependency on nature through various measures, which could include changes in production processes, product design, product stewardship, business models, and engagement with suppliers. These measures are designed to reduce pollution, enhance resource efficiency, and ensure compliance with environmental regulations. Zorlu Enerji implements the following measures as reduction actions:

Prevention of Environmental Pollution:

- **Scope:** All sites

- **Actions:**
  - Managing hazardous and non-hazardous waste.
  - Ensuring proper recycling and disposal by licensed firms. This includes detailed waste management plans, the use of pollution control technologies, and routine environmental audits. Specific actions entail the disposal of hazardous wastes and non-hazardous wastes according to their waste codes, and ensuring that all waste management practices comply with regulatory standards.
  - Regularly monitoring air and water emissions.
- **Purpose:** Effective waste and emission management reduces the pollution load on the environment, protecting air, water, and soil quality. These measures are critical for maintaining healthy ecosystems and preventing the degradation of natural resources.
- **Responsibility:** BEMS officials, environmental specialists
- **Duration:** Scheduled regularly, typically biannual or annual

<u>Infrastructure Adjustments:</u>



- **Scope:** Mercan HPP, Tercan HPP, Beyköy HPP, İkizdere HPP, Ataköy HPP, Kızıldere-I GPP, Kuzgun HPP, Gökçedağ WPP
- **Actions**:
  - Enforce vehicle speed limits within facility grounds
  - Create animal passages and modify infrastructure to minimize barriers for wildlife movement
  - Replace harmful fencing with wildlife-friendly alternatives
  - Ensure visible water flow by clearing debris and increasing base flow in streams to support fish migration and maintain genetic diversity.
  - Implement fish passages to facilitate the movement of migratory species, monitored by expert biologists.
  - Zorlu Enerji, with its sensitivity to protect natural life, invested 500.000 US Dollars to protect both birds and turbines, and installed Turkey's first bird tracking radar at Gökçedağ Wind Power Plant in 2011. Thanks to the Bird Radar System, birds or flocks of birds approaching the wind farms can be detected and monitored in real time from the monitor. Operationally, the turbines can be stopped for a short time during bird passage, while the flight direction of the birds can be changed by sending sound waves wtih the LRAD (Long Range Acoustic Device) system. With the data obtained from bird watching studies and regular monitoring activities, no operation-related bird deaths have occured at Gökçedağ WPP so far.
  - **OEDAŞ Flexiglass Project:** OEDAŞ Flexiglass Project - Our electricity distribution company, OEDAŞ, leads the way in the protection of migratory birds through innovative initiatives conducted along bird migration routes. Addressing issues that pose risks to energy transmission lines and lead to birds being electrocuted, OEDAŞ has successfully implemented insulator placement activities and now covers the lines with a transparent, rigid plastic material called flexiglass. This allows birds to safely build nests, reducing the risk of electrocution by 95%, thereby contributing to species preservation and enhancing the sustainability of energy supply. Initially launched as a pilot project in Afyonkarahisar, this initiative has since been implemented across five provinces served by OEDAŞ.
- **Purpose:** Adjusting infrastructure to include animal passages and wildlife-friendly fencing helps maintain habitat connectivity and reduces the risk of wildlife-vehicle collisions.
- **Responsibility:** BEMS officials
- **Duration:** Continuous during operation

Water Management:

- **Scope:** Kızıldere III GPP, İkizdere HPP, Lüleburgaz Natural Gas Plant
- **Actions:**

○ **Water Recovery and Reuse:** Utilize reverse osmosis for water recovery and reuse well and recycled water in operations to minimize water consumption and environmental impact.
○ **Wastewater Treatment:** Implement high-efficiency biological package treatment systems at facilities like Kızıldere 3 Geothermal Power Plant and İkizdere Hydroelectric Plant to ensure environmentally safe wastewater discharge.
○ **Management Systems & Certifications:** Zorlu Energy has established and operates an ISO 14046 management system for its plants located in high-impact areas, particularly for hydroelectric power plants, conducting regular audits and certification processes annually. At the corporate level, prioritization analyses are conducted for all stakeholders, monitoring the outcomes and performing AA1000 verification audits for water footprint. The ISO 14001 Management System is operated for critical facilities, ensuring the certification process through annual independent audits. In the regions where electricity distribution operations are conducted, the Sensitive Office Project is implemented, obtaining compliance certification. The L199 building holds a Gold LEED certification, and key actions include rainwater recovery, reuse of tap water, and minimizing water use through the utilization of aerators.
○ **Physical Precautions:** At Kızıldere 3 Geothermal Power Plant, drinking water is recovered using the reverse osmosis method. At the Lüleburgaz Natural Gas Plant, well water and recycled water are used as a tangible example of this commitment. In wastewater management, domestic wastewater is treated effectively to ensure it is discharged without harming the environment. The use of well water and recycled water from Zorlu Textile's wastewater treatment facility at the Lüleburgaz Natural Gas Plant reduced water consumption by 44.15% compared to the previous year. The biological package treatment systems at the Kızıldere 3 Geothermal Power Plant and the İkizdere Hydroelectric Plant demonstrate success in wastewater management, treating wastewater with high efficiency to ensure environmentally safe discharge. These practices are a notable part of water recovery efforts, offering proactive solutions to water scarcity in the region. A significant portion of water consumption stems from the production processes at natural gas, geothermal, and hydroelectric plants, where the use of renewable groundwater is a cornerstone of the sustainable water management strategy.

- **Purpose:** To ensure sustainable water management and reduce environmental impact by treating and reusing wastewater, increasing resource efficiency, and prioritizing water conservation.
- **Responsibility:** Zorlu Enerji's sustainability and environmental management teams

- **Duration:** Ongoing

Domestic Waste Management Plans:

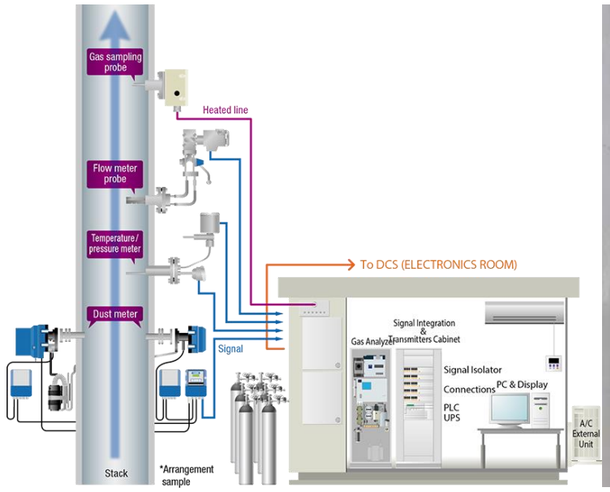
- **Scope:** Mercan HPP, Çıldır HPP, Gökçedağ WPP
- **Actions:**
    - Implementing comprehensive domestic waste management plans to prevent attracting wildlife such as bears. These plans include protocols for waste storage, handling, and removal, ensuring that waste does not attract wildlife or cause pollution. This includes the segregation of waste, secure storage of food waste, and regular collection and disposal by authorized personnel.
- **Purpose:** By preventing wildlife from accessing domestic waste, these plans help reduce human-wildlife conflicts and protect both wildlife and human health.
- **Responsibility:** BEMS officials
- **Duration:** Continuous during operation

Environmental Compliance:

- **Scope:** All sites
- **Actions:**
    - Ensuring strict compliance with environmental regulations, including obtaining necessary permits for air emissions, wastewater discharge, and other environmental impacts
    - Conducting regular environmental audits and report compliance status to relevant authorities and stakeholders
- **Purpose:** Compliance with environmental regulations ensures that Zorlu Enerji operates within legal frameworks, minimizing environmental harm and fostering transparency and accountability.
- **Responsibility:** QHSE team
- **Duration:** Ongoing

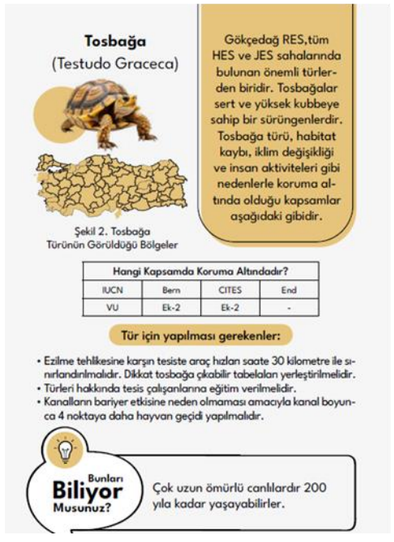
Emission Control:

- **Scope:** All sites
- **Actions**:
    - Maintaining and regularly calibrate Continuous Emission Monitoring Systems (SEÖS) to ensure compliance with emission standards
    - Implementing technologies and practices to reduce emissions from operational activities
- **Purpose:** Continuous monitoring and emission reduction technologies help maintain air quality and reduce the environmental footprint of Zorlu Enerji's operations.
- **Responsibility:** QHSE team
- **Duration:** Ongoing



<u>Biodiversity and Ecosystem Management System Integration:</u>

- **Scope:** All sites
- **Actions:**
  - **Integration of Biodiversity and Ecosystem Management System:** Successfully integrating the Biodiversity and Ecosystem Management System into business processes, managing documentation through QDMS, and developing strategic action plans for species protection at each facility.
  - **Critical Species Booklet:** Identifying critical species and compiling a booklet evaluated within the frameworks of the Bern Convention and CITES Convention, to be distributed to all power plants in 2024.
  - **Training and Awareness:** Organizing training sessions for plant personnel to raise awareness about biodiversity conservation.
- **Purpose:** To systematically protect species at risk, ensure compliance with international conservation agreements, and minimize the impact of operations on biodiversity.
- **Responsibility:** Zorlu Enerji's QHSE and sustainability teams.
- **Duration:** Ongoing



5.3 Regeneration Measures

Regeneration measures focus on restoring and monitoring the natural habitats and species affected by operational activities, thereby enhancing biodiversity and ecological resilience. These measures are essential for reversing the impacts of habitat degradation and promoting the recovery of ecosystems. Regeneration involves undertaking activities to increase ecological productivity in relation to nature's contribution to people. This includes practices like agriculture, aquaculture, and agroforestry that are compatible with ecosystems currently used by humans.

<u>Protection of Sensitive Species</u>**:**

- **Scope:** Mercan HPP, Tercan HPP, Beyköy HPP, Çıldır HPP, İkizdere HPP, Kuzgun HPP, Ataköy HPP, Kızıldere-I GPP, Kızıldere-II-III GPP, Alaşehir GPP, Gökçedağ WPP
- **Actions:**
    - Regular monitoring of species populations, such as Testudo graeca and Lutra lutra
    - Mapping and habitat analysis to support species conservation
    - **Conservation of Heliotropium thermophilum** (**Boraginaceae):** Preserving the genetic diversity and ecological health of the Heliotropium thermophilum species, ensuring its survival and contributing to broader biodiversity conservation goals.
        - Determining the genetic diversity of Heliotropium thermophilum using the ISSR technique.
        - Conducting soil and climate analysis to obtain detailed information about the species' ecology.
        - Preventing the risk of extinction through ex-situ and in-situ conservation studies.
        - Collecting and storing seed samples from healthy individuals in a gene bank.
        - Creating herbarium material from living samples collected during field studies.
        - Conducting germination studies with mature and productive seeds, and adaptation studies to the PAU Botanical Garden as part of ex-situ conservation efforts.
- **Purpose:** Regular monitoring and habitat analysis help maintain healthy populations of sensitive species, supporting biodiversity and ecosystem resilience.

- **Responsibility:** Expert biologists, BEMS officials
- **Duration:** Monthly or seasonally, depending on the site

Reforestation Projects:

- **Scope:** All sites
- **Actions**:
  - Zorlu Enerji has performed afforestation projects consisting of 600 thousand saplings by the end of 2023 in the regions where it operates, within the framework of the Commemorative Forests regulation of the General Directorate of Forestry
  - Within the scope of the project initiated with the aim of planting 1,150,000 saplings, an afforestation project consisting of 90 thousand saplings is planned every year.
    - 2017: Yeğenli/Tire-İzmir - 35,000 saplings
    - 2018: Yenicekent/Buldan-Denizli - 70,000 saplings
    - 2019: Salihli/Manisa - 90,000 saplings
    - 2020: Nurdağı/Gaziantep - 90,000 saplings
    - 2021: Nurdağı/Gaziantep - 90,000 saplings
    - 2022: Erzincan - 90,000 saplings
    - 2023: Ayvalık/Balıkesir - 90,000 saplings
  - This concerted effort not only offsets carbon emissions but also supports biodiversity by creating new habitats and enhancing existing ecosystems.
- **Purpose**: Reforestation helps restore degraded areas, enhances carbon sequestration, and improves habitat quality.
- **Responsibility:** Environmental and sustainability teams
- **Duration:** Annual

5.4 Restoration Measures

Restoration involves rehabilitating areas to their original ecosystems or restoring basic ecological functions and services. This may involve species recovery or ecological restoration of specific sites.

Monitoring and Mapping Populations:

- **Scope:** Mercan HPP, Tercan HPP, Çıldır HPP, İkizdere HPP, Kuzgun HPP, Kızıldere-I GPP, Kızıldere-II-III GPP
- **Actions:**

- Conducting extensive monitoring and mapping of flora and fauna populations. This involves regular field surveys, data collection on species abundance and distribution, and the use of geographic information systems (GIS) for detailed mapping.
- The data collected is used to assess the health and stability of populations, identify trends, and inform conservation strategies. This especially involves critical species such as Munzur Salamander, Egyptian Vulture, and Eurasian Otter.

- **Purpose:** Detailed monitoring and mapping help track the health and distribution of species, providing essential data for conservation planning and action. These activities support adaptive management and informed decision-making.
- **Responsibility:** Expert biologists, BEMS officials
- **Duration:** Ongoing during operation

Habitat Restoration:

- **Scope:** Kızıldere-I GPP, Kuzgun HPP
- **Actions:**
  - Implementing habitat restoration and terracing activities to stabilize slopes and support local flora using native shrubs and tree taxa. These efforts include soil erosion control, reforestation, and habitat enhancement to improve ecosystem functions.
  - Using native shrubs and tree taxa for soil erosion control and habitat enhancement.
  - Restoration activities should be carefully planned and executed to ensure that they are effective and sustainable.
  - Initiatives to restore and rehabilitate habitats that have been degraded due to operational activities. This includes reforestation projects and the restoration of riparian buffers by 2025.

○ Environmental clean-up initiatives were conducted during Turkey Environment Week. Volunteers from OEDAŞ conducted clean-ups in five provinces: Afyonkarahisar, Bilecik, Eskişehir, Kütahya, and Uşak. Our goal is a world that remains clean without the need for such efforts, but we will continue to support these activities until that day comes.
○ Forest ecosystem restoration: During the construction of Kızıldere 3 Geothermal Power Plant within the borders of Buharkent district in Aydın province, the 1600 fig and olive trees located in the area were relocated to suitable locations, 15 km away, indicated by the municipality. Zorlu Enerji is responsible for the periodic maintenance of the trees.

- **Purpose:** Restoration activities help rehabilitate degraded areas, improve habitat quality, and enhance the resilience of ecosystems to environmental changes. These efforts contribute to the long-term sustainability of biodiversity.
- **Responsibility:** BEMS officials, expert biologists

- **Duration:** Scheduled during specific times of the year, typically before the rainy season

5.5 Transformation Measures

Transformation involves addressing the fundamental drivers of nature loss and advocating for broader systemic changes. This can involve forming new partnerships, investing in landscapes and seascapes, and advocating for higher policy ambitions for nature and climate change.

<u>Net Zero Initiatives and the Transition to a Low Carbon Economy:</u>

- **Scope:** Applicable to all sites
- **Actions:**
    - **Renewable Energy Production:** Zorlu Enerji is committed to producing renewable energy through low-carbon systems. The company aims to manage net-zero operations by generating clean energy, thereby transforming the energy sector and redefining the dependency and impact of energy production on biodiversity.
    - **Electrip EV Charger Network:** Under the Electrip brand, Zorlu Enerji is establishing an extensive network of EV chargers. This initiative addresses the environmental impact of traditional internal combustion engines, which release toxic gases from the exhaust into the atmosphere, spreading pollution across the areas they traverse. By promoting electric vehicles, Zorlu Enerji significantly reduces the ecological footprint associated with petrochemical fuel extraction, processing, and consumption, thereby transforming the impact on nature and ecosystems both in energy production and transportation sectors. Below, there are some calculations regarding the environmental contribution of EV charger networks. Calculation basis and details can be found in Electrip ESG Report 2023
        - Mitigation Contribution (tCO2e) = 12.365,21-ton CO2e
        - Cost Savings from Climate Change Mitigation:
            - Short-and-medium run (up to 2030): € 1.236.520,83
            - Long run (from 2040 to 2060): € 3.326.241,03
        - Avoided Cost of Air Pollution (€) = € 1.415.863,54
        - Equivalent Number of Noisy Cars Removed = 5.524
        - Although direct KPIs on health contributions cannot be conclusively quantified at this stage, the WHO's extensive research offers a substantiated framework for understanding potential health improvements. For instance, the WHO's findings suggest that for every 1 µg/m^3 decrease in long-term PM2.5 exposure, significant health benefits can be realized, including the prevention of premature deaths among adults. For example, a decrease of 1 µg/m^3 in long-term exposure to PM2.5 can prevent about 34 deaths per 100,000 adults annually. For NOx, the health impact is more complex due to its role in forming secondary pollutants like ozone and fine particulates, but it significantly contributes to respiratory and cardiovascular diseases.
- **Purpose:** The primary purpose of these initiatives is to transition to a low-carbon economy and reduce the ecological footprint of energy production and transportation. This transition is crucial for mitigating climate change, preserving biodiversity, and ensuring sustainable development.
- **Responsibility:** Zorlu Enerji's sustainability and QHSE teams.
- **Duration:** Ongoing

Training and Awareness:

- **Scope:** All sites
- **Actions:**
    - Implementing training programs for staff on species protection.
    - Conducting training sessions, workshops, and provide informational materials.
    - Educating all employee on Critical Species Booklet. The species listed in the booklet are evaluated within the framework of the Bern Convention, an agreement for the conservation of European wildlife and natural habitats, and the CITES Convention, which regulates international trade to protect wild animal and plant species.
- **Purpose:** These programs foster a culture of environmental responsibility and stewardship among employees, ensuring that biodiversity conservation is integrated into daily operations.
- **Responsibility:** Expert biologists, BEMS officials
- **Duration:** Continuous during operation

Zorlu Enerji implements detailed BAP (Biodiversity Action Plans) for site specific requirements. Actions are managed by QDMS platform from Corporate Level. Actions have been assigned to related site managers and followed up.