

BIODIVERSITY MANAGEMENT PLAN (BMP)
WATER STORAGE, TRANSFER AND FLOOD PROTECTION
PROGRAM (STPCI II)
SUPPLY AND INSTALLATION OF WATER TRANSFER LINE OVER 82
KILOMETRES BETWEEN THE SEJNANE DAM AND THE MEDJERDA–CAP
BON CANAL

	BIODIVERSITY MANAGEMENT PLAN (BMP) FOR FLORA AND HABITATS SUPPLY AND INSTALLATION OF WATER TRANSFER LINE OVER 82 KILOMETERS BETWEEN THE SEJNANE DAM AND THE MEDJERDA–CAP BON CANAL	JUNE 2026
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REPORT Biodiversity Management Plan (BMP)
 Water Storage, Transfer and Flood Protection Program (STPCI II)
 Supply and installation of water transfer line over 82 kilometres between the Sejnane Dam and the Medjerda–Cap Bon Canal

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This report has been prepared in accordance with EAM's Integrated Management System.

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ACRONYMES & ABREVIATIONS

BMP	Biodiversity Management Plan
EBRD	European Bank for Reconstruction and Development
E&S	Environnemental et Social
EAM	Environmental Assessment & Management
ESR	Environmental and social requirements
EIES	Environmental and Social Impact Assessment
IBA	Important Bird Areas
IUCN	International Union for Conservation of Nature
KBA	Key Biodiversity Area
OP	Observation point
PBF	Priority biodiversity feature
STPCI II	Water Storage, Transfer and Flood Protection Program

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1 INTRODUCTION

1.1 PROJECT CONTEXT

Against a backdrop of increasing climate variability and water stress, Tunisia faces marked regional disparities in water availability. The northern river basins receive rainfall exceeding local demand, with annual rainfall ranging from approximately 400 to 1,500 mm, whilst the central and southern regions suffer from chronic water scarcity, with significantly lower annual rainfall, estimated at around 200 to 400 mm.

In response to these structural imbalances, the Tunisian Government has launched the ‘STPCI II’ Water Storage, Transfer and Flood Protection Program. The STPCI II program comprises several components, notably:

1. Supply and installation of pipes over 82 kilometers (DN1800, nominal capacity 4m³/s);
2. Construction and equipment of two pumping stations with an individual capacity of 4 m³/s and their loading basins;
3. Rehabilitation and equipment of a mini-hydroelectric power plant with a capacity of 2x743kW;
4. Installation of a photovoltaic park (if necessary, floating) with a capacity of 2,000 kW;
5. Construction of main hydraulic structures;
6. Small hydraulic structures and transitional structures

This report exclusively covers Component 1, financed by the European Bank for Reconstruction and Development (EBRD), namely the installation of a fourth transfer pipeline, 82 km in length, between the Sejnane Dam and the Medjerda–Cap Bon Canal (Control Structure 3, Béjaoua). The other components of the program are financed by KfW and the European Union (EU).

1.2 PROJECT CATEGORIZATION

The project is classified as Category “B” in accordance with the European Bank for Reconstruction and Development (EBRD) Environmental and Social Requirements (2024).

1.3 PURPOSE OF THIS DOCUMENT

This document constitutes the Biodiversity Management Plan (BMP) along the project corridor. It defines the measures aimed at avoiding, reducing, and, where appropriate, compensating for the project’s potential impacts on floral biodiversity. It also demonstrates the priority application of impact avoidance, followed by mitigation and restoration measures, and establishes a clear strategy for No Net Loss or, where appropriate, Net Gain in biodiversity.

The BMP serves as an operational environmental management tool ensuring that measures related to risks and impacts on flora are effectively implemented, monitored, and maintained

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throughout the project lifecycle. It specifies the implementation responsibilities of the Promoter, namely the General Directorate of Dams and Major Hydraulic Works (DGBGTH), as well as the EPC contractors, during both the construction and operation phases.

The objectives of this Flora BMP are in particular to:

- identify and define mitigation and monitoring measures for floral biodiversity in accordance with the European Bank for Reconstruction and Development (EBRD) Environmental and Social Requirement 6 (ESR6) on biodiversity conservation and sustainable management of living natural resources;
- apply the mitigation hierarchy by prioritizing avoidance of impacts on floral biodiversity and, where this is not possible, their reduction, mitigation, restoration, and compensation;
- integrate biodiversity management of flora into all environmental and social management plans and procedures throughout the project lifecycle;
- establish a monitoring and surveillance program to assess the effectiveness of implemented measures and the evolution of residual impacts on flora;
- ensure reporting and the implementation of corrective measures where necessary, in order to achieve the objectives, set out in this Plan.

2 PROJECT DESCRIPTION

2.1 GEOGRAPHICAL LOCATION

The Project consists of the installation of a water transfer pipeline approximately 82 km in length, with a nominal diameter of DN1800 and a design flow of 4 m³/s, conveying water from Sejnane Dam to the Medjerda–Cap Bon Canal. Construction works involve excavating a trench approximately 15 m wide and up to 3 m deep for a single pipeline of approximately 1.8 m diameter. The Project is classified as Category B under the EBRD Environmental and Social Policy (2024).

The pipeline corridor crosses three governorates in northern Tunisia:

- Governorate of Bizerte (delegations of Bizerte Sud, Ghezala, Mateur and Utique).
- Governorate of Manouba (delegations of Jedaïda and Oued Ellil).
- Governorate of Ariana (delegation of Sidi Thabet)



Figure 2-1: Administrative map along the water transfer pipeline

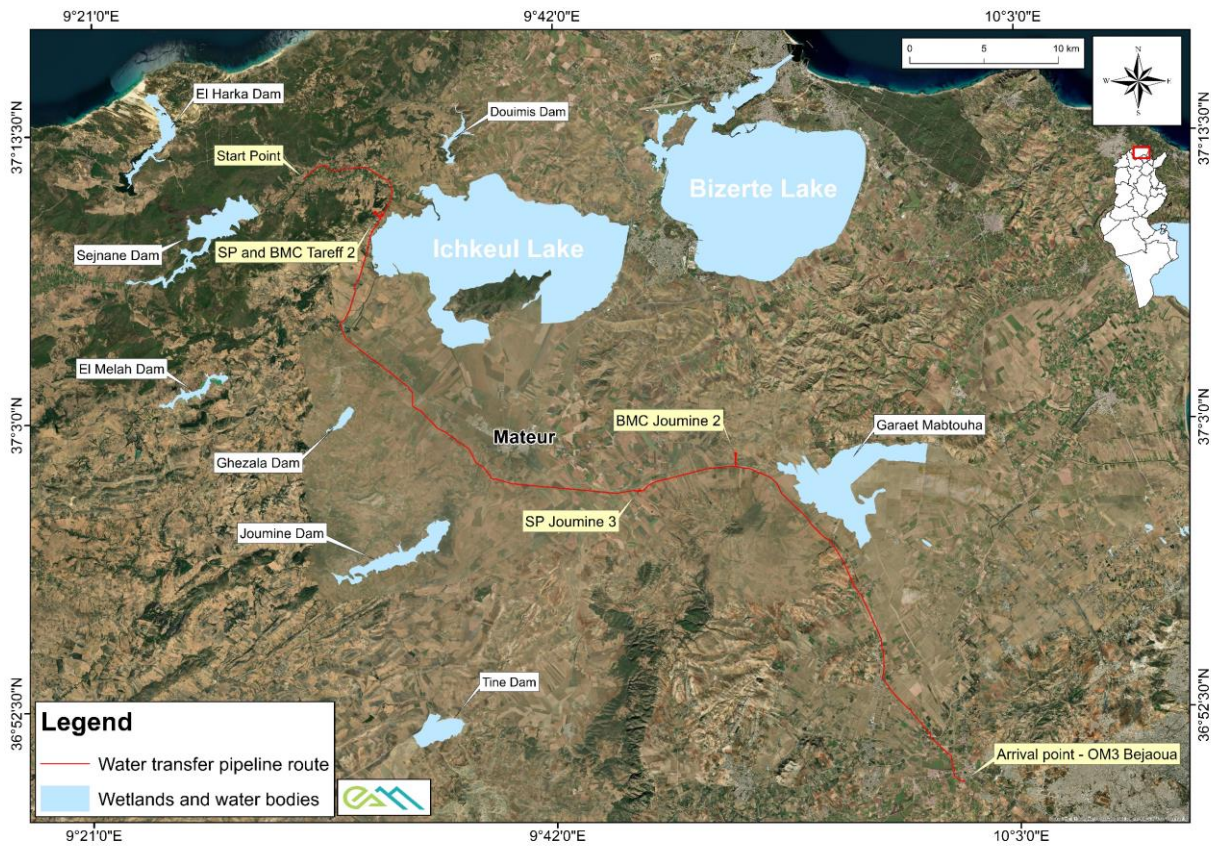


Figure 2-2: Spatial mapping along the pipeline corridor

2.2 SUMMARY OF PROJECT COMPONENTS

The STPCI II program includes several infrastructure components. This study focuses exclusively on the construction of an 80 km water transfer pipeline (hereinafter referred to as “the Project”), with a nominal diameter of DN1800 and a design flow rate of 4 m³/s. This pipeline is designed to convey water from the Sejnane Dam, either by gravity flow or by pumping, depending on topographic conditions.

The works will include the excavation of a trench approximately 15 m wide and up to 3 m deep for the installation of a single pipeline with an estimated diameter of 1.8 m

3 NATIONAL LEGISLATION AND EBRD REQUIREMENTS

3.1 NATIONAL LEGISLATION

The legal framework established in Tunisia covers most aspects related to environmental protection, pollution control, and the improvement of living conditions.

In addition to international conventions, a comprehensive legal framework has been established to preserve and protect biodiversity. The main relevant legal texts are listed below. The local regulatory and legislative framework related to biodiversity management includes, in particular, the following instruments:

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Law No. 88-20 establishing the Forestry Code of 13 April 1988, revising the Forestry Code, as amended and supplemented by Law No. 2005-13 of 26 January 2005. The Forestry Code constitutes the basic legal framework for the conservation of natural environments (forests, alfa grasslands, rangelands, lands designated for forestry, national parks and natural reserves, as well as wildlife and flora). It also governs the management of national parks. It stipulates that development works and projects may only be undertaken in areas governed by the Forestry Code after authorization from the Minister of Agriculture. With regard to national parks, the Forestry Code prohibits or restricts any activities likely to harm the natural development of fauna and flora, including hunting, advertising and commercial activities, extraction of materials, water use, public access, and circulation. It also defines offences involving protected wildlife and flora within national parks as serious offences that cannot be subject to settlement.

Ministerial Order of the Minister of Agriculture and Water Resources of 19 July 2006, establishing the list of rare and threatened wild species. This order defines the list of rare and threatened wild fauna and flora species.

Law No. 92-72 of 3 August 1992 revising phytosanitary legislation
This law sets out the general provisions relating to plant protection and the organization of the agricultural pesticide sector.

Ministerial Order of the Minister of Agriculture and Water Resources of 29 June 2006, setting the conditions for granting temporary occupation permits of the State forestry domain. It prohibits the authorization of any temporary structure likely to have a negative impact and to present a risk to the environment and natural resources within forest areas, national parks, natural parks, and zones designated for the protection of fauna and flora.

3.2 INTERNATIONAL CONVENTIONS RATIFIED BY TUNISIA

Tunisia has ratified more than 60 international conventions and agreements concerning environmental protection. It has developed information systems as part of the implementation of the three RIO conventions to facilitate reporting to various organizations, including: (i) the information system developed as part of the implementation of the Convention on Biological Diversity; and (ii) the information system on the Clean Development Mechanism.

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Tableau 3-1: International Conventions Ratified by Tunisia

International Conventions	Ratification text
Stockholm Convention on Persistent Organic Pollutants (POPs)	Decree No. 2004-918 of April 13, 2004
Cartagena Protocol on Biosafety.	Law n°2002-58 of June 25, 2002
Kyoto Protocol and Law 93-46 of May 3, 1993, ratifying the United Nations Framework Convention on Climate Change.	Law 2002-55 of June 19, 2002
Agreement Relating to the Establishment and Operation of the Observatory of the Sahara and Sahel	Law n°2000- 12 of February 7, 2000
Bern Convention on the Conservation of European Wildlife and Natural Habitats.	Law n° 95-75 of 07/08/95
Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal.	Law 95-63 of July 10, 1995
United Nations Convention to Combat Desertification in Those Countries Experiencing Serious Drought.	Law 95-52 of June 19, 1995
United Nations Convention on Biological Diversity.	Law 93-45 of May 3, 1993
United Nations Framework Convention on Climate Change.	Law 93-46 of May 3, 1993
Convention on the Conservation of Migratory Species of Wild Animals.	Law 86-63 of July 16, 1986
Convention on Wetlands of International Importance.	Law No. 80-9 of March 3, 1980
Protocol relating to the cooperation of North African States in the fight against desertification.	Law 71-1 of January 25, 1979
African Convention for the Conservation of Nature and Natural Resources.	Law 76-91 of November 4, 1976
Convention for the Protection of the World Cultural and Natural Heritage.	Law 74-89 of December 11, 1974
Convention on International Trade in Endangered Species of Wild Fauna and Flora	Law 74-12 of March 11, 1974

3.3 EBRD REQUIREMENTS

In accordance with Environmental and Social Requirement No. 6 (ESR6) on the conservation of biodiversity and sustainable management of living natural resources of the European Bank for Reconstruction and Development, the Project shall incorporate specific measures aimed at avoiding, reducing, and managing potential impacts on natural habitats and local flora.

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The water pipeline installation works may require localized vegetation clearing and superficial topsoil stripping within the project footprint, thereby causing disturbances to certain plant communities. In this context, floral species and associated habitats that may be affected shall receive particular attention within the framework of this Biodiversity Management Plan. Appropriate avoidance measures shall be prioritized as the primary mitigation approach.

4 RESULTS OF THE HABITAT AND FLORA SURVEY (SUMMARY)

The entire proposed alignment, approximately 82 km in length, extends from the starting point located about 4 km from the Sejnane Dam to Control Structure 3 at Béjoua. Thirty-four (34) observation points were strategically distributed along the corridor to ensure representative coverage of the diversity of landscape units and habitat transitions encountered. At each point a comprehensive ecological floristic inventory was compiled, habitats were identified and mapped against Berne Convention resolution 4 denomination. and the conservation status of all species was assessed against the IUCN Red List (2025.1) and the Tunisian Red Data Book. The table below presents the different habitats observed along the alignment.

Table 4-1: Habitats observed along the route and their ecological characteristics

Habitat type	Percentage along the route	Ecological characterization	Classification UICN	EUNIS code & habitat name	Resolution 4 of the Bern Convention
Natural Mediterranean maquis	≈1,4%	Dense, well-structured woodland with high biodiversity	Natural habitat	F5.12: Olea europaea and Pistacia lentiscus matorra	Not listed
Degraded maquis	≈1,3%	Fragmentation, grazing pressure, ruderal species	Modified habitat	F5.12: Olea europaea and Pistacia lentiscus matorral (Degraded habitat)	Not listed
Forest and pre-forest formations	≈1,5%	Natural habitat in an area of direct disturbance	Natural habitat	Mosaic of F5.1 and G3.7 F5.1: Arborescent matorral G3.7: Lowland to montane mediterranean Pinus woodland	F5.1 Not listed G3.7 Listed
wadis and their riparian vegetation	≈1,7%	Hydrological corridors, hygrophilous vegetation	Natural humid habitat	F9.3: Southern riparian galleries and thickets C3.2: Water-fringing reedbeds and tall helophytes other than canes C3.21: Reed beds of Phragmites australis	F9.3 et C3.2 Listed C3.21 Not listed
Agroecosystems	≈92%	Cultivated systems, high levels of human impact	Modified habitat	I1 – Arable land (Crops and farming systems)	Not listed
Urban areas	≈2%	Infrastructure, total land-use change	Artificial habitat	J – Built-up areas, industrial sites and other man-made environments	Not listed

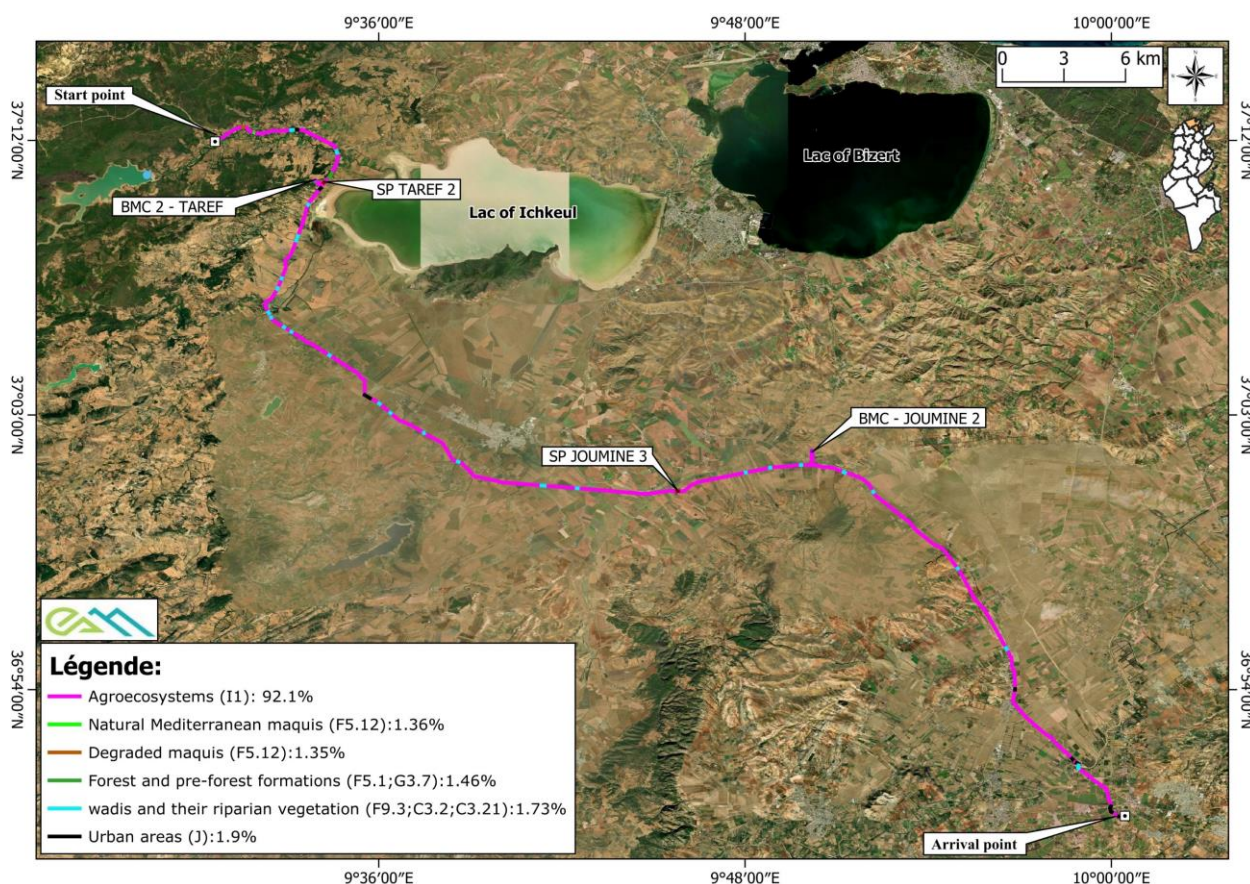


Figure 4-1: Maps of Habitats identified along the pipeline corridor

Regarding the taxonomic composition of the flora, the majority of species recorded along the route are classified as “Least Concern” (LC) or “Not Evaluated” (NE) on the IUCN Global Red List (2025.1), with the exception of *Eucalyptus camaldulensis*, which is classified as “Near Threatened” (NT), an introduced species. At the national level, none of the recorded taxa are protected. In addition, no taxa strictly endemic to Tunisia or the Maghreb were identified along the route.

The flora observed along the alignment is mainly composed of common Mediterranean or cosmopolitan species adapted to semi-natural, agricultural, ruderal, and hydromorphic environments of northern Tunisia.

Furthermore, the EIA identified two species potentially present and classified as “Critically Endangered” (CR) on the Tunisian Red List: *Carex pseudocyperus* and *Crypsis schoenoides*. However, neither of these species was recorded during field surveys. *Carex pseudocyperus* is not listed in the official Tunisian national flora and is only known from old historical records located far from the project area. its presence within the study area is therefore considered unlikely.

As for *Crypsis schoenoides*, although also absent from the official national flora, it has been reported in certain wetlands in northern Tunisia, particularly around Oued Joumine. Due to its strict summer phenology, field surveys conducted in April, during a period of active wadi flow, did not allow its presence to be confirmed or excluded. Nevertheless, even in the event of its presence, this small annual grass is not expected to be affected by the aerial overhead crossing of the canal. The species is therefore considered potentially relevant to floral biodiversity (PBF).

4.1 PROTECTED AREAS

Two internationally important protected areas have been identified in the vicinity of the water transfer pipeline route and the planned structures: Ichkeul National Park and Garaet Mabtough.



Figure 4-2: Protected Areas Map

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Table 4-2: Proximity and Relevance of Internationally Designated Biodiversity Sites to the Project Area

Site	Designation(s)	Distance	Relevance to Project
Ichkeul National Park	UNESCO World Heritage Site, UNESCO Biosphere Reserve, Ramsar Site, National Park, IBA, KBA	~47m (nearest point)	The most significant designated site in proximity to the Project. The pipeline trace runs alongside the lake for ~4 km without crossing it. The oueds intercepted by the pipeline are the primary hydrological inputs to the lake.
Garaet Mabtouh	IBA	~1.3 km	Residual freshwater marsh of the lower Medjerda alluvial plain. No direct physical interaction with the Project anticipated.

5 CRITICAL HABITAT ASSESSMENT

A Critical Habitat Assessment has been conducted for the STPCI II pipeline project (Sejnane–Medjerda corridor, ~82 km) in accordance with the screening and determination framework established under EBRD ESR6. Screening was applied across all five ESR6 Critical Habitat criteria:

- **Criterion i:** Three habitat types listed under Bern Convention Resolution 4 are present within the Aol: Southern riparian galleries and thickets (EUNIS F9.3), Water-fringing reedbeds and tall helophytes other than canes (EUNIS C3.2), and Mediterranean pine woodland (EUNIS G3.7). Their spatial extents within the Aol (1.7% and ~1.5% of the 40 m buffer respectively) do not reach the ≥5% global extent threshold for any IUCN CR/EN ecosystem type. Therefore, they do not trigger Critical Habitat under EBRD ESR6 criterion i.
- **Under Criteria iii, iv and v,** no endemic or geographically restricted species, globally significant migratory or congregatory species, or evolutionary hotspots were identified within the Area of Influence. Critical Habitat under these criteria has therefore not been triggered.

However, a number of Priority Biodiversity Features (PBFs) have been identified:

- **Threatened habitats:** wadis and riparian vegetation (F9.3/C3.2) and Mediterranean pine woodland mosaic (G3.7), both listed under Bern Convention Resolution 4 (PBF Criterion i)
- **Species:** *Crypsis schoenoides* (Tunisia RDB: CR), *Testudo graeca* (IUCN: VU), *Anodonta lucasi* (IUCN: CR) and *Potomida littoralis* (IUCN: EN) (PBF Criterion ii).
- **Significant biodiversity features:** Ichkeul National Park (UNESCO WHS / Ramsar / KBA / IBA) and Garaet Mabtouh (IBA) (PBF Criterion iii).

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- **Ecological function:** the wadi network providing hydrological connectivity to the Ichkeul Ramsar site (PBF Criterion iv). The water balance, salinity dynamics and submerged macrophyte communities of lake Ichkeul and, by extension, the wintering waterbird assemblages that depend on them, are contingent on the continuity of these flows.

Figure 5-1: Identified Priority biodiversity features

PBF	PBF Criterion	Status
Garaet Mabtough (IBA)	iii	IBA
Wadi network and riparian vegetation (F9.3 / C3.2) - Hydrological connectivity to Ichkeul	i, iv	Bern Conv. Resolution 4
Mediterranean pine woodland mosaic (G3.7)	i	Bern Conv. Resolution 4
<i>Crypsis schoenoides</i>	ii	Tunisia RDB: CR IUCN Global: LC
<i>Testudo graeca</i>	ii	IUCN Global: VU
<i>Anodonta lucasi</i>	ii	IUCN Global: CR
<i>Potomida littoralis</i>		IUCN Global: EN

6 Roles and Responsibilities

The main roles and responsibilities for the implementation of the BMP are described in the table below:

Table 6-1: Key Roles and Responsibilities

Roles	Responsibilities
EBRD	The EBRD is responsible for: ▪ Receiving and reviewing regular reports from the DGBGTH and the EPC contractor during the pre-construction, construction, and operation phases regarding the implementation of the BMP. ▪ Ensuring that the BMP and related plans are regularly updated. ▪ Ensuring that the DGBGTH and EPC contractors have sufficient and qualified resources to implement the plans. ▪ Verifying the implementation of the BMP and associated plans.

Roles	Responsibilities
DGBGTH	As the project promoter, the DGBGTH will retain overall accountability for the implementation of the BMP while implementation responsibilities will be delegated to the EPC Contractor through the EPC Contract. ▪ The Environmental and Social Project Implementation Unit will ensure that the provisions of this BMP are strictly complied with throughout all phases of the project. ▪ The Environmental and Social Project Implementation Unit shall be composed, where appropriate, of qualified biodiversity specialists to: ▪ Coordinate biodiversity-related aspects within procurement processes, tender documents, and contracts. ▪ Coordinate the implementation of biodiversity mitigation and monitoring measures. ▪ Verify the implementation of the BMP and identify corrective actions. ▪ Update the BMP based on audit findings or as required.
EPC contractor	The EPC contractor shall comply with all applicable national and international legislation and adhere to all mitigation and monitoring measures specified in this Management Plan. Prior to the start of construction works, the EPC contractor shall prepare a Construction Management Plan, including an implementation schedule. During the construction phase, the EPC contractor shall assume overall responsibility for the implementation and monitoring of the BMP. It shall ensure that sufficient, adequate, and competent resources are available to meet the BMP requirements. The EPC contractor is responsible for the continuous management of potential impacts on flora, whether carried out directly by itself or by subcontractors. All subcontractors must comply with all applicable requirements. The EPC contractor shall appoint, for the entire duration of the works, the following specialists: ▪ HSE Manager ▪ Environmental Manager ▪ Biodiversity Advisor <u>HSE Manager</u>

Roles	Responsibilities
	▪ Ensure that the Biodiversity Management Plan (BMP) is regularly updated, adapted to project conditions, and effectively implemented. ▪ Ensure that all mitigation measures, management actions, and monitoring activities defined in the BMP are carried out within the required timeframes and in accordance with applicable requirements. ▪ Propose, where necessary, improvements, modifications, or updates to the BMP and ensure the issuance of corresponding revisions. ▪ Implement an environmental inspection and internal audit programme to verify compliance with BMP requirements and the effectiveness of the adopted measures. ▪ Identify and address environmental non-conformities by defining and following up appropriate corrective and preventive actions. ▪ Immediately report to the DGBGTH any major non-compliance that could result in significant impacts on biodiversity or affect the project’s environmental compliance. ▪ Collect, organize, and analyze data from environmental monitoring activities, and prepare summaries and reports for the DGBGTH, relevant stakeholders, and lender <u>Environmental Manager</u> ▪ Ensure the implementation of the Biodiversity Management Plan (BMP) on site and verify compliance with its requirements. ▪ Coordinate the day-to-day environmental management activities during the construction phase. ▪ Support the implementation of mitigation and monitoring measures related to biodiversity and environmental protection. ▪ Conduct regular site inspections to ensure compliance with environmental requirements and identify potential risks or deviations. ▪ Assist in the identification and management of environmental non-conformities and support the implementation of corrective and preventive actions. ▪ Liaise with the HSE Manager, biodiversity specialists, EPC contractor teams, and subcontractors to ensure effective environmental performance.

Roles	Responsibilities
	▪ Contribute to the preparation of environmental monitoring reports and documentation to be submitted to the DGBGTH and lenders <u>Biodiversity Advisors</u> ▪ Provide technical expertise on biodiversity conservation and ecological management throughout the project lifecycle. ▪ Support the implementation of the Biodiversity Management Plan (BMP), including mitigation, monitoring, and restoration measures. ▪ Conduct field surveys and ecological assessments to monitor flora, habitats, and sensitive ecological features within the project area. ▪ Advise on best practices to avoid, minimize, and mitigate impacts on biodiversity, in line with EBRD Environmental and Social Requirements. ▪ Assist in the identification of Priority Biodiversity Features (PBFs) and potential ecological risks associated with project activities. ▪ Contribute to the development and review of biodiversity-related procedures, monitoring protocols, and reporting tools. ▪ Support the HSE and Environmental teams in addressing ecological non-conformities and proposing corrective actions where necessary. ▪ Prepare technical inputs for biodiversity monitoring reports to be submitted to the DGBGTH and lenders
Subcontractors	All subcontractors involved in the Project shall comply with all applicable requirements related to the management of potential impacts on biodiversity associated with their activities. In this regard, they shall ensure, under the supervision of the main contractor, the continuous and effective implementation of the prevention, avoidance, mitigation, and monitoring measures defined in the Biodiversity Management Plan (BMP), in order to ensure proper control of environmental risks associated with the works carried out.

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7 STAKEHOLDER ENGAGEMENT

A consultation meeting was held with representatives of the General Directorate of Dams and Major Hydraulic Works (DGBGTH) and senior officials from the Directorate General of Forestry (DGF). The objective of this meeting was to review the potential interactions of the pipeline alignment with sensitive natural environments within the study area, in particular the Ichkeul National Park, a UNESCO World Heritage Site and a Wetland of International Importance under the Ramsar Convention.

During the meeting, the DGF was informed of the canal alignment in proximity to the boundary of the Ichkeul lagoon. It was specified that the minimum distance of 47 m separating the canal alignment from the lagoon perimeter is considered sufficient to rule out any impact on the ecological integrity of the lagoon. This buffer is further reinforced by the presence of an existing physical barrier between the lagoon and the project alignment, namely the road running along the lagoon's perimeter, which lies between the canal route and the water body. This pre-existing infrastructure provides an additional barrier preventing any direct interaction between construction works and the lagoon.

Discussions also addressed the crossing of the canal through certain drainage channels converging towards the Ichkeul lagoon. It was concluded that the impact of these crossings would be ecologically and biologically negligible. This conclusion is based on two main considerations: the limited width of most of the affected drainage channels, and the overhead crossing design of each canal section at the level of the wadi beds, which ensures the preservation of hydrological continuity and the free flow of water towards the lagoon.

Finally, it was agreed through these consultations that the pipeline alignment crossing the various natural areas and habitats will not result in any habitat fragmentation. This absence of fragmentation ensures the maintenance of existing ecological corridors, thereby preserving the structural integrity and ecological functionality of the habitats traversed.

8 IMPACT ASSESSMENT

Activities undertaken during the construction and operation phases of the project may have an impact on flora. In addition, construction activities may also alter the structure and function of habitats within the project area, both directly and indirectly.

Impacts can be assessed by considering the likelihood of potential impacts and their consequences, as illustrated in the table below. Construction and operation activities that could affect biodiversity and habitats, as well as their associated risk ratings, are summarized in the table below.

Table 8-1: Risk Matrix

Impact Magnitude	Receptor Sensitivity / Value
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	High	Medium	Low	Negligible
High	Major	Major	Moderate	Negligible
Medium	Major	Moderate	Minor	Negligible
Low	Moderate	Minor	Minor	Negligible
Negligible	Negligible	Negligible	Negligible	Negligible

The Biodiversity Management Plan (BMP) aims to identify measures to mitigate or reduce impacts to acceptable levels.

The BMP will first assess the significance of impacts generated by the Project, and then define mitigation measures in accordance with the following hierarchy:

- Avoid impacts or eliminate them at the design stage where possible;
- Consider technical alternatives or design modifications to reduce impacts as much as possible;
- Implement measures to minimize and manage impacts; and, as a last resort;
- Identify fair compensation, remediation, and ecological offset measures to address any potentially significant residual impacts.

Some negative impacts can be easily mitigated, while others are more complex or technically or economically difficult to reduce. The various potential impacts will be described in the BMP, along with a list of feasible mitigation measures that can be implemented. In addition, regarding positive impacts, these are not mitigation measures but rather recommendations aimed at enhancing their beneficial effects.

The assessment of residual impacts during the construction and operation phases is presented in the tables below.

Table 8-2: Assessment of residual impacts

Impact Title	Initial impact significance	Management Plan linked to the mitigation measures	Residual impact	Justification
<i>Assessment of Residual Impacts during the Construction Phase</i>				
Potential Impact on Ichkeul National Park (UNESCO WHS /	Minor	Biodiversity Management Plan	Negligible	Ichkeul National Park qualifies as Critical Habitat under ESR6 Criterion i, as an ecosystem of high priority under national and international systematic conservation planning. However, the project AoI does not overlap

Impact Title	Initial impact significance	Management Plan linked to the mitigation measures	Residual impact	Justification
Ramsar / KBA / IBA)				with the designated site; nearest pipeline point is ~47 m from the lake shore, with an existing road providing an additional physical barrier.
Potential Impact on agrosystem habitats	Minor	Biodiversity Management Plan	Negligible	Anthropized habitat – These are heavily transformed systems characterized by floristic simplification, structural homogenization, and a significant reduction in ecological niches.
Potential Impact on natural Mediterranean maquis habitats	Moderate	Biodiversity Management Plan	Minor	Natural habitat – No Net Loss applicable. However, the environment demonstrates a strong capacity for ecological recovery and stability despite the presence of two existing canals, provided that the planned mitigation and management measures are properly implemented.
Potential Impact on degraded maquis habitats	Minor	Biodiversity Management Plan	Negligible	Modified habitat – These environments correspond to transitional zones subject to direct disturbances and reflect ecological regression dynamics linked to anthropogenic pressures, particularly overgrazing and habitat fragmentation. In cases where the destruction of certain habitats is unavoidable, it is recommended to promote a gradual replacement by herbaceous vegetation cover in order to limit degradation processes and contribute to the ecological

Impact Title	Initial impact significance	Management Plan linked to the mitigation measures	Residual impact	Justification
				restoration of the environment. This vegetation cover may naturally evolve into a more stable chamaephytic vegetation, depending on local ecological conditions and the level of pressure exerted on the ecosystem.
Potential Impact on forest and pre-forest formations	Moderate	Biodiversity Management Plan	Minor	Natural habitat – classified under Bern Convention Resolution 4 (EUNIS: G3.7: Lowland to montane mediterranean Pinus woodland) requiring specific conservation measures. This habitat is present in limited extent at the upstream end of the corridor (Colline de Tarref). No Net Loss applicable.
Potential Impact on wadis and their riparian vegetation habitats	Moderate	Biodiversity Management Plan	Minor	Natural wetland habitat – classified under Bern Convention Resolution 4 (EUNIS: F9.3: Southern riparian galleries and thickets; C3.2: Water-fringing reedbeds and tall helophytes other than canes) requiring specific conservation measures. No Net Loss applicable. The Wadis network is vital to maintaining the viability of the biodiversity features of the Ichkeul Ramsar/UNESCO World Heritage Site. All wadi crossings will be designed as aerial aqueducts, fully preserving hydrological continuity with the Ichkeul.

Impact Title	Initial impact significance	Management Plan linked to the mitigation measures	Residual impact	Justification
Potential Impact on peri-urban habitats	Negligible	None, as no mitigation measures are applicable to this impact.	Negligible	Artificialized habitat – These are fully artificial environments, lacking significant ecological functionality.
Potential impacts on fauna	Minor	Biodiversity Management Plan	Negligible	Presence of species of conservation concern flagged in the ESDD and identified as PBFs. <i>Anodonta lucasi</i> (IUCN: CR) and <i>Potomida littoralis</i> (IUCN: EN) are freshwater mollusc potentially present within wadis (Oued Joumine) and would not be affected by the aerial crossing design adopted for all Oued intersections.
<i>Assessment of residual impacts during the operation phase</i>				
Potential Impact on agrosystem habitats	Negligible	None, as no mitigation measures are applicable to this impact during the operation phase.	Negligible	None, as no mitigation measures are applicable to this impact during the operation phase.
Potential Impact on natural Mediterranean maquis habitats	Minor	Biodiversity Management Plan	Negligible	High ecological recovery capacity; however, it is important to implement ecological monitoring over a period of 3 years in order to adjust management measures and maintain or restore natural habitats.
Potential Impact on degraded maquis habitats	Minor	Biodiversity Management Plan	Negligible	It is recommended to implement ecological monitoring over a period of three years in order to adjust

Impact Title	Initial impact significance	Management Plan linked to the mitigation measures	Residual impact	Justification
				management measures and maintain or restore natural habitats.
Potential Impact on forest and pre-forest formations	Minor	Biodiversity Management Plan	Negligible	Implement ecological monitoring over a period of three years in order to adjust management measures and maintain or restore natural habitats. No further intervention will be conducted after the construction phase.
Potential Impact on wadis and their riparian vegetation habitats	Minor	Biodiversity Management Plan	Negligible	Implement ecological monitoring over a period of three years in order to adjust management measures and maintain or restore natural habitats. No further intervention will be conducted after the construction phase beyond maintenance activities. To the aerial aqueducts.
Potential Impact on peri-urban habitats	Negligible	None, as no mitigation measures are applicable to this impact during the operation phase.	Negligible	None, as no mitigation measures are applicable to this impact during the operational phase.

9 Mitigation measures and management controls

This section presents the mitigation measures and management methods that the BMP aims to implement.

The BMP distinguishes between measures to be applied during the construction and operation phases. Relevant BMP actions for the construction phase, as listed in the table below, shall

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be incorporated into the tender specifications for EPC contractors and subsequently included in the EPC contract.

9.1 CONSTRUCTION PHASE

Standard/ Benchmark	Potential Impacts	Management action / Mitigation measures	Monitoring actions	Frequency	Responsibility
ESR 6 on Biodiversity Conservation and Sustainable Management of Living Natural Resources (Responsibilities of DGBGTH)	Potential Impact on Ichkeul National Park (UNESCO WHS /Ramsar/KBA / IBA)	The DGBGTH shall consult the Directorate General of Forestry (DGF) prior to undertaking any vegetation clearing or removal activities, as this is essential to obtain all necessary permits and ensure compliance with environmental regulations. Involve the DGF in monitoring the works by keeping them regularly informed of the construction progress.	The DGBGTH shall review the implementation of the water transfer pipeline as well as the relevant requirements of the Biodiversity Management Plan falling under the responsibility of the EPC contractor.	Ongoing during the construction stage	EPC Contractor under the supervision of DGBGTH
	Potential Impact on agroecosystem habitats				
	Potential Impact on natural Mediterranean maquis habitats				
	Potential Impact on degraded maquis habitats				
	Potential Impact on forest and pre-forest formations				
	Potential Impact on wadis and their riparian vegetation habitats				
	Potential Impact on fauna				

Standard/ Benchmark	Potential Impacts	Management action / Mitigation measures	Monitoring actions	Frequency	Responsibility
Prohibit regular vehicle movements ESR 6 on Biodiversity Conservation and Sustainable Management of Living Natural Resources (Responsibilities of EPC contractor)	Potential Impact on Ichkeul National Park (UNESCO WHS / Ramsar / KBA / IBA)	- Conduct dedicated training for all staff working within the Ichkeul section to inform them of site location and significance. - Arrange for an ecological and environmental expert to be present on site. - Prohibit uncontrolled staff access into Ichkeul NP. - Prohibit poaching and hunting of all fauna and avifauna. - All spoil from the section closest to Ichkeul to be removed to a designated disposal site far away from the NP boundary. - Conduct pre-construction nest-search surveys for breeding birds in the section of the pipeline closest to the Ichkeul boundary between OP9 (37°11'34.69"N, 9°34'45.76"E) and OP12 (37°09'09.46"N, 9°33'29.16"E). Surveys shall be carried out prior to the commencement of construction works. In addition, construction activities within this section shall be avoided during the breeding period (April to July). If nesting avifauna species are identified, engage a qualified ornithologist to verify the presence or absence of sensitive species and active nesting sites prior to works. Where nesting is confirmed, appropriate measures shall be defined by the ornithologist to	The DGBGTH shall carry out continuous monitoring during the construction phase in accordance with the Biodiversity Management Plan (the Plan being under the responsibility of the EPC contractor).	Continuously, as defined in the Biodiversity Management Plan.	EPC contractor

Standard/ Benchmark	Potential Impacts	Management action / Mitigation measures	Monitoring actions	Frequency	Responsibility
		continue activities, subject to implementation of measures ensuring no significant impact on the reproductive success of the affected species.			
	Potential Impact on agroecosystem habitats	Establish a works schedule taking into account the climatic seasonality of the project. It is recommended that clearing and earthworks be carried out during the dry season (July to September).	The DGBGTH shall carry out continuous monitoring during the construction phase in accordance with the Biodiversity Management Plan (the Plan being under the responsibility of the EPC contractor).	Continuously, as defined in the Biodiversity Management Plan.	EPC contractor
	Potential Impact on degraded maquis habitats	- Prohibit vehicle movements on unpaved or dirty roads and maintain vehicle speeds at 15–20 km/h. - Where stripping is required, carefully remove and store topsoil. - The EPC contractor shall optimize the movement of construction equipment to minimize impacts on flora. - Prevent the introduction of invasive plant species during construction by ensuring that machinery is cleaned before arriving on site. - Cover, which will evolve in the long term into chamaephytic vegetation. - Where stripping is required, carefully remove and store topsoil. - The machines used will be regularly serviced to reduce the risk of accidental pollution. All			

Standard/ Benchmark	Potential Impacts	Management action / Mitigation measures	Monitoring actions	Frequency	Responsibility
		maintenance activities will take place in a dedicated area. ▪ The EPC contractor shall optimize the movement of construction equipment in order to minimize impacts on flora ▪ Providing ongoing training and awareness-raising (at the beginning of the works and once a month depending on the number of workers) for all project employees in waste management practices to avoid and reduce the risk of waste generation and its potential impact during the construction phase ▪ Ensure that a good practice of waste management is applied. ▪ Employees and subcontractors working on site will be made aware of the protected species potentially present in the area, in order to ensure constant monitoring and promote mitigation. ▪ The sensitivity and interest of Ichkeul will be communicated to all workers on site. ▪ In order to avoid introducing invasive vegetal species during the works, it is recommended that machinery be cleaned before arriving on every habitat along the pipeline. Quality controls will also be carried out on materials brought to every habitat			

Standard/ Benchmark	Potential Impacts	Management action / Mitigation measures	Monitoring actions	Frequency	Responsibility
	Potential Impact on natural Mediterranean maquis habitats Potential Impact on forest and pre-forest formations habitats	▪ The project shall apply the “No Net Loss (NNL)” principle in natural habitats to ensure no net loss of vegetation cover and ecological functions. ▪ Arrange for an ecological and environmental expert to be present on-site during construction. ▪ Vegetation clearing, material storage, or spoil deposition shall be strictly limited to areas essential for the works. ▪ Affected vegetation shall be compensated through the planting of native species adapted to the local ecological conditions. ▪ Revegetation operations shall be carried out in coordination with the relevant authorities, in particular the Directorate General of Forestry (DGF). ▪ Engage one or more suitably qualified ecological experts to provide training, awareness, and monitoring of environmental measures. ▪ Prohibit vehicle movements on unpaved or dirty roads and maintain vehicle speeds at 15–20 km/h. ▪ Prohibit the use of herbicides ▪ Where stripping is required, carefully remove and store topsoil. ▪ The machines used will be regularly serviced to reduce the risk of accidental pollution. All	The DGBGTH shall carry out continuous monitoring during the construction phase in accordance with the Biodiversity Management Plan (the Plan being the responsibility of the EPC contractor).	Continuously, as defined in the Biodiversity Management Plan.	EPC Contractor under the supervision of DGBGTH

Standard/ Benchmark	Potential Impacts	Management action / Mitigation measures	Monitoring actions	Frequency	Responsibility
		maintenance activities will take place in a dedicated area. ▪ The EPC contractor shall optimize the movement of construction equipment in order to minimize impacts on flora ▪ Providing ongoing training and awareness-raising (at the beginning of the works and once a month depending on the number of workers) for all project employees in waste management practices to avoid and reduce the risk of waste generation and its potential impact during the construction phase ▪ Ensure that a good practice of waste management is applied, ▪ Employees and subcontractors working on site will be made aware of the protected species potentially present in the area, in order to ensure constant monitoring and promote mitigation ▪ The sensitivity and interest of Ichkeul will be communicated to all workers on site ▪ In order to avoid introducing invasive vegetal species during the works, it is recommended that machinery be cleaned before arriving on every habitat along the pipeline. Quality controls will also be carried out on materials brought to every habitat.			

Standard/ Benchmark	Potential Impacts	Management action / Mitigation measures	Monitoring actions	Frequency	Responsibility
	Potential Impact on wadis and their riparian vegetation habitats	- No topsoil to be imported from outside the corridor to prevent Invasive Species - Prohibit the use of herbicides - The project shall apply the “No Net Loss” principle in natural habitats to ensure no net loss of vegetation cover and ecological functions. - Arrange for an ecological and environmental expert to be present on site. - Install appropriate hydraulic crossings (aerial aqueducts) to ensure hydrological continuity. - Clearing shall be strictly limited to areas essential for the works. - Affected vegetation shall be compensated through the planting of native species adapted to the local ecological conditions. Reforestation operations shall be carried out in coordination with the relevant authorities, in particular the Directorate General of Forestry (DGF). - No in-channel works and avoid any alteration of the natural wadi bed (realignment, infilling, or diversion). - Minimize ecological disturbances to wadi channels during construction. In the event of confirmed disturbance, a water quality monitoring program for	The DGBGTH shall carry out continuous monitoring during the construction phase in accordance with the Biodiversity Management Plan (the Plan being under the responsibility of the EPC contractor).	Continuously, as defined in the Biodiversity Management Plan.	EPC Contractor under the supervision of DGBGTH

Standard/ Benchmark	Potential Impacts	Management action / Mitigation measures	Monitoring actions	Frequency	Responsibility
		flows towards the Ichkeul lagoon shall be implemented. ▪ Strictly limit works during flood periods or periods of high biological activity. ▪ The riparian bank vegetation within 5 m of each abutment shall be retained; if any bank vegetation must be cleared for abutment construction, it shall be reinstated immediately after works. ▪ Prohibit the disposal of materials within wadi beds and along their banks. ▪ Establish buffer protection zones around wadis. ▪ Prohibit vehicle movements on unpaved or dirty roads and maintain vehicle speeds at 15–20 km/h. ▪ Where stripping is required, carefully remove and store topsoil. Retention of topsoil during works would safeguard the seed bank of PBF species. ▪ The machines used will be regularly serviced to reduce the risk of accidental pollution. All maintenance activities will take place in a dedicated area. ▪ The EPC contractor shall optimize the movement of construction equipment in order to minimize impacts on flora. ▪ Providing ongoing training and awareness-raising (at the beginning of the works and once a month			

Standard/ Benchmark	Potential Impacts	Management action / Mitigation measures	Monitoring actions	Frequency	Responsibility
		depending on the number of workers) for all project employees in waste management practices to avoid and reduce the risk of waste generation and its potential impact during the construction phase ▪ Ensure that a good practice of waste management is applied. ▪ Employees and subcontractors working on site will be made aware of the protected species potentially present in the area, in order to ensure constant monitoring and promote mitigation. ▪ The sensitivity and interest of ichkeul will be communicated to all workers on site. ▪ In order to avoid introducing invasive vegetal species during the works, it is recommended that machinery be cleaned before arriving on every habitat along the pipeline. Quality controls will also be carried out on materials brought to every habitat.			
	Potential Impact on fauna	▪ Animals with low mobility, such as certain reptiles and small mammals (<i>Testudo graeca</i>), may be at risk during construction works. Capture and relocation (rescue) operations should therefore be carried out during construction activities. ▪ All personnel should be trained on the Biodiversity Chance Find Procedure to be able to detect animals at risk and intervene promptly by alerting, capturing	The DGBGTH shall carry out continuous monitoring during the construction phase in accordance with the Biodiversity Management Plan (the Plan being under the	Continuously, as defined in the Biodiversity Management Plan.	EPC Contractor under the supervision of DGBGTH

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Standard/ Benchmark	Potential Impacts	Management action / Mitigation measures	Monitoring actions	Frequency	Responsibility
		and relocating individuals to suitable nearby habitats. ▪ Prohibit poaching and hunting. ▪ Install appropriate hydraulic crossings (aerial aqueducts) and prohibit in-channel works to avoid impact on identified PBF species.	responsibility of the EPC contractor).		

9.2 OPERATIONAL PHASE

Standard/ Benchmark	Potential Impacts	Management action / Mitigation measures	Monitoring actions	Frequency	Responsibility
ESR 6 on Biodiversity Conservation and Sustainable Management of Living Natural Resources	Potential impact on degraded maquis habitats	It is recommended to implement ecological monitoring over a period of three years in order to adjust management measures and maintain or restore natural habitats.	Visual evidence and site inspection Submission of an annual report	Annual	O&M Contractor under the supervision of DGBGTH
	Potential Impact on natural Mediterranean maquis habitats	- Implement an ecological monitoring program over a period of three years. - Verify the effectiveness of compensation measures on the site and in the compensatory areas.	Visual evidence and site inspection Submission of an annual report.	Annual	O&M Contractor under the supervision of DGBGTH
	Potential Impact on forest and pre-forest formations habitats	- Ensure the maintenance and protection of compensatory plantations and intervene in case of degradation. - Control invasive species.			
	Potential Impact on wadis and their riparian vegetation habitats	- Implement an ecological monitoring program over a period of three years. - Verify the effectiveness of compensation measures on the site and in the compensatory areas. - Ensure the maintenance and protection of compensatory plantations and intervene in case of degradation. - Ensure the maintenance of the water transfer pipeline without any intervention within wadi beds. - Continuously monitor the condition of hydraulic crossings. - Maintain flow capacity and prevent any clogging	Visual evidence and site inspection Submission of an annual report	Annual	O&M Contractor under the supervision of DGBGTH

9.3 KEY PERFORMANCE INDICATORS

Mitigation measures	KPI	Associated targets	Frequency	Budget (EUR)	Responsibility
Construction Phase					
Permitting and Regulatory consultation: DGF consultation prior to any vegetation clearing or removal	- DGF to be consulted and required permits obtained prior to clearing - DGF kept informed of construction progress	100% of required permits obtained before any vegetation clearing - Proof of consultation with DGF throughout the works (no clearing without prior consultation)	- ongoing during construction - Prior to vegetation clearing	Included in project costs	EPC Contractor (DGBGTH supervision)
Training, induction and awareness	- Key personnel formally trained on the implementation of the BMP % of general workforce given biodiversity induction and periodic awareness briefings (Ichkeul sensitivity, protected species, waste management, Chance Find Procedure) - Toolbox talks / refresher briefings delivered	100% of key personnel formally trained prior to mobilisation 100% of workforce inducted before starting work, with periodic refresher briefings - Records maintained of all trainings, inductions and briefings	- Prior to construction - Periodic refreshers	Included in EPC contract (Training Program)	(DGBGTH supervision)
Protection of Ichkeul National Park (UNESCO WHS / Ramsar / KBA / IBA): uncontrolled	- Number of unauthorised access / poaching incidents recorded - Condition of demarcation and signage of sensitive boundaries	Zero unauthorised access or poaching incidents	continuous during works in the area	Included in EPC contract	EPC Contractor (DGBGTH supervision)

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Mitigation measures	KPI	Associated targets	Frequency	Budget (EUR)	Responsibility
<i>access, disturbance, water quality</i>		Sensitive boundaries clearly demarcated and signage maintained throughout works	Incident log verified weekly during works in the area		
	Level of Turbidity / suspended solids in flows toward the Ichkeul lake	No measurable deterioration in water quality attributable to works (against pre-works baseline)	- Monthly during active sensitive works - After disturbance events	≈ 50,000 EUR – water quality monitoring programme	EPC Contractor (DGBGTH supervision)
<i>Spoil management adjacent to Ichkeul</i>	Spoil from the section closest to Ichkeul will be removed to a designated disposal site away from the NP boundary	100% of spoil from the Ichkeul-adjacent section will be disposed of at the designated site - zero deposition near the NP boundary	- Continuous during sensitive works - Verified at each disposal	Included in EPC contract	EPC Contractor (DGBGTH Supervision)
<i>Breeding-birds protection in the section closest to Ichkeul</i>	Pre-construction nest-search survey in the OP9–OP12 section during April–July	100% of the section to be surveyed prior to works	Survey Once pre-construction	≈ 30,000 EUR Total construction ecological monitoring budget	EPC Contractor (DGBGTH supervision)
	Where nesting is confirmed, a qualified ornithologist engaged to verify sensitive species / active nests and define protective measures	- No works proceed at confirmed-nesting locations until ornithologist-defined measures are in place - no significant impact on reproductive success of affected species	When active nests are identified		

Mitigation measures	KPI	Associated targets	Frequency	Budget (EUR)	Responsibility
<i>On-site ecological supervision during construction (all sensitive habitats)</i>	• Presence of a qualified ecological expert on site during sensitive works	• Qualified expert present on site throughout vegetation clearing and works in identified sensitive habitats	• Continuous during sensitive works	Included in the construction ecological monitoring budget	EPC Contractor (DGBGTH Supervision)
<i>Site-discipline controls: working-footprint limitation, hazardous-material storage and accidental-pollution prevention</i>	• Area cleared or occupied kept within the defined 15 m working corridor • Vegetation clearing, storage or spoil recorded outside designated areas • Hazardous materials stored in designated, bunded / impermeable areas • Construction machinery regularly serviced • maintenance / refuelling carried out within dedicated areas	• Zero encroachment beyond the designated footprint • 100% of maintenance and refuelling confined to dedicated impermeable areas • Construction machinery serviced on schedule; • Zero uncontrolled spills	• Continuous during works • Weekly inspection	Included in EPC contract	EPC Contractor (DGBGTH Supervision)
<i>NNL in natural Mediterranean maquis and forest / pre-forest formations</i>	• Area of natural habitat lost compared with area restored or compensated (loss–gain balance) • % of cleared natural-habitat area restored in place with native species	• Area of natural maquis / pre-forest restored or compensated equivalent or more than lost area • On-site restoration prioritised with native species, progressive revegetation toward full cover within the restoration plan's timeframe	• Quarterly audit during works • Annual ecological survey	Included in project costs (Restoration plan) Included in the construction ecological	EPC Contractor DGBGTH

Mitigation measures	KPI	Associated targets	Frequency	Budget (EUR)	Responsibility
	- Trend in vegetation cover per unit area (by species) - Number of native plants established % of stripped topsoil removed and stored for reinstatement - Where residual loss occurs area of like-for-like habitat offset established to achieve NNL	- Stable or increasing vegetation-cover trend confirmed by monitoring against baseline - Native planting implemented and maintained at stable density - Topsoil stripped, stored and reinstated towards no net loss of soil resource - Off-site offset used only for residual loss that cannot be restored in place		monitoring budget	
<i>Wadis & riparian vegetation: hydrological continuity and NNL</i>	% of wadi crossings constructed as aerial aqueducts - In-channel works recorded % of riparian vegetation within 5 m of abutments retained or reinstated - Buffer protection zones established around wadis - Material disposal in wadi beds recorded % of stripped topsoil removed and stored for reinstatement - Timing of works relative to flood	100% of crossings as aerial aqueducts - Zero in-channel works and no alteration of natural wadi bed - Bank vegetation within 5 m retained, or reinstated immediately post-works - Buffer zones in place around all wadis - Zero material disposal in wadi beds - works limited during flood periods - Topsoil stripped, stored and reinstated, no net loss of soil resource	- Continuous - Weekly inspection during wadi crossings construction - After each incident - Annual ecological survey	Included in project costs (civil works) Included in EPC contract Included in the construction ecological monitoring budget	EPC Contractor (DGBGTH Supervision)

Mitigation measures	KPI	Associated targets	Frequency	Budget (EUR)	Responsibility
	Number of residual-impact events recorded, and number of de-silting / invasive plant removal related to each event	No residual impact expected under the avoidance design; where impact occurs, de-silting / invasive-vegetation removal completed to restore hydrological continuity and riparian condition to baseline			
<i>Fauna protection</i>	- Number of individuals safely captured and relocated - Recorded mortalities - Cases when chance find procedure was applied	- All at-risk individuals detected will be relocated to suitable habitat - Mortalities minimised toward zero - Chance Find Procedure followed in all relevant cases	Continuous during works	Included in the construction ecological monitoring budget	EPC Contractor (DGBGTH Supervision)
<i>Agroecosystem: disturbed footprint, loss of harvest and cultivated trees</i>	- Timing of vegetation clearing / earthworks - Number and type of cultivations and trees removed, recorded per pre-clearance inventory	- Clearing and earthworks scheduled within the dry season (Jul–Sep) - Full pre-clearance inventory of affected cultivated trees completed	Prior to vegetation clearing	Included in project costs	DGBGTH

Mitigation measures	KPI	Associated targets	Frequency	Budget (EUR)	Responsibility
<i>degraded habitats footprint</i> <i>maquis disturbed</i>	% of stripped topsoil removed and stored for reinstatement - Trend in vegetation recovery toward chamaephytic / maquis cover in disturbed areas	- Topsoil stripped, stored and reinstated towards no net loss of soil resource - Progressive recovery of disturbed area, confirmed by post-works monitoring	- Continuous during works - annual ecological survey	Included in EPC contract Included in the construction ecological monitoring budget	EPC Contractor DGBGTH
Operational Phase					
<i>Ecological monitoring of restored / compensatory areas (maquis, forest, pre-forest)</i>	- Native-species survival rate of compensatory plantings - Trend in vegetation cover in compensatory areas	- Corrective replanting where decline is confirmed - Stable or improving cover trend	Annual (3 year monitoring programme)	Included in the operation ecological monitoring budget Included in O&M budget	DGBGTH
<i>Maintenance of wadi hydrological continuity</i>	- Condition of hydraulic crossings (aerial aqueducts) - Flow capacity - Clogging events	- Crossings maintained fully functional, zero in-channel intervention - Flow capacity maintained - Clogging cleared promptly	- Continuous - After each incident	Included in O&M budget	DGBGTH
<i>Ecological monitoring of degraded maquis habitats</i>	Trend in habitat condition / vegetation recovery	- Stable or improving habitat condition over the 3-year period - Management measures adjusted where decline observed	Annual (3 year monitoring programme)	Included in the operation ecological monitoring budget	DGBGTH

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Mitigation measures	KPI	Associated targets	Frequency	Budget (EUR)	Responsibility
				Included in O&M budget	
<i>Invasive-species control in operation</i>	• Presence / extent of invasive species in monitored habitats	• Invasive species controlled where presence/expansion is confirmed	• Annual	Included in the operation ecological monitoring budget Included in O&M budget	DGBGTH

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9.4 OUTLINE OF MEASURES TO ACHIEVE NO NET LOSS OF PRIORITY BIODIVERSITY FEATURES (PBFs) IN CASE OF INCIDENTAL IMPACTS

In case of incidental, accidental, or unforeseen impacts on Priority Biodiversity Features (PBFs), the Project will implement a structured adaptive response framework to ensure the achievement of No Net Loss (NNL). The table below presents this framework, which follows the mitigation hierarchy and prioritizes rapid ecological recovery through the prevention of secondary impacts, the immediate stabilization of affected areas, and targeted restoration actions.

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Table 9-1 Measures for priority biodiversity features (PBFs) in case of incidental impacts

Potential incidental impacts on PBFs	Management actions / Mitigation & restoration measures (NNL response)	Monitoring actions	Frequency	Responsibility
General incidental : disturbance of Priority Biodiversity Features (PBFs) during construction (unexpected vegetation clearing, soil disturbance, fauna disturbance, or hydrological alteration)	▪ Immediate stop-work procedure in affected area ▪ Delimitation and protection of impacted zone ▪ Rapid ecological assessment by Biodiversity Advisor ▪ Implementation of corrective action plan to restore ecological functions ▪ Avoidance of secondary impacts (erosion, sediment propagation)	Incident reporting and site inspection	Immediate upon detection	EPC Contractor under supervision of DGBGTH
Wadis and riparian vegetation habitats – disturbance sediment release, temporary flow alteration	▪ Controlled sediment removal only under ecological supervision (if required) ▪ Restoration of riparian vegetation using native species ▪ Restoration of natural hydrological continuity	Visual inspection of wadi condition, sediment monitoring, photographic documentation	Weekly during works and after any incident	EPC Contractor under supervision of DGBGTH
Natural Mediterranean maquis / forest and pre-forest formations – accidental clearing, soil compaction, habitat fragmentation	▪ Topsoil stripping and reinstatement ▪ native species replanting ▪ assisted natural regeneration ▪ invasive species removal ▪ restriction of access ▪ habitat structure restoration	Vegetation recovery surveys	seasonal post-restoration	EPC Contractor under supervision of DGBGTH

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Degraded maquis habitats – expansion of disturbed footprint	▪ The destruction of certain habitats in degraded maquis areas should be followed by a gradual replacement with herbaceous vegetation	Visual inspection	Monthly during construction	EPC Contractor
Hydrological connectivity (Ichkeul-linked wadi system) – sediment transport, flow disturbance	▪ Maintenance of natural flow regime; ▪ no modification of wadi geometry ▪ installation of sediment traps if required;	Water quality monitoring (turbidity, suspended solids), hydrological checks	monthly	EPC Contractor under supervision of DGBGTH
Fauna (Testudo graeca, freshwater molluscs, birds) – accidental mortality or disturbance	▪ Chance Find Procedure activation; ▪ capture and relocation of individuals ▪ protection of nests/breeding sites	observation records,	Continuous during works	EPC Contractor
Invasive species spread in disturbed or riparian habitats	▪ removal of invasive species ▪ controlled disposal outside ecological zones ▪ regular surveillance surveys	Invasive species monitoring surveys	Monthly during construction	EPC Contractor

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10 Reporting

This section presents the project's approach to BMP reporting.

10.1 BIODIVERSITY NON-CONFORMITY REPORTS

In case monitoring measures reveal that the indicator and targets are not met, a “Non-conformity report” will be prepared by the Environmental Engineer, communicated to the HSE Manager who will decide if support from a Specialized Contractor is needed in order to address the issue within 15 days from the monitoring.

The “Non-conformity report” will clearly describe the issue(s) observed and provide all the relevant available information including:

- ID: unique identification code of the monitoring activity;
- topic/ aspect monitored;
- date and location(s) of the monitoring;
- location of the observation (with geographic coordinates if available);
- name and role of the observer(s);
- description of the non-conformity compared to the target;
- photographic documentation (if available);
- suggested corrective actions.

The HSE Manager of the DGBGTH shall review the report and, with the support of the specialized contractor, assess the need to implement additional corrective actions and/or potential modifications to the BMP mitigation measures and monitoring activities.

10.2 ANNUAL BIODIVERSITY MANAGEMENT PLAN REPORTS

Evidence and results of mitigation measures and monitoring activities shall be included in an Annual Biodiversity Report to be prepared by the developer with the support of the Biodiversity Advisor. This report shall include, as a minimum, the following information/data:

Mitigation measures:

- list of the mitigation measures implemented their aims and description;
- period of the measure application (start date and end date);
- achievement (or not) of the target/acceptance criteria for the indicator.

Monitoring activities:

- location of the monitoring stations (geographical coordinates and elevation);
- timing of the data collection (start date and end date);
- description of the methodology applied and of the equipment used;
- results of the observations conducted;
- any anomalies that could have affected partially or totally the indicators results;

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- quality assurance and quality control procedures applied to ensure consistency and reliability of the results.
- the indicator results and their compliance with the target/acceptance criteria;
- The mitigation measures report will be prepared by The HSE Manager of the DGBGTH with the support of the specialized contractor(s) on a yearly basis.

11 Audit and Review

The current BMP is to be monitored through either internal or external audit on a regular basis (preferably yearly) and the audit report submitted to the lenders. The following is a non-exhaustive list of areas that may be checked during the audit process:

- Monitoring of achievement of targets set within the BMP.
- Utilization of funds for the implementation of the BMP.
- Assess whether efforts invested in mitigating threats to biodiversity were successful.
- Adherence to national applicable laws and to internationally signed agreements, protocols and treaties.
- Any sub-contracting undertaken for the implementation of the BMP. In such cases, standard audit procedures on contracts may be performed.
- Gaps in human resources for the proper implementation of the BMP in terms of enforcement activities, availability of scientists, taxonomists, etc.
- Roles of the different entities involved in the implementation of the BMP and their performance.
- Records of non-adherence to applicable rules and regulations and means taken to address non-adherence.
- Assess whether the monitoring and evaluation mechanism helped in effective implementation of the BMP.

The revision of the BMP shall be the responsibility of the HSE Manager of the DGBGTH, who is in charge of managing this Plan. During the operational phase, the BMP shall be reviewed on an annual basis, and any necessary amendments shall be made to reflect changes in conditions, operational needs, or monitoring results.

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