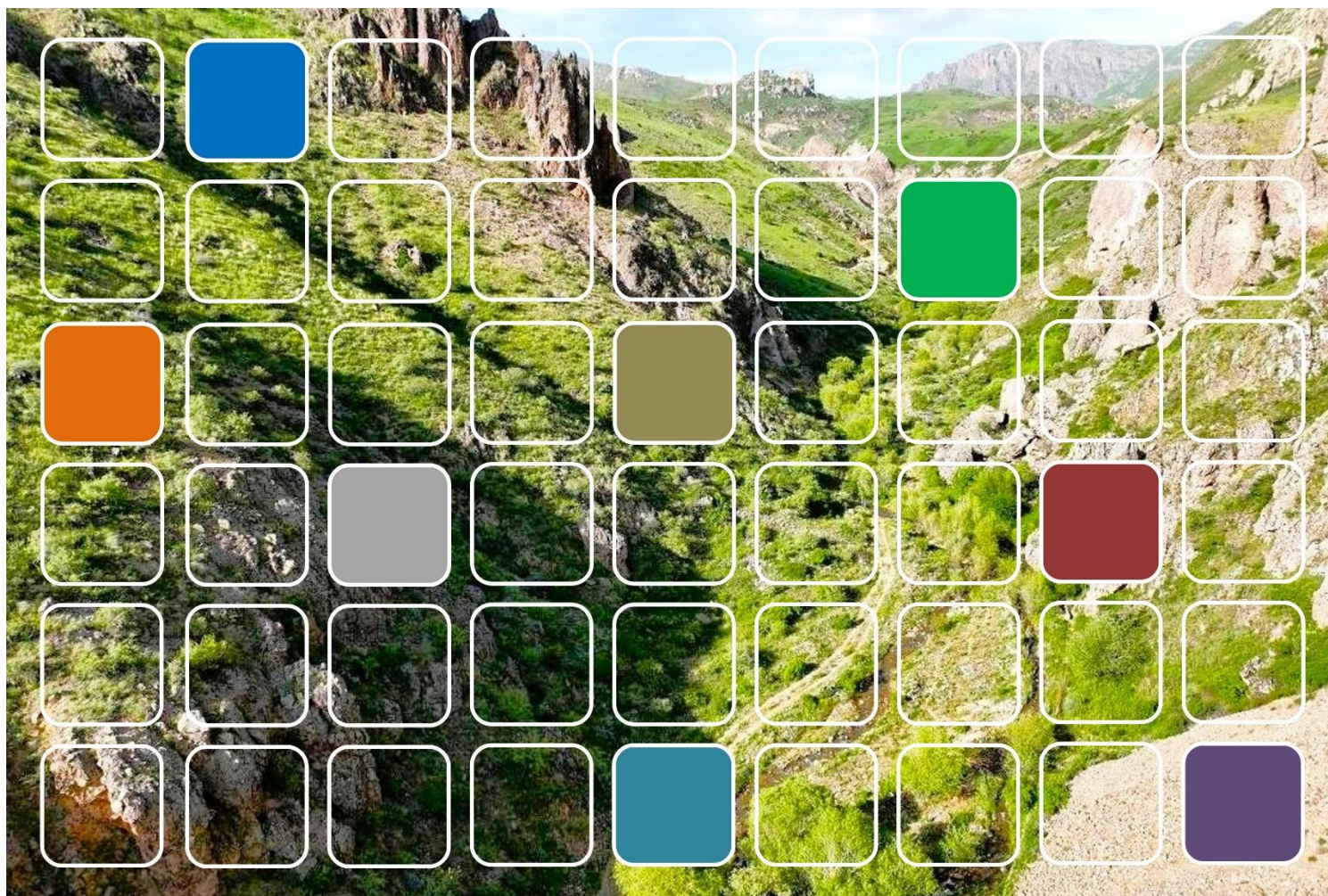




Source: Photos taken by the Consultant during the site visits

WATER RESERVOIRS PROJECT - ARMENIA

Environmental and Social Impact Assessment for the Yelpin Reservoir Construction Project

BIODIVERSITY ACTION PLAN

Rev02

January 2026

Prepared for:

**European Bank for
Reconstruction and
Development**

and

**Water Committee under the
Ministry of Territorial
Administration and
Infrastructure of the Republic
of Armenia**



www.atms.am

WATER RESERVOIRS PROJECT - ARMENIA

Environmental and Social Impact Assessment for the Yelpin Reservoir Construction Project

BIODIVERSITY ACTION PLAN

Rev02

Consultancy Services Contract № 2023.009567

Prepared for:

European Bank for Reconstruction and Development

Water Committee under the Ministry of Territorial Administration and Infrastructure of the Republic of Armenia

Prepared by:



ATMS Solutions Ltd. (Armenia)

Director: Dr. Artak Ter-Torosyan

1, 11 Griboedov str.,

0051, Yerevan, Armenia

Tel.: +37499 109495

E-mail: artak.ter-torosyan@atms.am

www.atms.am

and



Ecoline International Ltd. (Bulgaria)

Director: Dr. Maia Gachechiladze-Bozhesku

Tel.: +380 951 100 727, + 359 876 63 0522

E-mail: mgachechiladze@ecoline-int.org

www.ecoline-int.org

Document Preparation and Issue:

Version	Status	Prepared by	Reviewed by	Issued by	Date of issue
Rev01	1st draft of the BAP for the Yelpin Reservoir Construction Project	A. Artov A. Ter-Torosyan	M. Gachechiladze-Bozhesku		09.12.2025
Rev02	Final draft of the BAP for the Yelpin Reservoir Construction Project	A. Artov	M. Gachechiladze-Bozhesku	A. Ter-Torosyan	13.01.2026

© ATMS Solutions Ltd., 2026
All rights reserved

Disclaimer

This Biodiversity Action Plan (BAP) has been developed as part of the Environmental and Social Impact Assessment (ESIA) for the Yelpin Reservoir Construction Project (hereinafter 'the Project'). The assessment is based on information drawn from multiple sources, including the detailed design documentation, reports from field investigations, meeting records, relevant publications, various databases, and data collected directly by the ESIA team.

Verifying all sources with complete certainty is extremely challenging; therefore, validation has been undertaken primarily through careful review and logical assessment of the available information. Every effort has been made to ensure that all information used in the ESIA has been accurately presented.

If any inaccuracies are identified within this document, we respectfully request that they be brought to our attention so that the ESIA may be updated accordingly. We cannot accept liability for information that has been reproduced in good faith, irrespective of any consequences arising from its inaccuracy. Any party reproducing information from this ESIA does so entirely at their own risk.

List of Abbreviations

BAP	- Biodiversity Action Plan
BMP	- Biodiversity Management Plan
BOMP	- Biodiversity Offset Management Plan
CH	- Critical Habitat
CHA	- Critical Habitat Assessment
CJSC	- Close Joint Stock Company
EAAA	- Ecologically Appropriate Area of Analysis
EBRD	- European Bank for Reconstruction and Development
EIA	- Environmental Impact Assessment
ESAP	- Environmental and Social Action Plan
ESIA	- Environmental and Social Impact Assessment
ESHS	- Environmental, Social, Health, and Safety
ESMP	- Environmental and Social Management Plan
ESMS	- Environmental and Social Management System
ESP	- Environmental and Social Policy
EU	- European Union
E&S	- Environmental and Social
GIP	- Good International Practice
ME	- Ministry of Environment
MTAI	- Ministry of Territorial Administration and Infrastructure
NG	- Net Gain
NNL	- No Net Loss
OHS	- Occupational Health and Safety
OHSMP	- Occupational Health and Safety Management Plan
GA	- Government of Armenia
PAP	- Project Affected Person
PBF	- Priority Biodiversity Features
PIU	- Project Implementation Unit
PPE	- Personal Protective Equipment
PR	- Performance Requirement
RA	- Republic of Armenia
SDA	- Spoil Disposal Area
SDMP	- Spoil Disposal Management Plan
SPA	- Spoil Disposal Area
SPMP	- Spill Prevention and Management Plan
SSESMP	- Site-Specific Environmental and Social Management and Monitoring Plan
WCRA	- RA Water Committee
WMP	- Waste Management Plan

Table of Content

1. Introduction.....	6
2. Need, Purpose and Structure of the BAP	7
3. Legal and Regulatory Framework for Biodiversity	8
3.1 National Requirements	8
3.2 Ratified International Agreements	9
3.3 EBRD Requirements	10
3.4 Good International Practice (GIP) Guidelines	11
3.5 Applicable EU Directives	11
4. Project Description	11
5. Biodiversity Values	13
6. Summary of Potential Impacts	16
7. Mitigation: Biodiversity Management Plan	19
8. Residual impact.....	25
9. Offsetting strategy	29
9.1 Loss and gain analysis and calculations	29
9.2 Offsetting measures	32
10. Biodiversity monitoring	40

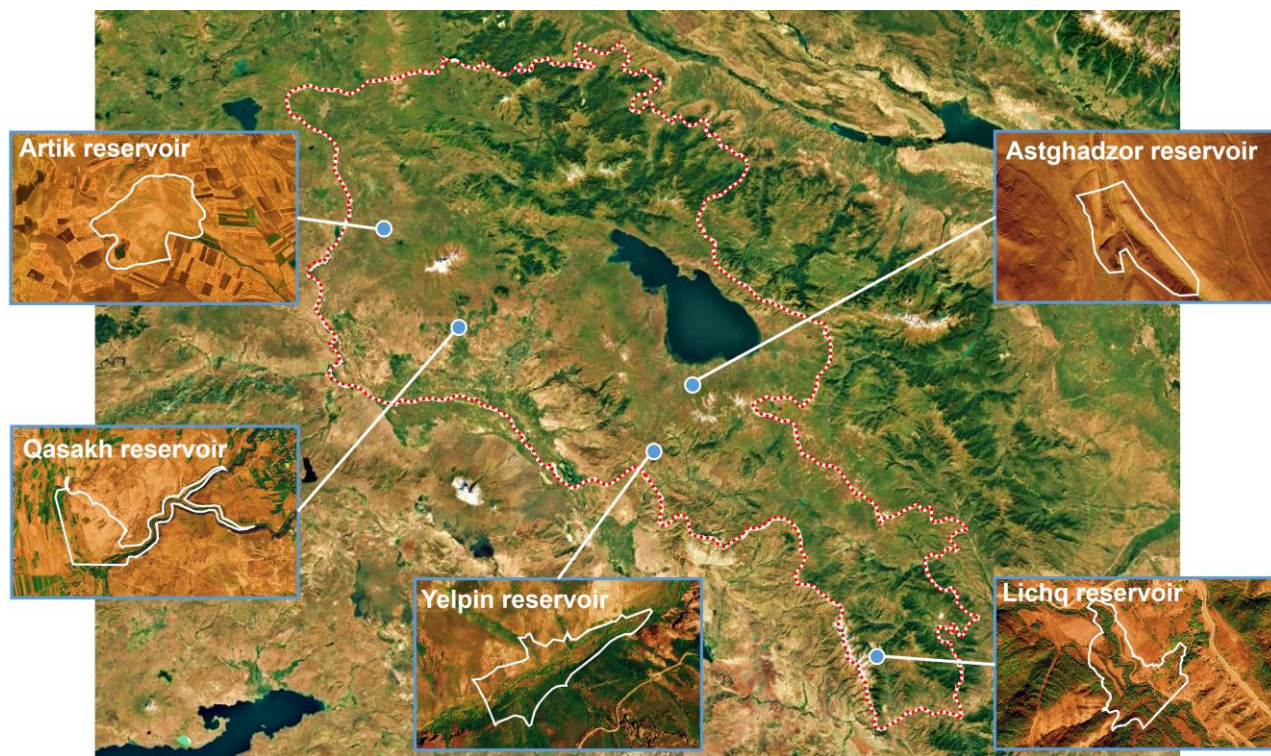
1. Introduction

The Government of the Republic of Armenia ('RA') plans to construct 17 reservoirs within the EU support initiative 'Recovery, resilience and reform: post 2020 Eastern Partnership priorities' to the Government of Armenia ('GA') to enhance the water and food security level in the country. The European Bank for Reconstruction and Development ('EBRD' or the 'Bank') is considering provision of a loan to the GA to finance the construction of five water reservoirs in different regions (Marzes) of Armenia:

- Kasakh reservoir in Aragatsotn Marz¹,
- Lichk reservoir in Syunik Marz,
- Yelpin reservoir in Vayots Dzor Marz,
- Artik reservoir in Shirak Marz,
- Astghadzor reservoir in Gegharkunik Marz.

The locations of the Project reservoirs are shown in **Figure 1**.

Figure 1. Map of the five planned reservoirs in Armenia



The EBRD has categorized this greenfield project as 'A' in line with its Environmental and Social Policy ('ESP') (2019) because it may cause significant environmental and social impacts. This means that a comprehensive Environmental and Social Impact Assessment ('ESIA') report and associated documents must be elaborated, followed by their public disclosure for a minimum period of 120 days.

One of the five reservoirs listed above is planned for construction within the administrative boundaries of Yelpin village, part of the Areni community in the RA Vayots Dzor Marz. The Yelpin Reservoir is designed on the Yelpin River, a right-bank tributary of the Arpa River, to supply irrigation water to 300 hectares of agricultural land in the rural settlements of Yelpin and Chiva (the Project).

¹"Marz" means "Region" in Armenian

The Bank has engaged the Consultant² to upgrade the national Environmental Impact Assessment ('EIA') report for the Yelpin Reservoir Construction Project into the ESIA in accordance with the EBRD ESP and to prepare the associated Environmental and Social (E&S) documentation, including this Biodiversity Action Plan ('BAP') proportionate to the Project's specific impacts, benefits, and opportunities.

2. Need, Purpose and Structure of the BAP

Armenia is a key contributor to biodiversity within the South Caucasus, one of the world's recognised biodiversity hotspots. Despite its relatively small size, Armenia hosts an exceptional variety of ecosystems and habitats, including semi-deserts, mountain steppes, broadleaf and mixed forests, riverine and wetland systems, subalpine and alpine meadows, and high-mountain rocky ecosystems. This habitat diversity supports high species richness and numerous endemic and rare species.

Located at the junction of Europe, Asia, and the Middle East, Armenia also functions as an ecological corridor, facilitating species movement and maintaining genetic exchange across the region. These characteristics give Armenia an important ecological role at both national and transboundary levels.

As presented in the ESIA, the Yelpin Reservoir Construction Project will be implemented in an area of rich biodiversity where valued habitats and species were identified. The critical habitat assessment (CHA) has revealed biodiversity values assessed as Priority Biodiversity Features (PBFs) and Critical Habitats (CHs) that will be adversely affected by the Project; some habitats will be lost. According to the EBRD PR6, this requires mitigation and, as a last resort, offsetting. This requirement underpins the need for a Biodiversity Action Plan (BAP).

The purpose of the BAP is to develop mitigation measures in accordance with the mitigation hierarchy and design a biodiversity offset strategy to address the project's significant residual impacts on biodiversity.

The BAP provides a biodiversity summary from the ESIA including a description of legal framework for biodiversity conservation, outline of the Project and findings on biodiversity values and impacts on them. In accordance with the EBRD PR6, the BAP includes a set of mitigation measures comprising objectives, series of actions and completion indicators per the Project phase. Just after, remained residual impacts on some PBFs and CHs are assessed. Finally, the BAP designs an offsetting strategy to achieve no net loss/net gains of priority biodiversity features and critical habitats.

The BAP has been informed by the Project's biodiversity baseline, national EIA and ESIA reports, and has been developed with input from a range of stakeholders, including the Ministry of Environment (ME), biodiversity experts, available national level reports as well as documents prepared by the international organization specialised in the biodiversity studies. The BAP will need to be updated if changes to the Project design occur and prior to the commissioning of the reservoir. Any update of the BAP should be agreed with the EBRD and "no objection" should be obtained from the Water Committee of the Republic of Armenia (WCRA).

²A consortium consisting of ATMS Solutions Ltd. (Armenia) and Ecoline International Ltd. (Bulgaria)

3. Legal and Regulatory Framework for Biodiversity

3.1 National Requirements

According to the **RA Law on Environmental Impact Assessment and Expert Examination (2014, revised in 2023)**³, there are two types of documents, which are subject to environmental impact assessment and expert examination. These documents are:

- (i) Framework Document - a policy, strategy, concept, scheme of utilization of natural resources, program, master plan, urban development document, which are likely to affect the environment; and
- (ii) Design Document - technical report, feasibility study and construction-engineering design of intended activity.

The Law establishes the general legal and organizational principles for conducting the mandatory EIA of various types of activities and concept documents of sectoral development. According to Article 12 of the Law, the types of activities, which should undergo EIA are divided into "A" and "B" categories depending on their expected environmental impact.

As per Article 12 the Law, the reservoirs or artificial lakes with 500,000 m³ and more capacities are subject of national EIA and State expert examination. The roles and powers of parties engaged in EIA and expert examination processes are set out in Chapter 2 of the Law. The procedure for public notification and public discussions is outlined in the **RA Government Decree №1325-N** dated 19.11.2014⁴.

The **RA Law on flora (1999)**⁵ and **RA Law on fauna (2000)**⁶ outline Armenia's policies for the conservation, protection, use, regeneration and management of natural populations of plants and animals as well as the impact of human activities on biodiversity. These laws are aimed at the sustainable preservation and use of flora/fauna and the conservation of biodiversity. The laws also contain provisions for assessing and monitoring flora and fauna, especially rare and threatened species. The RA Government Decree №71-N and №72-N on approval of the **RA Red Book of animals**⁷ and **RA Red Book of plants**⁸ respectively define the biology of threatened (rare, threatened, endangered, vulnerable) species of flora and fauna as well as their quantity, habitats and variety.

The **Law of Fauna** was materially updated in 2022 to introduce the new concepts in order to complete Armenia's commitments under the 2018 Partnership Agreement with the EU⁹ and align with the EU legislation. The amendments included such notions as fauna monitoring, definition of invasive species, use of fauna for health, protection and industrial purposes, Important Bird Areas (as areas of special environmental interest established for conservation of birds (outside of specially protected nature areas or included therein), serving for nesting, wintering or rest, and others.

RA Government Decree №781-N "On the order of protection of flora of the Republic of Armenia and its use for the purpose of reproduction in natural conditions (2014)"¹⁰ defines the measures for

³<https://www.arlis.am/documentview.aspx?docid=178468>

⁴<https://www.arlis.am/documentview.aspx?docid=188071>

⁵<https://www.arlis.am/documentview.aspx?docid=120784>

⁶<https://www.arlis.am/documentview.aspx?docid=120790>

⁷<https://www.arlis.am/DocumentView.aspx?DocID=56347>

⁸<https://www.arlis.am/DocumentView.aspx?DocID=56348>

⁹Comprehensive and enhanced Partnership Agreement between the European Union and the European Atomic Energy Community and their Member States, of the one part, and the Republic of Armenia, of the other part ([https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:22018A0126\(01\)](https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:22018A0126(01))).

¹⁰<https://www.arlis.am/documentview.aspx?docid=91830>

the protection, including translocation, of plants threatened with extinction as a result of economic activity.

The **RA Law on special protected natural areas (2006)**¹¹ regulates special protected areas of RA and eco-systems that have environmental, economic, social, scientific, educational, historical, cultural, healthcare and recreational value. It also outlines the legal basis for state policies regarding sustainable development, restoration, protection, reproduction and use of natural features and complexes. The Law defines four categories of protected areas in Armenia: (i) State Reserves; (ii) National Parks; (iii) Sanctuaries; and (iv) Nature Monuments. The list of the nature monuments is approved by the **RA Government Decree №967-N** dated 14.08.2008¹².

The **RA Forest Code (2005)**¹³ regulates the sustainable management of forests: guarding, preserving, rehabilitation, afforestation and rational use of forests and forest lands in Armenia as well as forest inventory, monitoring and control.

The **RA Water Code (2002)**¹⁴ provides the legal basis for the protection of water resources, the provision of water for people and economic sectors through effective management of water resources and ensuring the protection of water resources for future generations. The Water Code includes the following: responsibilities of state/local authorities and public, development of the national water policy and national water program, water cadastre and monitoring system, public access to relevant information, water use and water system use permitting systems, trans-boundary water resources use, water quality standards, safe operation of hydraulic facilities, protection of water resources and state supervision. The quality of surface water in Armenia is monitored as per the principles of EU Water Framework Directive adopted by the **RA Government Decree №75-N** dated 27.01.2011¹⁵.

Article 1 of the Water Code defines, among other things:

- 'Water protection zone' as an area designated to prevent the pollution and depletion of water resources, and to maintain a favourable water regime; such areas are not subject to privatization or confiscation.
- 'Protected sanitary zone of water ecosystems' as an area designated to protect water resources used for drinking, healthcare, domestic services, medical facilities, resorts, and other health-related purposes.

3.2 Ratified International Agreements

Republic of Armenia is a signatory/party to several international agreements related to biodiversity (**Table 1**).

Table 1. List of ratified by the RA international agreements applicable for the project

International agreements (convention or protocol)	Description
Convention on Wetlands of International Importance - (Ramsar 1971)	The Ramsar Convention is an intergovernmental treaty aiming to maintain the ecological character and plan the sustainable use of Wetlands of International Importance. The Convention entered into force in Armenia in 1993.

¹¹<https://www.arlis.am/documentview.aspx?docid=140513>

¹²<https://www.arlis.am/documentview.aspx?docid=157090>

¹³<https://www.arlis.am/DocumentView.aspx?docid=121312>

¹⁴<https://www.arlis.am/DocumentView.aspx?docid=148955>

¹⁵<https://www.arlis.am/documentview.aspx?docid=200962>

International agreements (convention or protocol)	Description
The Convention on the Conservation of Migratory Species of Wild Animals (1979) (Bonn Convention)	The objective of the Bonn Convention, which was adopted in 1979, is to ensure the conservation of land, marine and air migratory species over the whole of their area of distribution. Armenia is a State party since 2011
Convention on International Trade in Endangered Species (CITES) (1973)	This convention is designed to ensure that international trade in animals and plants does not threaten their survival in the wild. Armenia joined this convention in 2008.
Convention on the Conservation of European Wildlife and Natural Habitats, Bern (1979)	The Bern Convention is a binding international legal instrument in the field of nature conservation, covering most of the natural heritage of the European continent and extending to some States of Africa. Ratified by Armenia in 2008.
The Convention on Biological Diversity (1992)	The three main objectives of the Convention are: the conservation of biological diversity; the sustainable use of the components of biological diversity; and the fair and equitable sharing of the benefits arising out of the utilization of genetic resources. Signed by Armenia in 1993.
UN Convention to Combat Desertification, Paris (1994)	This Convention is the sole legally binding international agreement linking environment and development to sustainable land management. The Convention addresses specifically the arid, semi-arid and dry sub-humid areas, known as the drylands, where some of the most vulnerable ecosystems and peoples can be found. Ratified by Armenia in 1997.
Convention on Environmental Impact Assessment in a Transboundary Context, Espoo Convention (1991)	The Convention sets out the obligations of the Parties to carry out an environmental impact assessment of certain activities at an early stage of planning. Before permitting an industrial project, the country to decide on the project ("country of origin") must notify any countries which could be affected by the transboundary impacts of a project located in another country ("affected parties"). The affected party and the public in the affected area must be able to express their views and comments about the proposed project. This is a separate procedure which is additional to any relevant national permitting process. The permitting state must take these comments into account in its final decision and communicate it to the affected country and the public. The projects subject to consultations under the Convention are those listed in Appendix I including 'large dams and reservoirs'. Ratified by Armenia in 1997.

3.3 EBRD Requirements

The main requirements of the EBRD for its own activities are formulated in the Bank's ESP (2019), while the requirements for the E&S aspects of the Client-borrower's activities are set out in the RRs. The ESP sets E&S requirements for the EBRD clients' activities to achieve sustainable results, with the *PR1: Assessment and Management of Environmental and Social Risks and Impacts* being the umbrella PR for the other requirements. The one relevant regarding Biodiversity is the *PR 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources* which

determines the requirements for the conservation of biological and landscape diversity in the development area. PR 6 requires the borrower to characterise the state of biodiversity, identifying sensitive species and habitats, and developing measures to avoid / reduce impacts. PR 6 defines criteria for critical habitat screening and requires developing a Biodiversity Action Plan (BAP) where significant adverse impacts on biodiversity are expected.

3.4 Good International Practice (GIP) Guidelines

Specific E&S requirements applicable to the Project are set out in the EBRD's Sub sectoral Environmental and Social Guidelines: Building and Construction Activities (2010)¹⁶. They elaborate on typical E&S risks related to construction, operation, maintenance and decommissioning of facilities.

The following biodiversity guidelines were used for the BAP development:

- EBRD's Guidance Note 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources (Guidance Note PR6, EBRD, 2022)¹⁷,
- Hardner, J., R.E. Gullison, S. Anstee, M. Meyer. 2015. Good Practices for Biodiversity Inclusive Impact Assessment and Management Planning. Prepared for the Multilateral Financing Institutions Biodiversity Working Group¹⁸,
- Biodiversity Offsets: a User Guide. World Bank Group. October, 2016¹⁹,
- A Cross-sector Guide for Implementing the Mitigation Hierarchy. Prepared by The Biodiversity Consultancy. Cross-sector Biodiversity Initiative, 2015²⁰,
- Edgar, P., Foster, J. and Baker, J. (2010). Reptile Habitat Management Handbook. Amphibian and Reptile Conservation, Bournemouth²¹.

3.5 Applicable EU Directives

- Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora²²,
- Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds²³.

4. Project Description

The planned Yelpin Reservoir will be located within the administrative boundaries of Yelpin village. It is designed to be constructed on the Yelpin River, a right-bank tributary of the Arpa River, at an elevation of 1,650-1,700 meters above sea level (masl). The reservoir will provide irrigation for approximately 300 ha of agricultural land in the Yelpin and Chiva rural settlements. Yelpin village, along with 10 other rural settlements, is part of Areni multi-settlement community (**Figure 2**).

The Yelpin reservoir's footprint (water surface area at the Full Supply Level) is 6.35 ha, the footprint of the dam's western part that is not flooded is about 1.42 ha (thus, the full footprint area is 7.77 ha).

¹⁶<https://www.ebrd.com/downloads/policies/environmental/construction/buidling.pdf>

¹⁷<https://www.ebrd.com/who-we-are/our-values/environmental-and-social-policy/implementation.html>

¹⁸<https://publications.iadb.org/publications/english/document/Good-Practices-for-Biodiversity-Inclusive-Impact-Assessment-and-Management-Planning.pdf>

¹⁹<file:///D:/Biodiversity/IMPACT%20and%20Mitigation%20GUIDANCES/110820-WP-BiodiversityOffsetsUserGuideFinalWebRevised-PUBLIC.pdf>

²⁰<https://www.icmm.com/en-gb/guidance/environmental-stewardship/2015/implementing-mitigation-hierarchy>

²¹<https://dnu7gk7p9afoo.cloudfront.net/Files/37.-edgar-p.-foster-j.-and-baker-j.-2010.-reptile-habitat-management-handbook.amphibian-and-reptile-conservation-bournemouth.pdf>

²²<https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A01992L0043-20250714>

²³<https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A02009L0147-20190626>

The area of the buffer zone including the footprint area is 38.7 ha, and the area of the buffer zone alone is 30.93 ha.

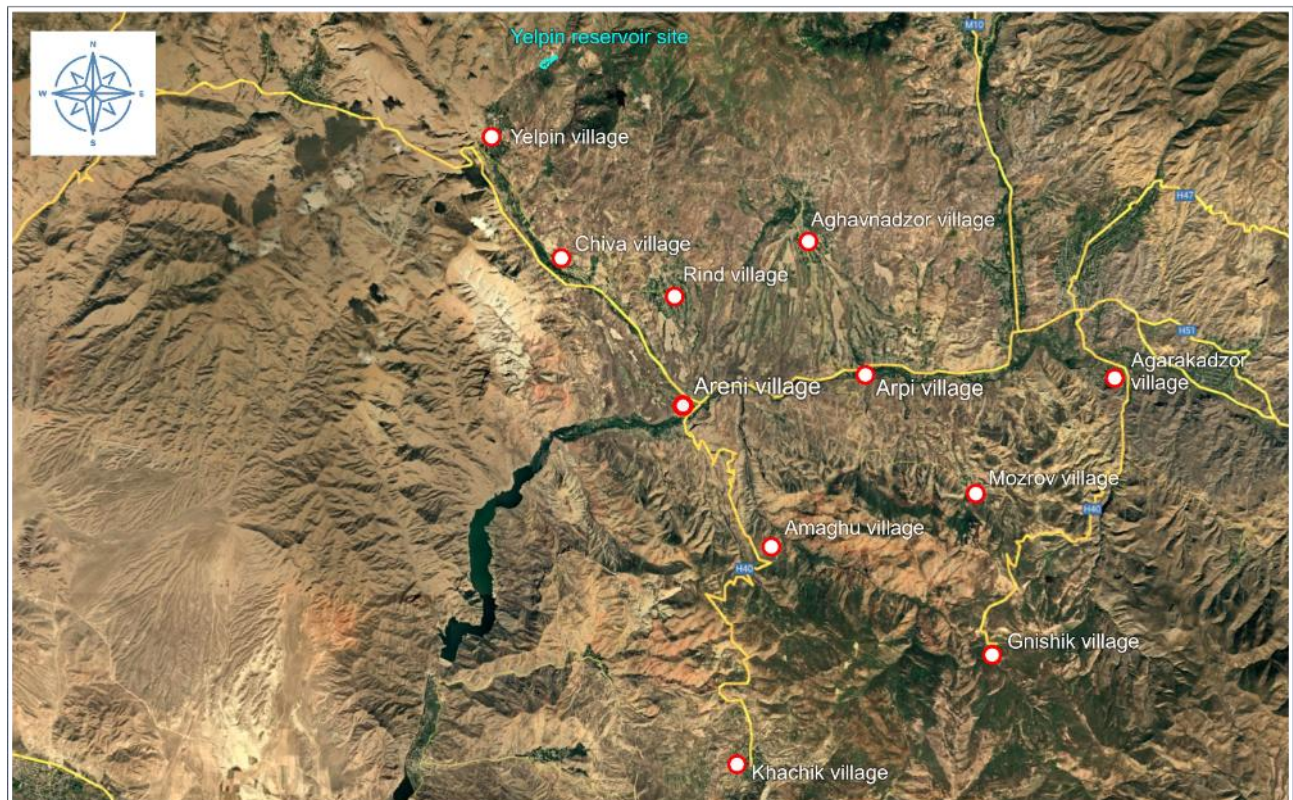
The reservoir will have a storage capacity of 0.93 mln. m³.

The reservoir hydraulic unit consists of:

1. Dam,
2. Spillway,
3. Construction spillway,
4. Irrigation outlet and main pipeline.

The dam body is planned to be constructed using local materials, specifically pebble-gravel shells. Anti-seepage protection will be provided by a central loam core. The dam crest elevation has been determined for both the Full Supply Level and the Maximum Water Level, with the Maximum Water Level calculated at 1,693 MASL.

Figure 2. Location of the Yelpin reservoir site and the villages included in Areni enlarged community



The main technical characteristics of the dam are as follows:

- Dam height - 40.0 m,
- Inclination of the upstream slope - 1:2.5,
- Inclination of the downstream slope - 1:2.25,
- Crest width - 8.0 m,
- Dam length - 168 m at an elevation of 1,697 masl.

Limestone alluvial soil can be obtained from the riverine valley area both upstream and downstream of the planned dam on the Yelpin River. The required quantity of sand can be extracted from a 40-

50 m wide section of the riverbed, provided it is excavated to a depth of 5.0-7.0 m. Blasting operations have been adopted in the project design.

Two construction camps with appropriate auxiliary structures will be used during the construction activities. The facilities of each construction camp will be installed in their designated areas in parallel with the construction process and placed on unused land allocated for this purpose. The construction period was determined according to the Project's implementation timeline and amounts to 34 months.

5. Biodiversity Values

Biodiversity values for this Project are defined as the species and habitats that qualify as (PBFs and CHs).

The CHA against the EBRD PR6 has revealed six habitats (according the EU Habitats Directive classification) and 41 species: 18 birds, one reptile species and 22 invertebrates (insect) species identified as PBFs and one habitat and 14 species: 9 mammal species, 4 reptile species and one amphibia triggering CHs (see [Table 3](#)).

In line with the EBRD Guidance Note on PR6 and Declaration on the European Principles for the Environment, the EBRD has adopted the country-sensitive approach for countries that are part of the European Neighbourhood Policy, which involves tailoring the application of the criteria and conditions for identifying priority biodiversity features and critical habitats to the needs of a specific country. This means that the requirements of the EU Directives would not be automatically applicable to the analysis below.

Table 2. CHA Findings: Summary Table of PBFs and CHs identified in the footprint area as per EBRD PR6²⁴

No	Criterion	Features (Habitats/species)
Priority Biodiversity Features as per EBRD PR6 (§12)		
i	12.i.a EAAA ²⁵ is habitat type listed in Annex I of the EU Habitats Directive and Resolution 4 of the Bern Convention	<u>Habitats</u> (×6 - according to the EU Habitats Directive classification) 6190 Rupicolous pannonic grasslands (Stipo-Festucetalia pallentis), 61A0 Eastern sub-Mediterranean dry grasslands (Scorzoneratalia villosae), 5410 West Mediterranean clifftop phrygas (Astregalo-plantaginetum subulatae), 3280 Constantly flowing Mediterranean rivers with Paspalo-Agrostidion species and hanging curtains of <i>Salix</i> and <i>Populus alba</i>, 92A0 <i>Salix alba</i> and <i>Populus alba</i> galleries, 8210 Calcareous rocky slopes with chasmophytic vegetation.
ii	12.ii.a EAAA for species and their habitats listed in Annex II of the Habitats Directive, Annex I of the Birds Directive, or Resolution 6 of the Bern Convention	<u>Birds</u> (×17) <i>Pernis apivorus</i> (LC) <i>Gypaetus barbatus</i> (NT) <i>Buteo rufinus</i> (LC) <i>Aquila chrysaetos</i> (LC)

²⁴In case a species would trigger several criteria in the PBF and CH, it is listed in this table only once as the highest conservation concern, which is CH.

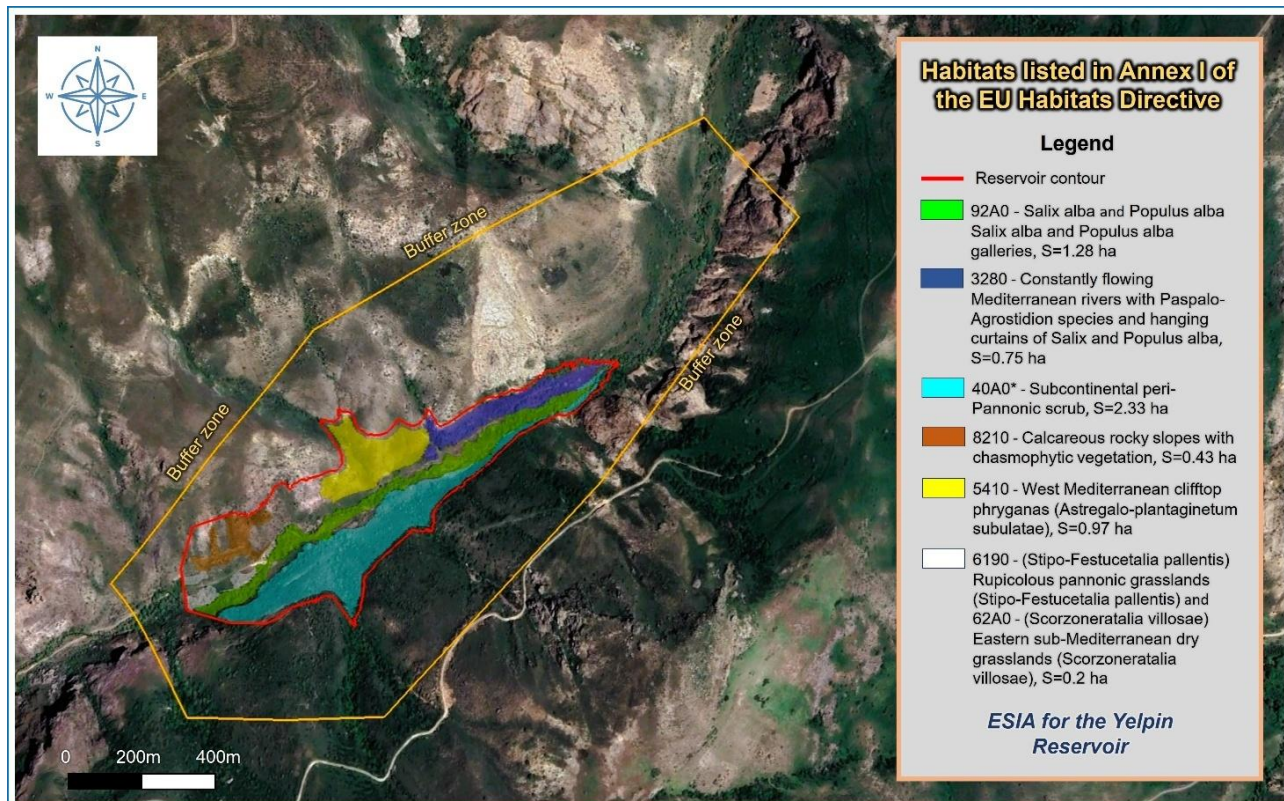
²⁵EAAA - Ecologically Appropriate Area of Analysis

№	Criterion	Features (Habitats/species)
		<i>Hieraaetus pennatus</i> (LC) <i>Falco peregrinus</i> (LC) <i>Anthropoides virgo</i> (LC) <i>Bubo bubo</i> (LC) <i>Lullula arborea</i> (LC) <i>Caprimulgus europaeus</i> (LC) <i>Coracias garrulus</i> (LC) <i>Anthus campestris</i> (LC) <i>Dendrocopos syriacus</i> (LC) <i>Ficedula semitorquata</i> (LC) <i>Lanius collurio</i> (LC) <i>Lanius minor</i> (LC) <i>Pyrrhocorax pyrrhocorax</i> (LC) <u>Insects (×1)</u> <i>Euphydryas aurinia</i>
iii	12.ii.d EAAA for regularly occurring nationally or regionally listed EN or CR species	<u>Insects (×2, already triggering cr.12 ii.e)</u> <i>Polyommatus (Agrodiaetus) eriwanensis</i> (EN) <i>Polyommatus (Agrodiaetus) ninae</i> (EN)
	12.ii.e EAAA for regularly occurring range-restricted species	<u>Insects (x20)</u> <i>Anthocharis gruneri</i> <i>Pieris krueperi</i> <i>Colias aurorina</i> (already triggering cr. 12 iii) <i>Armenia ledereri</i> <i>Armenia hyrcanica</i> <i>Nordmannia abdominalis</i> <i>Lycaena ochimus</i> <i>Ultraaricia crassipuncta</i> <i>Neolysandra coelestina</i> <i>Polyommatus (Agrodiaetus) demavendi</i> <i>Polyommatus (Agrodiaetus) eriwanensis</i> (already triggering cr. 12 ii.d) <i>Polyommatus (Agrodiaetus) ninae</i> (already triggering cr. 12 iii) <i>Hipparchia syriaca</i> <i>Hipparchia fatua</i> <i>Satyrus amasinus</i> <i>Pseudochazara pelopea</i> <i>Pseudochazara schahrudensis</i> <i>Chazara bischoffi</i> <i>Thaleropis ionia</i> <i>Melitaea perseia</i>
	12.iii Significant biodiversity features identified by a broad set of stakeholders or governments	<u>Birds (×1, listed in the Red Data Book of RA as Vulnerable)</u> <i>Sitta tephronota</i> (LC) <u>Reptiles (×1, listed in the Red Data Book of RA as Vulnerable)</u> <i>Zamenis hohenackeri</i> <u>Insects (×2, listed in the Red Data Book of RA as Vulnerable)</u> <i>Papilio alexanor</i>

No	Criterion	Features (Habitats/species)
		<i>Colias aurorina</i> (already triggering cr.12 ii.e)
Critical Habitats as per EBRD PR6 (§14)		
i	14.i.a EAAA is habitat type listed in Annex IV of the EU Habitats Directive	<u>Habitats</u> (×1) 40A0 Subcontinental peri-Pannonic scrub
ii	14.ii.a EAAA for species and their habitats listed in Annex IV of the Habitats Directive	<u>Mammals</u> (×9) <i>Ursus arctos</i> (LC) <i>Canis lupus</i> <i>Lynx lunx</i> <i>Dryomys nitedula</i> <u>Bats:</u> <i>Rhinolophus ferrumequinum</i> <i>Rhinolophus hipposideros</i> <i>Myotis</i> sp. (probably <i>Myotis oxygnathus</i>) (?) <i>Pipistrellus</i> sp. <i>Miniopterus schreibersi</i> <u>Reptiles</u> (×4) <i>Pseudopus apodus</i> <i>Lacerta media</i> (<i>Lacerta viridis</i>) <i>Coronella austriaca</i> <i>Ophisops elegans</i> <u>Amphibians</u> (×1) <i>Bufo viridis</i>

The habitats map of priority biodiversity features triggering the EBRD PR6 Criterion 12 i.a and of critical habitat triggering EBRD Criterion 14.i.a is presented on **Figure 3**.

Figure 3. Map of the habitats in the Project footprint area listed in Annex I of the EU Habitats Directive



Aquatic life

As described in the ESIA, ichthyological studies conducted under the EIA in the upper reaches of the Yelpin River, where the Yelpin reservoir is planned, revealed the absence of fish. This finding is supported by the surveys among recreational anglers, who report that the upper reaches of the Yelpin River do not sustain a native fish population. The Yelpin River almost completely dries up during the summer, and at its confluence with the Arpa, it remains dry for most of the year. These conditions make impossible migration of fish species from the Arpa River to the upstream of the Yelpin River.

There are no other available data about aquatic biota of the Yelpin River. Due to almost complete drying of the river in hot seasons, only seasonal occurrence of some aquatic and amphibious species may be expected there. A field survey focused on the river aquatic biota is included in the BAP as a preventive mitigation measure (see mitigation measures in section 7).

6. Summary of Potential Impacts

As presented in the ESIA, the Project will be implemented in the rich biodiversity area where valued (priority) habitats and species were identified.

The impacts of the Project on biodiversity will occur during both construction and operation/maintenance. The construction phase involves the dam building and reservoir filling. The methodology of impact assessment, including the identification of impact characteristics and significance matrix are detailed in Section 5 of the ESIA. As different species and their groups respond differently to different impacts, their sensitivity as receptors was taken into account during assessment.

Impacts on aquatic biota are not considered because there is no available data on the biota. Impact assessment will be done after the focused field survey under the BAP implementation is completed (see mitigation measures section). Thus, the BAP will be updated in this respect, if needed.

The following potential impacts on biodiversity (including priority biodiversity features and critical habitats) could result from the Project activities during:

1. Construction phase:

- Destruction (loss) of habitats (by vegetation clearance, excavation, top-soil removal and transportation, reservoir filling),
- Flora species loss (by vegetation clearance, including trees cutting, excavation, top-soil removal and its transportation, reservoir filling),
- Disturbance of fauna species by blasting, noise, vibration and light pollution (construction machinery, traffic, lighting at the construction site),
- Destruction of sedentary animals' habitats and risk of their death (as a result of excavation, top-soil removal and its transportation, reservoir filling),
- Loss of foraging habitats for medium and large mammals (as a result of excavation, top-soil removal and its transportation, reservoir filling),
- Loss of foraging habitats for bats (as a result of excavation, top-soil removal and its transportation, reservoir filling) (apparent, but should be confirmed)
- Loss of breeding and foraging habitats for birds (as a result of excavation, top-soil removal and its transportation, reservoir filling),

- Loss of breeding, foraging and wintering habitats for invertebrates and risk of their death in overwintering stages (as a result of vegetation clearance, excavation, removal of top-soil and its transportation, reservoir filling),
 - Impact on protected areas and internationally designated areas.
2. Operation and maintenance phase:
- Emergence of new habitats (water, riparian),
 - Increased access to the area.

Negative impacts could occur mainly at the construction phase; they are caused by the dam building and flooding of the reservoir footprint area.

Some positive impacts on biodiversity occur during the operational phase; they are connected with the emergence of new habitats where large water surface area and coastal vegetation would attract some species of animals.

The assessment is completed for each predicted impact at the construction and operation phases and per each group of biodiversity receptors, which were combined based on their ecological characteristics; in some cases, impacts on individual species are assessed where possible.

Table 3. Assessment of impacts on the identified biodiversity features (PBFs and CHs)

Code	Receptor	Key impacts identification	Impact significance
6190, 62A0	Rupicolous pannonic grasslands (<i>Stipo-Festucetalia pallentis</i>), Eastern sub-mediterranean dry grasslands (<i>Scorzoneretalia villosae</i>)	Habitat loss (0.2 ha)	Significant
5410	West Mediterranean clifftop phryganas (<i>Astregalo-plantagnetum subulatae</i>)	Habitat loss (0.97 ha)	Significant
3280	Constantly flowing Mediterranean rivers with Paspalo-Agrostidion species and hanging curtains of <i>Salix</i> and <i>Populus alba</i>	Habitat loss (0.75 ha)	Significant
40A0*	Subcontinental peri-Pannonic scrub	Habitat loss (2.33 ha)	Significant
92A0	<i>Salix alba</i> and <i>Populus alba</i> galleries	Habitat loss (1.28 ha)	Significant
8210	Calcareous rocky slopes with chasmophytic vegetation	Habitat loss (0.43 ha)	Significant
Sedentary animals Mammals: Forest dormouse (about 16-22 individuals) Reptilians: Pallas's glass lizard (at least 5 individuals) Snake-eyed lizard (at least 30 individuals) Medium Lizard (at least 10 individuals) Smooth snake (at least 2 individuals) Transcaucasian rat snake (at least 3 individuals)		Destruction of sedentary animals' habitats: Forest dormouse - about 1.28 ha Reptilians (five species) - about 3.9 ha totally (the species' ranges overlap) Risk of their death due to vegetation clearance, excavation works, flooding reservoir	Significant
Sedentary animals Amphibians: Variable toad/ green toad		Destruction of animals' habitats and risk of their death;	Moderate

Code	Receptor	Key impacts identification	Impact significance
		but the flooded area will increase the periphery of the coastline and thus increase the habitat of the species	
	Large terrestrial mammals and associated habitats: Brown Bear	Loss of insignificant part of foraging habitats	Low
		Disturbance by noise from blasting	
	Large terrestrial mammals and associated habitats: Grey Wolf, Eurasian Lynx	Loss (minor - in case of occasional hunting) of foraging habitats	Very low
		Development of the waterbird society in the filled reservoir might increase food supply for lynx	
	Flying mammals: bats Greater horseshoe bat Lesser horseshoe bat Lesser mouse-eared bat Pipistrellus sp. Common bent-wing bat	Loss of foraging habitats (should be confirmed) Increase in amphibious insect numbers around the filled reservoir might increase food supply for the bat species	Not defined
	Birds Syrian Woodpecker 1 pair Tawny Pipit 1-2 pairs Wood Lark 8-13 pairs Red-backed Shrike 2-3 pairs Lesser Grey Shrike 1-2 pairs European Roller 1-2 pairs Red-billed Chough 1 pair Eastern Rock-nuthatch (breeding is not confirmed)	Loss or restriction of breeding habitats Lost habitats – about 6 ha totally (the species' ranges overlap)	Significant
	Birds: European Honey-buzzard Bearded Vulture Long-legged Buzzard Booted Eagle Golden Eagle Peregrine Falcon Eurasian Eagle-owl Rosy Starling	Loss (minor) of foraging area	Low
	Birds: Demoiselle Crane Semicollared Flycatcher	Loss (minor) of habitats for stopover	Low
	Insects: <i>Anthocharis gruneri</i> <i>Pieris krueperi</i> <i>Colias aurorina</i> <i>Armenia ledereri</i> <i>Armenia hyrcanica</i> <i>Nordmannia abdominalis</i>	Destruction of habitats, increased mortality of individuals due to vegetation clearance, excavation works, flooding reservoir	Significant

Code	Receptor	Key impacts identification	Impact significance
	<i>Lycaena ochimus</i> <i>Ultraaricia crassipuncta</i> <i>Neolysandra coelestina</i> <i>Polyommatus (Agrodiaetus) demavendi</i> <i>Polyommatus (Agrodiaetus) eriwanensis</i> <i>Polyommatus (Agrodiaetus) ninae</i> <i>Hipparchia syriaca</i> <i>Hipparchia fatua</i> <i>Satyrus amasinus</i> <i>Pseudochazara pelopea</i> <i>Pseudochazara schahrudensis</i> <i>Chazara bischoffi</i> <i>Thaleropsis ionia</i> <i>Melitaea perseia</i> <i>Euphydryas aurinia</i> <i>Papilio alexanor</i>		

There are few field data on observation of flying bats, that allow to suggest that the Project area is a foraging area for the bat species. But this requires reliable confirmation as well as estimation of the level of the Project impact on the species. There is no data on bats roosting in the area. So, a high quality survey of *Chiroptera* should be carried out in the Project area and adjacent territories. This is included in the BAP as preventive mitigation measure (see below).

7. Mitigation: Biodiversity Management Plan

According to the EBRD PR6, the mitigation hierarchy should be applied, where impact avoidance is the first choice. If avoidance is not possible, adverse impacts have to be minimised or mitigated. And, as a measure of last choice, offsetting may be applied, if significant residual impacts remain after all previous efforts.

Mitigation measures were developed in the ESIA in terms of the priority features groups. In the current BAP, developed measures are presented in the framework of the Biodiversity Management Plan (BMP) with monitoring targets (indicators), timeframe and responsible parties.

Mitigation measures related to capacity improvement of the species habitats, capture and relocation of animals are integrated with the offset measures (see Offsetting strategy, BAP2). The mitigation measures are focused on the death avoidance of the species individuals, while the offset measures are intended to support the long-term sustainability of the species populations.

Additional studies are included into the BMP to reveal significance of the Project area for bats and occurrence of aquatic species, if any is confirmed.

Safe relocation and settlement procedures for the species will be elaborated in the form of protocols developed based on national and international requirements. The following national regulatory documents of the RA will be followed:

- The Procedure for relocating wild animals to natural conditions²⁶,

²⁶Approved by the RA governmental decree #758-N from 23.03.2024 <https://www.arlis.am/hy/acts/193176>

- The Procedure for issuing permits for the resettlement of wild animals into natural conditions²⁷.

Internationally coordinated approaches for animal relocation are presented in the IUCN Guidelines for Reintroductions and Other Conservation Translocations²⁸.

For the species-specific approaches and technics, the following manuals will be followed:

1. The dormouse conservation handbook <https://ptes.org/wp-content/uploads/2014/06/Dormouse-Conservation-Handbook.pdf>
2. Reptile Habitat Management Handbook <https://www.arc-trust.org/shop/reptile-habitat-management-handbook>
3. Reptile Guidance for Developers https://www.lbp.org.uk/downloads/Publications/PlanningGuidance/NE_reptilesguidelines.pdf

Creating conditions for safe life of the relocated animals require involvement and awareness raising of local community on biodiversity that is included into the offsetting strategy (see below).

This BAP forms part of the tender documentation for the Project. All mitigation contained in this BAP at the pre-construction and construction phase will be included in the Terms of Reference and contract of the Construction Contractor and cascaded into contracts of relevant subcontractors as appropriate. Hiring professional zoologists will be required to implement surveys and relocation of animals.

The EBRD will be kept updated on BAP implementation progress via regular E&S Monitoring Reports (by independent external monitoring consultants).

All mitigation contained in this BAP at the operation and maintenance phase will be included in the Client operation plan.

The matrix of the mitigation measures is presented in **Table 4**.

Table 4. Mitigation measures: Biodiversity Management Plan

Measures, actions	Timeframe	Responsible	Indicator
BMP1 (avoidance measures)			
Objective: Avoid mortality of sedentary animals due to construction works and flooding			
<i>Pre-construction phase</i>			
A1. Identify existing forest and rocky habitats which are potential habitats for relocation of Forest dormice, snakes, and lizards in the vicinities of the flooded area, (all habitats predominantly in the buffer zone), assess species-specific capacities of the habitats	Prior to the commencement of any pre-construction preparations, first year	Water Committee - overall responsibility	
Actions: 1. Engage properly qualified experts (with experience of animal relocation) zoologists – mammologist and herpetologist 2. Survey riparian woodlands and scrub areas upstream from the Project site to estimate a) whether Forest dormice occur there and how many, b) how many dormice may be relocated	Beginning of the year March-September	Water Committee Mammologist	Contract in place Report, maps

²⁷Approved by the order of the Ministry of Environment of the RA #113-N from 03.04.2024 <https://www.arlis.am/hy/acts/191577>

²⁸IUCN/SSC (2013). Guidelines for Reintroductions and Other Conservation Translocations. Version 1.0. Gland, Switzerland: IUCN Species Survival Commission <https://portals.iucn.org/library/efiles/documents/2013-009.pdf>

WATER RESERVOIRS PROJECT - ARMENIA

ESIA for the Yelpin Reservoir Construction Project

Biodiversity Action Plan

Rev02

Measures, actions	Timeframe	Responsible	Indicator
and where to, c) whether additional shelters (next boxes/tubes) have to be installed and where 3. Survey rocky slopes, grasslands, scrub areas in the buffer zone to estimate a) whether the species of lizards and snakes occur there and how many, b) how many these animals may be relocated from the footprint area and where to, c) whether additional shelters (rocky outcrops and other) have to be installed and where	April - September	Herpetologist	Report, maps
A2. If needed: provide additional rocky outcrops/stones and nestboxes/tubes in the surveyed areas (predominantly in the buffer zone) to increase the number of suitable local habitats for dormice, snakes, lizards	Prior to the commencement of any pre-construction preparations	Water Committee - overall responsibility	Additional habitats arranged
Actions: 1. Hire companies to install rocky outcrops/stones, produce nest boxes/tubes 2. Install rocky outcrops/stones under the supervision of the herpetologist 3. Install the nest boxes/tubes 4. Monitor settled reptilians at the new rocky shelters, dormice at the new nest boxes/tubes	After finishing surveys In cold season Round year Two years after installation, March - September	Water Committee (or the construction contractor) Contracted company Mammologist Herpetologist Mammologist	Contracts signed Installed shelters Monitoring reports
A3. Survey the area to map inhabited burrows of badger and other burrowing mammals; if the burrows may be affected by the pre-construction/construction works, conduct relocation using species-specific methods	Prior to the commencement of any pre-construction preparations	Mammologist (with support of the Water Committee or the construction contractor)	
Actions 1. Survey the footprint areas to identify inhabited burrows, species and estimate quantity of animals 2. If relocation is needed: survey the adjoining areas (predominantly in the buffer zone) with suitable habitats where the animals can be relocated to estimate their species-specific capacity 3. Develop a relocation protocol 4. Carry out relocation	First year, best time February to April, October to November (for badger) First year Second year Second year	Mammologist	Report, maps Report, maps Developed relocation protocol Identified/Safely relocated and settled animals

WATER RESERVOIRS PROJECT - ARMENIA

ESIA for the Yelpin Reservoir Construction Project

Biodiversity Action Plan

Rev02

Measures, actions	Timeframe	Responsible	Indicator
5. Monitoring of the animals in the new locations	For two years after relocation		Monitoring report, percent of settled animals
A4. Survey the Project area to capture as many individuals as possible including such species as Forest dormice, snakes, lizards, green toad and to move them to the safe habitats identified and/or arranged before.	Prior to the commencement of any pre-construction preparations	Water Committee - overall responsibility	
Actions 1. Survey riparian woodlands and scrub areas to identify dormice habitats/shelters, estimate quantity of animals 2. Survey rocky slopes, grasslands, scrub areas to identify lizards and snakes habitats, estimate quantity of animals 3. Survey the river shore line at the dam footprint area to identify green toad habitats and quantity of animals 4. Develop relocation protocols 5. Carry out captures and relocations	March-September, first year April-September, first year Second year Second year	Mammologist Herpetologist Mammologist, herpetologist	Report, map Report, map Protocols Identified/safely relocated and settled animals Monitoring report, percent of settled animals
<i>Construction phase</i>			
A5. Before tree cutting in the reservoir area, examine each tree to check whether Forest dormouse inhabits it; if so, capture individuals and relocate them to safe habitats identified during the pre-construction phase,	Before tree cutting, from March to September	Construction contractor - overall responsibility	
Actions: 1. Examine trees to be cut and adjoining scrub to identify dormice (if any remained there) 2. If any remained animals: provide capture and relocation of discovered dormice according to the earlier developed protocol (see A4) 3. Monitor the relocated animals at the new locations	March - September For two years after relocation	Mammologist	Identified/relocated dormice Monitoring report, percent of settled animals
A6. Before filling the reservoir, survey the flooded area and capture as many individuals as possible including such species as Forest dormouse, snakes, lizards (if remained), and relocate them to the safe habitats identified and/or arranged in advance	Before filling the reservoir from March - to September	Construction contractor - overall responsibility	
Actions:			

WATER RESERVOIRS PROJECT - ARMENIA

ESIA for the Yelpin Reservoir Construction Project

Biodiversity Action Plan

Rev02

Measures, actions	Timeframe	Responsible	Indicator
1. Examine potentially flooded area based on prepared maps of the species occurrence (see A4) to identify the animals (if any remained there) 2. If any animals remained: capture and relocate them according to the earlier developed protocols (see A4) 3. Monitor the relocated animals at the new locations	Mach - September For two years after relocation	Mammologist, herpetologist	Identified /relocated animals Monitoring report, percent of settled animals
A7. Before filling the reservoir, check the mapped residential burrows of badger and other animals; if they remain, to capture them and relocate to the safe habitats.	Before filling the reservoir from March - to October	Construction contractor - overall responsibility	
1. Examine potentially flooded area basing on prepared map of the burrow locations (see A3) to identify yet inhabited burrows and animals 2. If any animals remained: capture and relocate them according to the earlier developed protocol (see A3) 3. Monitor the relocated animals at the new locations	Mach-September For two years after relocation	Mammologist	Identified /relocated animals Monitoring report, percent of settled animals
BMP2 (reduction measures)			
Objective: decrease direct impacts of the construction works, operations, and employees on fauna			
<i>Pre-construction phase</i>			
R1. Develop the Worker Code of Conduct for employees of the construction company to prevent poaching and 'Procedures to prevent harm to animals during construction works'	During the bulding preparation	Construction contractor - overall responsibility	Developed and approved documents
Actions: 1. Develop the Worker Code of Conduct for employees focusing on prevention of poaching and protection of animals during building 2. Develop Procedures to prevent harm to animals during construction works' focusing on impact from excavating and blasting 3. Approve the documents by the building company order 4. Train personnel and subcontractors on the documents' application	During the bulding preparation Each new staff worker; all personnel - two times per year	Construction contractor - mammologist, herpetologist Construction contractor, Supervision Engineer	Developed documents Approved documents Trained personnel and subcontractors
<i>Construction phase</i>			
R2. Prevent any harm to animals and poaching during construction based on application of the developed documents (see R1)	During construction works	Construction contractor - overall responsibility; Water Committee - supervision	Absence of cases of harm to animals, no cases of poaching

WATER RESERVOIRS PROJECT - ARMENIA

ESIA for the Yelpin Reservoir Construction Project

Biodiversity Action Plan

Rev02

Measures, actions	Timeframe	Responsible	Indicator
Actions: 1. Apply the Procedures during construction works including, among other: - Start construction works from one edge of the dam area, this approach will allow remained animals to leave, - Start construction works before or after the breeding season - prior to April or after August; this will prevent/shorten mortality of animals including offspring, - strict respect of the limited project footprint areas, speed limitation - qualified and experienced zoologist is to be engaged to supervise the excavation works - should any animals be found, procedures on capture and relocation must be followed, - using minimum required number of explosives; implementing all required safety measures during blasting to minimize the impacted area 2. Apply and monitor compliance with the Worker Code of Conduct to prevent poaching during construction	During construction works During construction works	Supervision Engineer, Zoologist Supervision Engineer	Number of discovered animals, Number of saved and relocated animals Number of poaching cases
R3. Develop the Worker Code of Conduct for employees of the reservoir operator to prevent poaching and 'Procedures to observe, treat and save encountered animals during operations'	At the finishing construction works		Developed documents
Actions: 1. Develop the Worker Code of Conduct for employees focusing on prevention of poaching and saving animals during operation 2. Develop protocol on procedures during operation to observe, deal safely and save discovered animals 3. Approve the documents by the Water Department 4. Aware and train hired personnel on the documents' application	At the operation preparation phase Just after personnel hired, further - two times per year	JRAR CJSC - reservoirs operator - responsible person, mammologist, herpetologist Supervision person	Developed documents Approved documents Trained personnel
<i>Operation and maintenance phase</i>			
R4. Prevent poaching and save animals during operation of the reservoir hydraulic structure	During operation	JRAR CJSC - reservoirs operator	Absence of cases of harm to animals, cases of poaching
Actions: 1. Observe animals in the reservoir, riverbanks and buffer zone 2. If observed animal is at risk or harmed, implement animal saving actions according to the developed protocol (see R3), contact a responsible person/zoologist	During operation	JRAR CJSC - reservoirs operator Supervision person, if any	Number/ species of animals discovered at risk or harmed,

Measures, actions	Timeframe	Responsible	Indicator
3. Apply and monitor compliance of the reservoir's operator with the Worker the Code of Conduct to prevent poaching			number of saved animals cases of poaching
BMP3 (preventive measures): Additional surveys			
<i>Pre-construction phase</i>			
A8. Survey the Project area to identify species of bats, and a) reveal possible bat roosts (can be found on trees, in hollows, crevices, foliage, caves) and estimate their number, b) estimate value of the area for the bats' foraging. If the bat roosts or significant values of the area for the species foraging are identified, to develop an offset project. <i>Potential components of the offset project:</i> <i>A8.1 In case the bats' roosts are confirmed in the area, identify existing forest and rocky habitats which are potentially suitable for bat roosting in the vicinities of the flooded area (first of all, in the reservoir buffer/protection zone), built the bat boxes and hang them on trees to increase the habitat capacities for bats (in the framework of offset project), monitor the bats' occurrence</i> <i>A8.2. In case of considerable value of the area for bat foraging, take into account the bats' needs in food (insects) in the offset project on protection and development of habitats for insects (see the Offsetting strategy)</i>	from March to September	Water Committee - overall responsibility Mammologist	Report, maps
A9. Additionally survey aquatic ecosystem in the Project area and downstream, to identify aquatic species (if any) and estimate potential impact of the Project on these species. If the species are identified and impact is assessed as moderate or significant, develop appropriate mitigation measures and, if needed, an offset project.	from March to June	Water Committee, overall responsibility Aquatic biologist	Report, maps

8. Residual impact

The residual impact, remaining impact after the implementation of the mitigation measures is assessed as follows:

Minor or negligible residual impact: considered as negligible or minor/acceptable residual impacts for which additional measures are not necessary,

Moderate or major residual impact: unacceptable unless they can be offset by other positive impacts of the project.

In case of moderate or major residual impacts on 1/priority biodiversity features, additional measures will be designed to achieve "no net loss" and on 2/critical habitats net gain is required (through offsets as per EBRD PR6 definitions).

The final significance of the residual potential impacts after avoidance and reduction measures is presented in [Table 5](#).

WATER RESERVOIRS PROJECT - ARMENIA

ESIA for the Yelpin Reservoir Construction Project

Biodiversity Action Plan

Rev02

Table 5. Assessment of residual impacts

	Receptor	Key impacts identification	Impact significance	Mitigation measures	Residual impact	Offset needed
6190, 62A0	Rupicolous pannonic grasslands (<i>Stipo-Festucetalia pallentis</i>), Eastern sub-mediterranean dry grasslands (<i>Scorzoneratalia villosae</i>).	Habitat loss (0.2 ha)	Significant	No	Significant	Yes (no net loss)
5410	West Mediterranean clifftop phrygas (<i>Astregalo-plantaginetum subulatae</i>).	Habitat loss (0.97 ha)	Significant	No	Significant	Yes (no net loss)
3280	Constantly flowing Mediterranean rivers with Paspalo-Agrostidion species and hanging curtains of Salix and Populus alba.	Habitat loss (0.75 ha)	Significant	No	Significant	Yes (no net loss)
40A0*	Subcontinental peri-Pannonic scrub	Habitat loss (2.33 ha)	Significant	No	Significant	Yes (net gain)
92A0	<i>Salix alba</i> and <i>Populus alba</i> galleries (riverine woodland)	Habitat loss (1.28 ha)	Significant	No	Significant	Yes (no net loss)
8210	Calcareous rocky slopes with chasmophytic vegetation.	Habitat loss (0.43 ha)	Significant	No	Significant	Yes (no net loss)
Sedentary animals Mammals: Forest dormouse (about 16-22 individuals).		Destruction of sedentary animals' habitats and risk of their death in process of vegetation clearance, excavation works, flooding reservoir Habitat loss (about 1.28 ha riverine forested areas)	Significant	A1, A4, A5, A6, R1-R4	Moderate	Yes (net gain)
Sedentary animals Reptilians: Pallas's glass lizard (at least 5 individuals) Snake-eyed lizard (at least 30 individuals) Medium Lizard (at least 10 individuals) Smooth snake (at least 2 individuals) Transcaucasian rat snake (at least 3 individuals)		Destruction of sedentary animals' habitats and risk of their death in process of vegetation clearance, excavation works, flooding reservoir Habitat loss (totally up to 3.9 ha, including grasslands, phrygas, scrub areas and rocky slopes)	Significant	A1, A2, A4, A6, R1-R4	Moderate	Yes (net gain)
Sedentary animals Amphibians: Variable toad/ green toad.		Destruction of animals' habitats and risk of their death;	Moderate	A4 R1-R4	Minor	

	Receptor	Key impacts identification	Impact significance	Mitigation measures	Residual impact	Offset needed
		but the flooded area will increase the periphery of the coastline and thus, will increase the habitat of the species				
Large terrestrial mammals and associated habitats: Brown Bear.		Loss of insignificant part of foraging habitats	Low	R1-R4	Minor	
		Disturbance by noise from blasting				
Large terrestrial mammals and associated habitats: Grey Wolf, Eurasian Lynx.		Loss (minor) of foraging habitats	Low	R1-R47	Minor	
		Development of the waterbird society at the filled reservoir might increase food supply for lynx				
Flying mammals: bats Greater horseshoe bat Lesser horseshoe bat Lesser mouse-eared bat Pipistrellus sp. Common bent-wing bat.		Loss of foraging area (should be confirmed)	Not defined	A8, depending on the result - A8.1 or A8.2	Not defined	Probably
Birds Syrian Woodpecker 1 pair Tawny Pipit 1-2 pairs Wood Lark 8-13 pairs Red-backed Shrike 3-5 pairs Lesser Grey Shrike 1-2 pairs European Roller 1-2 pairs Red-billed Chough 1 pair Eastern Rock-nuthatch (breeding is not confirmed).		Loss or restriction of breeding habitats Habitat loss (totally about 6 ha, include all habitats included in this table)	Significant	R1-R4	Moderate	Yes (no net loss)
Birds: European Honey-buzzard Bearded Vulture Long-legged Buzzard Booted Eagle Golden Eagle		Loss (minor) of foraging area	Low	R1-R47	Minor	

WATER RESERVOIRS PROJECT - ARMENIA

ESIA for the Yelpin Reservoir Construction Project

Biodiversity Action Plan

Rev02

	Receptor	Key impacts identification	Impact significance	Mitigation measures	Residual impact	Offset needed
	Peregrine Falcon Eurasian Eagle-owl Rosy Starling.					
	Birds: Demoiselle Crane Semicollared Flycatcher	Loss (minor) of habitats for stopover	Low	R1-R47	Minor	
	Insects: <i>Anthocharis gruneri</i> <i>Pieris krueperi</i> <i>Colias aurorina</i> <i>Armenia ledereri</i> <i>Armenia hyrcanica</i> <i>Nordmannia abdominalis</i> <i>Lycaena ochimus</i> <i>Ultraaricia crassipuncta</i> <i>Neolysandra coelestina</i> <i>Polyommatus (Agrodiaetus) demavendi</i> <i>Polyommatus (Agrodiaetus) eriwanensis</i> <i>Polyommatus (Agrodiaetus) ninae</i> <i>Hipparchia syriaca</i> <i>Hipparchia fatua</i> <i>Satyrus amasinus</i> <i>Pseudochazara pelopea</i> <i>Pseudochazara schahrudensis</i> <i>Chazara bischoffi</i> <i>Thaleropsis ionia</i> <i>Melitaea persea</i> <i>Euphydryas aurinia</i> <i>Papilio alexanor.</i>	Destruction of habitats, increased mortality of individuals due to vegetation clearance, excavation works, flooding reservoir	Significant	R1-R4	Moderate	Yes (no net loss)

9. Offsetting strategy

The technical rationale of how the project's mitigation strategy (offset) will achieve a net gain (NG) or no net loss (NNL), for CH and PBF, respectively, as required by EBRD PR 6, is presented in this section.

The offsetting strategy aims to achieve NNL or NG on biodiversity values (habitats - ecosystems) based on the "biodiversity conservation" approach (of "prevented damage" method). The Project will fully destroy valuable habitats (ecosystems) in the borders of the dam and reservoir footprints due to construction works and flooding. At the same time, similar habitats are situated in surrounding areas, first of all in the buffer (protection) zone of the reservoir. These similar habitats will be conserved to avoid their changes/destruction in the future (due to such potential threats as overgrazing, agricultural usage, hunting, and intensive tourism).

Also, offset is needed to provide species habitats for animals who will lose their habitats due to construction to the reservoir (see [Table 5](#)). Conserved habitats (ecosystems) will be used for relocation of animals and, where needed, for construction of the species local habitats to increase the habitats capacities. Accordingly, the second offsetting approach – habitat restoration, will be applied in relation to the species habitats and, at the same time, contributing to the restoration of the habitats/ecosystems.

Additionally, the restoration approach will be applied to restore habitats similar to the existing riverine habitats along shoreline of the new reservoir. It is proposed to base the offsetting strategy on such pillars as stakeholders' involvement and capacity building, adaptive monitoring and law enforcement, adapted for the offsetting measures.

9.1 Loss and gain analysis and calculations

After implementation of mitigation measures, the key residual impacts are:

Lost habitats (ecosystems):

- 6190 Rupicolous pannonic grasslands (Stipo-Festucetalia pallentis), 62A0 Eastern sub-Mediterranean dry grasslands (Scorzoneratalia villosae), 0.2 ha,
- 5410 West Mediterranean clifftop phrygas (Astregalo-plantaginetum subulatae), 0.97 ha,
- 3280 Constantly flowing Mediterranean rivers with Paspalo-Agrostidion species and hanging curtains of Salix and Populus alba, 0.75 ha,
- 92A0 Salix alba and Populus alba galleries), 1.28 ha,
- 8210 Calcareous rocky slopes with chasmophytic vegetation), 0.43 ha,
- 40A0* Subcontinental peri-Pannonic scrub, 2.33 ha.

Lost species habitats (in brackets - codes of the habitats/ecosystems where the species occur):

- Mammalia: Forest Dormouse, up to 1.28 ha (92A0),
- Reptilians: Pallas's glass lizard, Snake-eyed lizard, Medium Lizard, Smooth snake, Transcaucasian rat snake, totally up to 3.9 (6190, 62A0, 5410, 8210, 40A0),
- Birds: Syrian Woodpecker, Tawny Pipit, Wood Lark, Red-backed Shrike, Lesser Grey Shrike, European Roller, Red-billed Chough, Eastern Rock-nuthatch, totally up to 6 ha (all above mentioned habitats/ecosystems).

Habitats of insects (PBF, 22 species - see [Table 5](#)) in the footprint area borders will be lost. Exact habitat area of the each of the insect species is currently unclear and will be estimated under the offset project.

An additional component of the offset may be support of the habitats of the observed bat species just after implementation of the A8 mitigation measure (see [Table 4](#)). But it depends on results of the bat field survey planned under the A8 measure.

Lost habitats have a different state of nature – from insignificant disturbances to areas with disturbed plots due to grazing and people passing. So, appropriate quality coefficients were defined for the habitats (see [Table 6](#)). The same coefficients are estimated for similar habitats located in the protection zone.

According to the literature sources²⁹ and expert (geobotanist) opinion, all lost habitats (ecosystems) are common for Armenia, there are not rare features among them. According to the practices in Armenia, offsetting multiplier has a range between 1 to 10.

Taking into account all these, the following multipliers are proposed for the habitats (ecosystems):

- multiplier of 1.5 for the PBF to reach the no net loss target, taking into consideration a potential forest restoration success rate around 70%,
- multiplier of 3 for the CH in order to reach the net gain target and to take into consideration the uncertainties on the restoration success.

The multipliers will need to be discussed and agreed with relevant stakeholders. If validated, this approach would imply the need to realize the following gains through offsetting actions (see [Table 6](#)).

Table 6. Gains needed regarding Habitats/ecosystems to achieve NNL (PBF) or NG (CH)

Code	Habitats	Residual impact			Offset			
		Physical Loss (ha)	Quality coefficients	Calculated loss (Qha)	Multiplier	Quality coefficients	Gain needed (Qha)	Gain needed, physical (ha) ³⁰
6190, 62A0	Rupicolous pannonic grasslands (<i>Stipo-Festucetalia pallentis</i>), Eastern sub-mediterranean dry grasslands (<i>Scorzoneretalia villosae</i>).	0.2	0.7	0.14	1.5	0.7	0.21	0.3
5410	West Mediterranean clifftop phrygas (<i>Astregalo-plagnetum subulatae</i>).	0.97	0.9	0.87	1.5	0.9	1.31	1.46

²⁹Habitats of Armenia, 2016, G.M. Fayvush, A.S. Aleksanyan
https://www.researchgate.net/publication/303689840_Habitats_of_Armenia

³⁰Physical gain needed is calculated by dividing "Gain needed" (Qha) by the respective quality coefficients.

Code	Habitats	Residual impact			Offset			
		Physical Loss (ha)	Quality coef-ficients	Calculated loss (Qha)	Multiplier	Quality coef-ficients	Gain needed (Qha)	Gain needed, physical (ha) ³⁰
3280	Constantly flowing Mediterranean rivers with Paspalo-Agrostidion species and hanging curtains of Salix and Populus alba.	0.75	0.75	0.56	1.5	0.75	0.84	1.13
92A0	<i>Salix alba</i> and <i>Populus alba</i> galleries.	1.28	0.75	0.96	1.5	0.75	1.44	1.92
8210	Calcareous rocky slopes with chasmophytic vegetation.	0.43	0.9	0.39	1.5	0.9	0.58	0.65
	Total PBF	3.63		2.92			4.38	5.45
40A0*	Subcontinental peri-Pannonic scrub.	2.33	0.85	1.98	3	0.85	5.94	6.99
	Total CH	2.33		1.98			5.94	6.99
	Total	5.96		4.90			10.33	12.44
	Other habitats, ha	1.81						
	Footprint area, ha	7.77						
	Buffer zone, ha	30.93						

As the species occur in the suitable habitats/ecosystems, the species loss and gain analysis is developed based on calculations related to the habitats/ecosystems (Table 6). Received multipliers for the species are presented in Table 7; they provide “net gain” for all concerned species (multipliers from 1.5 to 2.4).

Table 7. Gains needed regarding species habitats to achieve NG

Species	Codes of suitable habitats	Residual impact		Offset		Multipliers
		Physical Loss (ha)	Calculated loss (Qha)	Gain needed (Qha)	Gain needed, physical (ha)	
		a	b	c	d	c/b
Forest dormouse	92A0	1.28	0.96	1.44	1.92	1.5

Species	Codes of suitable habitats	Residual impact		Offset		Multipliers
		Physical Loss (ha)	Calculated loss (Qha)	Gain needed (Qha)	Gain needed, physical (ha)	
Reptilians³¹: Pallas's glass lizard (at least 5 individuals) Snake-eyed lizard (at least 30 individuals) Medium Lizard (at least 10 individuals) Smooth snake (at least 2 individuals) Transcaucasian rat snake (at least 3 individuals)	6190, 62A0, 5410, 8210, 40A0	3.93	3.38	8.04	9.39	2.4
Birds Syrian Woodpecker 1 pair Tawny Pipit 1-2 pairs Wood Lark 8-13 pairs Red-backed Shrike 3-5 pairs Lesser Grey Shrike 1-2 pairs European Roller 1-2 pairs Red-billed Chough 1 pair Eastern Rock-nuthatch	92A0, 6190, 62A0, 5410, 3289, 8210, 40A0	5.96	4.90	10.33	12.44	2.1

The losses and gains will have to be precisely assessed within the framework of a detailed Biodiversity Offsetting Management Plan (BOMP), based on fieldwork to identify potential conservation and construction areas for the different targets. If areas of the species habitats found in the protection (buffer) zone would not be enough, these habitats are available at the scale of the larger EAAA beyond the protection zone, to ensure>NNL/NG for the features. But the precise locations will need to be identified during the BOMP process through fieldwork.

9.2 Offsetting measures

Offset measures are proposed to achieve>NNL/NG for the CH and PBF. The details are presented in the measures below; the BAP consists of the following four components.

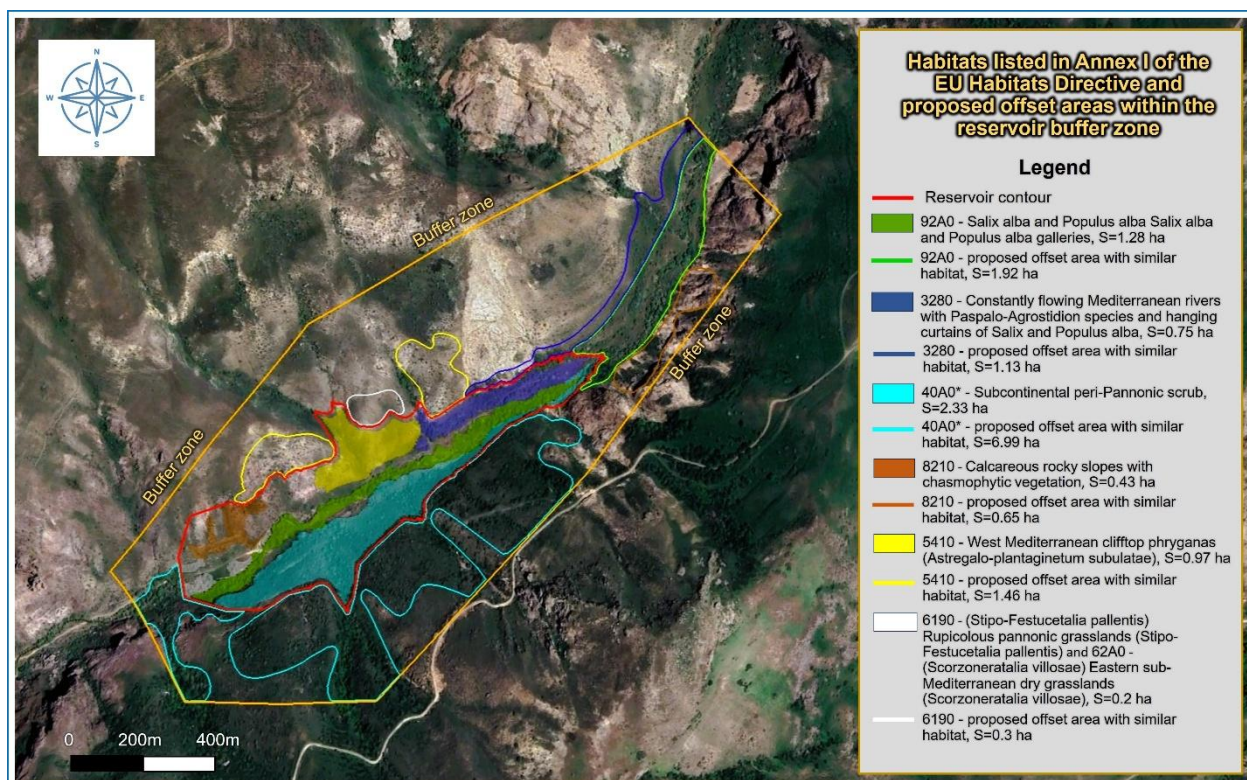
BAP 1: Community-based conservation of valuable habitats (PBF, CH)	
THE SCOPE OF THE MEASURE	
Objective:	Set-up a community-based conservation of valuable habitats (PBF, CH) in the vicinity of the project area, predominantly in the reservoir water protection (buffer) zone, by conciliating local development objectives and biodiversity conservation objectives
Critical habitat/	CH: 40A0*: Subcontinental peri-Pannonic scrub

³¹For reptiles, the loss and gain areas are the sums of the areas of respective habitats.

Priority Biodiversity Feature concerned	PBF: 6190: Rupicolous pannonic grasslands (Stipo-Festucetalia pallentis) 62A0: Eastern sub-mediterranean dry grasslands (Scorzoneratalia villosae) 3280: Constantly flowing Mediterranean rivers with Paspalo-Agrostidion species and hanging curtains of Salix and Populus alba 92A0: Riverine willow woodland 5410: West Mediterranean clifftop phrygas (Astregalo-plantaginetum subulatae) 8210: Calcareous rocky slopes with chasmophytic vegetation
MEASURE IMPLEMENTATION	
Project phase	Project lifespan (pre-construction, construction, operation and maintenance)
Measure description	<i>Pre-construction phase</i> 1. Study the valuable habitats (six PBFs, one CH) in the Project area, their plant composition and ecological structure, specify areas, 2. Study the reservoir protection/buffer area and areas around, upstream and downstream of it to define existing habitats including those that are equivalent to the priority lost habitats, 3. Develop a BOMP to provide the conservation of the valuable habitats in the most suitable for conservation areas; the BOMP will include a Riverine Habitats Construction Plan to plan and support the construction and maintenance of two riverine habitats (92A0 and 3280) in the suitable areas along the reservoir's banks; agree the BOMP with all stakeholders. But the final determination of the boundaries of habitats that are equivalent to the valuable lost habitats and the conservation procedures should be detailed in the BOMP and set-up precisely by scientists and Water Department specialists in close collaboration with the local community in order to ensure the sustainability of the conserved habitats. <i>Construction, operation and maintenance</i> 4. Ensure the conservation of valuable habitats in agreed borders
Timeline	Year 1: Seasonal habitat studies, development of a BOMP, workshop and consultations with local community, the BOMP approval Year 2 and onwards: Implement the conservation measures
Location	Predominantly within the reservoir's water protection zone; possibly in the area around, upstream and downstream of the zone
Party responsible for implementing the measure	Water Department - overall responsibility
Institutional or technical support	Project Implementation Unit Support Consultant - biodiversity expert / geobotanist
Plan to ensure the measure durability	Dedicate an internal Water Department staff responsible for Biodiversity conservation linked with local community
Implementation constraints and other remarks:	- Necessary involvement of local community - Necessary management and control of the Water Department - Law enforcement (for protection of the reservoir's water protection zone)

MEASURE MONITORING	
Key Performance Indicators (KPI) and targets	- Field report on the study of habitats - Developed BOMP - Consultations and workshop with local communities to set-up the habitat conservation - The area of 40A0*: Subcontinental peri-Pannonic scrub identified for conservation (target 6.99 ha) - The area of 6190: Rupicolous pannonic grasslands (Stipo-Festucetalia pallentis) and of 62A0: Eastern sub-mediterranean dry grasslands (Scorzoneratalia villosae) (target 0.3 ha) - The area of 3280: Constantly flowing Mediterranean rivers with Paspalo-Agrostidion species and hanging curtains of Salix and Populus alba (target 1.13 ha) - The area of 92A0: Riverine willow woodland (target 1.92 ha) - The area of 5410: West Mediterranean clifftop phryganias (Astregalo-plantaginietum subulatae) (target 1.46 ha) - The area of 8210: Calcareous rocky slopes with chasmophytic vegetation (target 0.65 ha) - Annual report presenting the progress of implementation and the results and analysis of the conservation process monitoring (target = the availability of the annual report)
Monitoring frequency	annually during the two first years, then bi-annually
Party responsible for monitoring the measure	Supervision Engineer

Figure 6. A map of habitats listed in Annex I of the EU Habitats Directive and proposed offset areas within the reservoir buffer zone



BAP 2: conservation and construction of the sedentary species' habitats (PBF/CH)	
THE SCOPE OF THE MEASURE	
Objective	Set-up a conservation and construction/support of the sedentary species habitats (CH)
Critical habitat/ Priority Biodiversity Feature concerned	CH: • Forest Dormouse, • Pallas's glass lizard, • Snake-eyed lizard, • Medium Lizard, • Smooth snake, • Transcaucasian rat snake
MEASURE IMPLEMENTATION	
Project phase	Project lifespan (pre-construction, construction, operation and maintenance)
Measure description	<i>Pre-construction phase</i> 1. Study the Project area to estimate the structure and size of the sedentary species populations, areas of their habitats, 2. Study the reservoir's water protection zone and adjacent areas to estimate habitats suitable for the populations relocation/development, including the "capacity" of the habitats and possibilities to construct additional habitats to increase their capacity; define boundaries of the suitable habitats, 3. Develop a BOMP, agree the BOMP with all stakeholders, 4. Within the framework of the BOMP: - plant some indigenous tree species (for example, wild plum and pear) to increase habitat capacities for Forest Dormouse, - provide additional rocky outcrops to increase habitat capacities for the snakes and lizards. According to the preliminary estimation, forested habitats for Forest Dormouse can be defined in the reservoir' water protection zone, at least 1.92 ha is needed to achieve a gain (in shrub habitats some trees can be planted to increase their capacity for the species). The same relates to the lizards and snakes as considerable areas in the water protection zone are rocky habitats suitable for the species. Also, the water protection zone is the most reasonable choice as it should be legally protected and the valuable habitats will be conserved there (see BAP1). The final determination of the habitats should be detailed in the BOMP and set-up precisely by zoologists and Water Department specialists in close collaboration with local community in order to ensure the sustainability of the habitats. <i>Construction, operation and maintenance</i> 5. Monitor and maintain forest and rocky habitats of the species, 6. Introduce/support a sustainable grazing practice in the areas that surround the planned reservoir, as the improved quality of the habitats can provide higher and diverse food supply for reptilians (increasing insect quantity), thus supporting an increase in the density of the snake and lizard species. This measure requires additional involvement, awareness and sensitization of the local community that will be planned in the BOMP.

	All these offset measures are integrated with the mitigation measures A1-A7 (Table 4), but while the mitigation measures are focused on the death avoidance of the species individuals, the offset measures are intended to support the long-term sustainability of the species populations.
Timeline	Year 1: Seasonal studies, development of a BOMP, workshop and consultations with local community, the BOMP approval Year 2: habitats construction, relocation of the species individuals Year 3 and onwards: monitoring of the populations
Location	Predominantly within the reservoir's water protection zone, possibly in the area around, upstream and downstream of the zone
Party responsible for implementing the measure	Water Department - overall responsibility
Institutional or technical support	Project Implementation Unit Support Consultant - biodiversity expert / zoologist
Plan to ensure the measure durability	Dedicate an internal Water Department staff responsible for Biodiversity conservation linked with local community
Implementation constraints and other remarks	- Necessary involvement of local community - Necessary management and control of the Water Department - Law enforcement (for protection of the reservoir's water protection zone)

MEASURE MONITORING

Key Performance Indicators (KPI) and targets	- Field report on the study of the species populations and habitats - Developed BOMP - Consultations and workshop with local community - Area of inhabiting Forest Dormouse (target at least 1.92 ha) - Area of inhabiting reptilians: Pallas's glass lizard, Snake-eyed lizard, Medium Lizard, Smooth snake, Transcaucasian rat snake (target 9.39 ha) - Annual report presenting the progress of implementation and the results and analysis of the monitoring (target = the availability of the annual report)
Monitoring frequency	annually during the first three years, then bi-annually
Party responsible for monitoring the measure	Supervision Engineer

BAP 3: conservation and construction of the bird species' habitats (PBF)

THE SCOPE OF THE MEASURE

Objective:	Set-up a conservation and construction/support of the bird species' habitats (PBF)
Critical habitat/ Priority Biodiversity Feature concerned	PBF: - Syrian Woodpecker, - Tawny Pipit, - Wood Lark, - Red-backed Shrike,

	• Lesser Grey Shrike, • European Roller, • Red-billed Chough, • Eastern Rock-nuthatch
MEASURE IMPLEMENTATION	
Project phase	Project lifespan (pre-construction, construction, operation and maintenance)
Measure description	<i>Pre-construction phase</i> 1. Study of the Project area to verify the Eastern Rock-nuthatch breeding and, if so, estimate number of breeding pairs, 2. Study the reservoir's water protection zone and adjacent areas to estimate habitats suitable for the bird species, including the "capacity" of the habitats and possibilities to construct additional habitats to increase their capacity; define suitable habitats, 3. Develop a BOMP, agree the BOMP with all stakeholders, 4. Within the framework of the BOMP implementation. - Plant additional indigenous species of Poplar, Willow, and Walnut trees for Syrian Woodpecker in the vicinities of the Project area (it is reasonable to do this in the framework of the Riverine Habitats Construction Plan, see BAP1), - Plant additional thorny bush species in the vicinities of the Project area as breeding spots for White-throated Robin, Red-backed Shrike, and Lesser Grey Shrike, helping them to discover new breeding sites. Preferably, the bird species habitats have to coincide with the conserved valuable habitats (see BAP1) to ensure their better conservation. According to the preliminary estimation, total habitats potentially suitable for the bird species cover about 27 ha of the reservoir' water protection zone, but a 39 ha gain is needed. Thus, the remaining area should be allocated outside of the zone; currently, the upstream areas look as the most suitable. The final determination of the habitats should be detailed in the BOMP and set-up precisely by zoologists and Water Department specialists in close collaboration with local community in order to ensure the sustainability of the habitats. <i>Construction, operation and maintenance</i> 5. Monitor and maintain the planted trees and bush species, 6. Introduce/support sustainable grazing practices in the local community, which would improve the quality of grassland habitat, increase the number and diversity of invertebrates, and support the necessary food supply for European Roller, Tawny Pipit, Wood Lark, White-throated Robin, Red-backed Shrike, Lesser Grey Shrike, and Red-billed Chough, thus supporting in increase of their density, This measure requires additional involvement, awareness and sensitization of the local community that will be planned in the BOMP.
Timeline	Year 1: Seasonal studies, development of a BOMP, workshop and consultations with local community, the BOMP improvement Year 2: habitats construction Year 3 and onwards: monitoring of the populations
Location	The reservoir's water protection zone, areas around, upstream and downstream of the zone

Party responsible for implementing the measure	Water Department - overall responsibility
Institutional or technical support	Project Implementation Unit Support Consultant - biodiversity expert / zoologist
Plan to ensure the measure durability	Dedicate an internal Water Department staff responsible for Biodiversity conservation linked with local community
Implementation constraints and other remarks	- Necessary involvement of local community - Necessary management and control of the Water Department - Law enforcement (for protection of the reservoir's water protection zone)
MEASURE MONITORING	
Key Performance Indicators (KPI) and targets	- Field report on the study of the species habitats - Developed BOMP - Consultations and workshop with local community - The area inhabited by birds: Syrian Woodpecker, Tawny Pipit, Wood Lark, White-throated Robin, Red-backed Shrike, Lesser Grey Shrike, European Roller, Red-billed Chough, Eastern Rock-nuthatch (target 39 ha) - Annual report presenting the progress of implementation and the results and analysis of the monitoring (target = the availability of the annual report)
Monitoring frequency	annually during the first three years, then bi-annually
Party responsible for monitoring the measure	Supervision Engineer

BAP 4: conservation and construction of the insect species' habitats (PBF)**THE SCOPE OF THE MEASURE**

Objective:	Set-up a conservation and construction/support of the insect species' habitats (PBF)
Critical habitat/ Priority Biodiversity Feature concerned:	PBF: <i>Anthocharis gruneri</i> <i>Pieris krueperi</i> <i>Colias aurorina</i> <i>Armenia ledereri</i> <i>Armenia hyrcanica</i> <i>Nordmannia abdominalis</i> <i>Lycaena ochimus</i> <i>Ultraaricia crassipuncta</i> <i>Neolysandra coelestina</i> <i>Polyommatus (Agrodiaetus) demavendi</i> <i>Polyommatus (Agrodiaetus) eriwanensis</i> <i>Polyommatus (Agrodiaetus) ninae</i> <i>Hipparchia syriaca</i> <i>Hipparchia fatua</i>

	• <i>Satyrus amasinus</i> • <i>Pseudochazara pelopea</i> • <i>Pseudochazara schahrudensis</i> • <i>Chazara bischoffi</i> • <i>Thaleropsis ionia</i> • <i>Melitaea persea</i> • <i>Euphydryas aurinia</i> • <i>Papilio alexanor</i>
MEASURE IMPLEMENTATION	
Project phase	Project lifespan (pre-construction, construction, operation and maintenance)
Measure description:	<i>Pre-construction phase</i> 1. Study the Project area to estimate the size of the insect species populations and areas of the habitats, lost by these species, 2. Study the reservoir's water protection zone and adjacent areas to estimate habitats suitable for the species, including the "capacity" of the habitats and possibilities to construct additional habitats to increase their capacity; define suitable habitats, 3. Develop a BOMP, agree the BOMP with all stakeholders, 4. Within the framework of the BOMP implementation. - Develop similar habitats in unflooded areas (preferably in the reservoir's water protection zone) ensuring the habitat connectivity (primarily requires planting forage plants, including herbaceous plants for the species and in some cases improving soil conditions), The insect species habitats have to coincide with the conserved valuable habitats, and habitats conserved/constructed for the reptilian and bird species (see BAP1-3) supporting the food chains. The determination of the habitats should be detailed in the BOMP and set-up precisely by entomologists and Water Department specialists in close collaboration with local community in order to ensure the sustainability of the habitats. <i>Construction, operation and maintenance</i> 5. Monitor and maintain the habitats with the species forage plants, 6. Introduce/support sustainable grazing practices in the local community, which would improve the quality of grassland habitat and increase the number and diversity of invertebrates. This measure requires additional involvement, awareness and sensitization of the local community that will be planned in the BOMP.
Timeline	Year 1: Seasonal studies, development of a BOMP, workshop and consultations with local community, the BOMP approval, Year 2: habitats construction, Year 3 and onwards: monitoring of the populations.
Location	Predominantly within the reservoir's water protection zone
Party responsible for implementing the measure	Water Department - overall responsibility
Institutional or technical support	Project Implementation Unit Support Consultant - biodiversity expert / zoologist

Plan to ensure the measure durability	Dedicate an internal Water Department staff responsible for Biodiversity conservation linked with local community
Implementation constraints and other remarks	- Necessary involvement of local community - Necessary management and control of the Water Department - Law enforcement (for protection of the reservoir's water protection zone)
MEASURE MONITORING	
Key Performance Indicators (KPI) and targets	- Field report on the study of the species and their habitats - Developed BOMP - Consultations and workshop with local community - The area inhabited by insects (the 22 species, PBF; target: at least 1,5 times greater than the area of the lost habitats) - Annual report presenting the progress of implementation and the results and analysis of the monitoring (target = the availability of the annual report)
Monitoring frequency	annually during the first three years, then bi-annually
Party responsible for monitoring the measure	Supervision Engineer

10. Biodiversity monitoring

After the completion of the studies and surveys, a robust baseline will be established. Only after that can the Biodiversity Monitoring Plan be elaborated. Reliable and high-quality monitoring and evaluation are the keys to adaptive management. Adaptive management is a good practice that is necessary to ensure the efficiency of the mitigation and offsetting.

For the PBF and CH, it is proposed to establish the long-term joint-monitoring of habitats and indicator species with the involvement of the national/local key specialists/stakeholders. The following two types of monitoring will be maintained: 1) the monitoring of mitigation measures and 2) the monitoring of habitats and species of the BOMP. As the reservoir's water protection zone is considered as the main conservation area for valuable habitats and species, key monitoring efforts will be concentrated there.