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Pilot Management Plan of Emerald Site Armash (AM0000025) in Armenia



Action implemented by:



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Acronyms and abbreviations

EU	European Union
EU4Environment	The “European Union for Environment” (EU4Environment) Action
ESMP	Emerald Site Management Plan
FAO	Food and Agriculture Organization
FE	Forest Enterprise
GEF	Global Environment Facility
IBA	Important Bird and Biodiversity Area
IUCN	International Union for Conservation of Nature
KBA	Key Biodiversity Area
MoE	Ministry of Environment
MP	Management Plan
NGO	Non-governmental Organization
OECD	Organization for Economic Co-operation and Development
PES	Payment for Ecosystem Services
PHL	Public Hunting Land
RA	Republic of Armenia
SDF	Standard Data Form
SNCO	State Non-Commercial Organization
SNPA	State Nationally Protected Area
SPNA	Specially Protected Nature Area
SWOT	Strengths, Weaknesses, Opportunities, and Threats
UNDP	United Nations Development Programme
UNECE	United Nations Economic Commission for Europe
UNEP	United Nations Environment Programme
UNIDO	United Nations Industrial Development Organization
USAID	United States Agency for International Development

Definitions

- **Conservation degree:**¹ The result of an evaluation of the status of a species or habitat type at the local scale (that is, protected area or country).
- **Conservation status:** The result of an evaluation of the status of a species or habitat type at the biogeographical scale.
- **Conservation objectives:**² Measurable indicators that are linked to concrete species and habitats and can be used for further monitoring. **Conservation objectives need to be as clear and straightforward as possible and allow us to put in place operational conservation measures in practice. They need to be specified in concrete terms and wherever possible quantifiable in numbers and/or size.**³ They should include the following:
 - Conservation or growth of the species population
 - Conservation or growth of the area's habitat types
 - Conservation or enhancement of species habitat quality (thus improving the degree of conservation of one or more habitat types)
 - Maintenance or improvement of the degree of conservation of a habitat type.
- **Conservation measures:** The actual mechanisms and actions to be put in place for an Emerald site with the aim of achieving the site's conservation objectives. The measures can be active and passive (nonintervention).
- **Cross-border ecological corridor:** A cross-border geographical space, determined on a managerial and scientific basis, that contains a combination of ecosystems characterized by relief forms and plantation cover and is of importance for the protection of biodiversity and landscapes.
- **Designated sites/areas:** State reserves, national parks, and sanctuaries of Armenia, under Armenia legislation.
- **Ecological character of an Emerald Network site:** The combination of ecosystem components, processes, and other ecological features or characteristics that contribute to the quality and functioning of the site.
- **Emerald site management:** The implementation of the necessary conservation measures, either active or passive, to maintain or increase species population sizes or quality and the habitat area. All other aspects of Emerald site 'management' are also important, but they must all be aligned with and adjusted to this primary objective.
- **Other lands:** State, community, and private lands of Armenia.

¹ Evans, D., and M. Arvela. 2011. *Assessment and Reporting under Article 17 of the Habitats Directive: Explanatory Notes & Guidelines for the period 2007–2012 - Final Draft*. European Topic Centre on Biological Diversity. <https://circabc.europa.eu/sd/a/2c12cea2-f827-4bdb-bb56-3731c9fd8b40/Art17-Guidelines-final.pdf>.

² "Managing Natura 2000 Sites. The Provisions of Article 6 of the 'Habitats' Directive 92/43/EEC." <https://op.europa.eu/en/publication-detail/-/publication/11e4ee91-2a8a-11e9-8d04-01aa75ed71a1> (2.3.1. Setting site-level conservation objectives).

³ <https://circabc.europa.eu/sd/a/68834981-033a-4d8e-b306-54dd8b6f48fa/Commission%20note%20on%20setting%20conservation%20objectives.pdf>

Introduction

General information and definitions

Project area significance

Armash is famous for hosting a high turnover of bird species over time due to the diverse habitats created in different seasons.

The Armash Emerald site (designated as an Important Bird and Biodiversity Area [IBA]) contributes substantially to the survival of 45 species of birds listed in the national Red Book⁴ and one species listed in the International Union for Conservation of Nature (IUCN) Red List of Threatened Species.⁵

The total number of habitats (listed in Bern Convention Resolutions 4 (1996)⁶) in the site is 11 and the total number of species (Resolution 6 (1998)⁷) is 103, indicating the site importance, especially for avifauna.

The Armash area, despite its designation as an IBA of global significance, is jointly owned by public and private entities. Water resources within the area are managed through a shareholder agreement primarily focused on commercial fish production. This ownership structure adds complexity to addressing conservation needs, which may not always align with the interests and priorities of private area management, because the prime interest is commercial fish production. Above all this, the site also serves as a public hunting ground,⁸ where waterbirds face additional direct threats of being killed (legally and illegally). However, the potential threat to habitat vital for birds from unsustainable management practices (such as permanent abstraction or conversion of the fishponds into cropland or abandonment due to financial instability of the owner) will have a more detrimental cascading effect on both breeding and nonbreeding waterbirds, resulting in the loss of the nesting and foraging grounds.

The objectives of the current Management Plan (MP) set the basis of a sustainable site management that must balance between the economic interests of the owners and conservation priorities and ensure that such balance is sustainable over time.

Study assignment details

The pilot Emerald Site Management Plan (ESMP) of Armash (AM0000025) is conducted under Task 3: *Test the recommendations for the management of Emerald sites using two sites as case studies* of the European Union for Environment Action (EU4Environment) Program.

The Armash site represents a case study with a significant anthropogenic influence in the area, such as freshwater fisheries operation, and rising pressures due to increase of land use changes and many water-sensitive target objects. This contrasts with the second case examined under the EU4Environment Programme of Ijevan site that experiences low pressures and threats for the target objects, a significant forest (and pasture) area under an active management framework, and almost no anthropogenic operations.

The current ESMP is based on the 2023-2024 Armash (AM0000025) recommended borders and revised list of species and habitats, under the EU4Environment Program. The current Armash site 2023–2024, that is, Armash (AM0000025), is a result of its separation from the Khor Virap site by the revised proposal (2023–2024 under the EU4Environment Programme recommendations).

The current ESMP is a demonstration case for the Republic of Armenia (RA), especially on the method of assessing the site conservation degree, conservation objectives, and conservation measures. The method followed is applied in Natura 2000 MPs selected from the latest European Union (EU) release of Pressure and

⁴ Aghasyan, A., and M. Kalashyan, eds. *The Red Book of Animals of the Republic of Armenia, 2010*. 2nd edition. Yerevan.

⁵ IUCN. 2024. "The IUCN Red List of Threatened Species." International Union for Conservation of Nature and Natural Resources Version 2023-1.

⁶ Council of Europe (CoE) 1996.

⁷ CoE 1998.

⁸ The official hunting season for waterbirds was established from mid September to the end of January in 2023. Hunting bag limitations are determined by the Ministry of Environment (MoE) each year based on pre-hunting season survey results.

Conservation Measures code lists. This is a standard list used for Natura 2000 to report information on pressures and threats of the Art 17 species and habitats of the Habitats Directive and the Art 12 bird species of the Birds Directive. It is a method that may cause the least inconsistencies and promote a standardized way of assessing ESMPs in Armenia. According to the team, this will also help better equip, and create capacities of, the Armenian experts and competent authorities with methodologies aligned to Natura 2000. This will be an advantage for future use (for example, in EU LIFE+ program and others) and future Emerald Barometer management and monitoring indicators.

In addition, the ESMP is locally adopted and simplified in several points and according to available information and capacities in the country. As a result, the MP is not highly extended. Nevertheless, the objectives are strongly supported, and all necessary MP items have been fulfilled to a level that aligns with the information availability.

The MP key components include presenting the conservation degree and status of the conservation objects. For specific habitats and species, the pressures and threats are further analyzed and respective management measures proposed. The MP recommendations are proposed for a 10-year timespan via an Action Plan (Annex B). The Action Plan also includes a midterm evaluation reporting.

MoE is advised to review and finalize the current ESMP and proceed on approval as well as to implement and monitor the performance of the conservation measures throughout the MP lifetime. Most importantly, the Armenian Government should provide the necessary framework and tools to implement and assess the current (and future) action and monitoring plan proposed. To this end is the new Eco Patrol Service Law.⁹ Once the Eco Patrol Service initiates its activities in the project area, it is important to be informed - by MoE - on the overall MP objectives, the site importance, and conservation measures.

The ESMP and recommendations described were developed by a team of local and international experts in the fields of habitats, plants, avifauna, reptiles, invertebrates and mammals.

During the implementation of communication, education, and awareness raising, a training/consultation meeting was undertaken in early April 2024 with local stakeholders for a broad and open public engagement. The local opinion and views were strongly considered during the current MP review and finalization. Strong participation and feedback were recorded, particularly from private fish farmers that operate in the project area. One of the challenges is implementing the ESMP in a way that leads to mutually beneficial solutions. To this end, a set of proposed actions are included in the Action Plan - in addition to the current MP assessment - such as new biodiversity monitoring and case-specific ecosystems services/socio-economic studies.

Structure and process flow of the ESMP

The current ESMP structure was based on the EU4Environment Programme recommendations for preparing and developing a stand-alone full-scale comprehensive ESMP.¹⁰

The MP follows a consecutive set of phases from MP preplanning and preparation till finalization, development, review, implementation, monitoring, and revision of the conservation measures through adaptive management (Figure 1). As also proposed in the Guidelines for preparing an ESMP, a field study/inventory is necessary and should be always complementary to the existing Standard Data Form (SDF) information.

The biodiversity information presented further is basically from desktop analysis with no specific field sampling/monitoring; nevertheless, it also included new data based on personal field investigations (for avifauna).

Regarding avifauna, the presented analysis is based on data collected from year-round field visits to Armash by L. Balyan, over the past 15 years (the past 3 years via a PhD program), covering all seasons of the year. Information was also provided by the SDF, 2016 (Annex C) before site separation, the datasets of BirdLife international, and the Armenian Bird Census Council. The total number and populations of target species and habitats at the two sites, that is, Khor Virap and Armash - as a result of the separation from the Khor Virap site by the revised proposal (2023–2024 under the EU4Environment Program recommendations) - remained

⁹ <https://www.arlis.am/DocumentView.aspx?DocID=186692>

¹⁰ D2: Recommendations for Guidelines for preparing management plans of Emerald sites in Armenia (2023), EU4Environment Programme.

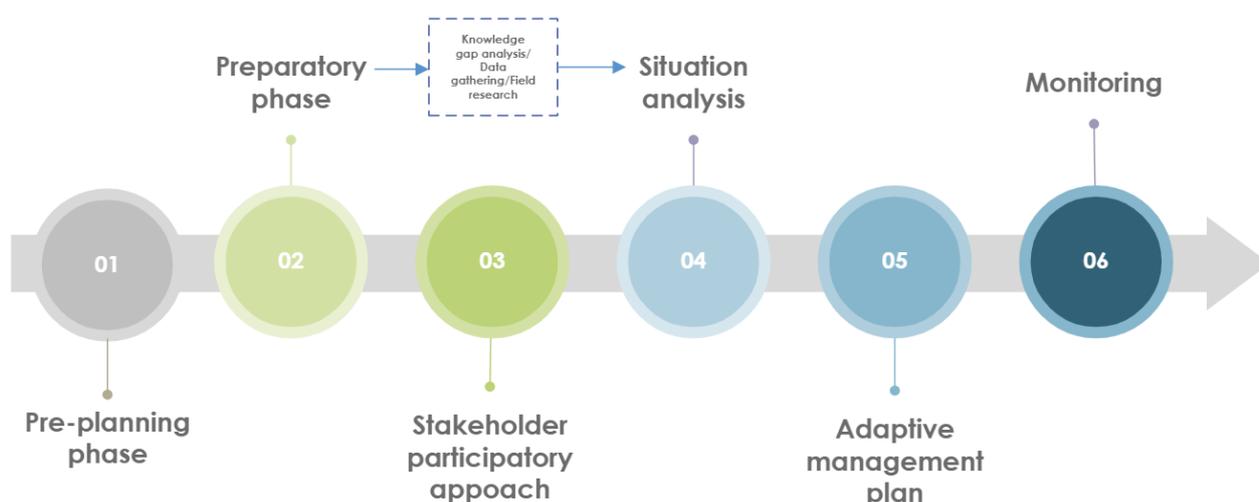
unchanged. Nevertheless, regarding the SDF, there are a few alterations in the species/habitats lists by the revised proposal (2023-2024 under the EU4Environment Program recommendations). Finally, information has been confirmed through lines of communication with other scientific members (for example, ornithological community) and local entities (for example, local Environmental Inspectorate, reports by local caretakers, and so on).

It should be emphasized that regular monitoring is a necessity and allocated in the Action Plan.

Also, a complete set of maps is included in Annex A, that is, Map 1. Background environment/Current situation, Map 2. Distribution and abundance of habitats of Resolution 4 of the Bern convention, Map 3. Habitats and populations of important fauna species of Resolution 6 of the Bern Convention other than avifauna, Map 4. Habitats and populations of important avifauna species, Map 5. Pressures/Threats to protective objects, and Map 6. Management measures.

Currently, the MP preparation and development is a scientific community responsibility under the supervision of MoE and the World Bank. Also, a new law regarding Eco Patrol¹¹ is active, but its functions are not active yet.

Figure 1. Process phases for the development of the current MP



Source: Developed by kartECO for the World Bank.

Conservation protection history

Emerald site 'Armash' (AM0000025) is located in Mideast Armenia in Ararat Marz (Figure 2). The nearest Emerald site is Urts Mountains (AM0000024) in the east.

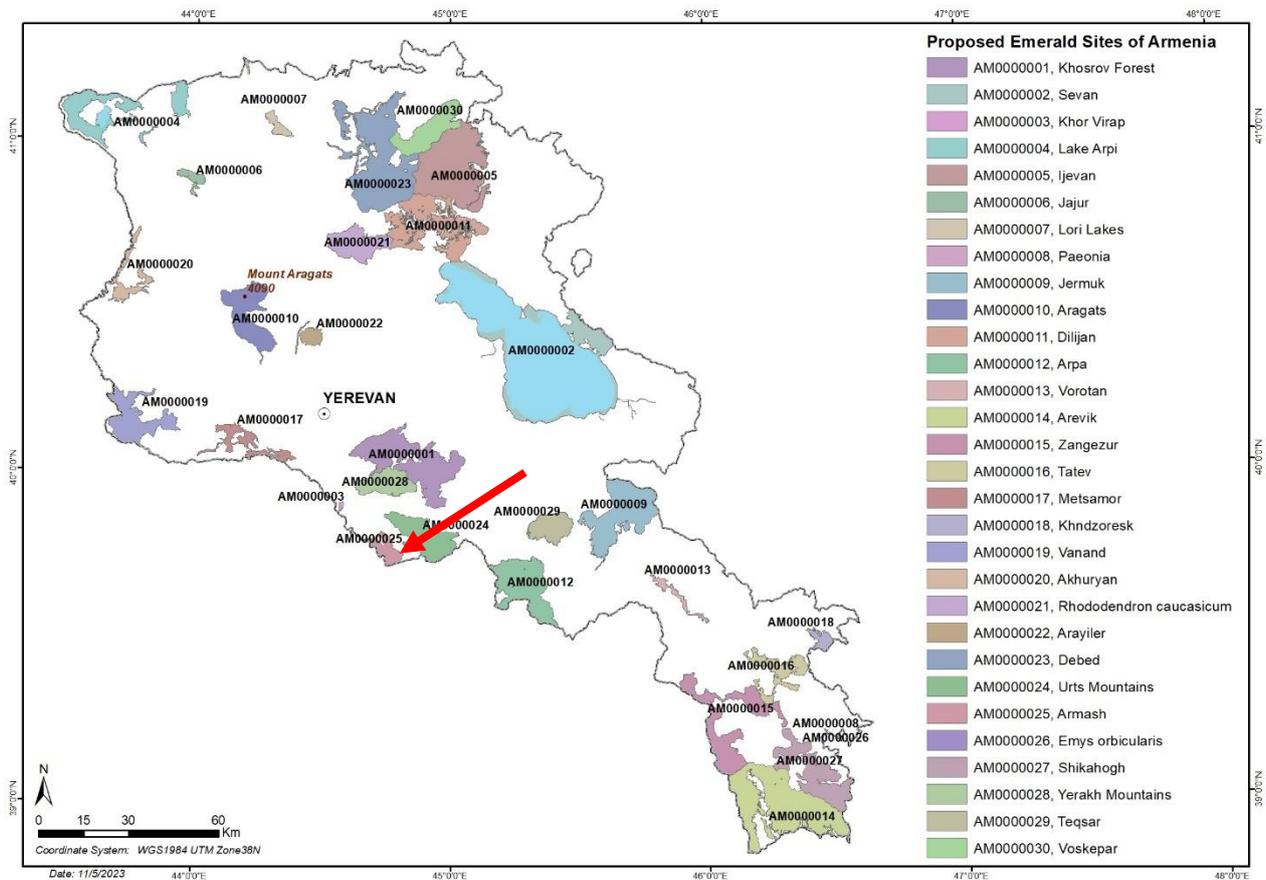
The Emerald site was initially proposed in 2016. It was part of the Emerald site AM0000003 - 'Khor Virap' with an area of 6,998 ha, covering approximately 90 percent of the current Emerald site Armash 2023-2024.

The first complete submission - to the Bern Convention - of the Armash site was in 2016. From 2023 it became an independent Emerald site. Many species from Resolution 6 of the Convention are present, together with many other flora and fauna of national importance. The 2016 site information was included in an SDF¹² (Annex C) with the respective shapefile delineating the site boundaries (Figure 3).

¹¹ <https://www.arlis.am/DocumentView.aspx?DocID=186692>

¹² SDF Khor Virap-Armash, <https://natura2000.eea.europa.eu/Emerald/SDF.aspx?site=AM0000003>

Figure 2. Emerald sites of Armenia (proposed in 2023) (Emerald site ‘Armash’ AM0000025 location indicated with red arrow)¹³



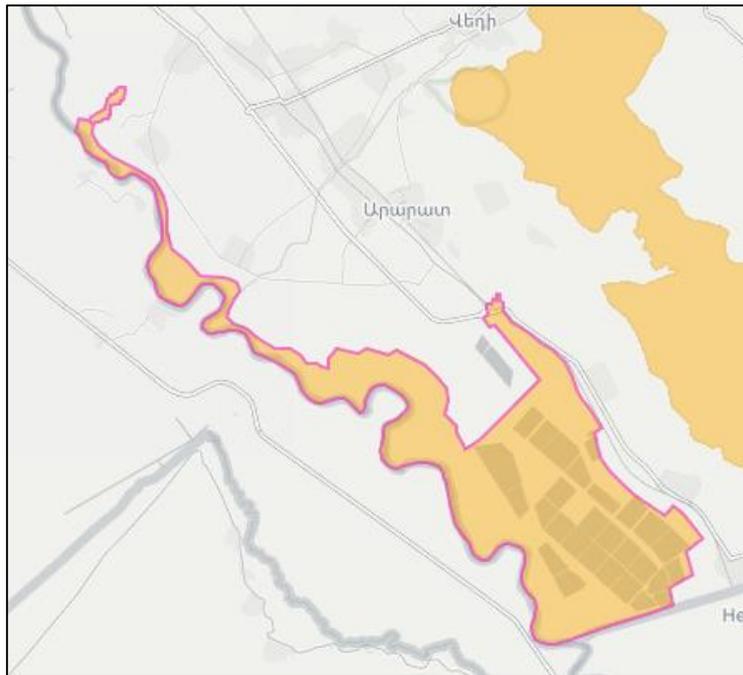
Source: Developed by kartECO for the World Bank.

Since 2016, according to the Emerald Barometer information,¹⁴ the Armash site (as for all Emerald sites in Armenia) is characterized as a *Candidate* site, that is, it has not yet been *Adopted*, meaning that the Emerald Network process has not progressed.

¹³ 2023–2024 Armash (AM0000025) recommended borders and revised list of species and habitats, under the EU4Environment Program

¹⁴ Emerald Barometer, https://tableau-public.discomap.eea.europa.eu/views/EmeraldBarometerdashboard/Barometertable?%3AshowAppBanner=false&%3Adisplay_count=n&%3AshowVizHome=n&%3Aorigin=viz_share_link&%3AisGuestRedirectFromVizportal=y&%3Aembed=y.

Figure 3. Emerald site ‘Armash’ (AM0000025) boundaries (from SDF 2016)



Source: Developed by kartECO for the World Bank.

In 2023–2024 - within the framework of the project on the EU4Environment - the site was separated from the Emerald site ‘Khor Virap’ and received boundary optimizations (90 percent of the Emerald site area remained the same). The reason for the separation was to concentrate the protection measures on wetlands and its habitats, which will significantly contribute to the conservation of target species. It will also contribute to a holistic and multifunctional wetland and fisheries MP in the future. The number and populations of target species and habitats at the two sites, that is, Khor Virap and Armash - as a result of the separation from the Khor Virap site - remained unchanged.

Based on the above information, the overall protection history of the Emerald site Armash is presented in Table 1.

Table 1. Protection history of Emerald site Armash since 2016

Year	Area (ha)	Comment
2011	—	—
2013	—	—
2016	6,998	As part of the AM0000003—‘Khor Virap-Armash’ Emerald site
2023	5,903	5,312 ha overlap with 2016 boundaries (approximately 90% of the site)

Source: Developed by kartECO for the World Bank.

Current conservation protection framework

The current nature conservation framework applied in the project area is presented below.

Conservation measures mentioned in SDF (2016)

The 2016 SDF¹⁵ (Annex C) covers the largest part of the current Emerald site Armash, that is, almost 90 percent has no information and recommendations on conservation management activities (opposed to ecological and conservation status information).

Site conservation and management framework under Armenia legislation (for example, designated protected areas and forest enterprises [FEs])

¹⁵ SDF Khor Virap-Armash, <https://natura2000.eea.europa.eu/Emerald/SDF.aspx?site=AM0000003>

Designated protected areas may include state nationally protected areas (SNPAs), sanctuaries, and others. The study site does not overlap with any SNPA and any other protected areas under Armenia legislation.

Other protected areas in the vicinity of the project area

Inside and in the vicinity of the Emerald site, there are two protected areas under BirdLife International recognition,¹⁶ that is, an IBA - AM004 and a Key Biodiversity Area (KBA) with an area of 4,639 ha. The KBA almost completely overlaps (95 percent) the Emerald site Armash (Table 2).

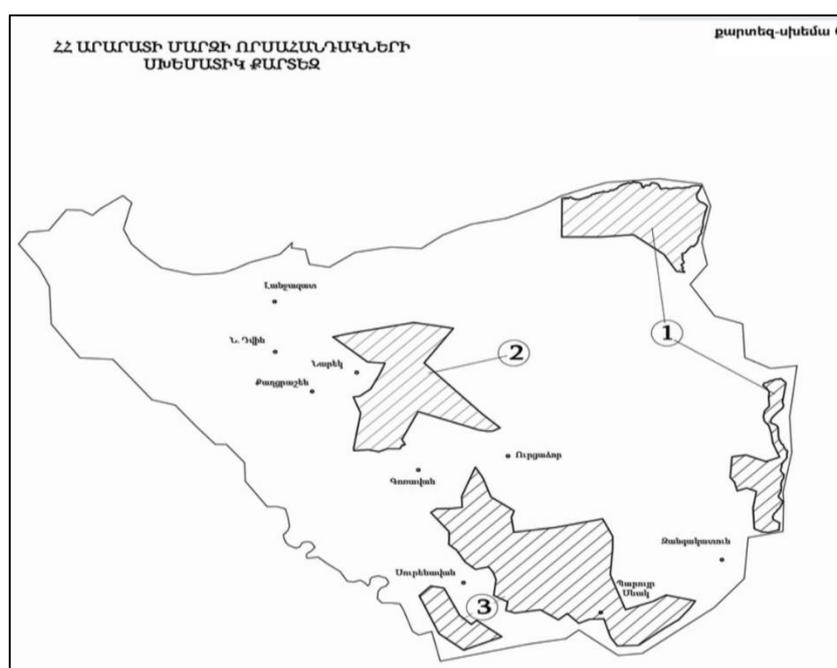
Table 2. Other types of protected areas (not governmentally protected in Armenia) in the vicinity of the Emerald site Armash¹⁷

Other types of protected areas (not governmentally protected in Armenia)	Name	Complete/partial overlap with the Emerald site Armash
IBA	AM004 Armash fish farm	Almost completely overlap (https://datazone.birdlife.org/site/factsheet/armash-fish-farm-iba-armenia)
KBAs	Armash fish farm	Almost completely overlap (https://www.keybiodiversityareas.org/site/factsheet/3137)
Hunting area	—	Almost completely overlap (https://www.arlis.am/DocumentView.aspx?docid=107946)

Source: Developed by kartECO for the World Bank.

The project area is located within the hunting area of Ararat Marz and specifically in the southwest part of the area (Figure 4).

Figure 4. Hunting areas in the Ararat Marz



Note: The Emerald site Armash is located to the southwest.

Source: <https://www.arlis.am/DocumentView.aspx?docid=107946>; Developed by kartECO for the World Bank.

The closest designated protected areas (under Armenia legislation) and FEs are presented in Table 3. It is evident that adjacent to the site there are many areas under a protection and management scheme and clearly indicates the conservation importance of the area and the surroundings. It is also a case that could be further explored in the future, for example, as a potential eco corridor or in joining Emeralds.

¹⁶ Also reflected in the Law on Fauna, Armenia.

¹⁷ Downloaded from <https://keybiodiversityareas.org/>, <https://www.keybiodiversityareas.org/sites/search>, and <https://datazone.birdlife.org/site/mapsearch> on April 23, 2024.

Table 3. Areas with special status of conservation in the vicinity of the Emerald site Armash

Areas with special status of conservation	Name	Distance to Armash Emerald site
Emerald sites	Yerakh Mountains - AM0000028	>13 km from the north boundary of Emerald site
	Khor Virap - AM0000003	>14 km from the northeast boundary of Emerald site
	Urts Mountains - AM0000024	>2k m from the east boundary of Emerald site
Other protected areas (IBA, KBAs, and so on) ¹⁸	KBA - Armash (Khor Virap)	Almost completely overlap
	IBA - Armash fish farm	Almost completely overlap

Source: Developed by kartECO for the World Bank.

¹⁸ <https://www.keybiodiversityareas.org/sites/search>
<https://datazone.birdlife.org/site/mapsearch>

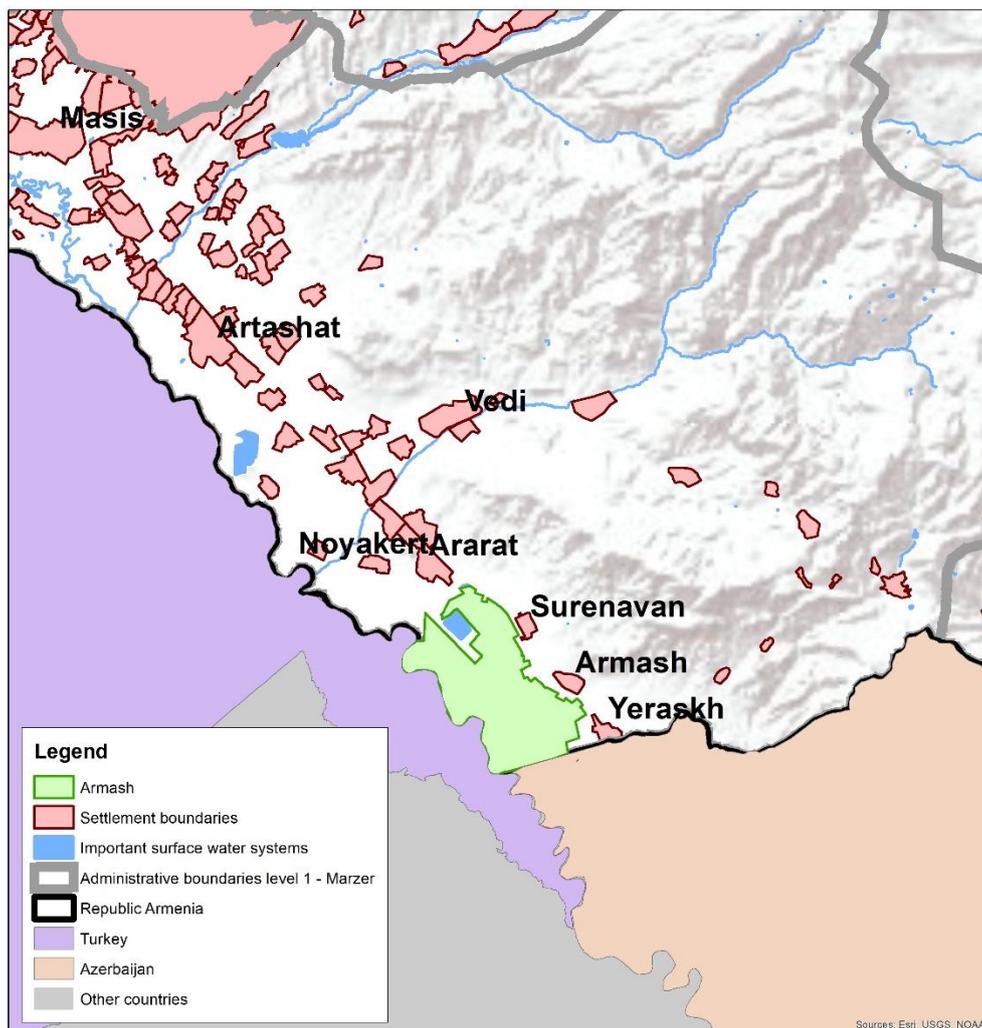
Description of the Emerald Site

Emerald site

The Emerald site Armash is located entirely in the marz (= province) of Ararat, which is a province in the west of Armenia. The nearest villages 1 km away from the project site boundaries are the settlement of Armash, Surenavan, and Yeraskh (Figure 5), on the east and north side of the Emerald site. In the vicinity of the project site are the settlements of Vedi and Yeghegnavan. The capital of the province is Ararat, 20 km northeast of the site. The site is approximately 45 km from Yerevan.

The national borders between Armenia and Azerbaijan are to the south of the site and Türkiye on the east, as shown in Figure 5.

Figure 5. Administrative divisions and communities in the vicinity of the Emerald site Armash



Source: Developed by kartECO for the World Bank.

The site border in the east follows Araks River and the local agricultural fields in the west. The northern part of the site follows the boundaries of the local fishery ponds. The southern part of the site follows the border lines between Armenia and Azerbaijan.

Table 4. General information of the Emerald site Armash - AM0000025

Geographical position		
Coordinates of center (m)	X	478,803
	Y	4,401,630
Perimeter (m)	52,609.14	
Area (ha)	5,902.58	
Administrative affiliation		
Province (marz)	Ararat (100%)	
Regional unit	Ararat (100%)	

Source: Developed by kartECO for the World Bank.

Land use, including current status and ownership, and factors affecting the protected object(s) (abiotic, biological, and human activities)

Land use and factors affecting the protected object(s) (abiotic, biological, and human activities)

Below is a brief presentation of land cover and land use factors that may affect the conservation of protected objects or need to be considered during design and implementation of management measures. The analysis is visualized through a complete set of maps included in Annex A, that is, Map 1. Background environment/Current situation, Map 2. Distribution and abundance of habitats of Resolution 4 of the Bern convention, Map 3. Habitats and populations of important fauna species of Resolution 6 of the Bern Convention other than avifauna, Map 4. Habitats and populations of important avifauna species, and Map 5. Pressures/Threats to protective objects.

Land use

The three main land use categories of the project area are the following:

- Permanent water bodies, which is the major land use in the project area (50 percent)
- Grassland, which is the second most predominant land use (21.9 percent)
- Shrubland, covering almost 15 percent of the site.

Table 5 depicts the land type distribution in the Emerald site.

Table 5. Land use distribution in the Emerald site Armash (AM0000025)¹⁹

Land type ²⁰	Area (ha)	Percentage of site (%)
Permanent water bodies ²¹	2,954.42	50.0
Grassland	1,292.70	21.9
Bare/sparse vegetation/shrubland	867.12	14.7
Herbaceous wetland	399.94	6.8
Cropland	288.54	4.9
Tree cover	94.22	1.6
Built-up	5.65	<0.1
Total area of site	5,902.59	100

Source: Developed by kartECO for the World Bank.

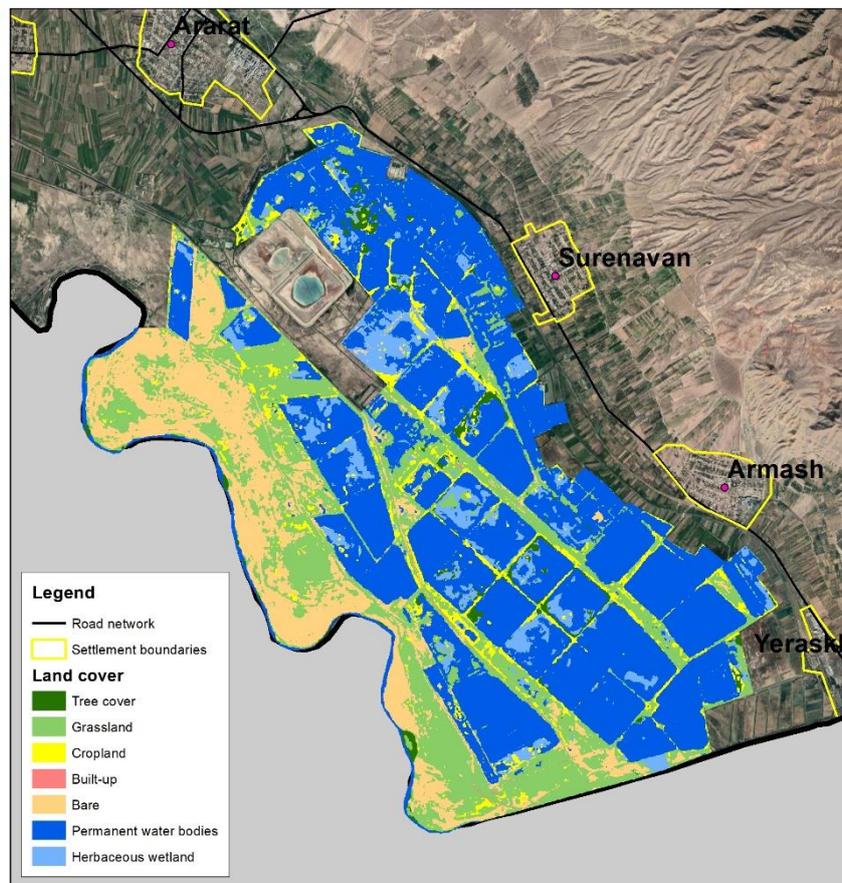
A land cover map of the Emerald site is presented in Figure 6. Permanent water bodies is the predominant land cover type.

¹⁹ Data source for the land use file: © ESA WorldCover project [2021]/Contains modified Copernicus Sentinel data processed by ESA WorldCover consortium.

²⁰ The discrete classification is based on 11 classes and is defined using the Land Cover Classification System (LCCS) developed by the United Nations Food and Agriculture Organization (FAO) (https://worldcover2021.esa.int/data/docs/WorldCover_PUM_V2.0.pdf)

²¹ Including fishponds that are dried once a year for about 5–7 weeks. This class includes any geographic area covered for most of the year (more than 9 months) by water bodies: lakes, reservoirs, and rivers. Can be either freshwater or salt water bodies. In some cases, the water stays frozen for part of the year (less than 9 months).

Figure 6. Land cover type distribution of the Emerald site Armash - AM0000025



Source: Developed by kartECO for the World Bank.

Vegetation

The project area vegetation cover is influenced by the dominant land use in the areas such as the water ponds, reed beds, and grassed area. Also, a number of ponds are not operating over a decade and have been changed into seasonal brackish wetlands. There are no settlements within the Emerald site and no other permanent structures.

Araks valley is mainly semidesert with extremely salty soils. The vegetation is basically halophytic, with mostly goosefoot (*Chenopodium*), pepper-grass (*Lepidium*), saltwort (*Salsola*), camel's thorn (*Alhagi*), and bean caper (*Zygophyllum*). Marshes, wetlands, water channel, and ponds are densely vegetated with reeds and forbs, mixed with *Typha*, *Carex*, and sparse *Tamarisk*.²²

Anthropogenic operation

Armash area is the largest fishery in the Araks valley of Armenia, with 1,514 ha covered by a total of 29 fishponds, each between 11 ha and 95 ha in size.

The fisheries include water ponds used as an integrated (neither intensive nor extensive) carp farming system (carp family *Cyprinidae*), fed by two major sources: artesian wells and an irrigation canal supplied partly by the Araks River hydrological network (Sevjur, Hrazdan, and Kasakh) and partly by the outflowing water from trout farms upstream.

An integrated fish farming system refers to a setup where fish stock is raised in a closed natural ecosystem and does not depend on artificial fodder. The system uses aquaculture (fish farming) with agriculture in a

²² BirdLife International. 2024. "Important Bird Area Factsheet: Armash Fish Farm." <https://datazone.birdlife.org/site/factsheet/armash-fish-farm-iba-armenia>.

rotational manner where the waste from fish farming (aquaculture) is used to fertilize crops and, in turn, the crops provide organic matter (nutrients) which is used as feed for the fish.

The area also includes large regions of salty semidesert areas, drought or abandoned water ponds, and an active long-standing industrial wastewater treatment pond in the north side of the project area, owned by a mining company. A map of the current situation is visualized in Annex A, that is, Map 1. Background environment/Current situation.

Regarding ownership in the site area, 'Arماش carp farm' CJSC is a joint ownership by public and private enterprises, where the public component is leased and managed through a shareholder participation. They pay the water fund but do not own the land.

Conflicts

According to a recent revision of the area conservation importance,²³ the protected area is characterized by the needs and operations of the fish farms. It potentially creates a conflict between the farm management purposes and conservation priorities, as on the one hand, the fish-eating species are influencing the yield and on the other hand, the production of fish requires less mosaic structure of the ponds, leading to decrease in shoreline vegetation and birds' habitats. Also, a significant part of the area is included in the public hunting lands (PHLs). According to a recent publication,²⁴ PHLs in Armenia do not overlap with the nationally protected areas but with the internationally recognized conservation sites, important for protection of breeding populations of waterbird species and their congregations during migrations: IBAs and Emerald sites protected under the Bern Convention (8 percent of the total Emerald site). Arماش fish farm is one of the most popular areas for waterbird harvesting, creating - according to the publication - serious risks for many breeding and migratory waterbird species.

Although the recent replacement of hunting by birdwatching²⁵ was successfully negotiated with Arماش carp farm CJSC (one of the private owners), the surrounding fish farms owned by other entrepreneurs still serve as hunting zone. Hunting potentially also causes lead pollution from bullets, which is a known threat for wetlands and waterbirds.

Another major possible threat is the gold mine's wastewater treatment pool, which is located upstream of Arماش. This can be a potential source of heavy metals in the surface and underground soil-water resources. Thus, a specific soil-water investigation program was included in the Emerald Site Action Plan.

During the stakeholder event, non-governmental organization (NGO) representatives have remarked that avifauna population maintenance is at risk due to shooting.²⁶

On the other hand, fish farmers claim that they employ measures other than hunting/killing to keep birds away from the fish farms as much as possible. Nevertheless, the area is unavoidably recognized as an officially hunting area of Ararat Marz. Also, due to its characteristic as a permanent water body, the site is sensitive to any local or upstream mismanagement of water resources (surface and underground).

Finally, they also mentioned uncontrolled or poorly managed grazing practices and reed burning that disrupt nesting areas for certain bird species and destroy important habitats for birds.

Reed management (including grazing and burning) varies spatiotemporally and thus can simultaneously benefit several groups of birds. In the absence of proper management, and in response to that,

²³ Aghababyan, K. et al. 2022. "A Revision of Important Bird and Biodiversity Areas of Armenia." *Int J Zoo Animal Biol* 5 (1): 000348. <https://medwinpublishers.com/IJAB/revision-of-important-bird-and-biodiversity-areas-of-armenia.pdf>.

²⁴ Aghababyan, K. et al. 2023. "Influence of Public Hunting Lands on Water Birds of Internationally Recognized Conservation Areas in Armenia." *GSC Advanced Research and Reviews* 17 (02): 87–103. <https://gsconlinepress.com/journals/gscarr/sites/default/files/GSCARR-2023-0417.pdf>.

²⁵ Birds conservation supporting local fish farm in Armenia, 2022, <https://www.biodiversity.am/en/news/77-bird-conservation-supporting-local-fish-farm>.

²⁶ 1. Aghababyan, K., G. Khanamirian, A. Ghazaryan, and V. Gevorgyan. 2021. "About Conservation Status of Northern Lapwing *Vanellus vanellus* in Armenia." *J Ecol & Nat Resour* 5 (3): 000257.

2. Aghababyan, K., A. Khachatryan, S. Baloyan, V. Grigoryan, A. Khechoyan, K. Hambardzumyan, A. Ghazaryan, V. Gevorgyan, and Ch. Rostron. 2023. "Influence of Public Hunting Lands on Water Birds of Internationally Recognized Conservation Areas in Armenia." *GSC Advanced Research and Reviews* 17 (02): 87–103. <https://doi.org/10.30574/gscarr.2023.17.2.0417>.

a Reed Management Plan is included in the Action Plan. The plan will focus on the target species and habitat conservation objectives.

Based on the above review, potential conflicts exist on a part of the project area. Nevertheless, the current MP considers, during the analysis and proposed measures, both the interests and willingness to cooperate of local stakeholders such as farm owners and livestock farmers.

View of the site and land use

Photographic samples of representative land cover areas in the project area can be seen in Figure 7, Figure 8, Figure 9, and Figure 10.

Figure 7. Panoramic view of the Emerald site Armash



Source: Photo by Giorgii Fayvush.

Figure 8. Emerald site view



Source: Photo by Karen Aghababyan.²⁷

²⁷ <https://www.worldbank.org/en/country/armenia/brief/the-emerald-network-in-armenia-progress-challenges-and-the-future>

Figure 9. Little egret fishing



Source: Photo by Rosa Vroom, perangua.com.

Figure 10. Flamingos in Armash fishponds



Source: Photo by Rosa Vroom, perangua.com.

Figure 11. The delineation between two ponds creates an artificial habitat



Source: Photo by Dermot Breen southdublinbirds.com.

Figure 12. The dried-up ponds that create brackish marshes



© Karen Aghababayan

Source: Photo by Karen Aghababayan.

Other information

The site is plain and the elevation approximately 800–810 m. Regarding transport utilities in the project area, the main road network that passes on the east side of the Emerald site is the M2 road. This is of national importance connecting Yerevan with Ararat. Also, road network M2 - Yerevan-Yeraskh-Goris-Meghri-Iran border - passes on the southeast of the site. Regarding protected area site management, there is no state authority managing the area up to now.

Protected object(s) (Resolutions 4 and 6)

The current chapter presents all key elements within the project area that are essential for the protection and preservation of the species and natural habitats listed in Resolutions no. 4 (1996) and no. 6 (1998) and that are present on the site.

The total number of habitats (Resolution 4) in the site is 11 (Table 6) and the total number of species (Resolution 6) is 103 (Table 7), indicating the site importance, especially for avifauna.

Table 6. List of habitats in the project area (11 types)

Code	Habitat
C1.32	Free-floating vegetation of eutrophic waterbodies
C1.33	Rooted submerged vegetation of eutrophic waterbodies
C1.4	Permanent dystrophic lakes, ponds, and pools
C2.34	Eutrophic vegetation of slow-flowing rivers
C3.4	Species-poor beds of low-growing water-fringing or amphibious vegetation
C3.51	Euro-Siberian dwarf annual amphibious swards
C3.55	Sparsely vegetated river gravel banks
C3.62	Unvegetated river gravel banks
D6.1	Inland saltmarshes
F9.3	Southern riparian galleries and thickets
G1.11	Riverine willow woodland

Source: Developed by kartECO for the World Bank.

Table 7. List of species in the project area (103 species)

Type	Number of species	Species
Fish	4	Aspius aspius, Barbus capito, Sabanejewia aurata, Rhodeus sericeus amarus
Reptiles	2	Mauremys caspica, Testudo graeca
Birds	89	Accipiter brevipes, Acrocephalus melanopogon, Alcedo atthis, Anser erythropus, Anthus campestris, Aquila clanga, Aquila heliaca, Aquila nipalensis, Aquila pomarina, Ardea purpurea, Ardeola ralloides, Asio flammeus, Aythya nyroca, Botaurus stellaris, Burhinus oedicnemus, Buteo rufinus, Calandrella brachydactyla, Charadrius alexandrinus, Charadrius asiaticus, Charadrius leschenaultii, Charadrius morinellus, Chlidonias hybridus, Chlidonias leucopterus, Chlidonias niger, Ciconia ciconia, Ciconia nigra, Circaetus gallicus, Circus aeruginosus, Circus cyaneus, Circus macrourus, Circus pygargus, Coracias garullus, Crex crex, Cygnus bewickii, Cygnus cygnus, Dendrocopos syriacus, Egretta alba, Egretta garzetta, Falco biarmicus, Falco cherrug, Falco columbarius, Falco naumanni, Falco peregrinus, Falco vespertinus, Gallinago media, Gelocheilidon nilotica, Glareola nordmanni, Glareola pratincola, Grus grus, Haliaeetus albicilla, Hieraetus pennatus, Himantopus himantopus, Hoplopterus spinosus, Ixobrychus minutus, Lanius minor, Larus genei, Larus melanocephalus, Larus minutus, Limosa lapponica, Luscinia svecica, Marmaronetta angustirostris, Melanocorypha calandra, Mergellus albellus, Milvus migrans, Neophron percnopterus, Nycticorax nycticorax, Oxyura leucocephala, Pandion haliaetus, Pelecanus crispus, Pelecanus onocrotalus, Pernis apivorus, Phalacrocorax pygmaeus, Phalaropus lobatus, Philomachus pugnax, Phoenicopterus ruber, Platalea leucorodia, Plegadis falcinellus, Pluvialis apricaria, Porphyrio porphyrio, Porzana porzana, Porzana parva, Porzana pusilla, Recurvirostra avosetta, Sternula albifrons, Sterna caspia, Sterna hirundo, Tadorna ferruginea, Tringa glareola, Xenus cinereus
		Note: 1. The bird list includes both breeding and migratory bird species which regularly (and even sporadically) occur at Armash. 2. There is an array of bird species whose taxonomic names have changed. Nevertheless, all features are originally listed in Res. 6 and called as such. No taxonomic changes are incorporated to avoid confusion regarding the MP objectives.
Mammals	8	Lutra lutra, Miniopterus schreibersii, Myotis blythii, Myotis emarginatus, Rhinolophus blasii, Rhinolophus euryale, Rhinolophus ferrumequinum, Rhinolophus hipposideros

Source: Developed by kartECO for the World Bank.

Maps

The analysis below is visualized through a complete set of maps included in Annex A, that is, Map 2. Distribution and abundance of habitats of Resolution 4 of the Bern convention, Map 3. Habitats and populations of important fauna species of Resolution 6 of the Bern Convention other than avifauna, Map 4. Habitats and populations of important avifauna species, and Map 5. Pressures/Threats to protective objects.

Methodology for conservation degree calculation per target habitat type and species

Based on the international practice employed within the EU for Natura 2000 site management, an adopted conservation degree methodology was developed and followed for the study needs and country experts' capacities. The conservation degree is calculated by combining the methodology proposed by Evans and Arvela (2011)²⁸ and the explanatory notes used for completing SDFs (European Commission 2011).²⁹ A brief description of the methodology is presented below. Moreover, it was thoroughly presented in the capacity-building seminar session organized in the context of the EU4Environment project.

Step 1

The analysis starts by assessing (with A, B, and C values) seven important conservation criteria per feature, that is, Structure and Functions (1), typical species (2), area cover (3), Pressures (P) and Threats (T) (4), positive impacts (5), future trend (6 = 4+5), and future status (7 = 1).

²⁸ Evans, D., and M. Arvela. 2011. *Assessment and Reporting under Article 17 of the Habitats Directive: Explanatory Notes & Guidelines for the period 2007–2012 - Final Draft*. European Topic Centre on Biological Diversity, <https://circabc.europa.eu/sd/a/2c12cea2-f827-4bdb-bb56-3731c9fd8b40/Art17-Guidelines-final.pdf>

²⁹ European Commission. 2011. "NATURA 2000 Standard Data Form Explanatory Notes." <https://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2011:198:0039:0070:EN:PDF>

Structure and Functions (1)	Typical species (2) ³⁰	Area cover (3) ³¹	Pressures (P) and Threats (T) (4) ³²	Positive impacts (5)	Future Trend (6 = 4 + 5)	Future status (7 = 1)
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As already mentioned, possible conservation criteria values are the following:

A: Excellent (A)

B: Good (B)

C: Moderate or limited (C)

Step 2

Based on the values, that is, with A, B, and C assigned to each of the seven criteria in Step 1, three combined results (groups), that is, Group A/Final evaluation of structures and functions, Group B/Conservation prospects, and Group C/Restoration possibility, are also calculated with the following calculation relations.

Structure and functions (1)	Typical species (2) ³³	Final evaluation of structures and functions (Group A = 1 + 2)	Area cover (3) ³⁴	Pressures (P) and Threats (T) (4) ³⁵	Positive impacts (5)	Future Trend (6 = 4 + 5)	Future status (7 = 1)	Conservation prospects (Group B = 3 + 6 + 7)	Restoration possibility (Group C) ³⁶
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Possible group values are the following:

A: Excellent (A)

B: Good (B)

C: Moderate or limited (C)

Step 3 - Final assessment for each target feature (species and/or habitats)

Based on Group A, Group B, and Group C values calculated in Step 2, the final and overall conservation degree of the habitat type or species, that is, 'Conservation degree (Groups A, B, and C)' is finally calculated.

Structure and functions (1)	Typical species (2) ³⁷	Final evaluation of structures and functions (Group A = 1 + 2)	Area cover (3) ³⁸	Pressures (P) and Threats (T) (4) ³⁹	Positive impacts (5)	Future Trend (6 = 4 + 5)	Future status (7 = 1)	Conservation prospects (Group B = 3 + 6 + 7)	Restoration possibility (Group C) ⁴⁰	Conservation degree (Groups A, B, C) ⁴¹
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The overall conservation degree (per target species and/or habitats), that is, 'Conservation degree (Groups A, B, C)' may take the following values:

³⁰ Assess the dominance of typical species of the habitat type.

³¹ Assess whether reference values (of distribution area) are satisfactory.

³² A: No P or T of high importance and up to 1 of medium importance, B: Up to 3 P or T of medium importance, C: At least 1 T or P of high importance and/or more than 3 P or T of medium importance.

³³ Assess the dominance of typical species of the habitat type.

³⁴ Assess whether reference values (of distribution area) are satisfactory.

³⁵ A: No P or T of high importance and up to 1 of medium importance, B: Up to 3 P or T of medium importance, C: At least 1 T or P of high importance and/or more than 3 P or T of medium importance.

³⁶ A = easy, B = possible with an average effort, C = difficult or impossible.

³⁷ Assess the dominance of typical species of the habitat type.

³⁸ Assess whether reference values (of distribution area) are satisfactory.

³⁹ A: No P or T of high importance and up to 1 of medium importance, B: Up to 3 P or T of medium importance, C: At least 1 T or P of high importance and/or more than 3 P or T of medium importance.

⁴⁰ A = easy, B = possible with an average effort, C = difficult or impossible.

⁴¹ Conservation degree = A (excellent conservation), B (good conservation), C (moderate or limited conservation), A/B (conservation degree is a result of expert judgment, needs to be evaluated with field data).

Conservation degree = A (excellent conservation)	Conservation degree = B (good conservation)	Conservation degree = C (moderate or limited conservation)
If a percentage greater than, or equal to, 75% of the area has an excellent conservation status	If the percentage having an excellent degree of conservation is less than 75% and the percentage of moderate conservation degree is less than 25%	If a percentage greater than, or equal to, 25% has moderate degree of conservation

A combined/new category added is:

Conservation degree = A / B

If the conservation degree is a result of expert judgment and needs to be further evaluated with field data

A calculation example is the following (Group A = A, Group B = B, Group C = A, thus conservation degree = A):

Habitat type or Species type	Structure and functions (1)	Typical species (2) ⁴²	Final evaluation of structures and functions (Group A = 1 + 2)	Area cover (3) ⁴³	Pressures (P) and Threats (T) (4) ⁴⁴	Positive impacts (5)	Future Trend (6 = 4 + 5)	Future status (7 = 1)	Conservation prospects (Group B = 3 + 6 + 7)	Restoration possibility (Group C) ⁴⁵	Conservation degree (Groups A, B, C) ⁴⁶
XXXXX	A	—	A	A	B	—	B	B	B	A	A

The goal of the above method is to calculate the conservation degree **of the sampling plots falling in each cell** and conservation degree of the habitat type or species **for each cell in the case of sampling**.

It must be emphasized that in the project area, no systematic sampling has been done, for the habitat types and for the species, and for this reason the calculation of the conservation degree **was estimated by the experts based on bibliographical data and few new observations**. The habitat mapping was done based exclusively on experts' assessments and satellite mapping and without field observations.

When the final habitat types or species conservation degrees are equal to A/B, B, or C, then the pressures and threats should be further analyzed, and management measures must be proposed for the particular habitats/species.

Natural habitat types

Eleven habitats are included in Resolution 4 and their conservation degree is calculated and presented in Table 8. According to the analysis out of 11, 7 are characterized as 'A' with excellent conservation and 4 as A/B (Table 9). The biodiversity information was collected and provided by G. Fayvush and A. Aleksanyan based on personal field investigations and the Monograph 'Habitats of Armenia'⁴⁷. It should be emphasized that some data on distribution and areas of certain habitats are missing. Thus, there is a need for monitoring and updating information via fieldwork.

⁴² Assess the dominance of typical species of the habitat type.

⁴³ Assess whether reference values (of distribution area) are satisfactory.

⁴⁴ A: No P or T of high importance and up to 1 of medium importance, B: Up to 3 P or T of medium importance, C: At least 1 T or P of high importance and/or more than 3 P or T of medium importance.

⁴⁵ A = easy, B = possible with an average effort, C = difficult or impossible.

⁴⁶ Conservation degree = A (excellent conservation), B (good conservation), C (moderate or limited conservation), A/B (conservation degree is a result of expert judgment, needs to be evaluated with field data).

⁴⁷ Fayvush, George, and Alla Aleksanyan. 2016. "Habitats of Armenia." 10.13140/RG.2.1.1695.9601.

https://www.researchgate.net/profile/George-Fayvush/publication/303689840_Habitats_of_Armenia/links/574dae1d08ae8bc5d15be295/Habitats-of-Armenia.pdf?_tp=eyJjb250ZXh0Ijp7ImZpcnN0UGFnZSI6InB1YmxpY2F0aW9uIiwicGFnZSI6InB1YmxpY2F0aW9uIn0

Table 8. Conservation degree analysis of habitats in the project area (11 types)

Habitat type	Structure and functions (1)	Typical species (2) ⁴⁸	Final evaluation of structures and functions (Group A = 1 + 2)	Area cover (3) ⁴⁹	Pressures (P) and Threats (T) (4) ⁵⁰	Positive impacts (5)	Future Trend (6 = 4 + 5)	Future status (7 = 1)	Conservation prospects (Group B = 3 + 6 + 7)	Restoration possibility (Group C) ⁵¹	Conservation degree (Groups A, B, C) ⁵²
C1.32 Free-floating vegetation of eutrophic waterbodies	A	A	A	A	B	—	B	A	A	A	A/B
C1.33 Rooted submerged vegetation of eutrophic waterbodies	A	A	A	A	B	—	B	A	A	A	A/B
C1.4 Permanent dystrophic lakes, ponds, and pools	A	A	A	A	B	—	B	A	A	A	A/B
C2.34 Eutrophic vegetation of slow-flowing rivers	A	A	A	A	A	—	A	A	A	A	A
C3.4 Species-poor beds of low-growing water-fringing or amphibious vegetation	A	A	A	A	A	—	A	A	A	A	A
C3.51 Euro-Siberian dwarf annual amphibious swards	A	A	A	A	A	—	A	A	A	A	A
C3.55 Sparsely vegetated river gravel banks	A	A	A	A	A	—	A	A	A	A	A
C3.62 Unvegetated river gravel banks	A	A	A	A	A	—	A	A	A	A	A
D6.1 Inland saltmarshes	A	A	A	A	A	—	A	A	A	A	A
F9.3 Southern riparian galleries and thickets	A	A	A	A	B	—	B	A	A	A	A/B
G1.11 Riverine willow woodland	A	A	A	A	A	—	A	A	A	A	A

Source: Developed by kartECO for the World Bank.

⁴⁸ Assess the dominance of typical species of the habitat type.

⁴⁹ Assess whether reference values (of distribution area) are satisfactory.

⁵⁰ A: No P or T of high importance and up to 1 of medium importance, B: Up to 3 P or T of medium importance, C: At least 1 T or P of high importance and/or more than 3 P or T of medium importance.

⁵¹ A = easy, B = possible with an average effort, C = difficult or impossible.

⁵² Conservation degree = A (excellent conservation), B (good conservation), C (moderate or limited conservation), A/B (conservation degree is a result of expert judgment, needs to be evaluated with field data).

Table 9. Conservation degree results for habitats in the project area (27 types)

Conservation degree = A (excellent conservation)	Conservation degree = B (good conservation)	Conservation degree = A / B (If the conservation degree is a result of expert judgment and needs to be further evaluated with field data)	Conservation degree = C (moderate or limited conservation)
7	0	4	0

A view of the current condition of several habitats is illustrated in Figure 13. Most of the habitats have an excellent conservation degree and status. The habitats are either not threatened, as they are located at the border zone, or in areas between fishponds. Periodic monograph drying of fishponds leads to change; all water habitats thus possess a non-permanent threat. Also, saltmarshes in the Emerald site area (D6.1 Inland saltmarshes) suffer no pressure from common threats such as habitat degradation and change to agricultural land or artificial drying. It should be noted that habitat D6.1 Inland saltmarshes in the Emerald site should be distinguished from the problematic case of the Natural monument of Armenia ‘Salt marshes’ in the vicinity of Ararat town.⁵³

The reedbeds cover the edges of ponds or grow in islet-shaped patches taking up approximately 30–50 percent of the water area, thus providing suitable cover and breeding places for grebes, cormorants, egrets/herons, rails, ducks, and other birds.⁵⁴ It should also be noted that the particular ponds follow a cycle evolution process during filling, operating as a fish farm, pond drying, or recharging with river water.

Figure 13. Photo of habitats in the project area



F9.3 Southern riparian galleries and thickets



C1.33 Rooted submerged vegetation of eutrophic waterbodies, and
C1.4 Permanent dystrophic lakes, ponds, and pools

Source: Photo taken by G. Fayvush.

Species

Invertebrates

No target invertebrates are included in the revised proposal (2023-2024 under the EU4Environment Program recommendations) of the project site.

Fish

Four fish species in the project area are included in Resolution 6 and their conservation degree is calculated and presented in Tables 10 and 11. According to the analysis below, all species are characterized as A/B, so for all species, monitoring and populations control is an absolute necessity.

⁵³ Akopian, J. A., A. G. Ghukasyan, and Zh. H. Hovakimyan. 2018. *Natural Monument of Armenia “Salt Marshes” in the Vicinity of Ararat Town*. Yerevan: Institute of Botany after A. L. Takhtajyan NAS RA.

https://www.researchgate.net/publication/323799994_Natural_monument_of_Armenia_Salt_marshes_in_the_vicinity_of_Ararat_town.

⁵⁴ BirdLife International. 2024. “Important Bird Area factsheet: Armash Fish Farm. Accessed March 14, 2024, <https://datazone.birdlife.org/site/factsheet/armash-fish-farm-iba-armenia>.

All four fish species live in Araks River, that is, upstream of the Emerald site. The river is also the physical border of Armenia with Türkiye, and it is guarded by border troops. Officially, fishing is prohibited and any activities - even fishing - close to the river are halted by the border guard patrol. Nevertheless - if possible - an Ichthyologist could study the target fish stock level in the future (included in the Action Plan).

Table 10. Conservation degree analysis of target fish in the project area (4 species)

Species	Population (1) ⁵⁵	Habitat (2) ⁵⁶	Final evaluation of habitat and population (Group A = 1 + 2)	Area cover (3) ⁵⁷	Pressures and threats (4) ⁵⁸	Positive impacts (5)	Future Trend (6 = 4 + 5)	Future status (7 = 1)	Conservation prospects (Group B = 3 + 6 + 7)	Restoration possibility (Group C) ⁵⁹	Conservation degree (Groups A, B, C) ⁶⁰
<i>Aspius aspius</i>	A	A/B	A/B	A	A	—	A	A	A	A	A/B
<i>Barbus capito</i>	A	A/B	A/B	A	A	—	A	A	A	A	A/B
<i>Sabanejewia aurata</i>	A	A/B	A/B	A	A	—	A	A	A	A	A/B
<i>Rhodeus sericeus amarus</i>	A	A/B	A/B	A	A	—	A	A	A	A	A/B

Source: Developed by kartECO for the World Bank.

⁵⁵ Assess whether reference values are satisfactory.

⁵⁶ Assess the conservation degree of the species habitat.

⁵⁷ Assess whether reference values (of distribution area) are satisfactory.

⁵⁸ A: No P or T of high importance and up to 1 of medium importance, B: Up to 3 P or T of medium importance, C: At least 1 T or P of high importance and/or more than 3 P or T of medium importance.

⁵⁹ A = easy, B = possible with an average effort, C = difficult or impossible.

⁶⁰ Conservation degree = A (excellent conservation), B (good conservation), C (moderate or limited conservation), A/B (conservation degree is a result of expert judgment, needs to be evaluated with field data).

Table 11. Conservation degree results for target fish in the project area (4 species)

Conservation degree = A (excellent conservation)	Conservation degree = B (good conservation)	Conservation degree = A/B (If the conservation degree is a result of expert judgment and needs to be further evaluated with field data)	Conservation degree = C (moderate or limited conservation)
0	0	4	0

Reptiles

Two reptile species in the project area are included in Resolution 6 and their conservation degree is calculated and presented in Tables 12 and 13. According to the analysis, one target species is characterized as 'B' with good conservation and one as 'A/B', requiring additional fieldwork to update the conservation object information. The biodiversity information used was collected and provided by Prof. M. Arakelyan during the previous Emerald Network review (2016).

Table 12. Conservation degree analysis of target reptiles in the project area (2 species)

Species	Population (1) ⁶¹	Habitat (2) ⁶²	Final evaluation of habitat and population (Group A = 1 + 2)	Area cover (3) ⁶³	Pressures and threats (4) ⁶⁴	Positive impacts (5)	Future Trend (6 = 4 + 5)	Future status (7 = 1)	Conservation prospects (Group B = 3 + 6 + 7)	Restoration possibility (Group C) ⁶⁵	Conservation degree (Groups A, B, C) ⁶⁶
<i>Mauremys caspica</i>	B	A	A/B	A	C	—	C	B	B	B	B
<i>Testudo graeca</i>	B	A	A/B	A	A	—	A	A	A	A	A/B

Source: Developed by kartECO for the World Bank.

⁶¹ Assess whether reference values are satisfactory.

⁶² Assess the conservation degree of the species habitat.

⁶³ Assess whether reference values (of distribution area) are satisfactory.

⁶⁴ A: No P or T of high importance and up to 1 of medium importance, B: Up to 3 P or T of medium importance, C: At least 1 T or P of high importance and/or more than 3 P or T of medium importance.

⁶⁵ A = easy, B = possible with an average effort, C = difficult or impossible.

⁶⁶ Conservation degree = A (excellent conservation), B (good conservation), C (moderate or limited conservation), A/B (conservation degree is a result of expert judgment, needs to be evaluated with field data).

Among reptiles, there are two species of turtles: *Testudo graeca* and *Mauremys caspica*. *Testudo graeca* is not threatened in this Emerald site, and according to recent information from locals, nobody intervenes with it. As for *Mauremys caspica*, this particular turtle prefers fish, and according to unofficial information, fishpond owners have complained in the past to MoE about the financial impact caused. Threats refers to any potential measures taken by locals against the particular species.

Table 13. Conservation degree results for target reptiles in the project area (2 species)

Conservation degree = A (excellent conservation)	Conservation degree = B (good conservation)	Conservation degree = A/B (If the conservation degree is a result of expert judgment and needs to be further evaluated with field data)	Conservation degree = C (moderate or limited conservation)
0	1	1	0

Figure 14. Photo of *Testudo graeca* in the project area



Source: Photo taken by Marine Arakelyan.

Birds

Eighty-nine bird species in the site area are included in Resolution 6 and their conservation degree is calculated and presented in Table 14. According to the analysis, out of 89, 56 are characterized as ‘A’ with excellent conservation, 14 as ‘B’ with good conservation, 2 as ‘C’ moderate or limited conservation, and 17 as ‘A/B’ (Table 15), requiring further evaluation.

It must be noted that the Armash site is a joint ownership by public and private enterprises, which is managed through a shareholder agreement. Species ranked as A/B require further field survey to determine their conservation degree in the site. Overall conservation degree is dependent on the management, the interests, and priorities of the private shareholders. Thus, designing and implementing a specific field monitoring program in the project area will require collaboration and coordination among various stakeholders with potentially different priorities, especially as many waterbirds are shot (legally or illegally) because the site is also a public hunting ground.

The avifauna data presented in Table 14 include - in addition to existing information - year-round field visits in Armash over the past 15 years and the past 3 years as part of the experts’ PhD program, covering all seasons of the year.

Table 14. Conservation degree analysis of target birds in the project area (89 species)

Species	Population (1) ⁶⁷	Habitat (2) ⁶⁸	Final evaluation of habitat and population (Group A = 1 + 2)	Area cover (3) ⁶⁹	Pressures and threats (4) ⁷⁰	Positive impacts (5)	Future Trend (6 = 4 + 5)	Future status (7 = 1)	Conservation prospects (Group B = 3 + 6 + 7)	Restoration possibility (Group C) ⁷¹	Conservation degree (Groups A, B, C) ⁷²
Accipiter brevipes	A	A	A	A	A	—	A	A	A	A	A
Acrocephalus melanopogon	A	A	A	A	B	—	B	A	A	A	A
Alcedo atthis	A	A	A	A	A	—	A	A	A	A	A
Anser erythropus	A	A	A	A	B	—	B	A	A	B	A/B
Anthus campestris	A	A	A	A	A	—	A	A	A	A	A
Aquila clanga	A	A	A	A	A	—	A	A	A	A	A
Aquila heliaca	A	A	A	A	A	—	A	A	A	A	A
Aquila nipalensis	A	A	A	A	A	—	A	A	A	A	A
Aquila pomarina	A	A	A	A	A	—	A	A	A	A	A
Ardea purpurea	A	A	A	A	A	—	A	A	A	A	A
Ardeola ralloides	A	A	A	A	B	—	B	A	A	B	B
Asio flammeus	A	A	A	A	A	—	A	A	A	A	A
Aythya nyroca	A	B	A	A	C	—	C	A	B	B	B
Botaurus stellaris	A	A	A	A	A	—	A	A	A	A	A
Burhinus oedicnemus	A	A	A	A	B	—	B	A	A	B	A/B
Buteo rufinus	A	A	A	A	A	—	A	A	A	A	A
Calandrella brachydactyla	A	A	A	A	A	—	A	A	A	A	A
Charadrius alexandrinus	A	A	A	A	B	—	B	A	A	B	A/B
Charadrius asiaticus	A	A	A	A	A	—	A	A	A	A	A
Charadrius leschenaultii	A	A	A	A	A	—	A	A	A	A	A
Charadrius morinellus	A	A	A	A	A	—	A	A	A	A	A
Chlidonias hybridus	A	A	A	A	A	—	A	A	A	A	A
Chlidonias leucopterus	A	A	A	A	A	—	A	A	A	A	A
Chlidonias niger	A	A	A	A	A	—	A	A	A	A	A
Ciconia ciconia	A	A	A	A	A	—	A	A	A	A	A

⁶⁷ Assess whether reference values are satisfactory.

⁶⁸ Assess the conservation degree of the species habitat

⁶⁹ Assess whether reference values (of distribution area) are satisfactory.

⁷⁰ A: No P or T of high importance and up to 1 of medium importance, B: Up to 3 P or T of medium importance, C: At least 1 T or P of high importance and/or more than 3 P or T of medium importance.

⁷¹ A = easy, B = possible with an average effort, C = difficult or impossible.

⁷² Conservation degree = A (excellent conservation), B (good conservation), C (moderate or limited conservation), A/B (conservation degree is a result of expert judgment, needs to be evaluated with field data).

Species	Population (1) ⁶⁷	Habitat (2) ⁶⁸	Final evaluation of habitat and population (Group A = 1 + 2)	Area cover (3) ⁶⁹	Pressures and threats (4) ⁷⁰	Positive impacts (5)	Future Trend (6 = 4 + 5)	Future status (7 = 1)	Conservation prospects (Group B = 3 + 6 + 7)	Restoration possibility (Group C) ⁷¹	Conservation degree (Groups A, B, C) ⁷²
<i>Ciconia nigra</i>	A	A	A	A	A	—	A	A	A	A	A
<i>Circaetus gallicus</i>	A	A	A	A	A	—	A	A	A	A	A
<i>Circus aeruginosus</i>	A	A	A	A	B	—	B	A	A	B	A/B
<i>Circus cyaneus</i>	A	A	A	A	A	—	A	A	A	A	A
<i>Circus macrourus</i>	A	A	A	A	A	—	A	A	A	A	A
<i>Circus pygargus</i>	A	A	A	A	A	—	A	A	A	A	A
<i>Coracias garullus</i>	A	A	A	A	A	—	A	A	A	A	A
<i>Crex crex</i>	A	A	A	A	A	—	A	A	A	A	A
<i>Cygnus bewickii</i>	A	A	A	A	B	—	B	A	A	B	A/B
<i>Cygnus cygnus</i>	A	A	A	A	B	—	B	A	A	B	A/B
<i>Dendrocopos syriacus</i>	A	A	A	A	A	—	A	A	A	A	A
<i>Egretta alba</i>	A	A	A	A	A	—	A	A	A	A	A
<i>Egretta garzetta</i>	A	A	A	A	A	—	A	A	A	A	A
<i>Falco biarmicus</i>	A	A	A	A	A	—	A	A	A	A	A
<i>Falco cherrug</i>	A	A	A	A	A	—	A	A	A	A	A
<i>Falco columbarius</i>	A	A	A	A	A	—	A	A	A	A	A
<i>Falco naumanni</i>	A	A	A	A	A	—	A	A	A	A	A
<i>Falco peregrinus</i>	A	A	A	A	A	—	A	A	A	A	A
<i>Falco vespertinus</i>	A	A	A	A	A	—	A	A	A	A	A
<i>Gallinago media</i>	A	A	A	A	B	—	B	A	A	B	A/B
<i>Gelochelidon nilotica</i>	A	A	A	A	A	—	A	A	A	A	A
<i>Glareola nordmanni</i>	A	A	A	A	A	—	A	A	A	A	A
<i>Glareola pratincola</i>	A	A	A	A	B	—	B	A	A	B	A/B
<i>Grus grus</i>	A	A	A	A	B	—	B	A	A	B	A/B
<i>Haliaeetus albicilla</i>	A	A	A	A	A	—	A	A	A	A	A
<i>Hieraaetus pennatus</i>	A	A	A	A	A	—	A	A	A	A	A
<i>Himantopus himantopus</i>	A	A	A	A	B	—	B	A	A	B	A/B
<i>Hoplopterus spinosus</i>	A	A	A	A	B	—	B	A	A	B	A/B
<i>Ixobrychus minutus</i>	A	A	A	A	A	—	A	A	A	A	A
<i>Lanius minor</i>	A	A	A	A	A	—	A	A	A	A	A
<i>Larus genei</i>	A	A	A	A	A	—	A	A	A	A	A
<i>Larus melanocephalus</i>	A	A	A	A	A	—	A	A	A	A	A
<i>Larus minutus</i>	A	A	A	A	A	—	A	A	A	A	A
<i>Limosa lapponica</i>	A	A	A	A	C	—	C	A	B	B	B
<i>Luscinia svecica</i>	A	A	A	A	A	—	A	A	A	A	A
<i>Marmaronetta angustirostris</i>	C	B	B	A	C	—	C	C	C	B	C

Species	Population (1) ⁶⁷	Habitat (2) ⁶⁸	Final evaluation of habitat and population (Group A = 1 + 2)	Area cover (3) ⁶⁹	Pressures and threats (4) ⁷⁰	Positive impacts (5)	Future Trend (6 = 4 + 5)	Future status (7 = 1)	Conservation prospects (Group B = 3 + 6 + 7)	Restoration possibility (Group C) ⁷¹	Conservation degree (Groups A, B, C) ⁷²
Melanocorypha calandra	A	A	A	A	A	—	A	A	A	A	A
Mergellus albellus	A	A	A	A	A	—	A	A	A	A	A
Milvus migrans	A	A	A	A	A	—	A	A	A	A	A
Neophron percnopterus	A	A	A	A	A	—	A	A	A	A	A
Nycticorax nycticorax	A	A	A	A	A	—	A	A	A	A	A
Oxyura leucocephala	B	B	B	A	C	—	C	B	B	B	B
Pandion haliaetus	B	A	A	A	B	—	B	B	B	A	A/B
Pelecanus crispus	A	A	A	A	B	—	B	A	A	B	A/B
Pelecanus onocrotalus	A	A	A	A	B	—	B	A	A	B	A/B
Pernis apivorus	A	A	A	A	A	—	A	A	A	A	A
Phalacrocorax pygmaeus	A	A	A	A	C	—	C	A	B	B	B
Phalaropus lobatus	A	A	A	A	C	—	C	A	B	B	B
Philomachus pugnax	A	A	A	A	C	—	C	A	B	B	B
Phoenicopterus ruber	A	A	A	A	C	—	C	A	B	B	B
Platalea leucorodia	C	A	B	A	C	—	C	C	C	B	C
Plegadis falcinellus	A	A	A	A	B	—	B	A	B	B	B
Pluvialis apricaria	A	A	A	A	C	—	C	B	B	B	B
Porphyrio porphyrio	A	A	A	A	B	—	B	A	A	B	A/B
Porzana porzana	A	A	A	A	B	—	B	A	A	B	A/B
Porzana parva	A	A	A	A	B	—	B	A	A	B	A/B
Porzana pusilla	A	A	A	A	A	—	A	A	A	A	A
Recurvirostra avosetta	B	B	B	A	C	—	C	B	B	B	B
Sternula albifrons	A	A	A	A	A	—	A	A	A	A	A
Sterna caspia	A	A	A	A	A	—	A	A	A	A	A
Sterna hirundo	A	A	A	A	A	—	A	A	A	A	A
Tadorna ferruginea	A	A	A	A	C	—	C	A	B	B	B
Tringa glareola	A	A	A	A	C	—	C	A	B	B	B
Xenus cinereus	A	A	A	A	C	—	C	A	B	B	B

Source: Developed by kartECO for the World Bank.

Table 15. Conservation degree results for target birds in the project area (89 species)

Conservation degree = A (excellent conservation)	Conservation degree = B (good conservation)	Conservation degree = A/B (If the conservation degree is a result of expert judgment and needs to be further evaluated with field data)	Conservation degree = C (moderate or limited conservation)
56	14	17	2

Figure 15. Photo of *Oxyura leucocephala* in the project area



Source: Photo by L. Balyan.

Mammals

Eight mammal species are included in Resolution 6 and their conservation degree is calculated and presented in Tables 16 and 17. According to the analysis, all target mammals are characterized as 'A/B' (Table 9). The biodiversity information was collected and provided by Astghik Ghazaryan during the previous survey in 2014–2017. Regular monitoring has never been done in this territory. Therefore, it is important that a specific field monitoring program is designed and implemented in the project area to reassess the conservation degree.

Table 16. Conservation degree analysis of target mammals in the project area (8 species)

Species	Population (1) ⁷³	Habitat (2) ⁷⁴	Final evaluation of habitat and population (Group A = 1 + 2)	Area cover (3) ⁷⁵	Pressures & Threats (4) ⁷⁶	Positive impacts (5)	Future Trend (6 = 4 + 5)	Future status (7 = 1)	Conservation prospects (Group B = 3 + 6 + 7)	Restoration possibility (Group C) ⁷⁷	Conservation degree (Groups A, B, C) ⁷⁸
Lutra lutra	A	A	A	A	C	—	C	A	B	B	A/B
Miniopterus schreibersii	A	A	A	A	A	—	A	A	A	B	A/B
Myotis blythii	A	A	A	A	A	—	A	A	A	B	A/B
Myotis emarginatus	A	A	A	A	A	—	A	A	A	B	A/B
Rhinolophus blasii	A	A	A	A	A	—	A	A	A	B	A/B
Rhinolophus euryale	A	A	A	A	A	—	A	A	A	B	A/B
Rhinolophus ferrumequinum	A	A	A	A	A	—	A	A	A	B	A/B
Rhinolophus hipposideros	A	A	A	A	A	—	A	A	A	B	A/B

Source: Developed by kartECO for the World Bank.

⁷³ Assess whether reference values are satisfactory.

⁷⁴ Assess the conservation degree of the species habitat.

⁷⁵ Assess whether reference values (of distribution area) are satisfactory.

⁷⁶ A: No P or T of high importance and up to 1 of medium importance, B: Up to 3 P or T of medium importance, C: At least 1 T or P of high importance and/or more than 3 P or T of medium importance.

⁷⁷ A = easy, B = possible with an average effort, C = difficult or impossible.

⁷⁸ Conservation degree = A (excellent conservation), B (good conservation), C (moderate or limited conservation), A/B (conservation degree is a result of expert judgment, needs to be evaluated with field data).

Table 17. Conservation degree results for target mammals in the project area (8 species)

Conservation degree = A (excellent conservation)	Conservation degree = B (good conservation)	Conservation degree = A/B (If the conservation degree is a result of expert judgment and needs to be further evaluated with field data)	Conservation degree = C (moderate or limited conservation)
0	0	8	0

Figure 16. Photo of *Myotis blythii*



Source: Photo by Astghik Ghazaryan.

Overall evaluation and composition of elements

Conservation objectives of the protected object(s)

Methodology for conservation objectives calculation per target habitat type and species

The following chapter presents the conservation objectives for specific habitats and species with **conservation degree results as A/B, B, or C according to the revised list of species and habitats**, under the EU4Environment Program. For the specific habitats and species, the pressures and threats are further analyzed and respective management measures are proposed.

Based on the international practice followed within the EU for Natura 2000 site management, an adopted conservation objectives methodology was developed and followed for the study needs. Pressures and threats are selected from the latest release of the EU Final Pressure List.⁷⁹ This is a standard list used in the EU to report information on pressures and threats.

Natural habitat types

Considering the results of the conservation degree assessment of habitat types in Tables 8 and 9, the pressures and threats are analyzed below - for habitats with conservation degree results as A/B, B, or C - and respective conservation goals identified. The site overall - according to the expert's opinion - is characterized by an excellent conservation degree. Possible pressures and threats are identified for riparian and water-oriented habitats on a non-permanent basis due to periodic drying of the fishponds. Also, currently no new drainage or other channels systems are installed in the site that may affect habitats such as D6.1 Inland saltmarshes.

It should be emphasized that some data on distribution and areas of certain habitats are missing. Thus, there is a need for monitoring and updating information via fieldwork.

Table 18. Pressures and threats of habitat types in project area

Habitat type	Pressures and threats ⁸⁰	Importance ⁸¹	Conservation goal	Short-term ⁸² /medium-term ⁸³ conservation objective: Area maintenance $\geq 90\%$	Long-term ⁸⁴ conservation objective: Area increase at least by 10% / $\geq 10\%$ ⁸⁵
				Habitat area cover (or land cover -ha)⁸⁶	
C1.32 Free-floating vegetation of eutrophic waterbodies	PA22 Drainage for use as agricultural land	M	Area maintenance	2,657	3,247
	PG22 Abandonment of aquaculture	M	Area maintenance	2,657	3,247
C1.33 Rooted submerged vegetation of eutrophic waterbodies	PA22 Drainage for use as agricultural land	M	Area maintenance	2,657	3,247

⁷⁹ <https://cdr.eionet.europa.eu/help/natura2000/>

⁸⁰ <https://cdr.eionet.europa.eu/help/natura2000/>

⁸¹ L = low, M = medium, H = High importance.

⁸² 1–6 years.

⁸³ 6–12 years.

⁸⁴ >12 years.

⁸⁵ It is a long-term theoretical goal to increase virtually ALL habitat types in other land use areas—not under protection.

⁸⁶ The values were assigned based on experts' assessment and satellite mapping (without field observations).

	PG22 Abandonment of aquaculture	M	Area maintenance	439	537
C1.4 Permanent dystrophic lakes, ponds, and pools	PA22 Drainage for use as agricultural land	M	Area maintenance	2,657	3,247
	PG22 Abandonment of aquaculture	M	Area maintenance	439	537
C2.34 Eutrophic vegetation of slow-flowing rivers	No pressures or threats	M	Area maintenance	118	144
C3.4 Species-poor beds of low-growing water-fringing or amphibious vegetation	No pressures or threats	M	Area maintenance	7	9
C3.51 Euro-Siberian dwarf annual amphibious swards	No pressures or threats	M	Area maintenance	16	20
C3.55 Sparsely vegetated river gravel banks	No pressures or threats	M	Area maintenance	17	21
C3.62 Unvegetated river gravel banks	No pressures or threats	M	Area maintenance	30	37
D6.1 Inland saltmarshes	No pressures or threats	M	Area maintenance	1,230	1,504
F9.3 Southern riparian galleries and thickets	PG09 Management of fishing stocks and game	M	Area maintenance	603	738
G1.11 Riverine willow woodland	No pressures or threats	M	Area maintenance	166	203

Source: Developed by kartECO for the World Bank.

The most significant threat in the site is the potential loss, degradation, and fragmentation of water habitats, largely due to the **permanent** drainage of water ponds and transformation of the latter to cropland (a threat which is a result of financial inability to maintain the land for aquaculture). The drainage of water ponds for substitute agriculture coupled with their abandonment may pose a direct threat to target species since they reduce the availability of suitable habitats and food resources essential for their survival and reproduction. The short-term⁸⁷/medium-term⁸⁸ conservation goal is to maintain at least 90 percent of the current habitat/land cover/area cover and the long-term⁸⁹ goal is to increase the current habitat/land cover/area cover by at least 10 percent on other land uses under no protection.

The biodiversity information used to assess the conservation objectives and pressures was collected and provided by G. Fayvush and A. Aleksanyan based on personal field investigations and the Monograph 'Habitats of Armenia' (Fayvush and Aleksanyan 2016).

⁸⁷ 1–6 years (6 years is the monitoring period interval for reporting according to European practice).

⁸⁸ 6–12 years.

⁸⁹ >12 years.

Species

Fish

Considering the results of the conservation degree assessment of fish species in Tables 10 and 11, the pressures and threats are analyzed in Table 19 and respective management measures proposed. The biodiversity information used to assess the conservation objectives and pressures was collected and provided by G. Fayvush.

Table 19. Pressures and threats of target fish species

Species	Pressures and threats ⁹⁰	Importance ⁹¹	Conservation goal	Conservation objective ⁹²
<i>Aspius aspius</i>	No pressures or threats	M	Population maintenance	Not available
<i>Barbus capito</i>	No pressures or threats	M	Population maintenance	Not available
<i>Sabanejewia aurata</i>	No pressures or threats	M	Population maintenance	Not available
<i>Rhodeus sericeus amarus</i>	No pressures or threats	M	Population maintenance	Not available

Source: Developed by kartECO for the World Bank.

According to Table 19, no significant pressures and threats are identified. Possible water and habitat deterioration due to pesticide and fertilizer concentrations in the drainage water from the ponds is considered to be harmless due to its limited extent and small water amount released. Araks River may be the receptor of pesticides and fertilizers from the surrounding fields - on a broader regional water basin scale - that is the key factor of water contamination from agricultural practices, which may affect the status of fish populations in the river.

The conservation objectives aim to maintain the present population. It is important for an Ichthyologist - if possible due to the military sensitiveness of the area - to study the target fish stock level in the future (included as a proposed program to be executed in the Action Plan).

Reptiles

Considering the results of the conservation degree assessment of reptiles in Tables 12 and 13, no specific pressures and threats are identified. Nevertheless, it should be emphasized that data are incomplete and there is a need for organized monitoring in the project area.

Table 20. Pressures and threats of reptiles

Species	Pressures and threats ⁹³	Importance ⁹⁴	Conservation goal	Conservation objective ⁹⁵
<i>Mauremys caspica</i>	PG14 Poisoning of animals (excluding lead poisoning)	M	Population maintenance	50 Individuals
	PG11 Illegal shooting/killing	M	Population maintenance	
<i>Testudo graeca</i>	No pressures or threats	M	Population maintenance	Not available

Source: Developed by kartECO for the World Bank.

As presented in Table 20, most of the conservation objectives identified are to maintain population. The *Mauremys caspica* turtle prefers fish, and the owners of fishponds, according to unofficial information, have complained to MoE about the financial impact caused. It is important to avoid any unnecessary actions by the pond owners that may provoke a reduction in the species population.

Birds

Considering the results of the conservation degree assessment of bird species in Tables 14 and 15, the pressures and threats are analyzed. The biodiversity information used to assess the conservation objectives and pressures was collected using both the bibliographical record and long-term regular expert observations.

⁹⁰ <https://www.eea.europa.eu/en>

⁹¹ L = low, M = medium, H = High importance.

⁹² The values were assigned based on the SDF - note that the current SDF does not include the revised list (2023–2024) of species and habitats and expert observation.

⁹³ <https://www.eea.europa.eu/en>

⁹⁴ L = low, M = medium, H = High importance.

⁹⁵ The values were assigned based on the SDF - note that the current SDF does not include the revised list (2023–2024) of species and habitats and expert observation.

It should be stated that the conservation degree for the majority of the species presented in Table 21 will require further evaluation. This is especially true due to the ongoing trend of negative impacts on local waterbird fauna, largely attributed to the site's ownership pattern (private shareholder enterprise and closed access) and unsustainable management nature, which in turn is triggered by a range of economic, legal, and environmental factors that are beyond the authority of the site but affect the overall integrity of the area. Therefore, it is essential to consider these external influences and the cost-effectiveness of the proposed management from a nature conservation viewpoint when developing management strategies for the site, to ensure that conservation efforts are compatible with the objectives of the private area's operational status. It should also be clear that the assessment below may refer to an observed local threat that may affect only one of the colonies of the species at the specific site. In that case, the threat should not - and it is not - be extrapolated to the rest of the population.

Table 21. Pressures and threats of target birds

Species	Pressures and threats ⁹⁶	Importance ⁹⁷	Conservation goal	Conservation objective ⁹⁸
<i>Anser erythropus</i>	PG11 Illegal shooting/killing	M	Population maintenance	>1 individual
<i>Ardeola ralloides</i>	PA09 Burning for agriculture	M	Population maintenance	5–10 individuals
		H	Habitat maintenance	3,655 ha
<i>Aythya nyroca</i>	PG11 Illegal shooting/killing	M	Population maintenance	100 individuals
	PA22 Drainage for use as agricultural land	H	Habitat maintenance	3,655 ha ⁹⁹
	PG22 Abandonment of aquaculture	H		
<i>Burhinus oedicnemus</i>	PA07 Intensive grazing or overgrazing by livestock	M	Habitat maintenance	1,292.70 ha ¹⁰⁰
<i>Charadrius alexandrinus</i>	PA22 Drainage for use as agricultural land	H	Habitat maintenance	3,655 ha
	PG22 Abandonment of aquaculture	H		
<i>Circus aeruginosus</i>	PG11 Illegal shooting/killing	M	Population maintenance	5–10 pairs
<i>Cygnus bewickii</i>	PG11 Illegal shooting/killing	M	Population maintenance	7–10 ind.
<i>Cygnus cygnus</i>	PG11 Illegal shooting/killing	M	Population maintenance	5–10 ind.
<i>Gallinago media</i>	PG11 Illegal shooting/killing	M	Population maintenance	2–3 ind.
<i>Glareola pratincola</i>	PA07 Intensive grazing or overgrazing by livestock	M	Habitat maintenance	1,292.70 ha ¹⁰¹
<i>Grus grus</i>	PG11 Illegal shooting/killing	M	Population maintenance	Max. 10 ind.
<i>Himantopus himantopus</i>	PA07 Intensive grazing or overgrazing by livestock	M	Habitat maintenance	1,292.70 ha ¹⁰²
<i>Hoplopterus spinosus</i>	PA07 Intensive grazing or overgrazing by livestock	M	Habitat maintenance	1,292.70 ha ¹⁰³
<i>Limosa lapponica</i>	PA22 Drainage for use as agricultural land	H	Habitat maintenance	3,655 ha
	PG22 Abandonment of aquaculture	H		
<i>Marmaronetta angustirostris</i>	PG11 Illegal shooting/killing	M	Population increase	10 individuals and 2 pairs
	PA22 Drainage for use as agricultural land	H	Habitat maintenance	3,655 ha
	PG22 Abandonment of aquaculture	H		
<i>Oxyura leucocephala</i>	PG11 Illegal shooting/killing	M	Population maintenance	20 individuals

⁹⁶ <https://www.eea.europa.eu/en>

⁹⁷ L = low, M = medium, H = High importance.

⁹⁸ The values were assigned based on the SDF—note that the current SDF does not include the revised list (2023–2024) of species and habitats and expert observation. Numbers are for individuals.

⁹⁹ Habitats C1.32, C1.33, C1.4.

¹⁰⁰ Grassland.

¹⁰¹ Grassland.

¹⁰² Grassland.

¹⁰³ Grassland.

	PA22 Drainage for use as agricultural land	H	Habitat maintenance	3,655 ha
	PG22 Abandonment of aquaculture	H		
<i>Pandion haliaetus</i>	PG11 Illegal shooting/killing	M	Population maintenance	1 individual
<i>Pelecanus crispus</i>	PG11 Illegal shooting/killing	M	Habitat maintenance	3,655 ha
<i>Pelecanus onocrotalus</i>	PG11 Illegal shooting/killing	M	Habitat maintenance	3,655 ha
<i>Phalaropus lobatus</i>	PA22 Drainage for use as agricultural land	H	Habitat maintenance	3,655 ha
	PG22 Abandonment of aquaculture	H		
<i>Phalacrocorax pygmaeus</i>	PG11 Illegal shooting/killing	M	Population maintenance	Min. 500 individuals
	PA22 Drainage for use as agricultural land	H	Habitat maintenance	3,655 ha
	PG22 Abandonment of aquaculture	H		
	PA09 Burning for agriculture	M	Habitat maintenance	399.94 ha ¹⁰⁴
<i>Philomachus pugnax</i>	PG11 Illegal shooting/killing	M	Habitat maintenance	3,655 ha
	PA22 Drainage for use as agricultural land	H		
	PG22 Abandonment of aquaculture	H		
<i>Phoenicopterus ruber</i>	PG11 Illegal shooting/killing	M	Population maintenance	10 individuals
	PA22 Drainage for use as agricultural land	H	Habitat maintenance	3,655 ha
	PG22 Abandonment of aquaculture	H		
<i>Platalea leucorodia</i>	PA09 Burning for agriculture	M	Habitat maintenance	399.94 ha ¹⁰⁵
	PA22 Drainage for use as agricultural land	H	Habitat maintenance	3,655 ha
	PG22 Abandonment of aquaculture	H		
<i>Plegadis falcinellus</i>	PA22 Drainage for use as agricultural land	M	Habitat maintenance	3,655 ha
	PG22 Abandonment of aquaculture	M	Habitat maintenance	
<i>Pluvialis apricaria</i>	PA21 Abstraction of water for agriculture	H	Habitat maintenance	3,655 ha
	PG22 Abandonment of aquaculture	H		
<i>Porphyrio porphyrio</i>	PA09 Burning for agriculture	M	Population maintenance	1–3 individuals
			Habitat maintenance	399.94 ha ¹⁰⁶
<i>Porzana porzana</i>	PA09 Burning for agriculture	M	Habitat maintenance	399.94 ha
	PA22 Drainage for use as agricultural land	M	Habitat maintenance	3,655 ha
<i>Porzana parva</i>	PA09 Burning for agriculture	M	Habitat maintenance	399.94 ha
	PA22 Drainage for use as agricultural land	M	Habitat maintenance	3,655 ha
<i>Recurvirostra avosetta</i>	PG11 Illegal shooting/killing	M	Habitat maintenance	3,655 ha
	PA22 Drainage for use as agricultural land	H		

¹⁰⁴ Herbaceous wetland.

¹⁰⁵ Herbaceous wetland.

¹⁰⁶ Herbaceous wetland.

	PG22 Abandonment of aquaculture	H		
Tadorna ferruginea	PG11 Illegal shooting/killing	M	Population increase	10–15 ind.
	PA22 Drainage for use as agricultural land	H	Habitat maintenance	3,655 ha
	PG22 Abandonment of aquaculture	H		
Tringa glareola	PA22 Drainage for use as agricultural land	H	Habitat maintenance	3,655 ha
	PG22 Abandonment of aquaculture	H		
Xenus cinereus	PG11 Illegal shooting/killing	M	Habitat maintenance	3,655 ha
	PA22 Drainage for use as agricultural land	H		
	PG22 Abandonment of aquaculture	H		

Source: Developed by kartECO for the World Bank.

As presented in Table 21, the most significant identified conservation objectives are (a) to improve the overall degree of conservation of their habitat and (b) to maintain the population of target species. The main threat to birds is their habitat loss, degradation, or fragmentation as a result of drainage of the water bodies and permanent conversion into cropland, burning of the reeds, or grazing, which is likely to cause mortality of ground-nesting waterbirds (for example, *Burhinus oedicephalus*, *Glareola pratensis*, *Hoplopterus spinosus*, *Himantopus himantopus*) through trampling of nests and chicks. For example, stone curlews (*Burhinus oedicephalus*) which breed in semidesert patches with scattered shrubs are more susceptible to this threat because their nesting grounds overlap with areas used for livestock grazing.

For the latter and in the absence of proper management, and in response to that, a Reed Management Plan is included in the Action Plan.

The permanent drainage of water bodies is driven by economic factors that render it economically disadvantageous for the owners to maintain and manage the water ponds for commercial fishing. This includes various reasons but primarily the cost and procedures of water use in light of the recent legal act adopted by the Government of Armenia governing the water use permit.¹⁰⁷ Consequently, water bodies vital for bird habitats may be drained or altered, leading to habitat loss and fragmentation, which can have detrimental effects on bird populations. Hunting waterbirds is another predominant threat due to the site being part of the PHL and partly due to the conflict of interests with the fish farming.

Mammals

Considering the results of the conservation degree assessment of target mammals in Tables 16 and 17, the pressures and threats are analyzed in Table 22 and the respective management measures proposed.

The biodiversity information used to assess the conservation objectives and pressures was collected and provided by Astghik Ghazaryan. Regular monitoring has never been done in this territory. All data provided are expert data collected during research.

Table 22. Pressures and threats of target mammals

Species	Pressures and threats ¹⁰⁸	Importance ¹⁰⁹	Conservation goal	Conservation objectives ¹¹⁰
Lutra lutra	PJ10 Change of habitat location, size, and / or quality due to climate change	M	Population maintenance	Not available
	PL05 – Modification of hydrological flow	M	Population maintenance	
Miniopterus schreibersii	PJ10 Change of habitat location, size, and / or quality due to climate change	M	Population maintenance	Not available

¹⁰⁷ <https://www.irtek.am/views/act.aspx?aid=155582>

¹⁰⁸ <https://www.eea.europa.eu/en>

¹⁰⁹ L = low, M = medium, H = High importance.

¹¹⁰ The values were assigned based on the SDF - note that the current SDF does not include the revised list (2023–2024) of species and habitats and expert observation.

Species	Pressures and threats ¹⁰⁸	Importance ¹⁰⁹	Conservation goal	Conservation objectives ¹¹⁰
<i>Myotis blythii</i>	PJ10 Change of habitat location, size, and / or quality due to climate change	M	Population maintenance	Not available
<i>Myotis emarginatus</i>	PJ10 Change of habitat location, size, and / or quality due to climate change	M	Population maintenance	Not available
<i>Rhinolophus blasii</i>	PJ10 Change of habitat location, size, and / or quality due to climate change	M	Population maintenance	Not available
<i>Rhinolophus euryale</i>	PJ10 Change of habitat location, size, and / or quality due to climate change	M	Population maintenance	Not available
<i>Rhinolophus ferrumequinum</i>	PJ10 Change of habitat location, size, and / or quality due to climate change	M	Population maintenance	Not available
<i>Rhinolophus hipposideros</i>	PJ10 Change of habitat location, size, and / or quality due to climate change	M	Population maintenance	Not available

Source: Developed by kartECO for the World Bank.

According to Table 22, the conservation objectives aim to maintain the present population through specific control actions and limitations proposed in the Action Plan.

Assessment and evaluation of potential conflicts between the conservation of the natural environment and economic activities and its development potential

Natural habitat types

As mentioned above, the main threats to specific habitats could be overabstraction of water and changes in water level as well as abandoned ponds that have turned into brackish habitats and burning of reeds and overgrazing which can alter the seasonal habitats where birds nest.

Species

Fish

There are no major threats since Araks River is in the border patrol zone and fishing is prohibited. Nevertheless, if possible, an ichthyologist could study the target fish stock level in the future (included in the Action Plan).

Reptiles

For *Mauremys caspica* sp., it is important to examine and propose measures to avoid any possible and unnecessary actions by the pond owners that may provoke a reduction in the species population.

Birds

While the Armash site was originally developed as a commercial fishery, over time it has turned into an unintended sanctuary providing suitable nesting grounds for thousands of waterbirds amidst its diversity of aquatic landscapes. The most significant threat to both resident and migratory waterbirds in the site is the potential loss, degradation, and fragmentation of their crucial habitats, largely due to the **permanent** drainage of water ponds and transformation of the latter to cropland or their abandonment. Burning of reeds and intensive grazing of livestock inside the territory pose an additional threat to waterbirds; however, the permanent draining of fishponds for agriculture may leave a significant negative impact on waterbirds requiring a diversity of habitat for wading birds relying on shallow wetlands and those requiring deeper water habitats (dabbling/diving ducks, geese/swans, and so on). The Armash site's key feature is its ability to provide diverse habitats, largely due to specialized farm management practices. These practices involve maintaining proper water levels for commercial fish production as well as annually lowering water levels for fish harvesting which results in the formation of a highly uncommon shallow water habitat rich in food and serves as a vital stopover for thousands of flocks of waders during their spring and autumn migrations.

The permanent drainage of water ponds for substitute agriculture coupled with their abandonment may pose a direct threat to waterbird populations in Armash site because these actions reduce the availability of suitable habitats and food resources essential for their survival and reproduction. The economic factors driving permanent drainage of water ponds for agriculture often stem from the costs associated with maintaining ponds for commercial fishing. The recent legal act adopted by the Armenian Government governing water use

permits¹¹¹ further complicates the situation, as the act may render it economically disadvantageous for pond owners to continue maintaining them for commercial fishing. Consequently, they may opt to drain or alter the ponds, directly affecting bird habitats. Illegal/legal hunting of birds inside the territory exacerbates the survival of both nesting and migratory waterbirds due to the site being a PHL and partly due to the conflict of interests with fish farming.

Mammals

No specific threats and conflicts are identified.

¹¹¹ <https://www.irtek.am/views/act.aspx?aid=155582>

Implementation

Action Plan (aims and objectives) and priority actions

A set of recommendations, that is, conservation measures, for a 10-year duration is presented below. Based on the pressures and threats analyzed, a set of respective management measures are proposed below to address them. Conservation measures are selected from the EU latest release of the Final Conservation Measures List.¹¹²

Allocation and timetable per activity are presented in the Action Plan table in Annex B. The Action Plan - for each measure - includes the priority target species/habitats/sites to protect, a short description of the measure, the appropriate monitoring indicator, a yearly timetable on a 10-year projection, and the responsible party for implementing the proposed measure.

The analysis below is visualized through a complete set of maps included in Annex A, that is, Map 5. Pressures/Threats to protective objects and Map 6. Management measures.

Natural habitat types

As described above, the most significant threat in the site is the potential loss, degradation, and fragmentation of water habitats, largely due to the abstraction or drainage of water ponds and transformation of the latter to cropland or their abandonment. Thus, management efforts at the Armash site should prioritize maintaining proper water levels to support both commercial fish production and the unique shallow water habitats crucial for waterbirds. Table 23 presents the proposed management measures for habitat types in the project area and the anticipated effectiveness timespan.

Table 23. Proposed management measures for habitat types in project area

Habitat type	Pressures and threats ¹¹³	Management measures ¹¹⁴	Expected benefit (H-High, M-Moderate, L-Low) and Expected time frame of effectiveness (Short term, Medium term, or Long term)
C1.32 Free-floating vegetation of eutrophic waterbodies	PA22 - Drainage for use as agricultural land	MA13 - Manage agricultural drainage and water abstraction (incl.+ the restoration of drained or hydrologically altered habitats)	M/Medium term
	PG22 - Abandonment of aquaculture	MG09 - Maintain existing aquaculture	M/Medium term
C1.33 Rooted submerged vegetation of eutrophic waterbodies	PA22 - Drainage for use as agricultural land	MA13 - Manage agricultural drainage and water abstraction (incl. the restoration of drained or hydrologically altered habitats)	M/Medium term
	PG22 Abandonment of aquaculture	MG09 - Maintain existing aquaculture	M/Medium term
C1.4 Permanent dystrophic lakes, ponds, and pools	PA22 - Drainage for use as agricultural land	MA13 - Manage agricultural drainage and water abstraction (incl. the restoration of drained or hydrologically altered habitats)	M/Medium term
	PG22 - Abandonment of aquaculture	MG09 - Maintain existing aquaculture	M/Medium term
F9.3 Southern riparian galleries and thickets	PG09 - Management of fishing stocks and game	MG03 - Reducing the impact of (re-) stocking for fishing and hunting, of artificial feeding and predator control	M/Medium term

Source: Developed by kartECO for the World Bank.

¹¹² <https://cdr.eionet.europa.eu/help/natura2000/>.

¹¹³ Chapter "Overall evaluation and composition of elements"

¹¹⁴ <https://cdr.eionet.europa.eu/help/natura2000/>.

Species

Fish

There are no major threats since Araks River is in the border patrol zone and fishing is prohibited; thus, no specific management measures are required. Nevertheless - if possible - an ichthyologist could study the target fish stock level in the future (included in the Action Plan).

Reptiles

For *Mauremys caspica* sp. - due to its recorded preference for fish - it is important to provide awareness and knowledge to local people regarding the particular species and propose measures to avoid any possible and unnecessary actions by the pond owners which may provoke a reduction in the species population. Any particular management measures should be rediscussed and agreed with pond owners. Table 24 presents the proposed management measures for the target reptile species in the project area and the anticipated effectiveness timespan.

Birds

The official recognition of the Armash area as an Emerald site (also as IBA) and the development of the current MP is the most important step toward conservation and protection of waterbirds.

Table 24. Proposed management measures of target reptile species

Species	Pressures and threats ¹¹⁵	Management measures ¹¹⁶	Expected benefit (H-High, M-Moderate, L-Low) and Expected time frame of effectiveness (Short term, Medium term, or Long term)
Mauremys caspica	PG14 - Poisoning of animals (excluding lead poisoning)	MG04 - Control/eradication of illegal killing, fishing and harvesting of wild plants, fungi, and animals	M/Long-term
	PG11 - Illegal shooting/killing		
Testudo graeca	No pressures or threats	—	—

Source: Developed by kartECO for the World Bank.

Management efforts at the Armash site should prioritize the preservation and restoration of diverse habitats critical for waterbird populations. This includes maintaining proper water levels to support both commercial fish production and the unique shallow water habitats crucial for migrating waders.

The negative impacts on waterbird populations at the Armash site are triggered by a complex array of economic, legal, and environmental factors that extend beyond the immediate control of the site managers. These external influences significantly affect the overall integrity of the area and must be carefully considered when developing management strategies. From a nature conservation standpoint, it is crucial to assess the cost-effectiveness of proposed management actions while considering these external factors. This ensures that conservation efforts align with the objectives of the private area's management and are sustainable in the long term. Overall, addressing the identified threats through the proposed management measures is essential for ensuring the long-term viability of waterbird populations at the site.

Table 25. Proposed management measures of target birds

Species	Pressures and threats ¹¹⁷	Management measures ¹¹⁸	Expected benefit (H-High, M-Moderate, L-Low) and Expected time frame of effectiveness (Short term, Medium term, or Long term)
Anser erythropus	PG11 - Illegal shooting/killing	MG04 - Control/eradication of illegal killing, fishing, and harvesting of wild plants, fungi, and animals	H/Medium term

¹¹⁵ <https://www.eea.europa.eu/en>

¹¹⁶ <https://www.eea.europa.eu/en>

¹¹⁷ <https://www.eea.europa.eu/en>

¹¹⁸ <https://www.eea.europa.eu/en>

Species	Pressures and threats ¹¹⁷	Management measures ¹¹⁸	Expected benefit (H-High, M-Moderate, L-Low) and Expected time frame of effectiveness (Short term, Medium term, or Long term)
Ardeola ralloides	PA09 - Burning for agriculture	MA05 - Adapt mowing, grazing, and other equivalent agricultural activities (for example, burning)	H/Medium term
		MA06 - Stop mowing, grazing, and other equivalent agricultural activities, for example, burning (incl. restore or improve habitats)	H/Short term
Aythya nyroca	PG11 - Illegal shooting/killing	MG04 - Control/eradication of illegal killing, fishing, and harvesting of wild plants, fungi, and animals	H/Medium term
	PA22 - Drainage for use as agricultural land	MA13 - Manage agricultural drainage and water abstraction (incl. the restoration of drained or hydrologically altered habitats)	H/Medium term
	PG22 - Abandonment of aquaculture	MG09 - Maintain existing aquaculture	H/Medium term
Burhinus oedicnemus	PA07 - Intensive grazing or overgrazing by livestock	MA05 - Adapt mowing, grazing, and other equivalent agricultural activities (for example, burning)	M/Medium term
		MA06 - Stop mowing, grazing, and other equivalent agricultural activities, for example, burning (incl. restore or improve habitats)	H/Short term
Charadrius alexandrinus	PA22 - Drainage for use as agricultural land	MA13 - Manage agricultural drainage and water abstraction (incl. the restoration of drained or hydrologically altered habitats)	H/Long term
	PG22 - Abandonment of aquaculture		
Circus aeruginosus	PG11 - Illegal shooting/killing	MG04 - Control/eradication of illegal killing, fishing, and harvesting of wild plants, fungi, and animals	H/Medium term
Cygnus bewickii	PG11 - Illegal shooting/killing	MG04 - Control/eradication of illegal killing, fishing, and harvesting of wild plants, fungi, and animals	H/Medium term
Cygnus cygnus	PG11 - Illegal shooting/killing	MG04 - Control/eradication of illegal killing, fishing, and harvesting of wild plants, fungi, and animals	H/Medium term
Gallinago media	PG11 - Illegal shooting/killing	MG04 - Control/eradication of illegal killing, fishing, and harvesting of wild plants, fungi, and animals	H/Medium term
Glareola pratincola	PA07 - Intensive grazing or overgrazing by livestock	MA05 - Adapt mowing, grazing, and other equivalent agricultural activities (for example, burning)	M/Medium term
		MA06 - Stop mowing, grazing, and other equivalent agricultural activities, for example, burning (incl. restore or improve habitats)	H/Short term
Grus grus	PG11 - Illegal shooting/killing	MG04 - Control/eradication of illegal killing, fishing, and harvesting of wild plants, fungi, and animals	H/Medium term
Himantopus himantopus	PA07 - Intensive grazing or overgrazing by livestock	MA05 - Adapt mowing, grazing, and other equivalent agricultural activities (for example, burning)	M/Medium term
		MA06 - Stop mowing, grazing, and other equivalent agricultural activities, for example, burning (incl. restore or improve habitats)	H/Short term
Hoplopterus spinosus	PA07 - Intensive grazing or overgrazing by livestock	MA05 - Adapt mowing, grazing, and other equivalent agricultural activities (for example, burning)	M/Medium term
		MA06 - Stop mowing, grazing, and other equivalent agricultural activities, for example, burning (incl. restore or improve habitats)	H/Short term
Limosa lapponica	PA22 - Drainage for use as agricultural land		H/ Long term

Species	Pressures and threats ¹¹⁷	Management measures ¹¹⁸	Expected benefit (H-High, M-Moderate, L-Low) and Expected time frame of effectiveness (Short term, Medium term, or Long term)
	PG22 - Abandonment of aquaculture	MA13 - Manage agricultural drainage and water abstraction (incl. the restoration of drained or hydrologically altered habitats)	H/Long term
Marmaronetta angustirostris	PG11 - Illegal shooting/killing	MG04 - Control/eradication of illegal killing, fishing, and harvesting of wild plants, fungi, and animals	H/Medium term
	PA22 - Drainage for use as agricultural land	MA13 - Manage agricultural drainage and water abstraction (incl. the restoration of drained or hydrologically altered habitats)	H/Long term
	PG22 - Abandonment of aquaculture		H/Long term
Oxyura leucocephala	PG11 - Illegal shooting/killing	MG04 - Control/eradication of illegal killing, fishing and harvesting of wild plants, fungi and animals	H/Medium term
	PA22 - Drainage for use as agricultural land	MA13 - Manage agricultural drainage and water abstraction (incl. the restoration of drained or hydrologically altered habitats)	H/Long term
	PG22 - Abandonment of aquaculture		H/ Long term
Pandion haliaetus	PG11 - Illegal shooting/killing	MG04 - Control/eradication of illegal killing, fishing, and harvesting of wild plants, fungi, and animals	H/Medium term
Pelecanus crispus	PG11 - Illegal shooting/killing	MG04 - Control/eradication of illegal killing, fishing, and harvesting of wild plants, fungi, and animals	H/Medium term
Pelecanus onocrotalus	PG11 - Illegal shooting/killing	MG04 - Control/eradication of illegal killing, fishing, and harvesting of wild plants, fungi, and animals	H/Medium term
Phalacrocorax pygmaeus	PA09 - Burning for agriculture	MA05 - Adapt mowing, grazing, and other equivalent agricultural activities (for example, burning)	H/Medium term
	PG11 - Illegal shooting/killing	MG04 - Control/eradication of illegal killing, fishing, and harvesting of wild plants, fungi, and animals	H/Medium term
	PA22 - Drainage for use as agricultural land	MA13 - Manage agricultural drainage and water abstraction (incl. the restoration of drained or hydrologically altered habitats)	H/Long term
	PG22 - Abandonment of aquaculture		H/Long term
Phalaropus lobatus	PA22 - Drainage for use as agricultural land	MA13 - Manage agricultural drainage and water abstraction (incl. the restoration of drained or hydrologically altered habitats)	H/Long term
	PG22 - Abandonment of aquaculture		H/Long term
Philomachus pugnax	PG11 - Illegal shooting/killing	MG04 - Control/eradication of illegal killing, fishing and harvesting of wild plants, fungi and animals	H/Medium term
	PA22 - Drainage for use as agricultural land	MA13 - Manage agricultural drainage and water abstraction (incl. the restoration of drained or hydrologically altered habitats)	H/Long term
	PG22 - Abandonment of aquaculture		H/Long term
Phoenicopterus ruber	PG11 - Illegal shooting/killing	MG04 - Control/eradication of illegal killing, fishing, and harvesting of wild plants, fungi, and animals	H/Medium term
	PA22 - Drainage for use as agricultural land	MA13 - Manage agricultural drainage and water abstraction (incl. the restoration of drained or hydrologically altered habitats)	H/Long term
	PG22 - Abandonment of aquaculture		H/Long term
Platalea leucorodia	PA09 - Burning for agriculture	MA05 - Adapt mowing, grazing, and other equivalent agricultural activities (for example, burning)	M/Medium term
		MA06 - Stop mowing, grazing, and other equivalent agricultural activities, for example, burning (incl. restore or improve habitats)	H/Short term
	PA22 - Drainage for use as agricultural land		H/Long term

Species	Pressures and threats ¹¹⁷	Management measures ¹¹⁸	Expected benefit (H-High, M-Moderate, L-Low) and Expected time frame of effectiveness (Short term, Medium term, or Long term)
	PG22 - Abandonment of aquaculture	MA13 - Manage agricultural drainage and water abstraction (incl. the restoration of drained or hydrologically altered habitats)	H/Long term
Plegadis falcinellus	PA22 - Drainage for use as agricultural land	MA13 - Manage agricultural drainage and water abstraction (incl. the restoration of drained or hydrologically altered habitats)	H/Long term
	PG22 - Abandonment of aquaculture		H/Long term
Pluvialis apricaria	PA22 - Drainage for use as agricultural land	MA13 - Manage agricultural drainage and water abstraction (incl. the restoration of drained or hydrologically altered habitats)	H/Long term
	PG22 - Abandonment of aquaculture		H/Long term
Porphyrio porphyrio	PA09 - Burning for agriculture	MA05 - Adapt mowing, grazing, and other equivalent agricultural activities (for example, burning)	M/Medium term
		MA06 - Stop mowing, grazing, and other equivalent agricultural activities, for example, burning (incl. restore or improve habitats)	H/Short term
Porzana porzana	PA09 Burning for agriculture	MA05 - Adapt mowing, grazing, and other equivalent agricultural activities (for example, burning)	M/Medium term
		MA06 Stop mowing, grazing, and other equivalent agricultural activities, for example, burning (incl. restore or improve habitats)	H/Short term
	PA22 - Drainage for use as agricultural land	MA13 - Manage agricultural drainage and water abstraction (incl. the restoration of drained or hydrologically altered habitats)	H/Long term
	PG22 - Abandonment of aquaculture		H/Long term
Porzana parva	PA22 - Drainage for use as agricultural land	MA13 - Manage agricultural drainage and water abstraction (incl. the restoration of drained or hydrologically altered habitats)	H/Long term
	PG22 - Abandonment of aquaculture		
Recurvirostra avosetta	PG11 - Illegal shooting/killing	MG04 - Control/eradication of illegal killing, fishing, and harvesting of wild plants, fungi, and animals	H/Long term
	PA22 - Drainage for use as agricultural land	MA13 - Manage agricultural drainage and water abstraction (incl. the restoration of drained or hydrologically altered habitats)	M/Medium term
	PG22 - Abandonment of aquaculture		
Tadorna ferruginea	PG11 - Illegal shooting/killing	MG04 - Control/eradication of illegal killing, fishing, and harvesting of wild plants, fungi, and animals	H/Long term
	PA22 - Drainage for use as agricultural land	MA13 - Manage agricultural drainage and water abstraction (incl. the restoration of drained or hydrologically altered habitats)	H/Long term
	PG22 - Abandonment of aquaculture		H/Long term
Tringa glareola	PA22 - Drainage for use as agricultural land	MA13 - Manage agricultural drainage and water abstraction (incl. the restoration of drained or hydrologically altered habitats)	H/Long term
	PG22 - Abandonment of aquaculture		H/Long term
Xenus cinereus	PG11 - Illegal shooting/killing	MG04 - Control/eradication of illegal killing, fishing, and harvesting of wild plants, fungi, and animals	H/Long term
	PA22 - Drainage for use as agricultural land		H/Long term
	PG22 - Abandonment of aquaculture	MA13 - Manage agricultural drainage and water abstraction (incl. the restoration of drained or hydrologically altered habitats)	H/Long term

Source: Developed by kartECO for the World Bank.

Mammals

Table 26 presents the proposed management measures for the target mammals in the project area and the anticipated effectiveness timespan.

Table 26. Proposed management measures of target mammals

Species	Pressures and threats ¹¹⁹	Management measures	Expected benefit (H-High, M-Moderate, L-Low) and Expected time frame of effectiveness (Short term, Medium term, or Long term)
Lutra lutra	PJ10 - Change of habitat location, size, and / or quality due to climate change	MJ01, MJ02 - Implement climate change adaptation measures	M/Long term
	PL05 - Modification of hydrological flow	MK02 - Reduce impact of multi-purpose hydrological changes	M/Medium term
Miniopterus schreibersii	PJ10 - Change of habitat location, size, and / or quality due to climate change	MJ01, MJ02 - Implement climate change adaptation measures	M/Long term
Myotis blythii	PJ10 - Change of habitat location, size, and / or quality due to climate change	MJ01, MJ02 - Implement climate change adaptation measures	M/Long term
Myotis emarginatus	PJ10 - Change of habitat location, size, and / or quality due to climate change	MJ01, MJ02 - Implement climate change adaptation measures	M/Long term
Rhinolophus blasii	PJ10 - Change of habitat location, size, and / or quality due to climate change	MJ01, MJ02 - Implement climate change adaptation measures	M/Long term
Rhinolophus euryale	PJ10 - Change of habitat location, size, and / or quality due to climate change	MJ01, MJ02 - Implement climate change adaptation measures	M/Long term
Rhinolophus ferrumequinum	PJ10 - Change of habitat location, size, and / or quality due to climate change	MJ01, MJ02 - Implement climate change adaptation measures	M/Long term
Rhinolophus hipposideros	PJ10 - Change of habitat location, size, and / or quality due to climate change	MJ01, MJ02 - Implement climate change adaptation measures	M/Long term

Source: Developed by kartECO for the World Bank.

Resources required to carry out activities: Human, time, and finance

Allocation and timetable per activity are presented in the Action Plan table in Annex B. The Action Plan - for each measure - includes the priority target species/habitats/sites to protect, a short description of the measure, the appropriate monitoring indicator, a yearly timetable on a 10-year projection, and the responsible party for implementing the proposed measure.

Governing/Site management body

MoE will oversee the establishment and organization of the governing body responsible for managing the Emerald site. The body, based on communication, will include representatives from all stakeholder groups to ensure that a diverse range of perspectives and interests are considered in the decision-making process. This governance structure should enhance transparency and accountability. It can lead to more balanced decision-making but may also introduce challenges in reconciling conflicting interests. The governing body should have the necessary capacity and resources to effectively manage the site. Collaboration with other relevant government agencies, NGOs, and local authorities may be necessary. Operational rules for governing bodies will be defined by MoE and should accommodate changes in environmental conditions, societal needs, and emerging challenges. Regular reviews and updates of rules and management strategies are crucial for adaptive management. An example of international governance approach in protected area management is briefly described below.

¹¹⁹ <https://www.eea.europa.eu/en>

International approach in conservation governance

National and regional parks are the main examples of the multilevel management of protected areas. Specifically, these parks are supervised by institutions or organizations that fall under the auspices of the competent state ministries.¹²⁰ A recent international approach for the achievement of sustainable development and coordination of the interdependencies is multilevel governance. It is based on the cooperation of public and private actors involved in an institutional rule-making system. To implement a modern system of protected areas' governance, it is thus necessary to adopt an integrated approach. Furthermore, the establishment of an agency with scientific and coordinating competencies, aiming at the protection, management, and promotion of these areas, appears to be an institutional solution. This operational model targets the development of protected areas, with direct positive consequences for the population as a whole, including stakeholders and end users. The regulatory framework for the Environmental Agency as well as the authorities for the National System of Protected Areas will take initiatives and shape holistic proposals for their competences within the framework of a decentralized policy. Therefore, decision-making comes closer to the local population, while the implementation of these decisions addresses the needs of individuals and society. Effective local governance and abandonment of bureaucratic mechanisms are the main drivers to evolve protected areas into real hubs of sustainable development.

Investment financial resources

Investment financial resources option is through the central government and annual budget allocation. Additional financing could be through the following:

- Cash contribution, for example, controlled ecotourism entrance fees, payment for ecosystem services (PES), and noncash contribution, for example, park vehicles
- Corporate donations or other financial channels
- Any governmental movement toward community-driven initiatives, for example, establishing an association of local stakeholders that would support and search for funding.

In parallel and in line with the priorities and management activities proposed, MoE is willing to get engaged in European and international research and applied biodiversity projects from international funding institutions and grants, for example, UNDP, GIZ, EU, USAID, GEF, LIFE+, and Interreg–Territorial Cooperation.

Operational financial resources

Protected area financing has traditionally focused on meeting direct operational and management costs—in other words, funding the salaries, infrastructure, equipment, and maintenance required to establish and run protected areas.

A range of innovative financing mechanisms have been developed and implemented. However, the extent to which these mechanisms have improved the financial sustainability of protected areas or have made an appreciable contribution to biodiversity conservation remains less clear. MoE should identify lessons from recent experience on the key factors that influence the success of different financing mechanisms and provide recommendations for improving the future sustainability, efficiency, and effectiveness of protected area financing.¹²¹

Birdwatching—a potential source of income from community-driven initiatives

Armash area is a key local economic factor with a high number of fish farm operation units. Also, a significant part of the area (about 2,020 ha) is included in the PHL. It is recorded that hunters, under conditions of poor

¹²⁰ 1. National Park Service: <https://www.nps.gov/index.htm>. 2. Metsähallitus: <https://www.metsa.fi/en/nature-and-heritage/>. 3. Environmental Protection Agency: <http://www.epa.ie/>. 4. Getzner, M., and G Withalm. 2017. "Protected Areas and Regional Development: An Austrian Case Study." In *National Parks - Management and Conservation*, edited by M. N. Suratman, 384. IntechOpen. 5. Natural Environment and Climate Change Agency Greece, <https://necca.gov.gr/ofypeka/>.

¹²¹ Emerton, Lucy, Joshua Bishop, and Lee Thomas. 2006. *Sustainable Financing of Protected Areas: A Global Review of Challenges and Options*. <https://portals.iucn.org/library/efiles/documents/PAG-013.pdf>

control, have exceeded the quotas for permissible game birds and have also poached threatened species of ducks, waders, crakes, and herons.¹²² In addition, the hunting in this area causes lead pollution from bullets, which is a well-known threat for wetlands and waterbirds.

Recent development of birdwatching¹²³ in the area created an opportunity to compensate for the lost yield of fish and over several years changed the attitude of the fish farm's management. Since 2006, all efforts have been dedicated to the development of birdwatching in part of the Armash wetlands. The tourists (international and local naturalists, photographers, and visitors) are required to pay an entrance fee, which compensates for the loss of income from the yield. Such initiative may also lead to conservation practices by the pond owners such as:

- Banning shooting of fish-eating birds;
- Prohibiting the hunters' entrance;
- Clearing the shoreline from the reed to be only under the directions of the Reed Management Plan (included in the Action Plan); and
- Leaving the brackish marshes as they are.

Thus, the model becomes mutually beneficial for the fish farm management and the wildlife.

At present, bird watching infrastructures are not a necessity. The site according to the experts' opinion fully caters to the needs of birdwatching tourism for both international and national visitors. Nevertheless, considering future needs, infrastructure design and plan for birdwatching (such as towers and walkways) have been included in the Action Plan (Annex B).

Human resources

MoE will be responsible for allocating personnel for monitoring and MP implementation. Considering international best practices, most protected area organizations exhibit a number of common functions and structural components relating to planning and operational management of protected sites. Common organizational components are the following: 1. Planning conservation outreach and coordination Officer, 2. Management areas operations officer, 2.1 Conservation officers and 2.2 Rangers or other on-field day-to-day officers, and 3. Administrative and accounting office. The Management Board will mainly comprise local stakeholders. Finally, an Advisory Board is recommended to guide the Management Board and overall unit performance. A specific institutional reform study should be undertaken, which is beyond the scope of the current MP.

New Eco Patrol Law

So far, according to the new Eco Patrol Service Law,¹²⁴ the Eco Patrol Service has the rights to enforce control in specially protected nature areas (SPNAs) and forest economies. In the future, if the Eco Patrol Service becomes active in Armash site, an information and training event should be organized on the overall MP objectives, the site importance, and MP measures. Attention must be given to specific protection management measures of the Action Plan such as control/eradication of illegal killing.

Ecosystem services

An ecosystem services-based strengths, weaknesses, opportunities, and threats (SWOT) analysis is proposed to identify and quantify internal and external factors supporting or threatening the conservation effectiveness of protected areas¹²⁵ - thus included in the Action Plan. One of the study objectives will be to record the economy and ecosystem services in the site and the surrounding villages, deliver questionnaires to locals about their income sources, and provide a SWOT analysis and feasibility report recommendation on the

¹²² Aghababyan, K. et al. 2023. "Influence of Public Hunting Lands on Water Birds of Internationally Recognized Conservation Areas in Armenia." *GSC Advanced Research and Reviews* 17 (02): 087–103.

<https://gsconlinepress.com/journals/gscarr/sites/default/files/GSCARR-2023-0417.pdf>.

¹²³ Bird conservation supporting local fish farm in Armenia, 2022, <https://www.biodiversity.am/en/news/77-bird-conservation-supporting-local-fish-farm>

¹²⁴ <https://www.arlis.am/DocumentView.aspx?DocID=186692>.

¹²⁵ Scolozzi, R. et al. 2014. "Ecosystem Services-Based SWOT Analysis of Protected Areas for Conservation Strategies." *Journal of Environmental Management* 146: 543–551. <http://dx.doi.org/10.1016/j.jenvman.2014.05.040>.

ecosystem services of the site under the particular conservation management practices and measures. The following points could be covered by the study: what is the financial sustainability of the ESMP, how are the major ecosystem services (for example, birdwatching) and touristic activities influenced and in what timespan, what could be the financial incentives for ecosystem service changes under the MP scheme, how is the income positively influenced, and so on.

Synergies

Site managers and site management authority should continuously seek local and national (or international) synergies for conservation and sustainable operations as well as future awareness and management activities and opportunities, for example, Interreg Black Sea Basin – BSB - projects.

Monitoring, surveillance and observation recording

Monitoring conservation degree in relation to conservation objectives

The design and implementation of the degree monitoring procedure is proposed to be done by MoE together with the research institutions. Specific monitoring plans proposed for target species/habitats and a 10-year projection timetable are presented in the Action Plan table in Annex B.

Observation recording actions and their effects

- Monitoring of management interventions¹²⁶

No intervention management action is required.

- Routine and event monitoring

Specific monitoring plans proposed for target species/habitats and a 10-year projection timetable are presented in the Action Plan table in Annex B.

Plan review

The recommended validity period of the current plan is 10 years, after which the MP should be revised and updated. Nevertheless, since the current plan is being developed for the first time in Armenia, and a field biodiversity inventory of habitats and target species is planned, a midterm revision is required (in five years).

¹²⁶ 1. To assess if and how the implemented conservation measures are leading toward reaching conservation objectives for the site. 2. To assess the efficacy of employed conservation methods and approaches.

Communication, education, and awareness raising

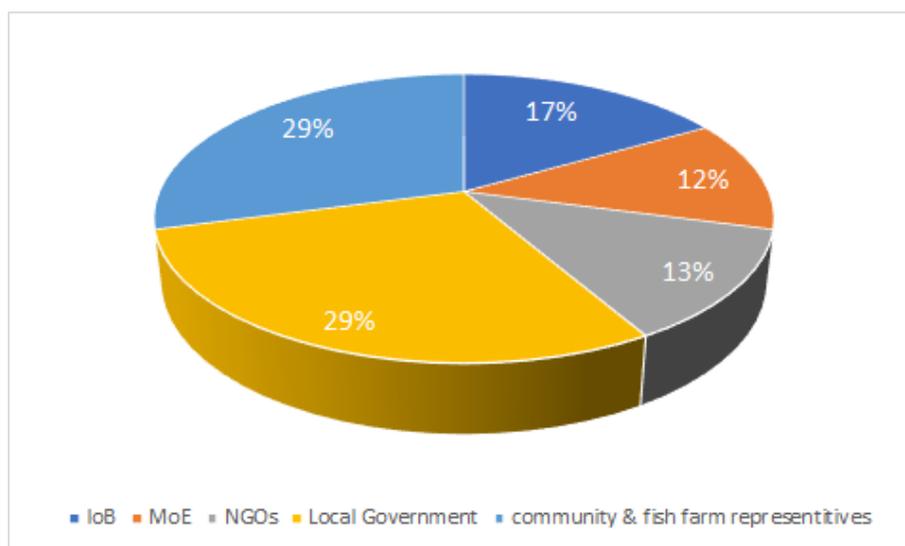
During the implementation of communication, education, and awareness raising, a stakeholder consultation meeting was undertaken in April 2024 with local stakeholders, for a broad and open public engagement. This event offered a valuable opportunity to relevant stakeholders, such as government officials, private sector representatives, and local communities, to be informed about the advancements of the Emerald Network in Armenia and to enhance their knowledge regarding the management of Emerald sites and new ESMP for the Armash site.

Overview of participants

A total of 24 persons participated in the event, from the following organizations:

- MoE (Hydrometeorology and Monitoring Center State Non-Commercial Organization [SNCO], Specially Protected Areas of Nature and Biodiversity Policy Department, BC Focal Point)
- Birdlinks NGO
- Nature Protection Union (NABU) Armenia
- Foundation for the Preservation of Wildlife and Cultural Assets (FPWC)
- Institute of Botany after the name A. Takhtajyan NAS RA
- Local administration of Ararat enlarged community
- Head of communities (Ararat, Armash, and Eraskh)
- Representatives of all target communities and fish farms (Ararat, Eraskh, Armash, Surenavan) (that are owners or rent fish farms).

Figure 17. Distribution of participants



Source: Developed by kartECO for the World Bank.

Objectives

The objectives of the event were to present the advancement of Emerald Network in Armenia and key points on the new MP for Armash site. In addition, a specific session was dedicated on sharing local stakeholders'

insights, concerns, and suggestions regarding the establishment of the Emerald site and the MP. The session was held in the meeting hall of the House of Culture of Ararat City and conducted by the project team.

Event Review

The meeting commenced with a welcome to all stakeholders and an introduction to the purpose of the meeting: to present and discuss the advancement of Emerald Network in Armenia and new MP for Armash site. The project team provided a detailed presentation of the project and Emerald Network, key components of the plan, including specific protected objects, conservation objectives, conservation measures, monitoring plan, and community engagement initiatives.

Figure 18. Photo from the event



Source: Photo by A. Aleksanyan.

Discussion and Q&A session overview

Stakeholders actively participated in the discussion, sharing their insights, concerns, and suggestions regarding various aspects of establishment of the Emerald site, its management, and planned conservation measures.

Topics of discussion included habitat and species conservation and management options, monitoring of activities, governance structure, stakeholder engagement, and the allocation of resources.

NGO representatives highlighted the following issues:

- **Hunting and shooting of birds:** This is a significant concern as it directly affects bird populations.
- **Grazing:** Grazing activities are often uncontrolled or poorly managed, which can disrupt feeding and nesting areas for certain bird species. Grazing can lead to habitat degradation by trampling nests and chicks of some ground-nesting waterbirds. Additionally, it can damage vegetation, alter landscape structure, and reduce food availability and sheltering habitat. As a result, some bird populations may experience declines due to the loss or degradation of their habitat.
- **Water management:** Problems of water use management and mismanagement of water resources.
- **Common reed burnings:** Burning of common reeds can alter the landscape and destroy important habitats for birds. Many bird species rely on reed beds for nesting and shelter, and their destruction can lead to population declines.

A list of issues - that should be considered about conservation measures effectiveness - was raised by fish farmers.

- **Drying up/Abandonment of fishponds due to changes in the legal field:** Fish farmers are facing financial burdens as new regulations require them to pay twice for water usage according to water meters. Other concerns were difficulties in installing the water meters in nonsecure areas. One large and one medium-size farm utilize underground water sources while the rest rely on surface water. No further information is available regarding water share and supply quantities consumed.
- **Impact of bird species on fish farming:** Fish farmers refuse claims of hunting on their farms, despite the fact that some bird species negatively affect fish farming by consuming fingerlings. They claimed that scaring and shooting to deter birds was better than hunting them.
- **Benefits of fish farming for the environment:** Fish farmers highlighted the environmental benefits of their operations, such as natural water cleaning processes and organic production methods. They also mentioned the historical context of establishing fish farms for soil cleaning due to soil salinity issues. Due to high salinity level after the fish farms cease operations, the land can only be utilized as pasture or arable land for a short time, typically one to two years.
- **Awareness of species diversity:** Fish farmers claim to have knowledge of flora and fauna, particularly the bird species diversity in the area.
- **Challenges in selling and exporting fish:** Fish farmers face difficulties in selling fish in local markets and find exporting unfeasible due to high costs, making their products uncompetitive internationally. However, they emphasize the importance of fish farming for ensuring food security in the country.
- **Common reed burnings:** Fish farmers attribute common reed burnings to third parties, indicating that they are not directly involved in such practices.

Local administration representatives mentioned the following issues:

- **Closure of fish farms due to financial reasons:** Fish farms may become unprofitable or face multiple penalty fines, leading owners to cease operations. There is no mechanism in place to prevent this, indicating a lack of regulatory support or intervention to sustain fish farming activities.
- **Challenges related to hunting:** Fish farms cannot completely avoid hunting activities as they are located in the officially recognized hunting area of Ararat Marz. For further information, refer to Figure 4.
- **Issues related to farm operation:** Various issues arise concerning the exploitation of fish farms, including challenges in obtaining water permits and discrepancies in cadastral values based on the community or land type to which the farm belongs.
- **Lack of administrative control over private lands:** The administration faces difficulties in controlling activities such as shooting, hunting, burning, or uncontrolled grazing on private lands which encompass fish farm areas. This indicates a limitation in regulatory oversight and enforcement on private properties.

Key points raised by stakeholders included the importance of balancing conservation efforts with socioeconomic development.

Participants expressed their willingness to support the establishment of an Emerald site and conservation measures, contingent upon the provision of compensations and benefits by MoE and other governmental bodies. This suggests that while there is general agreement on the importance of conservation efforts, participants also recognize the need for incentives or support to mitigate any potential negative impacts on their activities or livelihoods.

Figure 19. Photo from the event



Source: Photo by A. Aleksanyan.

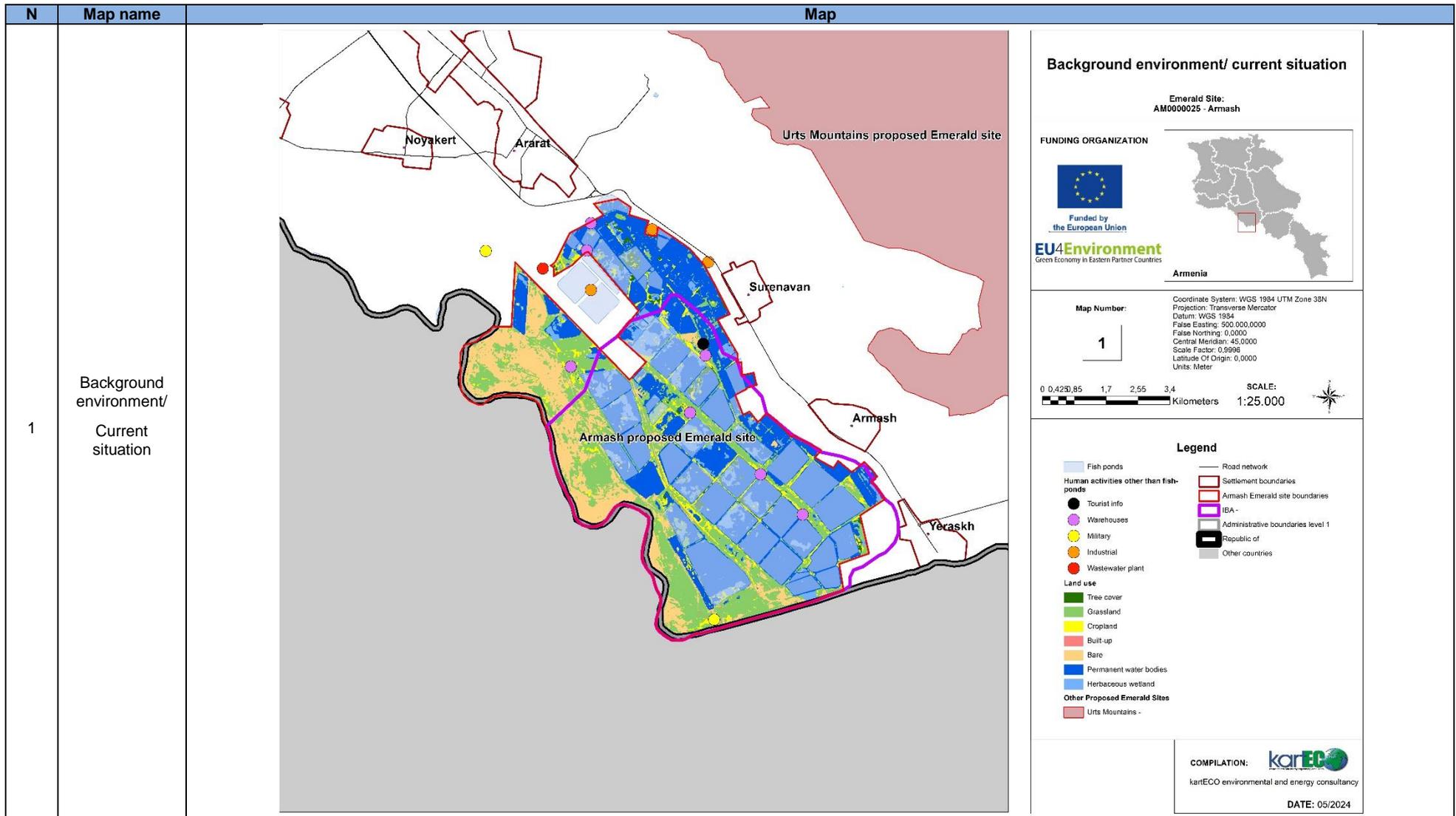
Follow-up and next steps

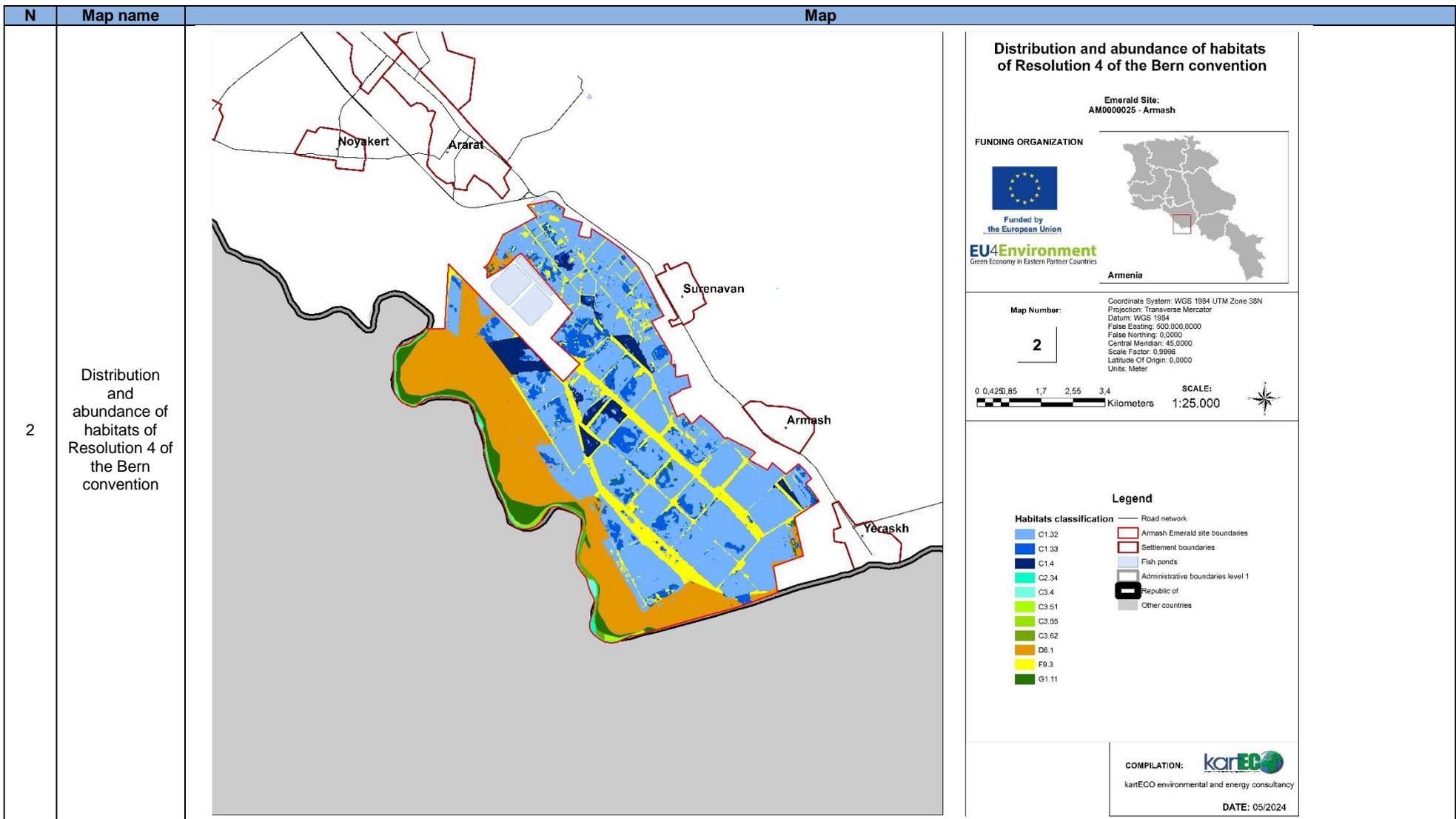
In response to the discussion and challenges of balancing conservation efforts with socioeconomic development, the Action Plan includes four site-specific actions:

1. Common reed management conservation in the area is important for target species, especially birds. A common reed integrated management program should be developed and followed to examine aspects such as timing and frequency of burns, cutting, and mowing and to employ adaptive management practices (for example, patch burning technique) to balance the needs of both birds and sustainable aquaculture operations. It is recommended that a specific reed management advisory group be established, which will be responsible for the reed management preparation and monitoring. The plan should consider target species and habitat conservation objectives and impacts without jeopardizing the fish production economy.
2. Achieving sustainable water use management and eliminating possible mismanagement of water resources in the area are beyond the scope of the current MP. Nevertheless, due to the water-oriented environment and high water sensitivity of many target species and habitats, the competent water management authority should be closely involved in the preparation of a holistic sustainable Water Management Plan for the particular project area. Also, specific financial incentives and other developing instruments and initiatives could be examined (for example, the ponds' operation provides a countable ecosystem services to salinization from anthropogenic sources). The goal is to create economically advantageous incentives and conditions for pond owners to maintain the former fish farming practices which create suitable habitats for birds. By this way the potential threat of drying up of fish farms due to financial burdens faced by the fishpond owners will be avoided.
3. Prepare a SWOT analysis of the ecosystem services of the Armash Emerald site and, among others, examine (a) compensation models for fish farmer owners and (b) financial initiatives for site area management, support, and development, for example, birdwatching infrastructure needs.
4. Regarding eliminating illegal hunting and shooting of birds, it is advised to engage a patrol/control service as soon as possible. In the future, if the Eco Patrol Service becomes active for Emerald sites such as in Armash, an information and training event should be organized on the overall MP objectives, the site importance, and MP measures. This has to be in close communication and coordination with fish farmer owners. For that reason, a specific set of meeting events should be organized frequently per year.

Details are presented in the Action Plan in Annex B. In addition, several communications, education, and awareness raising activities are also proposed in the Action Plan.

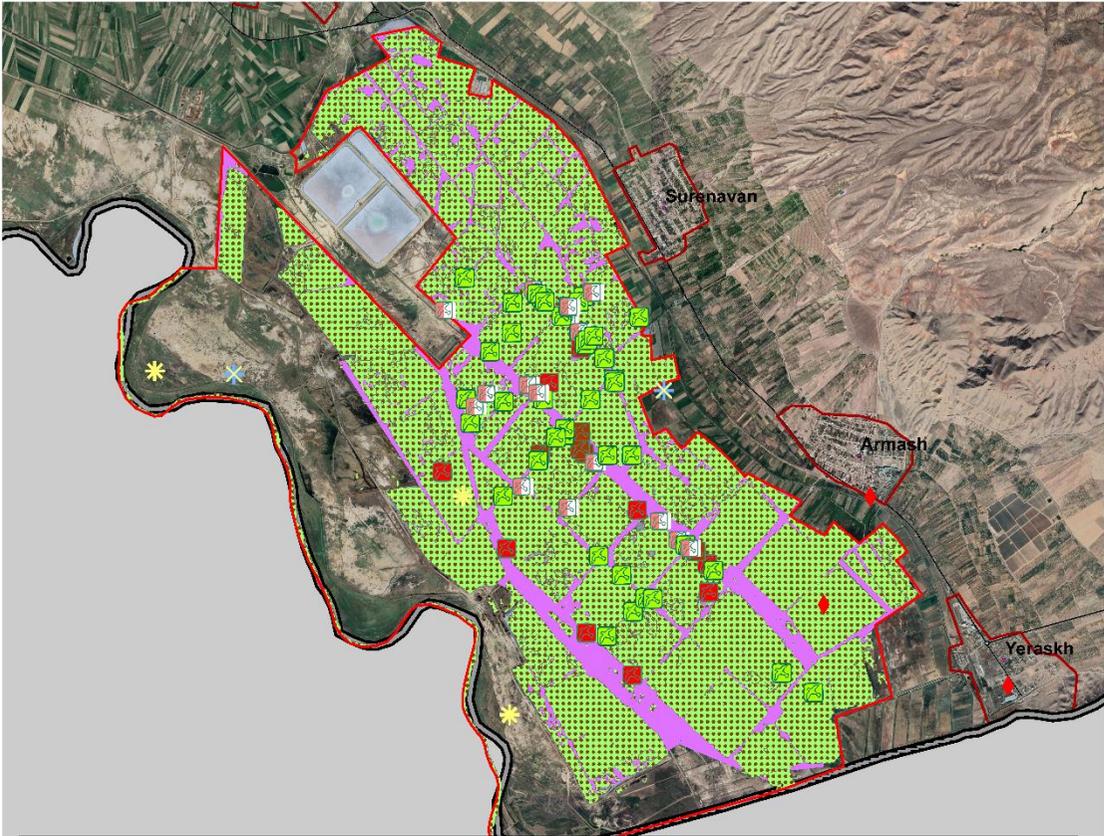
Annex A: Thematic maps





N	Map name	Map																									
3	Habitats and populations of important fauna species of Resolution 6 of the Bern Convention other than avifauna		<p style="text-align: center;">Important fauna species of Resolution 6 of the Bern convention other than avifauna</p> <p style="text-align: center;">Emerald Site: AM0000025 - Armash</p> <p>FUNDING ORGANIZATION</p>  <p style="text-align: center;">Funded by the European Union EU4Environment Green Economy in Eastern Partner Countries</p>  <p style="text-align: center;">Armenia</p> <p>Map Number: 3</p> <p>Coordinate System: WGS 1984 UTM Zone 38N Projection: Transverse Mercator Datum: WGS 1984 False Easting: 500,000,0000 False Northing: 0,0000 Central Meridian: 45,0000 Scale Factor: 0,9996 Latitude Of Origin: 0,0000 Units: Meter</p> <p>0 0,45 0,9 1,8 2,7 3,6 SCALE: 1:25.000 Kilometers</p> <p style="text-align: center;">Legend</p> <table border="0"> <tr> <td>Mammal species</td> <td>Fish species</td> </tr> <tr> <td> <i>Canis lupus</i></td> <td> <i>Aspius aspius</i></td> </tr> <tr> <td> <i>Lutra lutra</i></td> <td> <i>Barbus capito</i></td> </tr> <tr> <td> <i>Miniopterus schreibersii</i></td> <td> <i>Rhodeus sericeus amarus</i></td> </tr> <tr> <td> <i>Myotis blythii</i></td> <td> <i>Sabanejewia aurata</i></td> </tr> <tr> <td> <i>Myotis emarginatus</i></td> <td> Road network</td> </tr> <tr> <td> <i>Rhinolophus euryale</i></td> <td> Armash Emerald site boundaries</td> </tr> <tr> <td>Reptile species</td> <td> Settlement boundaries</td> </tr> <tr> <td> <i>Mauremys caspica</i></td> <td> Fish ponds</td> </tr> <tr> <td> <i>Testudo graeca</i></td> <td> Administrative boundaries level 1</td> </tr> <tr> <td></td> <td> Republic of</td> </tr> <tr> <td></td> <td> Other countries</td> </tr> </table> <p style="text-align: right;"> COMPILATION:  kartECO environmental and energy consultancy DATE: 05/2024 </p>	Mammal species	Fish species	<i>Canis lupus</i>	<i>Aspius aspius</i>	<i>Lutra lutra</i>	<i>Barbus capito</i>	<i>Miniopterus schreibersii</i>	<i>Rhodeus sericeus amarus</i>	<i>Myotis blythii</i>	<i>Sabanejewia aurata</i>	<i>Myotis emarginatus</i>	Road network	<i>Rhinolophus euryale</i>	Armash Emerald site boundaries	Reptile species	Settlement boundaries	<i>Mauremys caspica</i>	Fish ponds	<i>Testudo graeca</i>	Administrative boundaries level 1		Republic of		Other countries
Mammal species	Fish species																										
<i>Canis lupus</i>	<i>Aspius aspius</i>																										
<i>Lutra lutra</i>	<i>Barbus capito</i>																										
<i>Miniopterus schreibersii</i>	<i>Rhodeus sericeus amarus</i>																										
<i>Myotis blythii</i>	<i>Sabanejewia aurata</i>																										
<i>Myotis emarginatus</i>	Road network																										
<i>Rhinolophus euryale</i>	Armash Emerald site boundaries																										
Reptile species	Settlement boundaries																										
<i>Mauremys caspica</i>	Fish ponds																										
<i>Testudo graeca</i>	Administrative boundaries level 1																										
	Republic of																										
	Other countries																										

5 Pressures/Threats to protective objects



Legend

<p>Pressures/ Threats (Colourmap)</p> <ul style="list-style-type: none"> PA07 - PA09 PA22 PG09 PG11 - PG14 PG22 PJ10 PL05 	<p>Reptile species</p> <ul style="list-style-type: none"> Mauremys caspica <p>Avifauna species</p> <p>Name</p> <ul style="list-style-type: none"> Aythya nyroca, Charadrius alexandrinus, Limosa lapponica, Marmarometta angustirostris, Oxyura leucocephala, Phalaropus lobatus, Phalacrocorax pygmaeus, Philomachus pugnax, Phoenicopterus ruber, Plataleia leucorodia, Plegadis falcinellus, Pluvialis apricaria, Porzana porzana, Porzana parva, Recurvirostra avosetta, Tadorna ferruginea, Tringa glareola, Xenus cinereus Ardeola ralloides, Phalacrocorax pygmaeus, Plataleia leucorodia, Porphyrio porphyrio, Porzana porzana, Burhinus oedicnemus, Giarola pratincola, Himantopus himantopus, Hoplopterus spinosus 	<p>Mammal species</p> <ul style="list-style-type: none"> Myotis blythi, Myotis emarginatus, Miniopterus schreibersii, Rhinolophus blasii, Rhinolophus euryale, Rhinolophus ferrumequinum, Rhinolophus hipposideros (expected to have an impact on all species and habitats) Lutra lutra <p>Habitats classification</p> <ul style="list-style-type: none"> C1.32; C1.33; C1.4 F9.3 	<p>Other species</p> <ul style="list-style-type: none"> Anser erythropus, Aythya nyroca, Circus acroginuosus, Cygnus bewickii, Cygnus cygnus, Gallinago media, Grus grus, Marmarometta angustirostris, Oxyura leucocephala, Pandion haliaetus, Pelecanus crispus, Pelecanus oncorhinalis, Phalacrocorax pygmaeus, Philomachus pugnax, Phoenicopterus ruber, Recurvirostra avosetta, Tadorna ferruginea, Xenus cinereus Aythya nyroca, Charadrius alexandrinus, Limosa lapponica, Marmarometta angustirostris, Oxyura leucocephala, Phalaropus lobatus, Phalacrocorax pygmaeus, Philomachus pugnax, Phoenicopterus ruber, Plataleia leucorodia, Plegadis falcinellus, Pluvialis apricaria, Porzana porzana, Recurvirostra avosetta, Tadorna ferruginea, Tringa glareola, Xenus cinereus 	<ul style="list-style-type: none"> Road network Settlement boundaries Armash Emerald site boundaries Administrative boundaries level 1 Republic of Other countries
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Pressures/ Threats to protected objects

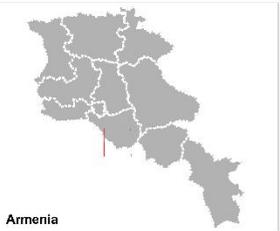
Emerald Site:
AM000025 - Armash

FUNDING ORGANIZATION



Funded by
the European Union

EU4Environment
Green Economy in Eastern Partner Countries



Armenia

Map Number:

5

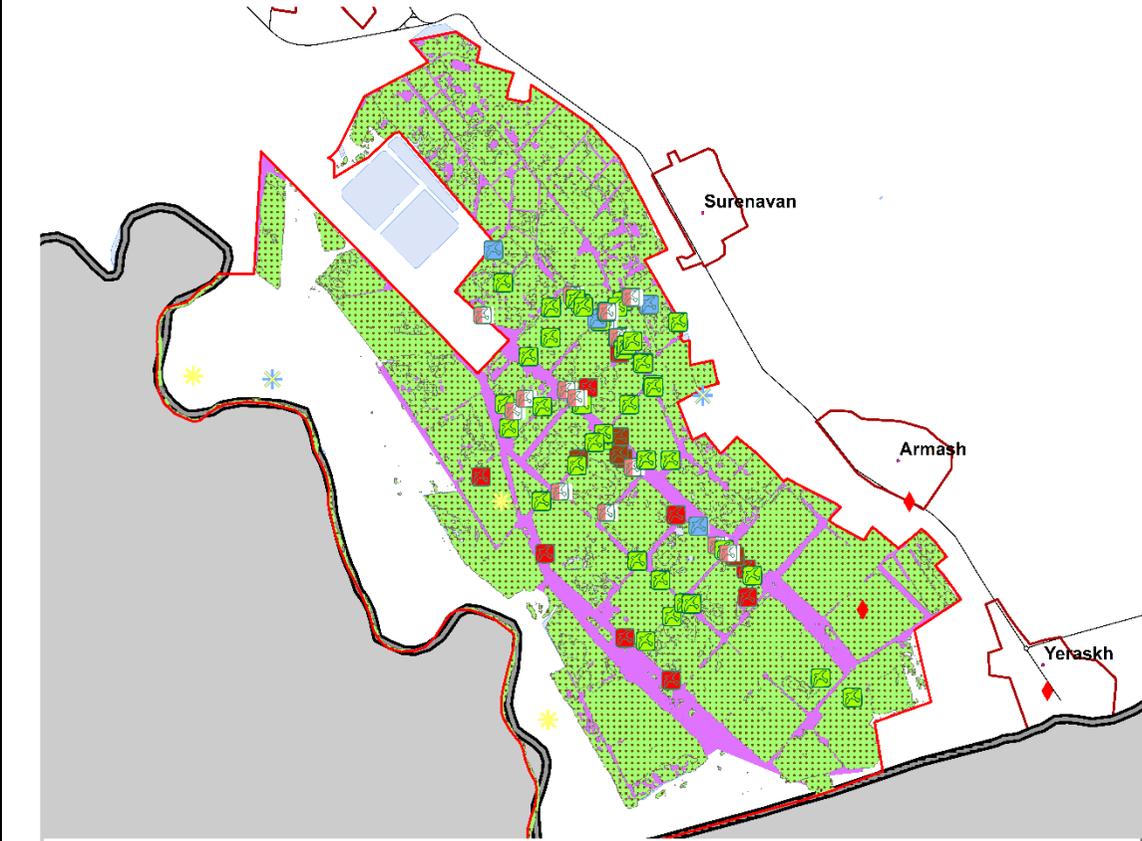
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Projection: Transverse Mercator
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False Northing: 0 0000
Central Meridian: 45 0000
Scale Factor: 0.9996
Latitude Of Origin: 0 0000
Units: Meter



Pressure/Threat (Code)	Map symbol (Color/Pattern)	Map symbol (Color/Pattern)	Pressure/Threat (Code)	Map symbol (Color/Pattern)
PA07 - PA09	Red outline	Red outline	PA22	Green grid
PA22	Green grid	Green grid	PG09	Purple outline
PG09	Purple outline	Purple outline	PG11 - PG14	Red outline
PG11 - PG14	Red outline	Red outline	PG22	Brown outline
PG22	Brown outline	Brown outline	PJ10	Blue outline
PJ10	Blue outline	Blue outline	PL05	Yellow outline
PL05	Yellow outline	Yellow outline		

COMPILATION: **karECO**
karECO environmental and energy consultancy
DATE: 07/2024

6 Management measures



Legend

Management Measures (Colourmap)

- MA05 Reptile species
- MA06
- MA13
- MG03
- MG04
- MG09
- MJ01 - MJ02
- MK02

Avifauna species

Name

- Aythya nyroca, Chamaea alexandrinus, Limosa lapponica, Marmaronetta angustirostris, Oxymycterus leucocephala, Phalaropus pygmaeus, Phalaropus lobatus, Phalaropus pugnax, Phoenicopus ruber, Platalea leucorodia, Plegadis falcinellus, Pluvialis apricaria, Porzana porzana, Porzana parva, Recurvirostra avosetta, Tadorna ferruginea, Tringa glareola, Xenus cinereus
- Ardeola ralloides, Burhinus oedionemus, Clarsia brachyole, Himantopus himantopus, Hoplopterus spinosus, Phalaropus pygmaeus, Platalea leucorodia, Porphyrio porphyrio, Porzana porzana

Reptile species

- Msauremys caspica

Mammal species

Species

- Miniopterus schreibersii, Myotis blythii, Myotis emarginatus, Rhinolophus blasii, Rhinolophus euryale, Rhinolophus ferrumequinum, Rhinolophus hipposideros
- Lutra lutra

Habitats classification

- C1.32; C1.33; C1.4
- F9.3

All target bird species

Other symbols:

- Road network
- Settlement boundaries
- Armash Emerald site boundaries
- Administrative boundaries level 1
- Republic of
- Other countries

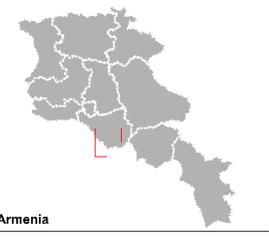
Management measures

Emerald Site:
AM0000025 - Armash

FUNDING ORGANIZATION



EU4Environment
Green Economy in Eastern Partner Countries



Map Number:

6

Coordinate System: WGS 1994 UTM Zone 38N
Projection: Transverse Mercator
Datum: WGS 1984
False Easting: 500,000,000
False Northing: 0,0000
Central Meridian: 45,0000
Scale Factor: 0,9996
Latitude Of Origin: 0,0000
Units: Meter



Code	With priority on the following target areas: types/spaces/subhabitats	With priority on the following target areas: types/spaces/subhabitats
MA05	Reptile species	Reptile species
MA06	Reptile species	Reptile species
MA13	Reptile species	Reptile species
MG03	Reptile species	Reptile species
MG04	Reptile species	Reptile species
MG09	Reptile species	Reptile species
MJ01 - MJ02	Reptile species	Reptile species
MK02	Reptile species	Reptile species

COMPILATION:

karECO environmental and energy consultancy

DATE: 07/2024

Annex B: Action plan framework with allocated activities per year

Ref code	Measure code (MXX is from EU lists ¹²⁷)	With priority on the following target area types/species/habitats/sites	Short description of measure ¹²⁸	Monitoring Indicator	Period/Year 2024–2034	Responsible
ACTIONS FOR PROTECTION AND MANAGEMENT						
1-0	Action Plan implementation outcome	<i>All-HORIZONTAL</i>	Overall outcome indicators of the Action Plan Implementation and need assessment of adaptations	Conservation goals of habitat and species (Tables 18, 19, 20, 21, 22)	The values of 2024 will be assessed based on the results of the next midterm report	MoE
1-1	MA05 - Adapt mowing, grazing, and other equivalent agricultural activities (for example, burning)	Birds <i>Ardeola ralloides, Burhinus oedicnemus, Glareola pratincole, Himantopus himantopus, Hoplopterus spinosus, Phalacrocorax pygmaeus, Platalea leucorodia, Porphyrio porphyrio, Porzana porzana</i>	Adapting the frequency, methods used, and/or the timing of mowing/cutting of grasslands or of grazing by livestock to maintain/improve habitats or to avoid damage to species (for example, nesting birds). This also includes the adaptation and management of other equivalent activities (for example, burning). Includes, for example, converting from intensively managed grassland to more extensive or reducing trampling by livestock. Specific measures should be implemented also in accordance with the recommendations of the Reed Management Plan (see point 4-2 for details)	The area concerned is Grassland and Herbaceous wetland totaling 1,692 ha (see Table 5, Figure 6) Indicator species: <i>Burhinus oedicnemus</i> (1 ind.) <i>Glareola pratincole</i> (min. 10 ind.), <i>Himantopus himantopus</i> (min. 25 ind.), <i>Hoplopterus spinosus</i> (2 ind.), <i>Platalea leucorodia</i> (5 ind.), <i>Porphyrio porphyrio</i> (2 pairs), <i>Recurvirostra avosetta</i>	In accordance with the recommendations of the Reed Management Plan of the Armash Emerald site (see point 4-2 for details) Mar–June each year for spring migrants and breeding populations; Sep–Oct for autumn migrants and Jan for winter visitors	MoE - Assess possible integration with the new Eco Patrol Service ¹²⁹ if it becomes active in the future Academia
1-2	MA06 - Stop mowing, grazing, and other equivalent agricultural activities, for example, burning (incl. restore or improve habitats)	Birds <i>Ardeola ralloides, Burhinus oedicnemus, Glareola pratincole, Himantopus himantopus, Hoplopterus spinosus, Platalea leucorodia, Porphyrio porphyrio, Porzana porzana</i>	Stopping (or avoiding) the mowing or cutting of grasslands or grazing by livestock to restore or improve habitats or to avoid damage to species (for example, nesting birds); stopping (or avoiding) other equivalent activities. Specific measures should be implemented also in accordance with the recommendations of the Reed	The area concerned is Grassland and Herbaceous wetland totaling 1,692 ha (see Table 5, Figure 6) Same as above	In accordance with the recommendations of the Reed Management Plan of the Armash Emerald site (see point 4-2 for details)	MoE - Assess possible integration with the new Eco Patrol Service ¹³⁰ if it becomes active in the future Academia

¹²⁷ <https://c1-0-5dr.eionet.europa.eu/help/natura2000/>

¹²⁸ <https://cdr.eionet.europa.eu/help/natura2000/>

¹²⁹ <https://www.arlis.am/DocumentView.aspx?DocID=186692>

¹³⁰ <https://www.arlis.am/DocumentView.aspx?DocID=186692>

Ref code	Measure code (MXX is from EU lists ¹²⁷)	With priority on the following target area types/species/habitats/sites	Short description of measure ¹²⁸	Monitoring Indicator	Period/Year 2024–2034	Responsible
			Management Plan (see point 4-2 for details).			
1-3	MA13 - Manage agricultural drainage and water abstraction (incl. the restoration of drained or hydrologically altered habitats)	<p>Habitats</p> <p>C1.32 - Free-floating vegetation of eutrophic waterbodies</p> <p>C1.33 - Rooted submerged vegetation of eutrophic waterbodies</p> <p>C1.4 - Permanent dystrophic lakes, ponds, and pools</p> <p>Birds</p> <p><i>Aythya nyroca</i>, <i>Charadrius alexandrinus</i>, <i>Limosa lapponica</i>, <i>Marmaronetta angustirostris</i>, <i>Oxyura leucocephala</i>, <i>Phalacrocorax pygmaeus</i>, <i>Phalaropus lobatus</i>, <i>Philomachus pugnax</i>, <i>Phoenicopterus ruber</i>, <i>Platalea leucorodia</i>, <i>Plegadis falcinellus</i>, <i>Pluvialis apricaria</i>, <i>Porzana porzana</i>, <i>Porzana parva</i>, <i>Recurvirostra avosetta</i>, <i>Tadorna ferruginea</i>, <i>Tringa glareola</i>, <i>Xenus cinereus</i></p>	<p>Managing drainage and irrigation operations and infrastructures (such as surface and groundwater abstraction, construction and operation of dams, or altering of hydrological flow of rivers) as well as managing or restoring the hydrological regime of drained agricultural areas (for example, restoration of hydrological regimes of drained peatlands, hydrologically altered wetlands, and freshwater habitats in agricultural areas). The management of drainage and irrigation can include the possible cessation of these activities. This measure also includes restoring other freshwater habitats or wetlands affected by changes of hydrological functioning through activities such as building dams or surface water abstraction for agriculture. Specific measures should be implemented in accordance with the recommendations of the Sustainable Water Management Plan (see point 4-3 for details).</p>	<p>Number of water and drainage management measures implemented</p> <p>Indicator species:</p> <p><i>Aythya nyroca</i> (at least 100), <i>Marmaronetta angustirostris</i> (2 pairs),</p> <p><i>Oxyura leucocephala</i> (10 ind.), <i>Phalacrocorax pygmaeus</i> (min. 400), <i>Philomachus pugnax</i> (>50 ind.),</p> <p><i>Platalea leucorodia</i> (5 ind.),</p> <p><i>Recurvirostra avosetta</i> (10 ind.)</p>	<p>In accordance with the recommendations of the Sustainable Water Management Plan of the Armash Emerald site (see point 4-3 for details)</p> <p>Mar–June for spring migrants and breeding populations;</p> <p>Sep–Oct for autumn migrants</p> <p>Jan for winter populations</p>	<p>MoE and Water Committee - Assess possible integration with the new Eco Patrol Service¹³¹ if it becomes active in the future</p> <p>Academia</p>
1-4	MG03 Reducing the impact of (re-) stocking for fishing and hunting, of artificial feeding and predator control	<p>Habitats</p> <p>F9.3 - Southern riparian galleries and thickets</p>	<p>Reducing the impacts caused by (re-) stocking fish and game species, artificial game feeding, culling of possible predators, or competitors of game species (illegal persecution of predators such as raptor persecution should be reported under MG04) and reducing the impact of other similar activities related to management of game and fishing stocks.</p>	<p>Fishpond operation area extension—total area concerned is 670.49 ha. Fishponds' area is approximately 2,952 ha.</p>	<p>Whole period</p>	<p>MoE - Assess possible integration with the new Eco Patrol Service¹³² if it becomes active in the future</p>
1-5	MG04 - Control/eradication of illegal killing, fishing, and harvesting of	<p>Reptiles</p> <p><i>Mauremys caspica</i></p> <p>Birds</p>	<p>Controlling, through enforcement, the illegal killing, fishing, and harvesting of fish, shellfish, plant species, or fungi, including preventing the use of illegal</p>	<p>Number of illegal activities</p> <p>Any shot bird species</p>	<p>Whole period</p>	<p>MoE - Assess possible integration with the new Eco Patrol Service¹³³ if</p>

¹³¹ <https://www.arlis.am/DocumentView.aspx?DocID=186692>

¹³² <https://www.arlis.am/DocumentView.aspx?DocID=186692>

¹³³ <https://www.arlis.am/DocumentView.aspx?DocID=186692>

Ref code	Measure code (MXX is from EU lists ¹²⁷)	With priority on the following target area types/species/habitats/sites	Short description of measure ¹²⁸	Monitoring Indicator	Period/Year 2024–2034	Responsible
	wild plants, fungi, and animals	<i>Anser erythropus</i> , <i>Aythya nyroca</i> , <i>Circus aeruginosus</i> , <i>Cygnus bewickii</i> , <i>Cygnus cygnus</i> , <i>Gallinago media</i> , <i>Grus grus</i> , <i>Marmaronetta angustirostris</i> , <i>Oxyura leucocephala</i> , <i>Pandion haliaetus</i> , <i>Pelecanus crispus</i> , <i>Pelecanus onocrotalus</i> , <i>Phalacrocorax pygmaeus</i> , <i>Philomachus pugnax</i> , <i>Phoenicopterus ruber</i> , <i>Recurvirostra avosetta</i> , <i>Tadorna ferruginea</i> , <i>Xenus cinereus</i>	methods or the taking of protected species. Should be implemented in close cooperation with fishpond owners.			it becomes active in the future
1-6	MG09 - Maintain existing aquaculture	Habitats C1.32 - Free-floating vegetation of eutrophic waterbodies C1.33 - Rooted submerged vegetation of eutrophic waterbodies C1.4 - Permanent dystrophic lakes, ponds, and pools Birds All target bird species	Other measures to reduce the impact from aquaculture. such as those from the introduction of new species. Includes maintaining existing extensive aquaculture.	Number of water and drainage management measures implemented Indicator species: <i>Aythya nyroca</i> (at least 100), <i>Glareola pratincola</i> (10 ind.), <i>Marmaronetta angustirostris</i> (2 pairs), <i>Oxyura leucocephala</i> (10 ind.), <i>Pandion haliaetus</i> (1), <i>Phalacrocorax pygmaeus</i> (min. 400), <i>Philomachus pugnax</i> (>50 ind.), <i>Platalea leucorodia</i> (5 ind.), <i>Recurvirostra avosetta</i> (10 ind.)	In accordance with the recommendations of the Sustainable Water Management Plan of the Armash Emerald site (see point 4-3 for details) For birds: Mar–June for spring migrants and breeding populations Sep–Oct for autumn migrants Jan for winter populations	MoE - Assess possible integration with the new Eco Patrol Service ¹³⁴ if it becomes active in the future Academia
1-7	MJ01 and MJ02 - Implement climate change adaptation measures	Mammals <i>Lutra lutra</i> , <i>Miniopterus schreibersii</i> , <i>Myotis blythii</i> , <i>Myotis emarginatus</i> , <i>Rhinolophus blasii</i> , <i>Rhinolophus Euryale</i> , <i>Rhinolophus ferrumequinum</i> , <i>Rhinolophus hipposideros</i> (expected to have an impact on all species and habitats) Phenological shifts: early arrival and late departures of breeding and migratory birds, increasing number of wintering species	Adoption and implementation of general climate change mitigation measures. These are generally taken in a broader scale and not specifically for alleviating pressure on habitats and species. Therefore, this 'conservation measure' should only be noted when the main pressure is climate change and mitigation measures are being implemented.	Possible sensitive areas under climate change adaptation. The area concerned consists of Tree cover, Grassland, Permanent water bodies, Herbaceous wetland, and F9.3 Southern riparian galleries and thickets totaling approximately 5,075 ha (see Table 5, Figure 6)	Case specific	MoE - Assess possible integration with the new Eco Patrol Service ¹³⁵ if it becomes active in the future Academia

¹³⁴ <https://www.arlis.am/DocumentView.aspx?DocID=186692>

¹³⁵ <https://www.arlis.am/DocumentView.aspx?DocID=186692>

Ref code	Measure code (MXX is from EU lists ¹²⁷)	With priority on the following target area types/species/habitats/sites	Short description of measure ¹²⁸	Monitoring Indicator	Period/Year 2024–2034	Responsible
			Implementation of particular climate change adaptation measures to address specific pressures on habitats and species (for example, managing an interconnected network of habitats/protected areas to facilitate the adaptive dispersal of key species in the context of shifts in suitable 'climate envelopes').			
1-8	MK02 - Reduce impact of multi-purpose hydrological changes	Mammals <i>Lutra lutra</i>	Reducing the impact of landfilling, removal of sediments, canalization, water deviation, flooding regime modification, and other modifications of hydrological functioning or physical characteristics of water bodies, which cannot be easily associated with one of the categories above.	Number of water and drainage management measures implemented Indicator species: <i>Aythya nyroca</i> (at least 100), <i>Glareola pratincola</i> (10 ind.), <i>Marmaronetta angustirostris</i> (2 pairs), <i>Oxyura leucocephala</i> (10 ind.), <i>Pandion haliaetus</i> (1), <i>Phalacrocorax pygmaeus</i> (min. 400), <i>Philomachus pugnax</i> (>50 ind.), <i>Platalea leucorodia</i> (5 ind.), <i>Recurvirostra avosetta</i> (10 ind.)	In accordance with the recommendations of the Sustainable Water Management Plan of the Armash Emerald site (see point 4-3 for details) For birds: Mar–June for spring migrants and breeding populations; Sep–Oct for autumn migrants Jan for winter populations	MoE - Assess possible integration with the new Eco Patrol Service ¹³⁶ if it becomes active in the future Academia
ACTIONS FOR MONITORING AND REVIEW						
2-1	Field inventory and monitoring program	In the case of habitats, it is also important to consider using target species as indicators for future monitoring of the health of specific habitat. Some species are sufficient to be used as a representative indicator species in their respective habitats, for example, (a) birds requiring deep water habitats (>2 m): dabbling/diving ducks (Mallard - <i>Anas platyrhynchos</i> , Gadwall - <i>Mareca strepera</i> , Eurasian teal - <i>Anas crecca</i> : it is a year-round	Field inventory and monitoring program	Number of programs executed	Annually	MoE Academia

¹³⁶ <https://www.arlis.am/DocumentView.aspx?DocID=186692>

Ref code	Measure code (MXX is from EU lists ¹²⁷)	With priority on the following target area types/species/habitats/sites	Short description of measure ¹²⁸	Monitoring Indicator	Period/Year 2024–2034	Responsible
		resident bird. Others include Garganey - <i>Spatula querquedula</i> , Coot - <i>Fulica atra</i> , Grebes - <i>Tachybaptus ruficollis</i> , <i>Podiceps cristatus</i>) and (b) shallow wetlands such as mudflats or salt marsh which originate as a result of lowering water in ponds and used by shorebirds (<i>Charadrius hiaticula</i> , ¹³⁷ <i>Ch. dubius</i> , <i>Actitis hypoleucos</i> , <i>Tringa totanus</i> , <i>T. glareola</i> , <i>Calidris minuta</i>) and also used by other waterbirds as foraging ground.				
2-2	Field inventory and monitoring program	For all target species (apart from birds)	Field inventory and monitoring program	Number of programs executed	Annually	MoE Academia
2-3	Field inventory and monitoring program	For all target <i>birds</i>	(a) Monitor the population size and density of species (b) Research limiting factors in the breeding period	Total monitoring area	Annually	MoE Academia
2-4	Fish stock level study	<i>Lutra lutra</i>	There are no major threats since Araks River is in the border patrol zone and fishing is prohibited; thus no specific management measures are required. Nevertheless—if possible—an ichthyologist could study the target fish stock level in the future.	Number of programs executed	Once	MoE
2-5	Midterm MP review	—	—	—	Midterm (5th year)	MoE
ACTIONS FOR COMMUNICATION/AWARENESS						
3-1	Stimulate involvement in decision-making and/or in implementation processes	Local stakeholder, fish farm owners, and other businesses, for example, touristic. Should ensure participation of all stakeholders' representatives.	Local awareness campaigns	Number of open discussion events	Whole period	MoE and local administration
3-2	Conduct raising awareness campaigns	Local schools		Number of campaigns		
3-3	Develop specific educational program for capacity building to be applied at local schools					

¹³⁷ Migratory shorebirds are the great indicators of the properly managed rotational aquaculture: when ponds are periodically lowered and a new silty wetland originates, foraging shorebirds indicate the amount of available food resources and ecological health and functionality of rotational aquaculture.

Ref code	Measure code (MXX is from EU lists ¹²⁷)	With priority on the following target area types/species/habitats/sites	Short description of measure ¹²⁸	Monitoring Indicator	Period/Year 2024–2034	Responsible
3-4	Ecological summer camp for school kids					
3-5	Any type of Patrol or New Eco Patrol Service/Set of information and training events	Emerald site	<p>Once the Eco Patrol Service initiates in the project area (and during its activities), an information and training event should be organized on the overall MP objectives, the site importance and MP measures, possible challenges, and so on. Attention must be given to specific protection management measures of the Action Plan.</p> <p>It is also important that the Eco Patrol unit be in close communication and coordination with fish farmer owners. For that reason, a specific set of meeting events should be frequently organized per year.</p>	Number of events	Whole period	MoE - Assess possible integration with the new Eco Patrol Service if it becomes active in the future
OTHER						
4-1	SDF update	Emerald site	SDF update	-	-	MoE
4-2	Develop and implement a Reed Management Plan of the Armash Emerald site	Areas of reed (<i>Phragmites australis</i>) and target species	<p>Common reed management conservation in the area is important for target species, especially birds. A common reed integrated management program should be developed and followed to examine aspects such as timing and frequency of burns, cutting, mowing and to employ adaptive management practices (for example, patch burning technique) to balance the needs of both birds and sustainable aquaculture operations. A specific reed management advisory group is recommended to be established, which will be responsible for the reed management preparation and monitoring. The plan should consider target species and habitat conservation objectives and impacts without jeopardizing the fish production economy.</p> <p><i>Note:</i> Target species conservation and pond operational feasibility should be considered in the plan. All fish which are breeding in Armash fishponds are herbivorous, and they prefer young</p>	<p>Number of plan/program executed</p> <p>Indicator species: <i>Ardeola ralloides</i>, <i>Phalacrocorax pygmaeus</i>, <i>Platalea leucorodia</i>, <i>Porphyrio porphyrio</i>, <i>Porzana sp.</i></p>	Annually	MoE Academia

Ref code	Measure code (MXX is from EU lists ¹²⁷)	With priority on the following target area types/species/habitats/sites	Short description of measure ¹²⁸	Monitoring Indicator	Period/Year 2024–2034	Responsible
			shoots of <i>Phragmites</i> for food. So, reproducing new shoots and rise of population of <i>Phragmites</i> should consider target species conservation.			
4-3	Develop and implement a Sustainable Water Management Plan of the Armash Emerald site	Emerald site	Achieving sustainable water use management and eliminating possible mismanagement of water resources in the area is beyond the scope of the current MP. Nevertheless, due to the water-oriented environment and high-water sensitivity of many target species and habitats, the competent water management authority should be strongly engaged for the preparation of a holistic sustainable Water Management Plan for the particular project area. Also, specific financial incentives and other developing instruments and initiatives could also be examined (for example, the ponds operation provides a countable ecosystem services to salinization from anthropogenic sources). The goal is to create economically advantageous incentives and conditions for pond owners to maintain the former fish farming practices which create suitable habitats for birds. By this way the potential threat of drying up of fish farms due to financial burdens faced by the fishpond owners will be avoided.	Number of plan/program executed	Once	MoE Academia
4-4	SWOT analysis of the ecosystem services of the Armash Emerald site (socioeconomic study)	Emerald site	Prepare an ecosystem services SWOT analysis. The study objective will be to record the economy and ecosystem services within the site, deliver questionnaires to locals about their income sources, and provide a SWOT analysis recommendation on the ecosystem services of the site under the proposed and current conservation management scheme. Prepare a SWOT analysis of the ecosystem services of the Armash Emerald site and, among others, examine (a) compensation models for fish farmer owners and (b) financial	Number of plan/program executed	Once	MoE

Ref code	Measure code (MXX is from EU lists ¹²⁷)	With priority on the following target area types/species/habitats/sites	Short description of measure ¹²⁸	Monitoring Indicator	Period/Year 2024–2034	Responsible
			initiatives for site area management, support, and development, for example, birdwatching infrastructure needs.			
4-5	Birdwatching infrastructure and facilities' program	Emerald site	Birdwatching infrastructure layout design study and construction works. Can be also used during Eco Patrol.	Number of birdwatching/Eco patrol facilities installed/Number of tourists annually/Harmful and 'bad' tourism occurrences recorded	Whole period	MoE - Assess possible integration with the new Eco Patrol Service if it becomes active in the future
4-6	Soil and groundwater examination of heavy metals	Wastewater pond surrounding area (downstream)	Soil and groundwater examination of heavy metals downstream the old wastewater pool—remediation plan (if required).	Number of programs executed/Preserve acceptable water quality level	Once	MoE

Annex C: SDF for Emerald site AM0000005 'Khor Virap-Armash' area¹³⁸

12/13/23, 3:26 PM

Emerald AM0000003 dataforms

Database release: End2023 All countries --- 15/11/2023 ▼

SDF



EMERALD - STANDARD DATA FORM

For proposed Emerald Sites (Areas of Special Conservation Interest, ASCI), Candidate Emerald Sites and,

For Areas of Special Conservation Interest (ASCI = Emerald Sites)

SITE AM0000003
SITENAME "Khor Virap - Armash" area

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- [7. MAP OF THE SITE](#)

Print Standard Data Form

1. SITE IDENTIFICATION

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1.1 Type

C

1.2 Site code

AM0000003

1.3 Site name

"Khor Virap - Armash" area

1.4 First Compilation date

2008-07

1.5 Update date

2016-12

1.6 Respondent:

Name/Organisation: Ministry of Nature protection

Address:

<https://natura2000.eea.europa.eu/Emerald/SDF.aspx?site=AM0000003>

1/11

¹³⁸ <https://natura2000.eea.europa.eu/Emerald/SDF.aspx?site=AM0000003>

Email:	
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1.7 Site indication and designation / classification dates

Classification	Data
Date site proposed as ASCI (Emerald):	2008-07
Date site accepted as candidate ASCI (Emerald):	No data
Date site designated as ASCI (Emerald):	No data
Date site accepted as ASCI (Emerald):	No data
National legal reference of ASCI designation:	No data

2. SITE LOCATION

2.1 Site-centre location [decimal degrees]:

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Longitude	44.873300
Latitude	39.875000

2.2 Area [ha]

6998.2000

2.3 Marine area [%]

0.0000

2.4 Sitelength [km]:

0.00

2.5 Administrative region code and name

NUTS level 2 code	Region Name
AM02	Ararat marz

2.6 Biogeographical Region(s)

Anatolian	(100.00 %)
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3. ECOLOGICAL INFORMATION

3.1 Habitat types present on the site and site evaluation for them:[Back to top](#)

Resolution 4 Habitat type					Site assessment				
Code	PF	NP	Cover [ha]	Cave [number]	Data quality	A B C D	A B C		
						Representativity	Relative Surface	Conservation	Global
C1.32 f			0	0.00	M	A	B	C	C
C1.33 f			0	0.00	M	B	B	C	C
C1.3411 f			0	0.00	M	B	C	C	C
C1.4 f			0	0.00	M	A	B	C	C
C2.34 f			0	0.00	M	A	B	C	C
C3.4 f			0	0.00	P	A	C	C	C
C3.51 f			0	0.00	P	A	C	C	C
C3.55 f			0	0.00	M	C	C	C	C
C3.62 f			0	0.00	M	C	C	C	C
D2.3 f			0	0.00	M	B	B	C	C
D5.2 f			0	0.00	M	A	B	C	C
D6.1 f			0	0.00	M	A	B	C	C
E1.2 f			0	0.00	M	C	B	C	C
E1.3 f			0	0.00	M	C	B	C	C
E3.4 f			0	0.00	M	C	B	C	C
E5.4 f			0	0.00	P	C	C	C	C
E6.2 f			0	0.00	M	A	B	C	C
F6.8 f			0	0.00	M	A	C	C	C
F7 f			0	0.00	M	C	C	C	C
F9.3 f			0	0.00	P	B	B	C	C
G1.11 f			0	0.00	G	C	C	C	C

PF: for the habitat types that can have a non-priority as well as a priority form (6210, 7130, 9430) enter "X" in the column PF to indicate the priority form.

NP: in case that a habitat type no longer exists in the site enter: x (optional)

Cover: decimal values can be entered

Caves: included in habitat types A1.44, A3, A4 and H1: enter the number of caves if estimated surface is not available.

Data quality: G = "Good" (e.g. based on surveys); M = "Moderate" (e.g. based on partial data with some extrapolation); P = Poor (e.g. rough estimation)

3.2 Species listed in Resolution 6 and site evaluation for them

Species		Population in the site							Site assessment					
Group	Code	Scientific Name	S	NP	Type	Size	Unit	Cat.	Data quality	A B C D	A B C			
						Min	Max	C/R/V/P		Pop.	Con.	Iso.	Glo.	
B	A402	Accipiter brevipes			c	50	300	i	C		B	C	C	C
B	A293	Acrocephalus melanopogon			c	5	20	i	R		B	C	C	C
B	A229	Alcedo atthis			r	7	10	p	V		B	C	C	C
B	A042	Anser erythropus			c	1	5	i	V		A	C	C	C
B	A255	Anthus campestris			r	10	20	p	R		B	C	C	C
B	A090	Aquila clanga			w	1	5	i	V		A	C	C	C
B	A404	Aquila heliaca			c	1	10	i	V		B	C	C	C
B	A509	Aquila nipalensis			c	40	60	i	C		A	C	C	C
B	A089	Aquila pomarina			c	50	100	i	C		A	C	C	C
B	A024	Ardeola ralloides			p	500	1000	p	C		A	C	C	C
B	A222	Asio flammeus			c	1	5	i	V		B	C	C	C
F	1130	Aspius aspius			p	0	0		R		B	C	C	C
B	A060	Aythya nyroca			c	10	50	p	R		B	C	C	C
B	A021	Botaurus stellaris			w	5	10	i	R		A	C	C	C
B	A133	Burhinus oedicnemus			r	10	50	p	R		A	C	C	C
B	A403	Buteo rufinus			c	30	70	i	R		B	C	C	C
B	A243	Calandrella brachydactyla			r	30	50	p	C		A	C	C	C
M	1352	Canis lupus			p	0	0		C		C	C	C	C
B	A138	Charadrius alexandrinus			c	15	40	i	R		B	C	C	C
B	A417	Charadrius asiaticus			c	1	5	i	V		A	C	C	C
B	A516	Charadrius leschenaultii			c	1	5	i	V		A	C	C	C
B	A139	Charadrius morinellus			c	1	5	i	V		A	C	C	C
B	A196	Chlidonias hybridus			c	50	70	i	C		A	C	C	C
B	A198	Chlidonias leucopterus			c	300	500	i	C		A	C	C	C
B	A197	Chlidonias niger			c	1	10	i	R		B	C	C	C
B	A031	Ciconia ciconia			r	75	80	p	C		A	C	C	C
B	A030	Ciconia nigra			p	1	5	i	V		A	C	C	C
B	A080	Circaetus gallicus			c	10	20	i	R		C	C	C	C
B	A081	Circus aeruginosus			r	20	30	p	R		B	C	C	C
B	A082	Circus cyaneus			w	5	10	i	R		B	C	C	C
B	A083	Circus macrourus			c	10	30	i	R		B	C	C	C
B	A084	Circus pygargus			c	50	100	i	C		B	C	C	C
B	A231	Coracias garrulus			r	3	10	p	V		C	C	C	C

Species		Population in the site							Site assessment					
Group	Code	Scientific Name	S	NP	Type	Size	Unit	Cat.	Data quality	A B C D	A B C			
						Min	Max	C/R/V/P		Pop.	Con.	Iso.	Glo.	
B	A122	Crex crex			c	10	50	i	R		B	C	C	C
B	A037	Cygnus columbianus bewickii			w	20	80	i	C		A	C	C	C
B	A038	Cygnus cygnus			w	50	100	i	C		A	C	C	C
B	A429	Dendrocygus syriacus			p	1	2	p	V		A	C	C	C
B	A027	Egretta alba			w	50	100	i	C		A	C	C	C
B	A101	Falco biarmicus			c	1	5	i	V		A	C	C	C
B	A511	Falco cherrug			c	1	3	i	V		C	C	C	C
B	A098	Falco columbarius			c	1	5	i	V		B	C	C	C
B	A095	Falco naumanni			c	100	300	i	C		B	C	C	C
B	A103	Falco peregrinus			c	5	20	i	R		A	C	C	C
B	A097	Falco vespertinus			c	1	5	i	V		B	C	C	C
B	A154	Gallinago media			c	10	100	i	C		A	C	C	C
B	A189	Gelocheilidon nilotica			c	20	50	i	C		A	C	C	C
B	A515	Glareola nordmanni			c	1	10	i	V		A	C	C	C
B	A135	Glareola pratincola			c	5	10	i	R		A	C	C	C
B	A127	Grus grus			c	50	200	i	C		A	C	C	C
B	A075	Haliaeetus albicilla			c	1	3	i	V		A	C	C	C
B	A092	Hieraetus pennatus			c	20	50	i	C		B	C	C	C
B	A131	Himantopus himantopus			r	30	50	p	R		A	C	C	C
B	A418	Hoplopterus spinosus			c	1	5	i	V		A	C	C	C
B	A339	Lanius minor			p	300	600	i	C		B	C	C	C
B	A180	Larus genei			c	20	50	i	C		B	C	C	C
B	A176	Larus melanocephalus			c	1	10	i	V		A	C	C	C
B	A177	Larus minutus			w	10	30	i	R		B	C	C	C
B	A157	Limosa lapponica			c	1	10	i	R		B	C	C	C
F	6168	Luciobarbus comizo			p	0	0		R		B	C	C	C
B	A272	Luscinia svecica			c	100	500	i	C		C	C	C	C
M	1355	Lutra lutra			p	0	0		P		D	C	C	C
B	A057	Marmaronetta angustirostris			c	5	10	i	R		A	C	C	C
R	1222	Mauremys caspica			p	20	50	i	C		B	C	C	C
B	A242	Melanocorypha calandra			c	500	1000	i	C		A	C	C	C
P	2068	Microcnemum coralloides ssp. anatolicum			p	1000	5000	i	V		A	C	C	B

Species		Population in the site							Site assessment					
Group	Code	Scientific Name	S	NP	Type	Size	Unit	Cat.	Data quality	A B C D	A B C			
						Min	Max	C/R/V/P		Pop.	Con.	Iso.	Glo.	
B	A073	Milvus migrans			c	100	1000	i	C		B	C	C	C
M	1310	Miniopterus schreibersii			p	0	0		R		B	C	C	C
M	1307	Myotis blythii			p	0	0		P		D	C	C	C
M	1321	Myotis emarginatus			p	0	0		C		A	C	C	C
B	A077	Neophron percnopterus			c	5	20	i	R		A	C	C	C
B	A071	Oxyura leucocephala			p	5	10	p	V		A	C	C	C
B	A094	Pandion haliaetus			c	1	5	i	V		A	C	C	C
B	A020	Pelecanus crispus			c	5	20	p	R		B	C	C	C
B	A019	Pelecanus onocrotalus			c	50	100	i	C		B	C	C	C
B	A072	Pernis apivorus			c	200	1000	i	C		A	C	C	C
B	A170	Phalaropus lobatus			c	5	20	i	R		B	C	C	C
B	A151	Philomachus pugnax			c	50	200	i	C		A	C	C	C
B	A035	Phoenicopterus ruber			c	1	10	i	V		A	C	C	C
B	A140	Pluvialis apricaria			c	5	30	i	R		A	C	C	C
B	A124	Porphyrio porphyrio			p	10	30	p	R		A	C	C	C
B	A120	Porzana parva			c	5	20	i	P		A	C	C	C
B	A119	Porzana porzana			c	10	30	p	R		B	C	C	C
B	A121	Porzana pusilla			c	1	5	i	V		A	B	C	C
B	A132	Recurvirostra avosetta			r	3	10	p	V		B	C	C	C
M	1306	Rhinolophus blasii			p	0	0		R		A	C	C	C
M	1305	Rhinolophus euryale			p	0	0		R		B	C	C	C
M	1304	Rhinolophus ferrumequinum			p	0	0		P		D	C	C	C
M	1303	Rhinolophus hipposideros			p	0	0		P		D	C	C	C
F	5339	Rhodeus amarus			p	0	0		R		A	C	C	C
F	1146	Sabanejewia aurata			p	0	0		R		B	C	C	C
B	A195	Sterna albifrons			c	40	60	p	R		A	C	C	C
B	A190	Sterna caspia			c	1	5	i	V		A	C	C	C
B	A193	Sterna hirundo			c	20	50	i	C		A	C	C	B
B	A397	Tadorna ferruginea			c	10	20	i	R		A	C	C	C
R	1219	Testudo graeca			p	0	0		R		A	C	C	C
B	A166	Tringa glareola			c	50	150	i	C		A	C	C	C
B	A167	Xenus cinereus			c	1	10	i	R		A	C	C	C

Group: A =Amphibians, B = Birds, F = Fish, I = Invertebrates, M = Mammals, P =Plants, R = Reptiles
S: in case that the data on species are sensitive and therefore have to be blocked for any public access enter: yes
NP: in case that a species is no longer present in the site enter: x (optional)
Type: p=permanent, r=reproducing, c=concentration, w=wintering (for plant and non-migratory species use permanent)
Unit: i=Individuals, p=pairs or other units according to the standardised list of population units and codes, in accordance with Article 12 and 17 reporting under the Birds and Habitats Directives
Abundance categories (Cat.): C=common, R= rare, V=very rare, P=present - to fill if data quality are deficient (DD) or in addition to population size information
Data quality: G = 'Good' (e.g. based on surveys); M = 'Moderate' (e.g. based on partial data with some extrapolation); P = 'Poor' (e.g. rough estimation); DD = Data deficient (use this category only, if not even a rough estimation of the population size can be made, in this case the fields for population size can remain empty, but the field "Abundance categories" has to be filled in)

3.3 Other important species of flora and fauna

Species		Population in the site				Motivation								
Group	CODE	Scientific Name	S	NP	Size	Unit	Cat.	Species appendix			Other categories			
					Min	Max	C R V P	I	II	III	A	B	C	D
P		Amberboa sosnovskyi			15	100					X			
P		Amberboa turanica			15	100					X			
P		Astragalus paradoxus			2	15					X			
I		Ctenious persimilis			15	100						X		
I		Epiphanops dohrni			15	100						X		
P		Falcaria falcaroides			15	100					X			

Group: A =Amphibians, B = Birds, F = Fish, Fu = Fungi, I = Invertebrates, L = Lichens, M = Mammals, P =Plants, R = Reptiles

CODE: for Appendix I, II and III species the code provided in the Emerald reference portal should be used, in addition to the scientific name

S: in case that the data on species are sensitive and therefore have to be blocked for any public access enter: yes

NP: in case that a species is no longer present in the site enter: x (optional)

Unit: i = Individuals, p=pairs or other units according to the standardised list of population units and codes, in accordance with Article 12 and 17 reporting under the Birds and Habitats Directives.

Cat.: Abundance categories: C=common, R= rare, V=very rare, P=present

Motivation categories: I, II, III: Appendix Species (Bern Convention), A: National Red List data; B: Endemics; C: International Conventions; D: other reasons

4. SITE DESCRIPTION

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4.1 General site character

Habitat class	% Cover
N07	10.00
N09	40.00

N06	50.00
Total Habitat Cover	100

Other Site Characteristics

Semi-desert - 40% Marshes, ponds - 60%

4.2 Quality and importance

Site contributes substantially to the survival of more than 50 threatened included in the Armenian Red book species, more than 20 Caucasian endemic species, and more than 300 species listed in Appendices I and II of the convention; it supports more than 1000 species in this area; it represents an important area for many migratory species.

4.3 Threats, pressures and activities with impacts on the site

The most important impacts and activities with high effect on the site

Negative Impacts

Rank	Threats and pressures [code]	Pollution (optional) [code]	inside/outside [i o b]
L			o
M			b
M			o
L			o
M			i
H			b

Positive Impacts

Rank	Activities, management [code]	Pollution (optional) [code]	inside/outside [i o b]
M			i
L			i

Rank: H = high, M = medium, L = low

Pollution: N = Nitrogen input, P = Phosphor/Phosphate input, A = Acid input/acidification,

T = toxic inorganic chemicals, O = toxic organic chemicals, X = Mixed pollutions

i = inside, o = outside, b = both

4.4 Ownership

Type	[%]	
Public	National/Federal	40
	State/Province	0
	Local/Municipal	0
	Any Public	20
Joint or Co-Ownership	0	
Private	40	
Unknown	0	
sum	100	

4.5 Documentation

RA Governmental decision N 975-N, 25.01.07

5. SITE PROTECTION STATUS

5.1 Designation types at national and regional level:

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Code	Cover [%]
AM00	60.00
AM03	40.00

5.2 Relation of the described site with other sites:

Designated at national or regional level:

Type code	Site name	Type	Cover [%]
AM03	"Khor virap" state sanctuary	=	40.00

Designated at international level:

Type	Site name	Type	Cover [%]
Other	"Khor virap" state sanctuary	=	40.00

5.3 Site designation (optional)

To protect wetland ecosystems and typical species of plants and animals

6. SITE MANAGEMENT

6.1 Body(ies) responsible for the site management:

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Organisation:	Ministry of nature protection, Agency of bio-resources management
Address:	
Email:	

6.2 Management Plan(s):

An actual management plan does exist:

<input type="checkbox"/>	Yes
<input type="checkbox"/>	No, but in preparation
<input checked="" type="checkbox"/>	No

6.3 Conservation measures (optional)

No management plans elaborated

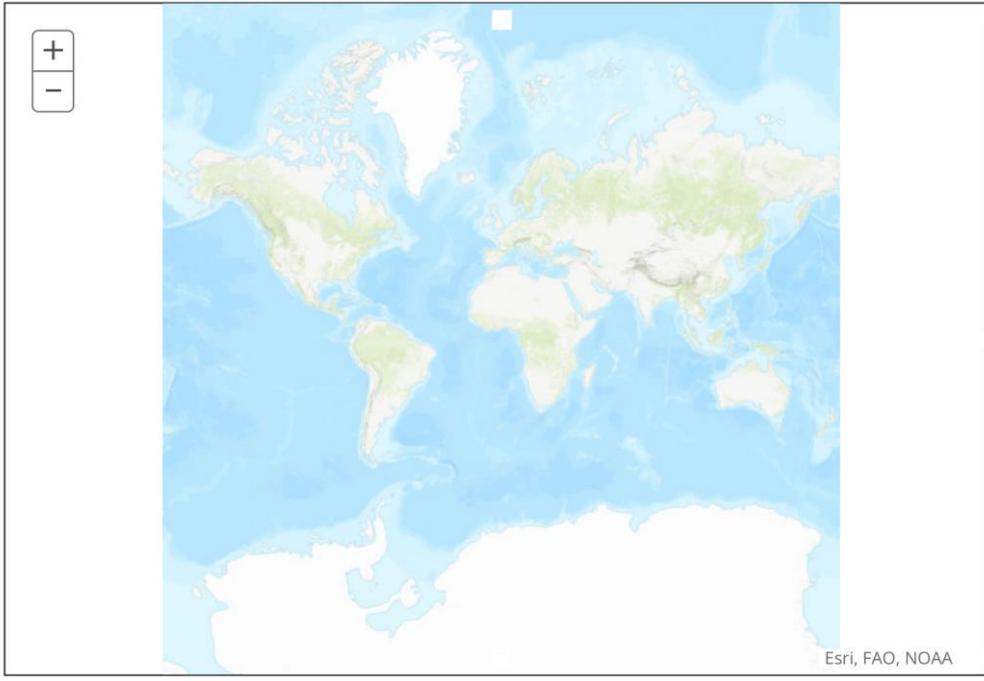
7. MAP OF THE SITE

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Map delivered as PDF
in electronic format
(optional)

<input type="checkbox"/>	Yes	<input type="checkbox"/>	No
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SITE DISPLAY





Pilot Management Plan of Emerald Site Armash (AM0000025) in Armenia

The Armash site represents a case study with significant anthropogenic operation in the area, such as freshwater fisheries, and rising pressures due to land use changes trend and water-sensitive target objects. The current ESMP is based on the 2023–2024 Armash (AM0000025) recommended borders and revised list of species and habitats, under the EU4 Environment Program.

The key components of the MP include the conservation degree assessment and conservation objects status analysis. For specific habitats and species, the pressures and threats are further analyzed and respective management measures are proposed to address them. The MP recommendations for a 10-year timespan are presented via an Action Plan (Annex B). The Action Plan also includes a midterm evaluation report. The biodiversity information presented is basically from desktop analysis with no specific field sampling/monitoring taking place (since 2016 for the needs of the current SDF, to be modified); nevertheless, it has also included new data from personal experts' field investigations (for example, for avifauna).

Finally, during the implementation of communication, education, and awareness raising, a training/consultation meeting was undertaken in April 2024 with local stakeholders for a broad and open public engagement. The local opinion and views were strongly considered during the current MP review and finalization. MoE is advised to consider reviewing and finalizing the current ESMP and proceeding on approval.

The current ESMP is a demonstration case for Armenia, applying a locally adopted EU-Natura 2000 MP method and similar code lists during assessing and presenting the site conservation degree, conservation objectives, and conservation measures.

Programme website:

www.eu4environment.org

Action implemented by:

