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Short Communication

Advancing protected area management planning in Armenia: A case study of Sevan National Park

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Abstract

This article presents the case study of Sevan National Park to showcase the evolving conservation planning and management of protected areas in Armenia. We highlight the first application of the basic principles of the Open Standards for the Practice of Conservation in the country, which has been piloted within the Park's management planning process. We also address recent institutional reforms, including the establishment of the EcoPatrol service, to examine their implications for centralized protection. Furthermore, efforts to align the management plan of Sevan National Park with the EU Biodiversity Strategy 2030, Kunming-Montreal Global Biodiversity Framework, and the feasibility of designating the area as a UNESCO Biosphere Reserve are discussed. Our findings demonstrate how Sevan National Park can serve as a potential model for adaptive conservation planning across Armenia. Ultimately, the case of Sevan National Park provides valuable insights for countries aiming to bridge ecological conservation with inclusive and sustainable development.

Key words: Biodiversity, biosphere reserve, Kunming-Montreal Global Biodiversity Framework, management effectiveness, nature conservation

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1. Introduction

Protected areas (PAs) play a critical role in the conservation of biodiversity, enhancement of climate resilience, and support for human well-being through the provision of essential ecosystem services such as habitat protection, carbon sequestration, and water regulation (Soares-Filho et al. 2010; IPBES 2019; Naidoo et al. 2019; Cannizzo et al. 2023; Duncanson et al. 2023). Over the past decade, efforts to expand and strengthen PAs have accelerated globally in response to international conservation targets. Since 2010, areas expanding over 21 million km² have been added to the global PAs network, contributing

significantly to Aichi Biodiversity Target 11 under the Convention on Biological Diversity (CBD) (UNEP-WCMC and IUCN 2021).

Building on this momentum, the Kunming-Montreal Global Biodiversity Framework (GBF), adopted at the 15th meeting of the Conference of the Parties to the UN Convention on Biological Diversity (COP CBD) in 2022, establishes an ambitious global target to conserve at least 30% of terrestrial and marine areas by 2030. This "30x30" goal emphasizes not only spatial expansion but also effective management, connectivity, and equitable governance of PAs and other effective area-based conservation measures (OECMs) (COP CBD 2022). In parallel, the EU Biodiversity Strategy for 2030 reinforces these goals, calling for a coherent and resilient trans-European network of protected areas, with strict protection for the most biodiversity-rich regions (European Commission 2020).

As a signatory to the CBD and party to the Comprehensive and Enhanced Partnership Agreement (CEPA) with the European Union (EU), Armenia is actively working to align its conservation efforts with these international frameworks. The country aims to increase protected area coverage to 20% of its territory by 2030, up from the current 13.1% (Government of the Republic of Armenia 2019). The Armenian PAs system includes three strict nature reserves (IUCN Category I), four national parks (Category II), 27 state sanctuaries (area, set apart pursuant to the statutory order, ensuring the conservation and natural regeneration of sample natural ecosystems of scientific, historical, cultural economic values and their components, and plant and animal species) (Category IV), and over 230 natural monuments (Category III) (Law of the Republic of Armenia on Specially Protected Natural Areas 2006; Dudley 2008; Stolton at al. 2013, 2020; UNEP-WCMC and IUCN 2021). While regulatory frameworks exist, management planning remains uneven; only Dilijan National Park (Tavush province) has an approved plan for 2017–2026, with draft plans pending for Sevan National Park and the Zangezur Biosphere Complex (Syunik province).

This article aims to review the integration of international best practices in the planning of protected area management in Armenia, with Sevan National Park (SNP) as a pilot case. The National Park served as the first example where the Open Standards for the Practice of Conservation were applied to guide the management planning process. This structured and adaptive approach addresses ecological, institutional, and socio-economic challenges while aligning with key national strategies, including the 2050 National Vision for Lake Sevan (Ministry of Environment of the Republic of Armenia 2024) and the draft 2025–2030 Ecosystem Restoration Strategy (Ministry of Environment of the Republic of Armenia 2025b)—both of which promote integrated, watershed-based restoration and development. SNP also serves as a testing ground for recent institutional reforms, notably the establishment of the EcoPatrol Service (Law of the Republic of Armenia on Ecopatrol Service of Armenia 2023), a centralized body tasked with protection functions across protected and forested areas. While the evolving roles of PAs' management bodies are still being defined, a shift is anticipated toward enhanced ecotourism, education, scientific research, and biodiversity monitoring. The SNP management plan (Ministry of Environment of the Republic of Armenia 2025c) reflects and supports these institutional transitions, laying the groundwork for long-term goals such as a potential designation as a United Nations Educational, Scientific and Cultural Organization

(UNESCO) Biosphere Reserve, which would link conservation with sustainable development across the Lake Sevan basin.

2. Materials and Methods

2.1. Study area

Sevan National Park (40°20'46"N, 45°20'04"E), located in the northeastern part of the Republic of Armenia, in the Gegharkunik region (Fig. 1), covers an area of approximately 1,473 km^2, including Lake Sevan's water surface. Sevan is the largest freshwater lake in the Caucasus region and one of the largest alpine lakes in Eurasia (Babayan et al. 2006). Situated at an altitude of 1,900 m a.s.l., the lake covers 1,260 km^2, making up 4.3% of Armenia's total area. The National Park surrounds Lake Sevan while encompassing small patches of planted pine monocultures in the south-east.

SNP was established in 1978 to protect unique high-mountain freshwater and terrestrial ecosystems that host a rich diversity of life found in the Lake and in its surroundings (Fig. 2). Due to anthropogenic pressure, the lake had experienced recurring algal blooms since 1963, with a marked intensification between 1975 and 1978 threatening the fragile ecosystems within and in the vicinity of the lake (Khanjyan 2004).

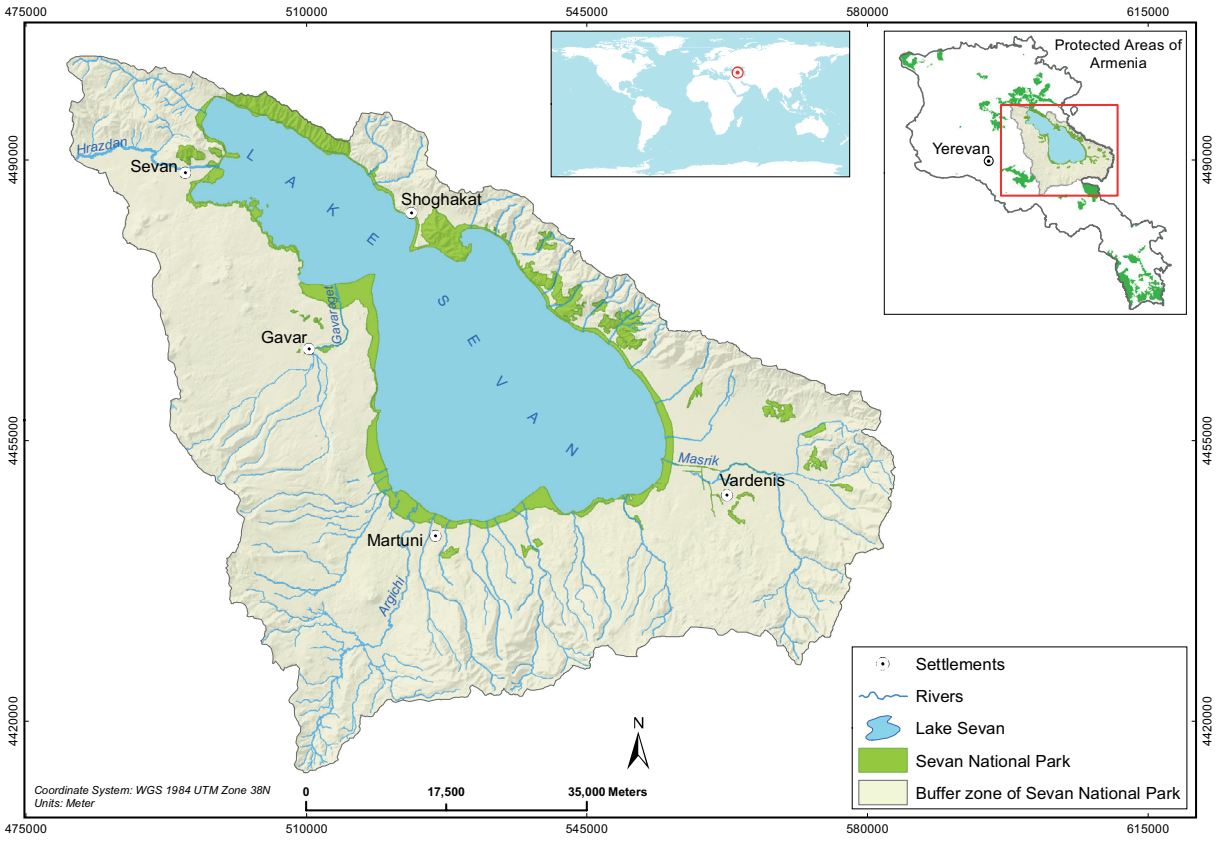

Figure 1. Map of the study area.

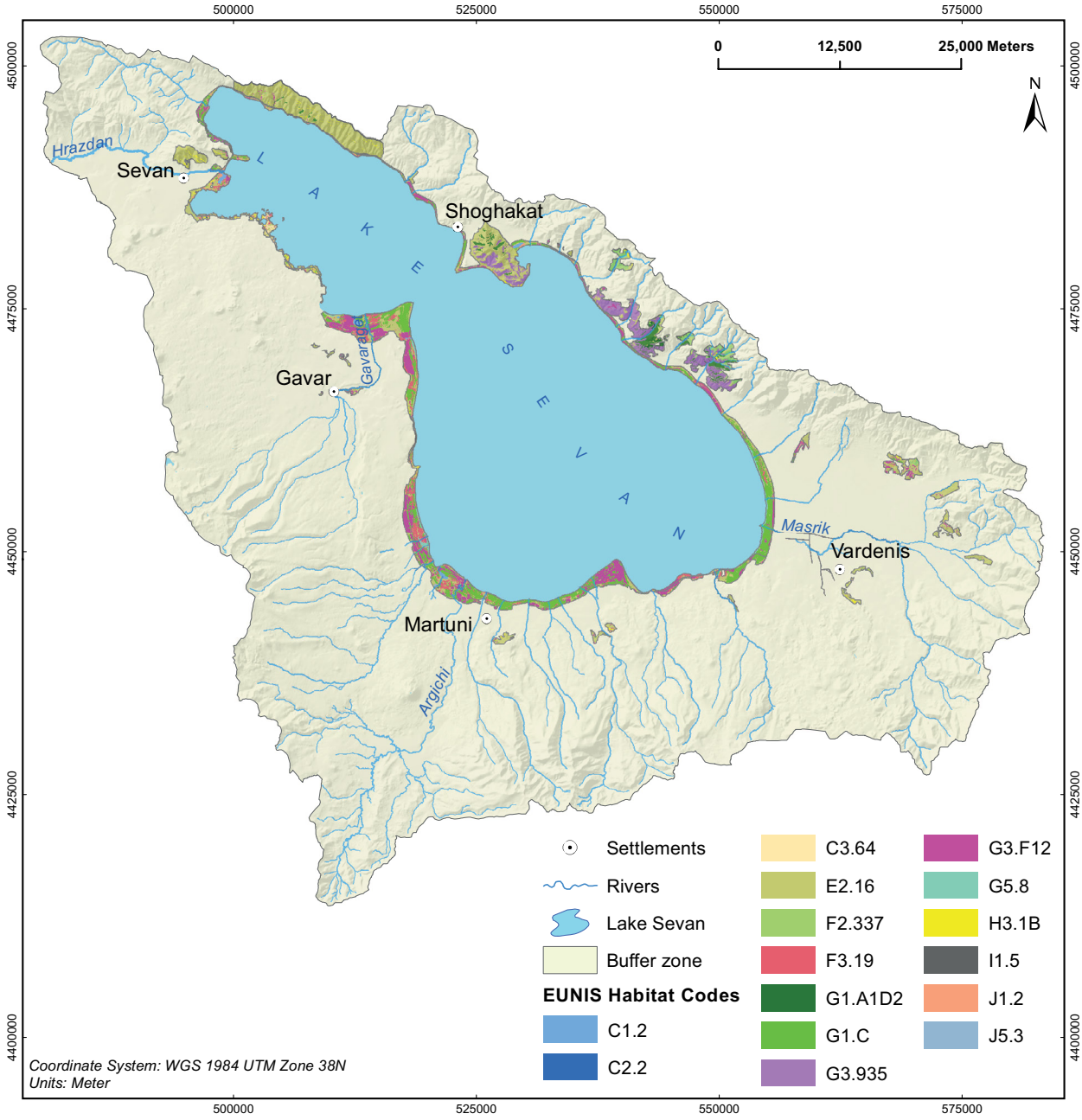

Figure 2. Map of the major ecosystems of Sevan National Park.

The National Park is home to 1,056 species of vascular plants, 267 macro fungi, 227 lichens, 67 mammals, nine species of fish, etc. (Ministry of Environment of the Republic of Armenia 2025c). The endemic Sevan trout (*Salmo ischchan*), assessed as Critically Endangered (B2ab (i, ii, iii, iv)) on the IUCN Red List of Species, is considered SNP's flagship species (Aghasyan and Kalashyan 2010; Freyhof 2019). This protected area is also renowned for its more than 275 species of birds, including the Armenian gull (*Larus armenicus*) (Ministry of Environment of the Republic of Armenia 2025c). Additionally, SNP is a popular tourist destination, attracting thousands of visitors, especially during the summer months.

The Sevan National Park state non-commercial organization (SNCO), operating under the direct coordination of the Ministry of Environment, is responsible for the scientific study, conservation, restoration, reproduction, inventory, and monitoring of the natural ecosystems, landscape, and biological diversity, and natural heritage within the Park's territory (Government of the Republic of Armenia 2002). Additionally, it ensures the sustainable use and preservation of the Park's natural resources as well as the maintenance of public beaches located within the Park's territory.

2.2. Methodology

The methodology used in developing the management plan for SNP marks the first application of the Open Standards for the Practice of Conservation (Conservation Standards) in Armenia as a foundational framework. Developed by the Conservation Measures Partnership (CMP), this globally recognized methodology provides a structured and adaptive management cycle—encompassing conceptualization, planning, implementation, monitoring, and learning—to guide systematic, participatory, and results-oriented conservation efforts (Schwartz et al. 2012; CMP 2020). Its use aligns with global conservation priorities such as the Kunming-Montreal Global Biodiversity Framework and the EU Biodiversity Strategy for 2030. The methodology integrated provisions from national legislation and adopted international best practices, particularly the IUCN-WCPA Guidelines for Protected Area Management Planning and the IUCN Green List Standard (IUCN and WCPA 2017), to improve governance and accountability.

The planning process began with conceptualizing the management framework, defining the scope, vision, and conservation targets for SNP. This was achieved through a participatory, multi-stakeholder engagement. To facilitate this, an advisory board was established, and 29 stakeholder workshops and meetings were held between January 2022 and May 2024, with 364 participants. The meetings brought together representatives from government agencies, local communities, NGOs, scientists, and other actors. The board consisted of representatives from the four national governmental bodies, two protected area and forestry management bodies, two academic institutions, six local and regional authorities, and four international and non-governmental organizations. A team of 18 subject-matter experts was engaged in the planning process, including international and sectoral experts, environmental and ecological experts, biological sciences experts, socioeconomic and community experts, and planning and technical experts. The process emphasized stakeholder participation, equity, and inclusivity, integrating gender, youth, and underrepresented voices. Structured engagement methods such as focus groups and digital platforms ensured broad involvement throughout the planning stages.

Building on the conceptual phase, we applied the SMART framework to define goals that are Specific, Measurable, Achievable, Realistic, and Time-bound (Doran 1981). Each objective was matched with measurable indicators to support monitoring and evaluation.

Given the vulnerability of Lake Sevan's ecosystems to climate change, such as fluctuating water levels, eutrophication, and biodiversity decline, climate con-

siderations were mainstreamed across all components of the plan. Socio-economic analyses were conducted to assess local livelihoods, dependence on natural resources, and drivers of human-wildlife interactions. These insights helped formulate equitable and sustainable conservation strategies.

Spatial planning and zoning were informed by updated cartography, remote sensing, and field surveys. Zones were revised based on conservation targets, threat assessments, and stakeholder feedback, ensuring consistency with national law and IUCN guidelines. ArcGIS was used for mapping and identification of EUNIS habitats (European Environment Agency 2022). According to the EUNIS classification, the SNP area includes representations of all major ecosystem types found in Armenia (C–J) (Fayvush and Aleksanyan 2016; Fayvush et al. 2023). The basis for mapping was high-resolution satellite images, large-scale topographic maps, and national park forest inventory data obtained through field surveys and remote sensing. Habitat mapping was carried out by combining the above-mentioned base maps, remote sensing, and visual digitization, and identification was carried out during field observations.

Finally, the methodology included ecosystem services mapping and financial analysis to ensure long-term sustainability. Funding sources—governmental, donor-based, and market-driven—were identified to support the ongoing plan implementation in alignment with both national and international financing mechanisms.

In sum, the SNP management plan methodology integrates international standards with Armenia's legal framework and stakeholder needs. It provides a participatory, science-based, and adaptive foundation for the sustainable conservation and development of Lake Sevan's ecological and socio-economic landscape.

3. Integrating Conservation Standards into the management of Sevan National Park

As a result of intensive consultations, a place-based scope was determined for the SNP management plan, and its vision was articulated as follows:

Sevan National Park is a protected area with a sustainable management system that ensures the conservation of natural and socio-cultural values, including the sustainable and integrated use of natural resources, harmoniously aligned with the region's socio-economic development. Within the boundaries of Sevan National Park, aquatic and terrestrial ecosystems, as well as biodiversity, remain largely viable, with minimal negative human impact (Ministry of Environment of the Republic of Armenia 2025c).

Subsequently, we identified 17 conservation targets, comprising two key habitats and 15 species (Table 1).

Another key component of the Conservation Standards framework is the identification of direct threats, based on the Conservation Threats Classification (CMP 2020). Through a series of workshops, we have distinguished, described and ranked a total of 16 threats to SNP (Table 2), among which household sewage and urban wastewater, other ecosystem modifications, fishing and harvesting aquatic resources, logging and wood harvesting, garbage and solid waste, hunting and collecting terrestrial animals, invasive non-native/alien plants and animals, pathogens and microbes were ranked as high or critical, providing a foundation for targeted conservation actions.

Table 1. The identified conservation targets for Sevan National Park.

Type	Conservation target
Habitat	Artanish Peninsula
Habitat	Noratus Peninsula
Species	*Salmo ischchan gegarkuni* Kessler, 1877
Species	*Salmo ischchan aestivalis* Fortunatov, 1926
Species	*Capoeta capoeta sevangi* De Filippi, 1865
Species	*Larus armenicus Buturlin, 1934*
Species	*Falco peregrinus* Tunstall, 1771
Species	*Crex crex* Linnaeus, 1758
Species	*Falco cherrug* Gray, JE, 1834
Species	*Neophron percnopterus* Linnaeus, 1758
Species	*Botaurus stellaris* Linnaeus, 1758
Species	*Accipiter gentilis* Linnaeus, 1758
Species	*Aythya nyroca* Güldenstädt, 1770
Species	*Charadrius alexandrinus* Linnaeus, 1758
Species	*Plegadis falcinellus* Linnaeus, 1766
Species	*Bubo bubo* Linnaeus, 1758
Species	*Phylloscopus sindianus* W.E. Brooks, 1880

Table 2. Major threats to Sevan National Park.

Ecosystem Services	Negative factors (threats)
Water quality regulation	• Municipal household pollution
	• Excess organic matter
	• Presence of hydroelectric power plants on the river waters
	• Scarcity of sources
	• Mining
Fish/crayfish	• Uncontrolled fishing
	• Scarcity of fish stocks
	• “Privileged people”, some people have a privileged status and catch fish even in the prohibited season
	• Poor natural reproduction
	• Lack of trout feed
	• Poor water quality
Forest and berries	• Forest aging
	• Diseases
	• Degradation
Pasture and grassland	• Overgrazing of peri-community pastures
	• Under grazing of distant pastures
	• Early spring grazing
	• Climate change

During the planning stage, an action plan for each programme of the management plan, defining SMART goals (Doran 1981) and objectives, and an operational plan were prepared by the management planning team. For the first time in the process of protected area management planning in Armenia, we have introduced the monitoring framework aimed at monitoring annually the effectiveness of the management plan implementation. Additionally, the Management Effectiveness Tracking Tool (METT) (Stolton et al. 2020) was proposed to track long-term improvements over time.

Further implementation, analysis, adaptation, and sharing of results are the most critical and challenging steps in closing the loop. There is an urgent need to build the management capacities of SNP staff to enhance their understanding of the Conservation Standards framework and its practical application in effective protected area management.

Based on recent amendments in environmental legislation, the SNP Management Plan was also subject to a Strategic Environmental Assessment (SEA). The SEA was completed successfully, resulting in an official positive conclusion. This ensures full compliance with national environmental laws and supports the formal adoption and implementation process of the management plan.

4. The EcoPatrol Service in Sevan National Park: challenges and opportunities

The International Union for Conservation of Nature (IUCN) recognizes four primary governance types for PAs: a) governance by government at various levels, b) shared governance by multiple rights-holders and stakeholders, c) governance by private individuals and organizations, and d) governance by indigenous peoples and/or local communities (Worboys et al. 2015). In Armenia, PAs are currently managed by the SNCOs responsible for protected areas and forestry under the jurisdiction of the Ministry of Environment of the Republic of Armenia.

In 2023, the Government of the Republic of Armenia initiated major reforms in the field of nature conservation. Previously, the SNCOs managing protected

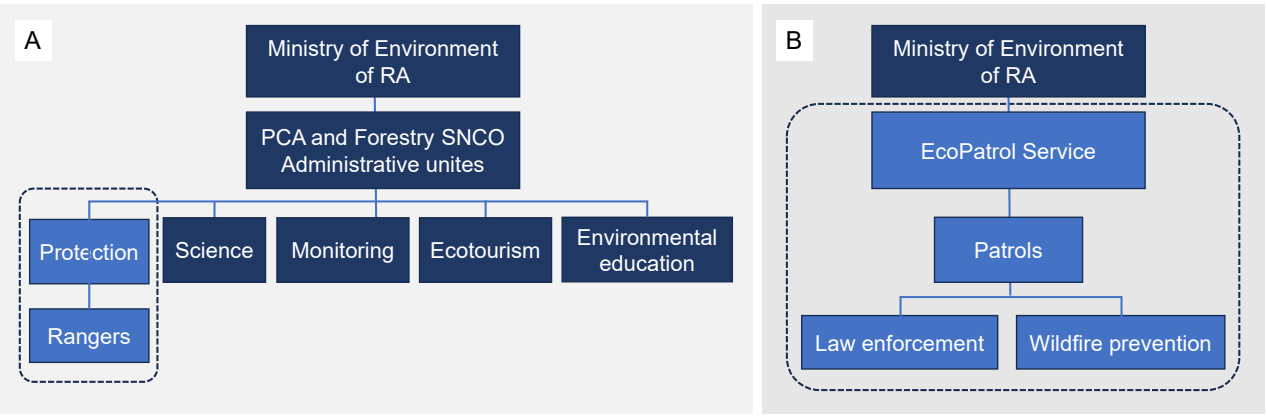

Figure 3. Allocation of the PA management responsibilities before and after the 2023 reform in the Republic of Armenia (RA). **A** the responsibilities exercised by the Protected Areas and Forestry SNCOs **B** the EcoPatrol Service taking the protection function.

and forested areas were responsible for a broad range of functions, including protection, scientific research, monitoring, environmental education, and ecotourism. However, following the Law on the EcoPatrol Service adopted by the Government Decree of the Republic of Armenia on December 6, 2023, a new centralized protection body, the EcoPatrol Service, was established to replace the former protection system operating within these units (Law of the Republic of Armenia on Ecopatrol Service of Armenia 2023). The EcoPatrol Service assumed the protection function from the management bodies of PAs, centralizing law enforcement responsibilities under a unified structure. Regional divisions of the EcoPatrol Service will now oversee patrol teams operating within PA territories. This reorganization aims to enhance the efficiency and consistency of law enforcement and wildfire prevention across forested and protected areas in Armenia (Fig. 3).

According to the Law on the EcoPatrol Service, the main responsibilities of this entity include: the protection of state forests, forest lands, and PAs; the detection and prevention of legal violations within the scope of its authority; ensuring compliance with regulations related to the protection of these areas; oversight of fire safety in forests and PAs; and the protection of ecosystems and their components by preventing or mitigating human-induced negative impacts (Law of the Republic of Armenia on Ecopatrol Service of Armenia 2023). The activities of the EcoPatrol Service were officially launched in the spring of 2025 in the Syunik province (Ministry of Environment of the Republic of Armenia 2025a), which has the largest proportion of protected areas in the country.

The separation of management and protection functions in Armenia's protected area system finds parallels in countries like Portugal and Norway. While the Institute for Conservation of Nature and Forests (ICNF) in Portugal serves as the primary governmental body responsible for national forest policy and the management of the National Network of Protected Areas with duties including conservation planning, public awareness initiatives, infrastructure maintenance, and data monitoring, the enforcement and emergency response fall to the Republican National Guard (GNR), the national gendarmerie force of Portugal (Beighley and Hyde 2018). Within the GNR, the Nature and Environment Protection Service (SEPNA) and the Intervention Group for Protection and Rescue (GIPS) enforce environmental laws, conduct surveillance, and carry out first-response interventions, such as wildfire management. SEPNA collaborates with ICNF (which focuses on structural prevention measures like fuel management and forest planning) and with the National Authority for Emergency and Civil Protection (ANPC) (which coordinates fire suppression and emergency response) to handle surveillance and first intervention in wildfire management. This arrangement mirrors Armenia's new EcoPatrol Service, which centralizes law enforcement and wildfire response under a single body, distinct from the agencies responsible for management. Similarly, in Norway, responsibility for most nature reserves rests with County Governors or, since 2010, with municipal-led conservation boards supported by state-appointed secretaries. These management authorities focus on rule enforcement, developing management and maintenance plans, and ensuring visitor information and way marking. Protection functions are handled by the Norwegian Nature Inspectorate (SNO), which operates within the Norwegian Environment

Agency (NEA). SNO oversees compliance, environmental monitoring, and inter-agency coordination on pollution control and biodiversity conservation (Fauchald et al. 2014; Norwegian Environment Agency 2025), somewhat resembling Armenia's model, where EcoPatrol assumes specialized protection duties, allowing management bodies to concentrate on planning, science, and education. In both examples, as in Armenia, distinct institutions share or transfer protection responsibilities to allow regional management bodies to focus on conservation planning and non-law-enforcement activities.

While centralization offers potential for improved coordination, resource allocation, recruitment of new personnel, and upgrade of facilities/equipment, this centralized approach to protection functions still requires a thorough assessment of its management effectiveness, which is planned to take place over five years in Armenia. Initial observations have already revealed several visible opportunities and challenges associated with the reforms. The reform raises concerns related to the loss of local knowledge, lack of management planning for newly developed units, reduced community engagement, and the complexity of managing a large-scale system. In addition, one of the most significant gaps is that EcoPatrol staff are not responsible for biodiversity monitoring, collecting ecological data, observing ecotourism infrastructure, guiding visitors, supporting educational activities, and ensuring communication with adjacent communities, which would have ensured a systematic approach to conservation efforts.

According to the requirements for the EcoPatrol Service, we have developed a new patrolling route scheme and protection units within the SNP management plan. There, we have introduced several approaches to address the challenges mentioned above. In particular, we recommend allocating new positions for monitoring specialists, which would allow the fulfillment of the above-mentioned responsibilities that remain unaddressed following the establishment of the EcoPatrol Service.

5. From local to global: aligning with the EU Biodiversity Strategy 2030 and the Kunming-Montreal Global Biodiversity Framework

During the development of the SNP management plan, we emphasized the importance of aligning the document with key strategic frameworks functioning both within the EU and globally. The Kunming-Montreal GBF highlights the need for the effective conservation and management of at least 30% of terrestrial and marine areas, particularly those of high importance for biodiversity and ecosystem functions and services by 2030 (COP CBD 2022). For the first time in Armenia, we have incorporated the concept of ecosystem services into protected area planning and proposed a payment scheme for ecosystem services (PES) for the SNP. PES assumes that businesses like hotels and restaurants operating within the park voluntarily participate in conservation funding. Customers are offered the option to contribute a small voluntary fee per bill, which, if not declined, is collected by the business and transferred to the park's conservation fund, helping establish a sustainable, alternative income source for the park's core functions.

The main ecosystem services were identified and mapped through a participatory process, involving the active engagement of key stakeholders. Effective management is crucial for achieving the 30x30 global target, and the management plan places strong emphasis on monitoring management effectiveness through the use of the METT and a management plan monitoring framework, which enables the Ministry of Environment to track the implementation of the plan on an annual basis.

Aligned with the Kunming-Montreal GBF, the plan promotes a whole-of-government and whole-of-society approach, encouraging inclusive, national-level action through broad stakeholder engagement. To further this inclusivity, the plan proposes an enhanced community participation in decision-making through representation on the management board and emphasizes the importance of active communication and cooperation with adjacent communities.

In the meantime, the EU Biodiversity Strategy for 2030 emphasizes not only the 30x30 target but also the need for strict protection of at least 10% of the EU's land and sea (European Commission 2020). In alignment with this, and with CEPA between Armenia and EU (in force since 2021) to support the harmonization of national legislation with EU commitments, the zoning proposal for Sevan National Park includes an expansion of the reserve zone (strict protection) from 74.64 km^2 to 162.4462 km^2, demonstrating Armenia's commitment to advancing conservation measures in line with the EU Biodiversity Strategy 2030 (Fig. 4).

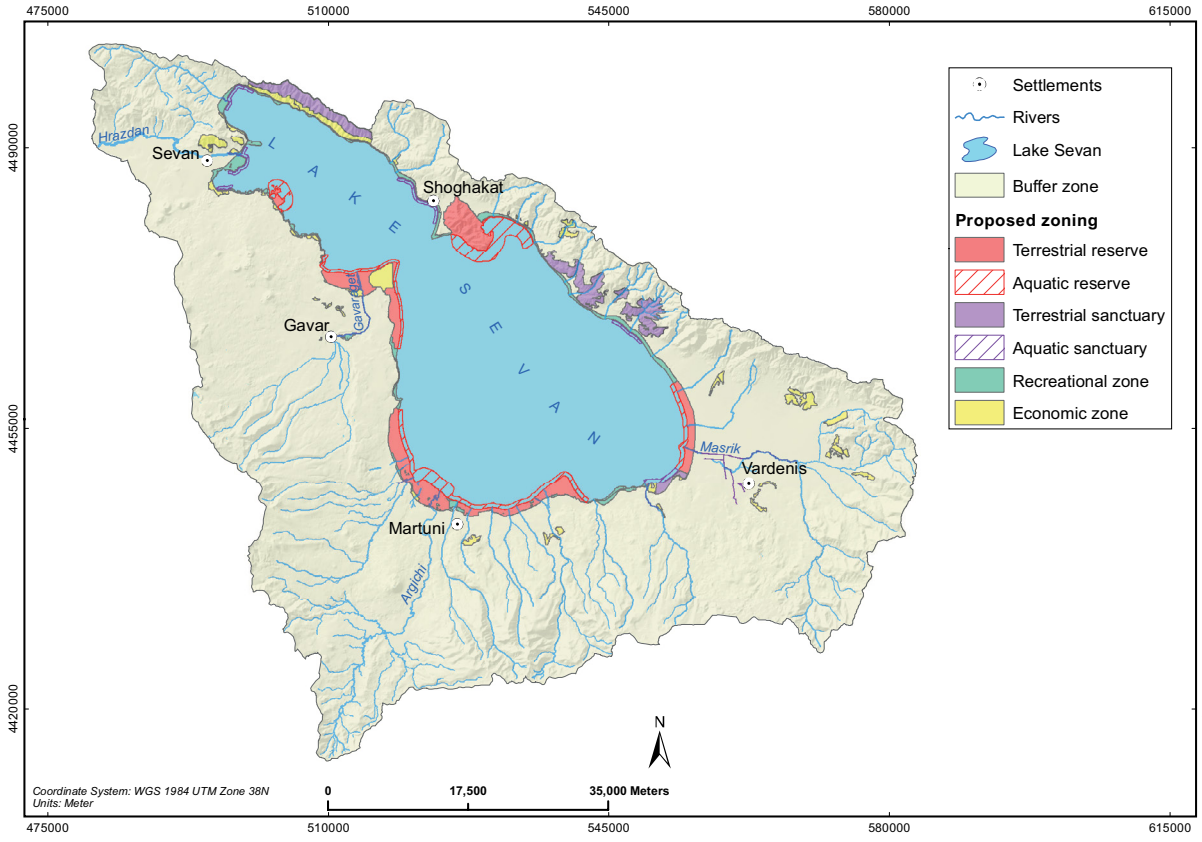

Figure 4. Map of the proposed zoning of the Sevan National Park.

6. Future perspectives: Sevan National Park as a biosphere reserve?

The strategic direction for the future of Lake Sevan's ecosystem calls for an inclusive and ecosystem-based approach as laid out in both the Lake Sevan Vision 2050 (Ministry of Environment of the Republic of Armenia 2024) and the draft Ecosystem Restoration Strategy (2025–2030) (Ministry of Environment of the Republic of Armenia 2025b). These documents jointly stress the need for a balanced development model that extends beyond SNP to the entire watershed basin of Lake Sevan. The basin-wide perspective is vital, as it is the broader landscape and the human activities within it that ultimately determine the ecological status of the lake and the conservation targets.

A central tenet of both the vision and strategy is that successful ecosystem restoration and sustainable use of Lake Sevan's resources depend on strong community engagement, public awareness, and responsible stewardship. This points toward the gradual adoption of the UNESCO Biosphere Reserve model, which promotes sustainable human-nature interactions within delineated conservation zones, sustainable use, and transition.

Biosphere Reserves (BR) under the UNESCO Man and Biosphere Programme are developed and managed as model regions for sustainable development, including climate change mitigation and adaptation. BR were given the task of investigating the complex human-environment relationships and of applying the findings for a meaningful and sustainable use of natural resources (UNESCO 2022). They can be regarded as a promising instrument for an integrated management of natural resources and for supporting the resilience of climate-vulnerable regions, such as those in Armenia.

The idea to establish one or more UNESCO BR as model regions and testing sites for new approaches to address environmental problems (for example, those related to climate change) is being voiced by many governmental officials and stressed in national strategies and action plans in Armenia (Government of the Republic of Armenia 2014). Despite several attempts to establish a functioning BR since the beginning of the century, no initiative has ever made much progress, and no BR has been created in the country.

Within the bilateral cooperation between the German and Armenian governments, the Michael Succow Foundation, together with the Centre for Ecological Noosphere Studies of the National Academy of Sciences of the Republic of Armenia (CENS), analyzed the potential for UNESCO biosphere reserve establishment in Armenia (Succow Foundation 2023). The work conducted between 2017 and 2019 aimed to analyze the potential of different regions in Armenia, including Lake Sevan and surrounding territories, to become BRs and act as model regions for sustainable development, as well as to provide a base for further projects to establish BRs in Armenia. Based on the preferences and suggestions of experts and stakeholders, eight potential sites were selected, including SNP.

Recently, the development of Armenia's first UNESCO Biosphere Reserve has been initiated, prioritizing Dilijan National Park as a potential candidate site (Succow Foundation 2023). Currently, a project on capacity development for the BR establishment is underway, which considers part of Dilijan National Park as the core zone. Surrounding areas in the Gegharkunik, Tavush, and Lori prov-

inces have been proposed as buffer and transition zones, based on a preliminary zoning plan.

According to this plan, the potential BR in Gegharkunik province would border the SNP, laying the groundwork for a possible connection between the two potential biosphere reserves into a larger, integrated region. This presents a valuable opportunity to establish a regional model for sustainable development. Such a model could include selected zones within SNP and adjacent communities, fostering a shared approach to sustainable socio-economic development, while reducing pressure on valuable ecosystems and enhancing biodiversity conservation.

The biosphere reserve concept may offer a pathway for integrating conservation with development at the landscape scale. However, before its application, considerable work is required to cultivate the necessary conditions—primarily, building community awareness, fostering a sense of ownership, and embedding sustainability into local practices.

It should also be noted that SNP, with its surrounding areas, is a potential Emerald network site in Armenia. The Natura 2000 and Emerald Networks share a common objective of conserving Europe's most valuable and threatened species and habitats. While Natura 2000 applies within the European Union, the Emerald Network extends similar principles to non-EU countries, including Armenia. Armenia is actively revising its list of potential Emerald Network sites, aiming to align more closely with the standards and coverage of Natura 2000. This process is expected to result in the designation of a significantly expanded and representative network of protected areas across the country, contributing both to national conservation goals and to broader regional biodiversity targets (EU4Environment 2024).

7. Conclusion

The development of the SNP management plan marks a significant milestone in Armenia's progress toward state-of-the-art, inclusive, and internationally aligned conservation planning. By introducing the basic principles of the Open Standards for the Practice of Conservation to the country's PAs, this initiative provides a robust and transparent framework for improving management effectiveness. The planning process also demonstrates how strategic alignment with the Kunming-Montreal GBF and the EU Biodiversity Strategy for 2030 can be successfully localized, particularly in the context of meeting the 30x30 global biodiversity target.

At the same time, ongoing institutional reforms, especially the establishment of the EcoPatrol Service, offer new opportunities for centralized protection and law enforcement. However, these structural changes also present challenges, such as reduced local engagement and gaps in responsibilities related to biodiversity monitoring and ecotourism oversight. The SNP management plan proposes targeted interventions to bridge these gaps, including the allocation of new monitoring roles and enhanced community participation in governance processes.

Furthermore, both the 2050 National Vision and the draft 2025–2030 Strategy for Restoration of Lake Sevan Ecosystem underscore the critical importance of a balanced development model—one that recognizes the ecological, social,

and economic interdependence of Lake Sevan and its surrounding basin. Recognizing the limitations of managing the lake solely through the lens of national park boundaries, these strategic frameworks promote an inclusive approach that spans the entire watershed.

The biosphere reserve concept is presented as a promising future direction to institutionalize this integrated approach. However, a phased, community-driven process is essential. Awareness raising, community empowerment, and the promotion of sustainable natural resource use must precede the formal designation. Building a foundation of local ownership and capacity is the prerequisite for long-term success. Looking ahead, the potential establishment of a UNESCO Biosphere Reserve in the neighboring Dilijan National Park opens the door to a broader regional model for sustainable development in Gegharkunik province.

Ultimately, the case of SNP serves not only as a pilot initiative within Armenia but also as a potentially transferable model for other regions seeking to reconcile biodiversity conservation with sustainable development.

The process of developing the SNP management plan yielded important lessons that can inform future protected area management efforts. First, the need for robust baseline data was highlighted, particularly regarding biodiversity inventories, forest resources, and ecosystem services. Second, the complexities of land tenure, especially around protected area boundaries, emphasized the importance of early and continuous stakeholder engagement to resolve conflicts and build consensus. Third, external factors, such as regional security challenges, demonstrated the necessity of integrating risk management and contingency planning into conservation frameworks. Finally, the iterative process of stakeholder consultations revealed that flexible, adaptive communication and feedback mechanisms are critical for ensuring broad ownership and effective implementation of management actions. These lessons underscore the need for a dynamic, inclusive, and science-based approach to protected area management that can be adapted to changing socio-political and ecological conditions.

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Data availability

All of the data that support the findings of this study are available in the main text or Supplementary Information.