

The significance/importance and role of Specially Protected Nature Areas in the protection of biodiversity and landscape diversity

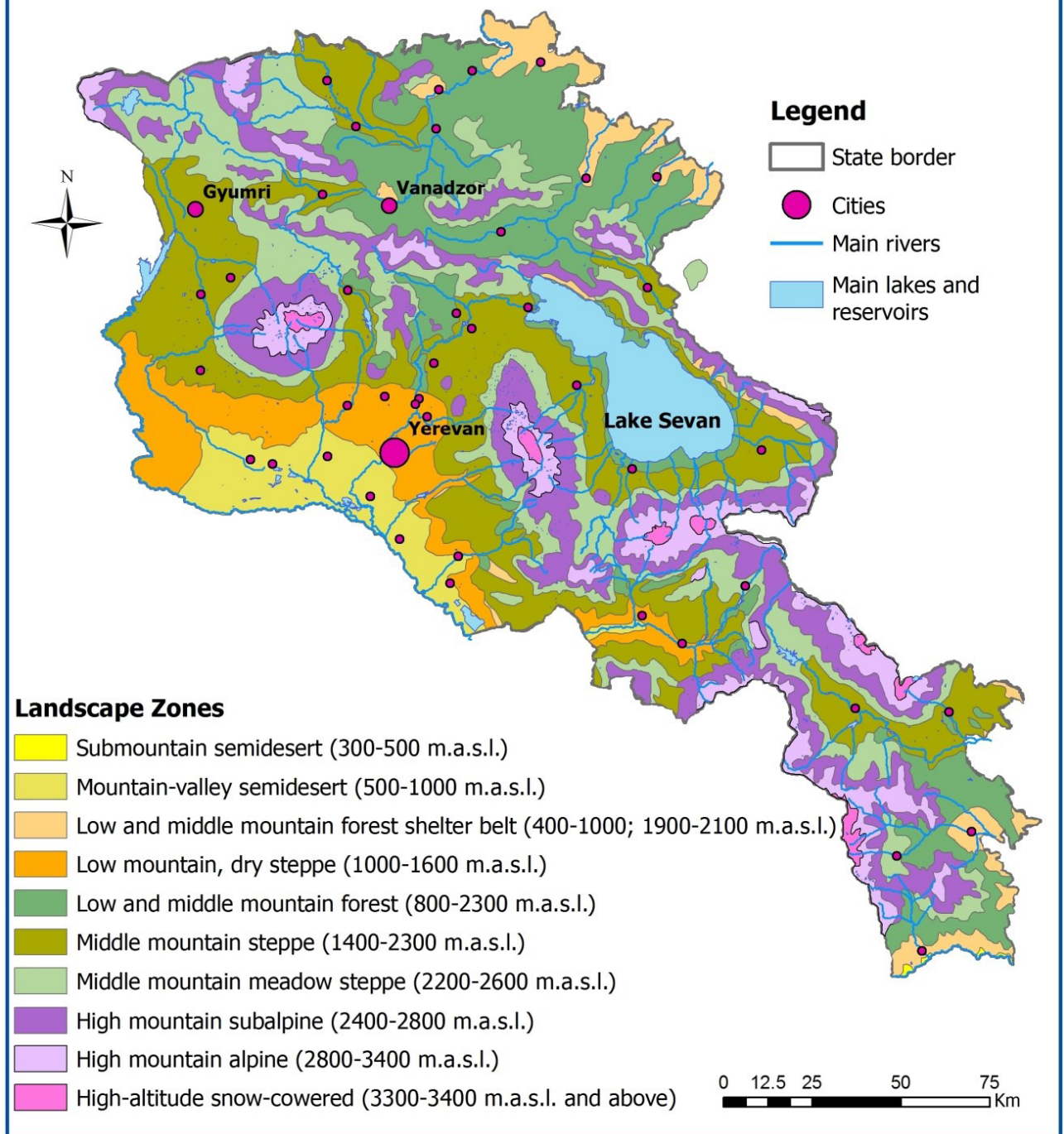
The landscapes of Specially Protected Nature Areas of Armenia and challenges of their protection

SPNAs play pivotal role in the conservation and restoration of nature, as they contribute to the reduction of anthropogenic impact on the environment ensuring ecological balance, biological and landscape diversity conservation. SPNAs being integral part of the country's total environmental system, are included in the effective nature use system and in interaction with the operating areas implement environment conservative and resource-saving functions. Currently the following SPNAs operate in the Republic: 3 state reserves ("Khosrov forest", "Shikahogh" and "Erebuni"), which cover 35 439.6 ha territory or 1.19% of Armenia's total area; 4 national parks ("Sevan", "Dilijan", "Lake Arpi" and "Arevik") which cover 236802.1 ha territory or 7.96 % of Armenia's total area; 27 state sanctuaries which cover 114 812.7 ha territory or 3.95% of Armenia's total area; and 232 natural monuments.

Due to the complex relief and altitudinal and zonal alternation of the Armenia, even on the small territory of the country it is possible to distinguish six climatic types and 10 landscape zones from semidesert areas to snow covered highlands. There are also a number of intrazonal ecosystems (wetlands, rocks, screes), which are present almost in all altitudinal zones.

The location of the country in the intersection of three biogeographical provinces, diversity of climatic conditions and active geological processes have resulted in formation of diverse ecosystems and rich biodiversity with high level of endemism. In the result, on the small territory of the country (about 30 thousand km²) there are about 3800 species of vascular plants, 428 species of soil and water algae, 399 species of mosses, 4207 species of fungi, 464 species of lichens, 549 species of vertebrates and about 17200 species of invertebrate, many of which are considered endemics (Table 1). All main natural ecosystems of the Caucasus are presented in the country except moist subtropical ecosystems.

Landscape Zones of the Republic of Armenia



- a) Semidesert zone: 80-90% of the semidesert zone territory is used for agricultural purposes, where often the rules of irrigation and soil cultivation are not followed, which has resulted in soil erosion and secondary salination processes. Over the recent years a new alarming problem has occurred in the Ararat valley, which is connected with reduction of the volume of underground (artesian) water

resources and decrease of aquifers. The upper soil layers have been subject to artificial drying, the trends of changes in natural ecosystems are obvious with acceleration of the rates of changes in flora and fauna species in parallel with desertification processes. Artificial drying of saline marshes (due to use of soils for agricultural purposes as well as for improvement of sanitary-epidemiological situation) is a good example of natural ecosystem degradation and their complete extinction in semidesert zone; saline marshes had been present in this zone before the middle of the 20th century. In the result of changes the valuable rare plants and animals typical only for the mentioned ecosystem have disappeared. The semidesert landscape of the Araks River valley is of high interest. The main threat to them is the industrial use of sand for construction purposes. The most interesting part of the sand desert is the Calligonum desert, which is the only site in the Lesser Caucasus with the presence of Calligonum communities. The area is included in the territory of Goravan Sands State Sanctuary. In the terrestrial semidesert ecosystems of Armenia 101 species of vertebrate animals and 1687 species of invertebrates have been registered.

- b) **Steppe zone:** The mountainous steppe zone is the largest on the territory of Armenia, it starts from the altitude of 1500-1600 m above sea level and extends up to 2000 m in the north and 2400-2500 in the south. On low altitudes this zone is a typical steppe zone and on high altitudes it is a meadow steppe zone. 96 species of vertebrates and 992 species of invertebrates have been registered as typical for the steppes. Soil cultivation in steppes and establishment of field protective forest belts as well as use of areas for hay-making and fires have negative impacts on plant cover and fauna. At present in Armenia the steppes loss their typical features and functions such as retention of water resources and regulation of evaporation, soil protection, reduction of the risk of pasture digression, prevention of water and wind erosion, neutralization of pollution including in soil, biota and agricultural products, protection of the habitats of rare species registered in the Red Book of Armenia, securing the quantity of pollinators through reproduction of natural vegetation and others. The steppe ecosystems are protected in a number of specially protected nature areas (SPNA) including Khosrov Forest State Reserve, Sevan, Dilijan, Arpi Lake and Arevik National Parks and in a number of sanctuaries with the total territory of 61 391.7 ha, which makes 15.8 % of the total territory of SPNAs.
- c) **Forest zone:** The forest cover of the Republic of Armenia makes 332.333 ha or 11.17 % of the total territory of Armenia. The volume and quantity of services and benefits provided by forest ecosystems is extremely high. However, due to the present anthropogenic pressure on forest ecosystems including overuse of forests, irregular loggings, grazing, hay-making, land occupations and others, the valuable forest areas are being reduced; the changes in species composition and forest structure are registered. Due to various socio-economic problems and high demand for wood the forest loggings still exceed the rates of natural regeneration of forests. Over the recent years in the logged forest areas and adjacent territories the instability of ecosystems has been observed with increase of wind-fallen or snow-fallen areas, activation of soil erosion, landslides, avalanches, drying of springs, formation of dust clouds and other processes, which cause serious damage to communities and areas of agricultural significance. 75% of the forests of Armenia is managed by "Hayantar" SNCO under the RA Ministry of Agriculture and 25% (forests in specially protected nature areas) – by the RA Ministry of Nature Protection. In the structure of the forest lands managed by "Hayantar" SNCO there

are 13 forest sanctuaries, where at present there is a need for clarification of boundaries and development of management plans. The forest covered areas dominate in the specially protected nature areas under the RA Ministry of Nature Protection. They include Khosrov Forest and Shikahogh State Reserves, Dilijan, Sevan and Arevik National Parks, a number of sanctuaries with forest landscapes occupying 110 269.2 ha, which makes 28.5 % of the total territory of SPNAs.

- d) **Sub-alpine and alpine meadow zone:** The sub-alpine and alpine landscapes are the main areas of hay-making and summer pastures in Armenia. In the structure of agricultural lands of Armenia the hay-making areas make 10 % and the pastures make 49 %. At the same time according to the data of the RA Ministry of Agriculture of Armenia, the pastures of Armenia occupy 1 million 118 thousand ha (in all landscape zones), out of which only 30% is used effectively. Despite the importance of natural grasslands in Armenia at present their biological and economic status is far from being satisfactory. The studies show that nowadays about 57% of pasture lands in Armenia is degraded (eroded, tramped and decomposed). In the fauna of this zone 58 species of vertebrates and 508 species of invertebrates have been registered as typical. In the structure of specially protected nature areas the sub-alpine and alpine meadows make 87 516.24 ha, which is 22.6 % of the total territory of SPNAs. They are well represented in Arpi Lake and Arevik National Parks, Zangezur, Khustup, Aragats Alpine, Sev Lich and Jermuk Hydrological State Sanctuaries.
- e) **Intrazonal ecosystems:** The total area of intrazonal ecosystems is difficult to estimate as such territories are practically present everywhere. However they rarely occupy large territories. Wetlands also belong to intrazonal ecosystems. According to definition of the Convention on Wetlands of International Importance especially as Waterfowl Habitat (Ramsar, 1971) the wetlands in Armenia are represented by lakes, small lakes, rivers, reservoirs, water courses, areas temporarily covered by water, marshes and peat areas. The rivers of Armenia are the tributaries of two large rivers of the Southern Caucasus – the Araks River and the Kura River. In Armenia there are about 9500 rivers and small rivers with the total length of about 23 thousand km. The average annual flow of the rivers originating in Armenia makes 6.3 billion m³, the total volume of surface waters is 7.2 billion m³. In Armenia six river basin management areas have been defined and management plans should be developed for them. In the structure of inner waters the lakes and small lakes are of special importance. According to up-to-date hydrological studies on the territory of the Republic of Armenia there are about 250 lakes; more than the half of them is of a temporary character, they are periodically drying. Lake Sevan is the largest lake of Armenia. The other large lakes are Arpi Lake, Sev Lake and Akna Lake. The total water resources of the lakes of Armenia are estimated as much as 39.8 milliard m³. In order to prevent the lake eutrophication processes and improve the situation in the lake since 2002 the works to increase the water level have started. As of 1 January 2016 the water level of the lake compared to its mark of 1 January 2002 has increased by 3.88meters. In total, the marshes and peat areas in Armenia occupy 42 km². Lake Sevan, Lake Arpi and Khor Virap wetland area are included in the list of wetlands of international importance under the Ramsar Convention. These three water objects are also included in the system of specially protected nature areas of Armenia. In total, the surface of water and wetland areas in the system of SPNAs makes 127 254.08 ha or 32.9 % of their total area; its majority (124 759.0 ha) is on the territory of Sevan National Park.

During the recent years for the protection of biodiversity and landscape diversity a number of SPNAs have been established (<<Lake Arpi>> National Park, 2009; <<Arevik>> National Park, 2009; <<Khor Virap>> State Sanctuary, 2007; <<Zangezur>> State Sanctuary, 2009; <<Zikatar>> State Sanctuary, 2010; <<Khustup>> State Sanctuary, 2013).

Natural monuments: By the Orders of RA Minister of Nature Protection dated 5 August, 2014 N218-Ն, N219-Ն and N220-Ն the passports of the following monuments have been approved: 8 at Lori Marz, 4 at Vajots Dzor Marz, and 15 at Tavush Marz, total 27. By the RA Government Decree N473-Ն dated 2d May, 2013, the new lists of Natural Monuments have been approved with 232 nominations, from which 106 are classified in geological, 48 in hydro geological, 40 in hydrographical, 17 in natural and 21 in biological typological groups. Currently by the Orders of the RA Minister of Nature Protection passports of 29 monuments have been approved.

The fifth National Report to the Convention of Biological Diversity, prepared at 2014, lists the activities that are directly linked to unique, valuable landscapes, and to the protection, restoration and utilization of biological diversity.

The Government Decree N1059-Ն dated September 25, 2014 on "Strategy and State program of Conservation and Use of Specially Protected Nature Areas" was approved, the Annex 2 of which "2014-2020 Measures of State Program of Conservation and Use of Specially Protected Nature Areas of the Republic of Armenia" states measures that are directly linked to the unique, valuable landscapes – to the protection of specially protected nature areas.

By the 5th point of the RA Government Protocol Decision N23 dated 27 May, 2015 the "The Strategy and National Action Program to Combat Desertification in the Republic of Armenia" was approved. Under the scope of this project it is planned to refine corresponding field related legislation, enhance the productivity of soil management, and to raise awareness about desertification issues and the mechanisms of their resolution, implement measures under the Rio Convention and promote international cooperation.

Map-scheme of existing and planned protected areas of RA

