



Protected Areas Management Planning in Armenia

Principles of Planning Protected Areas Management and Corresponding Legal Framework

EXECUTIVE SUMMARY

The aim of this task is to prepare a Regional Concept on Protected Areas Management Planning, which should serve as a basis for future development of National Guidelines on National Parks Management Planning.

This Report presents the analysis of the RA nature protection legislation issues connected with the management planning of specially protected nature areas according to the TJS Operational Plan Task 1.2. The Report presents a short overview of the RA natural resources, the problems, specially protected nature areas (SPNA) and their management system. The peculiarities of SPNA management planning in Armenia were studied.

Key nature protection laws, regulatory acts, international conventions ratified by Armenia, related program documents and other relevant documents on management planning were analyzed.

The data presented in the Report will be then integrated in the Regional Concept on Protected Areas Management Planning to be developed on the basis of international experience analysis.

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CONTENTS

CHAPTER 1. NATURAL FEATURES OF THE RA TERRITORY.....	4
1.1 General Information	4
1.2 Geological Structure	4
1.3 Climate.....	5
1.4 Hydrology	5
1.5 Landscapes	6
1.6 Soils	7
CHAPTER 2 THE PROBLEMS OF NATURAL RESOURCE MANAGEMENT	10
2.1 General Environmental Issues in the RA	10
2.2 Biodiversity	10
2.2.1 Problems	11
2.2.2 Legislation	13
2.2.3 Management	15
2.3 Forest Resources	17
2.3.1 Problems	18
2.3.2 Legislation	19
2.3.3 Management	20
2.4 Land Resources	24
2.4.1 Problems	25
2.4.2 Legislation	27
2.4.3 Management	28
2.5 Water Resources	30
2.5.1 Problems	31
2.5.2 Legislation	33
2.5.3 Management	35
2.6 Underground Resources and Minerals	37
2.6.1 Problems	38
2.6.2 Legislation	38
2.6.3 Management	39
2.7 Atmosphere Protection and Climate Change	41
2.7.1 Problems	42
2.7.2 Legislation	44
2.7.3 Management	45
CHAPTER 3. THE SYSTEM OF THE SPECIALLY PROTECTED NATURE AREAS OF THE REPUBLIC OF ARMENIA	48
3.1 Specially Protected Nature Areas of the RA	48
3.2 Legal Framework for the RA SPNA Management	51
3.3 Key Environmental Legislation of RA	52
3.4 Legislation of Related Fields	53
3.5 Classification of Specially Protected Nature Areas	55
3.6 The RA SPNA Management Categories by IUCN Guidelines	56
3.7 SPNAs Status/Category	56
3.8 SPNAs Establishment	57

CHAPTER 4. SPNAs MANAGEMENT PLANNING	58
4.1 Current State	58
4.2 Legal Regulation of Management Planning	59
4.3 Management Planning Authorities	60
4.4 Participatory Management	60
4.5 Management Plan Structure	61
4.6 SPNAs Monitoring	62
4.7 Main Objectives of SPNAs Monitoring	63
4.8 Proposals on Improvement of the SPNAs System and Biodiversity Protection	64

APPENDICES

Appendix 1. Environmental legal acts of the Republic of Armenia	65
Appendix 2. International Environmental Agreements of the Republic of Armenia	67
Appendix 3. Short List of By-Laws Regulating the Management of Biodiversity and Specially Protected Nature Areas of Armenia	70
Appendix 4. Structure of the Ministry of Nature Protection of the Republic of Armenia	72
Appendix 5. The structure of Structural Subdivisions of the Republic of Armenia Ministry of Nature Protection	73
Appendix 6. Actual planning examples	75
Appendix 7. Characteristics of the RA Protected Areas	79
Map 1. RA Forest Cover by Satellite Images	23

Analysis of the Current State of the RA Specially Protected Nature Areas Management Planning

CHAPTER 1. NATURAL FEATURES OF THE RA TERRITORY

1.1 General information

The Republic of Armenia is located in northeastern part of the Armenian mountain rangeland. It occupies an area of 29.74 thousand km² between the north latitude 38⁰50' - 41⁰18' and of east longitude of 43⁰27' - 46⁰37'. The length of the territory from the northwest to the southeast is about 360 km and its widest part is about 200 km. By a direct line the distance between the RA and the Caspian Sea is 175 km, the Black Sea - 145 km and the Mediterranean Sea - 750 km.

Armenia has a long history of nature protection including *in-situ* (in nature) and *ex-situ* (zoological parks, botanical gardens) conservation. The network of specially protected nature areas (SPNA) includes state reserves, national parks, sanctuaries and natural monuments, and occupies about 10% of the whole territory of Armenia. However, it does not include some important biotopes and does not function effectively. Out of the territory of protected areas the nature protection is regulated by a number of laws and by-laws, which limit the use of natural (biological) resources.

Environmental aspects become integral parts of the development of Armenia, as the link between biodiversity conservation and sustainable development becomes more and more obvious. The need for development and implementation of the mechanisms on maintenance and sustainable development of natural resources gets better understanding in Armenia.

1.2. Geological structure

The area of the Republic of Armenia has a complicated geological structure and rugged relief. The republic is a typical highland country with the lowest altitude in the north on the bank of Debet River at 375 m above sea level and with the highest altitude of 4095 m, which is the northern peak of the Mount Aragats. The relative altitudes fluctuate from 1500-2000 m to 3700 m. The average altitude of the area amounts to 1850 m. The altitude fluctuation is an important factor in terms of formation of climate and landscape vertical zonation.

The largest inclinations are typical of plicate and fission-fragmented mountains, whereas weak inclinations - to plains and volcanic plateaus. In terms of geological structure Armenia is a part of the Transcaucasus great arched fold and medium-Araxian intermountain lowering. These two geological structural units are included in the Caucasus-Anatolia-Iranian segment of the Mediterranean plicate zone.

By geological structure the territory of Armenia is divided into three parts - the Somkhetti-Kapan complex, Bazum-Zangezur and Trans-Araksian zones.

Volcanism of the Quaternary and human economic activity in the recent times left an indelible track on the Armenian mountain range. Due to the complicated relief, natural landscape changes are notable everywhere in the country. Each and every valley, watershed and mountain peak here has its own landscape. Biogenic elements are represented in the most diverse nature. Similar diversity is conditioned also by the location of the Armenian highland, which is located in the junction of several geographical regions.

1.3 Climate

The Republic of Armenia is located on the borderline of temperate and sub-tropical climatic zones with the vertical zonation, mountainous and microclimatic local peculiarities of natural conditions typical for mountainous countries.

During the year terrestrial air masses from middle latitudes prevail on the territory of Armenia. During winter and summer anticyclone type of the weather dominates, which results in cold winter and dry and hot summer. Due to tropical air masses the climate is mainly dry terrestrial. In the lower plane areas and valleys the dryness is more expressed. In winter often cold arctic air masses come from the north.

Precipitations on the territory of RA range from 250 mm (semi-desert zone) to 1000-1100 mm (alpine zone) with the average annual precipitation rate of about 600-1000 mm (meadow zone) happening mainly during spring with dry second half of summer. Vertical zonation of precipitation distribution is notable. Stable snow cover in winter stays in the mountainous zones on the altitudes above 1300 m with the deepest snow cover of 3-4 m (Mount Aragats). The average snow cover in mountainous steppe zone is about 50 cm.

The relative humidity on the territory of the RA is the lowest in the semi-desert zone. It gets higher by altitudes and with 80% and more during winter months.

The climate is significantly affected also by local air circulation, which is conditioned by local mountainous peculiarities and the impact of relief on air masses. The diversity of relief results in a number of microclimatic sub-regions differing by temperature regime, precipitation and humidity.

1.4 Hydrology

The Republic of Armenia is covered with a dense net of rivers, conditioned by climatic, relief and hydrological-geological peculiarities.

The network density coefficient is 0.8 km/km^2 . The rivers of Armenia belong to the Caspian Sea basin. The basins of the River Kur tributaries (Debed, Pambak, Aghstev, Tavush, etc.) occupy an area of 7000 km^2 and the basins of the River Arax tributaries (Akhuryan, Kasakh, Metsamor, Hrazdan, Azat, Vedi, Arpa, Vorotan, etc.) - an area of 22790 km^2 . The rivers are fed from mixed sources (melting water, underground and rain waters). River flow fluctuates significantly during the year.

Country is not rich in lakes. Lake Sevan is the biggest lake in the Caucasus and Armenia with the surface of about 1240 km^2 . The lake is located at the altitude of 1897 m above sea level. The rest of the lakes in the country (Kari, Akna, Sev, etc.) are small and mostly located in high mountainous zones. The Lakes Arpi and Parz are located at a medium altitude mountainous zone. The Lake Ayghr is a lowland lake fed by underground waters.

The underground waters in the country are distributed unevenly. These are mainly springs, wetlands, underground flows (artesian waters and groundwater).

1.5 Landscapes

The complex mountainous relief, vertical zonation, altitudes and difference of soil-climatic conditions result in landscape diversity of the country with different landscape zones ranging from semi-desert to alpine and sub-alpine landscape types.

In the Republic of Armenia there are two major types of highland-zoning landscapes: temperately wet landscapes of weathered or bar mountain slopes and dry landscapes of closed concavities.

The first type is typical for the areas involved within the highland system of the Small Caucasus, the second one - to the Arax basin's concavities. Within the first type landscapes forests dominates and within the second type - steppes and semi-deserts. Alpine meadow landscapes are spread in the high mountains region in both landscape types. The shift of the landscape zones within the above types has the following picture (see Table 1).

The following natural landscapes are typical for Armenia:

The semi-desert zone goes up to 1300 m high. Wormwood and ephemeral vegetation is typical to semi-deserts, and drimophilous subshrubs - to saline land. During recent decades soils in this zone have been desalinated and cultivated. Within the semi-desert zone there are also low-land wetland landscapes, which have been mainly ameliorated and cultivated.

The steppes are the major type of landscape in Armenia. They are represented by various sub-types: dry, moderately dry, moderately wet and wet steppes.

Moderately dry steppes are shifted by dry steppes by forming a narrow zone on the highland slopes. They are located in large areas at an average height on the lain bottoms of inter-highland concavities (Sisian, Pambak, Sevan, Shirak, etc.). The climate is continental, precipitation is decreasing during the vegetation period and an active farming requires irrigation.

Moderately wet steppes are mainly spread on the parts of medium volcanic rock floors and sunny slopes of the mountain range surrounding the concavities (Bazum, Virahayots, Pambak, etc.). Climate conditions are favorable for agriculture although large steepness of the relief prevents it. Thus, most of these landscapes are used as pastures and hay meadows.

Sub-alpine meadow steppe is a unique landscape type formed in the lower floor of the high mountains. These steppes have a double nature in terms of their origin: in the Medium Arax part they are a result of xerophytes of lower alpine meadows; in the Small Caucasus Mountains - the retreat of the forest upper zone. In both cases they are notable by their biological productivity, being mostly used as hay meadows.

The alpine meadow zone covers highland mountain plateaus and massifs above 2000 (2100) m. In its inferior sub-zone lower alpine meadow landscapes are spread over, and in the upper one - upper alpine meadows (above 2700-2800 m). This landscape zone is a summer pasture region. However, they require reformation due to their stony nature and over-grazing. The meadow landscapes in high mountains are formed under cold climate. As a result of low temperature the evaporation tension is essentially decreasing. Meanwhile the surface flow is increasing. The biomass is low due to the lack of warmth.

Subnival zone (snow-like landscapes) are formed on some of the highest mountain peaks in the country (Aragats, Kaputjugh, Geghama etc.) above the alpine zone and represented by spots of eternal snow and ice.

Table 1. Landscape Zoning Structure in the Republic of Armenia

Medium Arax Type		Small Caucasus Type	
Landscape zones	Upper limit of dispersion (m above sea level)	Landscape zones	Upper limit of dispersion (m above sea level)
Semi-desert	up to 1250 (1300)	Sub-tropical dry steppe	up to 700 - 800
Dry steppe	up to 1600 (1700)	Dry sparse forests	up to 1000 - 1100
Steppe	up to 2300 - 2400	Forest steppe	800 - 2000 (concavity bottoms)
Forest	from 1800 to 2300	Alpine meadows	above 2000 (2200)
Alpine meadows	up to 3700		
Sub-snow	above 3700		

1.6 Soils

The Republic of Armenia has diverse soil cover subject to vertical zonation and conditioned by relief (see Table 2). The main soil types of Armenia according to the landscape zones are as follows:

Semi-desert soils include semi-desert grey, irrigated meadow grey, paleohydromorphic alkalined and hydromorphic salinated-alkaline soils.

Steppe soils cover black-soil, meadow black-soil, river-valley-plateau soils and subsoil.

Highland-meadow soils cover the highland-meadow and meadow- steppe types of soils. They have been originated on the fragmented mountain slopes and plateaus spread in the area at the altitude above 2200-2600 m ASL, under cold and humid climatic conditions. They have high humus percentage (13-20%), light mechanical composition and fragile structure, absorption ability below medium (15-20 mg/eqv), acid reaction (pH 4.8-5.5) and favorable hydrophysical properties.

Meadow-steppe lands are available at an altitude of 1800-2600 m. They have comparatively high humus percentage (8-13%), neutral or weak acid reaction (pH 5.5-6.8) expanded absorption capacity, medium and low mechanical clay-and-sand composition and favorable hydrophysical properties.

Forest soils - grey soils have been formed on the slopes in North-eastern Armenia at the altitude of 1800-2250 m. They are characterized by earthiness as a result of alleviation. There is a high humus percentage (4.8%), an average absorption capacity, from weak to strong acid reaction (pH 4.6-5.9) and favorable hydrophysical properties.

Forest turf-carbonate soils have been formed on average altitude in plicate mountains of Gugark, Hakhum, Bargushat on mother types rich in carbonate. They are characterized by considerable humus percentage (7.5-11%), on upper stratum neutral (pH 7.0-7.4), and basic

reactions in lower stratum (pH 7.8-8.5), saturated with alkali soils with medium and above medium absorption capacity, clay and clay-and-sand mechanical composition.

Forest brown soils are spread over the Virahayots, Gegark, Pambak and Zangezour mountain ranges at an altitude of 500-1700 m, whereas in the sunny- side dry slopes -- in the areas of up to 2400 m height. Earthiness, considerable stoniness, mechanical clay-and-sand and clay composition, essential humus percentage (4-10%), and medium absorption capacity, as well as carbonate percentage, and adequate physical properties of the middle part of the profile characterize them.

Table 2. Soils in the Republic of Armenia

Zones	Provinces/marzes	Soil types	Area		Altitude m above sea level
			thousa nd ha	%	
Semi-desert	Aragatsotn, Ararat, Armavir, Kotayk, Yerevan	Semi-desert grey, irrigated meadow grey, palaeo-hydromorphic, combined alkaline and saline alkali	152	5.8	850-1250
			53	2.0	
			2	0.1	
			29	1.1	
Sub-total:			236	9.0	
Dry steppe	Ararat, Aragatsotn, Kotayk, Syunik, Vayots Dzor	Brown	242	9.2	1250-1950
Steppe	Aragatsotn, Ararat, Gegharkunik, Lori, Kotayk, Syunik, Vayots Dzor, Shirak	Black-soil, meadow-black-soil, river-valley-plateau, land-subsoil	718	27.4	1300-2450
			13	0.5	
			48	1.8	
			18	0.7	
Sub-total:			797	30.4	
Forest	Ararat, Aragatsotn, Gegharkunik, Lori, Kotayk, Syunik, Tavush	Forest grey, turf-carbonate, chestnut	133	5.2	500-2400
			15	0.6	
			564	21.6	
Sub-total:			712	27.4	
Highland meadow	Ararat, Aragatsotn, Gegharkunik, Lori, Kotayk, Syunik, Vayots Dzor, Tavush	Highland- meadow, meadow-steppe	346	13.2	2200-4000
			283	10.8	
Sub-total:			629	24.0	
Total:			2616	100	

CHAPTER 2. THE PROBLEMS OF NATURAL RESOURCE MANAGEMENT

2.1 General Environmental Issues of RA

According to the National Security Strategy of the Republic of Armenia among the factors of security are “...*environmental problems and efficient management of natural resources*. The Republic of Armenia emphasizes the importance of the improved efficiency of mining industry and use of natural resources especially forest and water resources. From environmental security perspective the protection of the Lake Sevan and rational use of its resources are of special importance...”.

In the RA the main environmental issues are as follows:

- Degradation of watershed basins and wetlands;
- Inefficient management and overexploitation of natural resources;
- Uneven accessibility of natural resources;
- Degradation of forested areas and soils and desertification;
- Biodiversity loss;
- Exceeded maximum allowable rates of emissions and discharges;
- Non-regulated use of hazardous substances and wastes;
- Natural and technological disasters;
- Poor level of environmental education;
- Low public awareness;
- Obstacles of transboundary resource use (management);
- Air pollution, global climate change and ozone layer depletion;
- Introduction, non-regulated use, etc. of genetically modified plant and animal organisms.

2.2 Biodiversity

The location and relief of Armenia have contributed to rich biodiversity, endemism and rich agrobiodiversity. On the territory of Armenia (29,74 thousand sq.km) there are 3500 species of high vascular species and more than 17500 animal species, out of them about 536 vertebrates. The number of lower plants and microorganisms is more than several ten thousands. Armenia is one of the leading countries in the world by the density of high vascular species, which is more than 100 species per 1 sq.km.

There are 106 endemics in the flora of Armenia, which makes about 3% of the total species diversity of flora and 329 endemics of terrestrial fauna, out of which 316 are invertebrates. Armenia is one of the most important centers of origin for a number of plant and animal species of economic importance. Till now wild varieties of cereal and other cultivated species as well as domestic animals are represented in Armenia. There are about 2000 species important as edible, fodder, medicinal and oil-bearing plants as well as those important for honey and tar production and a number of animal species important in terms of fur, meet and others.

Wild plant species of agrobiodiversity including wild varieties of cultivated plants are of special importance in the group of useful plants.

Forest ecosystems have important ecological significance, though they occupy less than 10% of the country territory.

Due to natural and anthropogenic impact almost the half of the plant species of Armenia need some protection. At present 35 plant species of economic importance are at the edge of extinction.

386 species of flora (or 12% of the flora of Armenia) are registered in the Red Data Book of Armenia (1988). Out of them 61 were registered in the USSR Red Data Book. 35 valuable plant species have completely disappeared on the territory of Armenia. At present a number of valuable species are under the threat of extinction. At the regional level 61 plant species have been registered as those of special concern. The species such as *Acorus calamus* (valuable medicinal plant) and *Cercis griffithii* are considered threatened due to use of lands for agricultural purposes. 99 vertebrate species are registered in the Red Data Book of Armenia, including 2 species of fish, 1 amphibian, 11 reptiles, 67 birds and 18 mammals. Out of them 39 were registered in the Red Data Book of USSR and 6 in international Red Lists. 48 species of invertebrates were registered in the Red Data Book of USSR.

Out of the mentioned number of mammals the survival of 6 species is under the big threat in Armenia. These are the Caucasian leopard (*Panthera pardus*), Armenian mouflon (*Ovis orientalis*), Bezoar goat (*Capra aegagrus*), Caucasian brown bear (*Ursus arctor*), south-russian marbled polecat (*Vormela peregusna*), Otter (*Lutra lutra*) and Manul (*Felis manul*).

Armenia is a global center for species of wild wheat, rye, barley and *aegilops*. Many species originated in Armenia have been spread all over the world. Forest oak, wild rose, hazel-nut (*Corylus colurna*) and yew are in the list of rare tertiary relict species.

2.2.1 Problems

At present the work on development of new Red Data Books of plants and animals of RA is implemented by the Institutes of Zoology, Hydroecology and Botany of the National Academy of Sciences of the RA, which should be finalized in 2009. The analysis of preliminary data has shown that much more plant and animal species will be registered in the new Red Data Books.

The biodiversity use in Armenia has been done mainly without taking into account natural renewal capacities of bioresources. This approach along with the use of natural habitats have brought to gradual decline of some species and even extinction of certain species, which has resulted in the general decline of biodiversity. These processes were more active during the last century connected with increased pollution due to industrial, agricultural, transport, energy and other activities, as well as with intensive exploitation of forests, pastures and other ecosystems. During political and social-economic restructurings of recent years unsustainable use of biological resources has resulted in significant degradation of habitats (including forests, mountainous pastures and wetlands) and put some species under the threat of extinction.

Main threats to biodiversity are linked directly or indirectly with the impact of anthropogenic factors. The main threatening processes are as follows. i. loss and modification of habitats; ii. overuse of biological resources; iii. pollution, impact of introduced alien species, iv. climate change and others.

The factors of biodiversity loss in Armenia are as follows:

- Climate change and desertification;
- Non-regulated exploitation of biological resources;
- Lack of technical equipment and materials as well as professional education;
- Loss of water habitats of migratory bird species: decreasing water level of the Lake Sevan, loss of the Lake Gili, which resulted in the reduction of species from initial 150 to 50 at present;
- Forest damage from pests and diseases;
- Weak system of stock-taking and monitoring of ecological systems;
- Low public awareness about biodiversity;
- Non-regulated use of high mountainous ecosystems, forest biodiversity and threatened water habitats;
- Illegal loggings and overgrazing;
- Overuse of biodiversity and pastures by local communities;
- Unsustainable use of medicinal, edible and decorative plants as well as hunting and illegal fishing;
- Social insecurity of rural population (including sources of income, lack of alternative ecologically sustainable resources, resource accessibility and others).

The protection of areals of biodiversity including flora and fauna according to the Bern convention is one of the main environmental problems. Many rare and threatened species of flora and fauna are adapted to 1-2 ecosystems, whereas one of the best ways of particular species protection is through the protection of the whole ecosystem.

Climate change and shifts of landscape zones will have significant impact on the most vulnerable species of the flora of Armenia. It is expected that the cumulative biomass of terrestrial zoosystems will decrease by 14%, the areals and populations of some insects and reptiles will shrink and certain rare and endemic species will disappear. Imposed migrations and shrink of habitats will result in decrease of certain bird species populations.

2.2.2 Legislation

Within the framework of “Capacity assessment for biodiversity of Armenia” project (UNDP/GEF ARM/97/G/31) the State Strategy on the Development of Specially Protected Nature Areas of Armenia and National Action Plan for 2003-2010 was developed and approved by the Government of the Republic of Armenia (2002, 26 December, protocol decision N 54). It envisages a number of activities aimed at legislation and management improvement, capacity strengthening and others. In the actions the development of SPNA management plans is emphasized.

In Armenia the management of biological resources is mainly regulated by the following legal acts:

- RA Law on Specially Protected Nature Areas;
- RA Land Code;

- RA Forest Code;
- RA Law on Fauna;
- RA Law on Flora;
- RA Law on Nature Protection and Nature Use Fees;
- RA Law on Tariffs of Nature Protection Fees;
- RA Law on Environmental Impact Expertise and others.

According to the Law on Specially Protected Nature Areas biodiversity is defined as variability of living organisms, which are considered the components of terrestrial, air and water ecosystems, which includes diversity within species, between species and ecosystem diversity. Biological resources are genetic resources, organisms, their parts, populations and any other components of ecosystems having actual or perspective use and (or) value.

According to the Land Code (Article 8) the requirements of land use include “...safeguarding nature protection systems, integrity of sanitary-hygienic conditions, biodiversity protection measures on the lands...”. According to the Code (Article 28) “the planning of land resource use shall be done on the basis of social-economic, land planning, city planning, *nature protection programs* and other papers...”.

According to the RA Law on Flora (Article 1) “...plant reserve is the quantity of flora species and associations existing on certain geographic area and subject to use...”. According to the Law (Article 5) the competences of the RA Government includes “...approval of the list of flora objects subject to use, payment tariff and payment procedure...”. The competences of the authorized state body of the RA Government are “...organization and implementation of state stock-taking of flora, approval of norms and rules of plant resource use, implementation of state control over flora protection, guarding and use...”. The objects of flora are used for agricultural purposes (selection, live-stock grazing, haymaking, bee-keeping), industrial purposes (collection and harvesting of wood, medicinal, technical plants and their parts), social, nature protection and decorative purposes (recreation, health, planting, recultivation, field protection, soil protection), scientific-research and educational purposes.

According to the RA Law on Fauna the fauna reserve is the quantity of fauna species and associations existing on certain geographic area and subject to use. The Law regulates “...relations connected with the use of fauna objects...”. The competences of the RA Government (Article 5) are “...approval of state programs in the field of protection, guarding, use and reproduction of fauna, establishment of the order for protection, guarding and use of fauna objects, establishment of payment procedure for fauna objects use and others”. Among the competences of the authorized state body of the RA Government are “... establishment of the procedure and maintenance of Red Data Book of fauna, implementation of state control over fauna protection, guarding, reproduction and use...” and others. According to the Law (Article 25) the fauna objects shall be used for agricultural, industrial, social, nature protection, decorative, scientific-research and educational purposes. The objective of fauna protection and guarding (Article 16) is to secure integrity of species diversity of fauna.

According to the RA Law on Environmental Impact Expertise in the field of nature protection “...improvement and restoration of natural ecosystems damaged by anthropogenic impact, introduction of new species of animals and plants...” are subject to environmental impact expertise. The objective of the environmental impact expertise is to secure efficient and rational use of natural resources.

Environmental control over the implementation of environmental law is carried out to ensure:

- Observation of maximum allowable norms of harmful physical impacts on fauna and flora objects;
- Implementation of determined requirements of protection, guarding, use and reproduction of fauna and flora objects;
- Observation of determined requirements for export from the Republic of Armenia and import to the Republic of Armenia of wild animal and plant objects;
- Observation of determined requirements for protection of animals and plants registered in the Red Data Book and plant associations;
- Observation of determined requirements on fauna species reintroduction, climate adaptation and use for selection;
- Observation of determined requirements on climate adaptation of flora species and their use for selection;
- Observation of requirements on use of living modified organisms originated through application of modern biological technologies;
- Observation of determined requirements on protection of flora objects habitats as well as fauna objects habitats, breeding/nesting sites and migration ways;
- Observation of requirements on use of flora and fauna objects for agricultural, industrial and social purposes;
- Observation of wild animal hunting and fishing rules;
- Observation of requirements on protection of determined regimes for specially protected nature areas, observation of determined requirements on protection of trees, bushes, parks and other green zones in the areas of common use;
- Observation of rules on protection of trees, bushes, young growth and cultivated plants in forests as well as on tree and bush logging;
- Observation of restrictions preventing pollution of forests with industrial and domestic sewage waters, industrial emissions, chemical substances and wastes;
- Observation of rules on hay-making, live-stock grazing and use of pastures on the territory of the forest fund;
- Implementation of forest rehabilitation and other activities according to the forest management plans.

According to the RA Law on Tariffs for Compensation of the Damage Caused to Fauna and Flora due to Environmental Violations, the following is regarded as violation:

- Destruction of rare, threatened and Red Book animals, their eggs and breeding/nesting sites and (or) the activities which result in reduction of the number of these animals and deterioration of their habitats;
- Deterioration of flora objects (wild plants, associations, their habitats, natural monuments, botanical gardens, arboretums, forest stands) as well as water-protection, soil-protection, climate regulating and recreational functions of vegetation.

The Law establishes the tariffs for compensation of the damage caused to flora and fauna due to environmental violations.

2.2.3 Management

The inventory of bioresources of Armenia is carried out by different research institutions (Institutes of Zoology, Botany and Hydroecology of the National Academy of Sciences of RA, Yerevan State University, and Agricultural University) in a non-systematic manner and without appropriate professional approach. These institutions make research regarding the systematics of flora and fauna, less work is done on studying the state of populations of rare and threatened species and almost no research is done on assessment of biological resources.

During recent years in Armenia certain steps have been initiated on coordination of activities implemented by different state entities in the field of natural resource management. For biological resource management the Bioresources Management Agency has been established as a separate subdivision within the Ministry of Nature Protection of RA. Sevan and Dilijan National Parks, Khosrov Forest, Erebuni and Shikahogh State Reserves, Vordan Karmir, Sev Lich, Akhnabat Yew Grove, Plane Grove, Khor Virap and Gilan Sanctuaries have been subordinated to the Agency.

The Bioresources Management Agency also maintains the natural monuments cadastre. The Agency manages in-situ and ex-situ protection objects through the Departments on SPNAs and Arboretum Management. Bioresources management is regulated also by the orders and assignments of the Minister of Nature Protection of RA. They are about setting bioresources use volumes, approval of annual plans, reporting, development of mid-term financial plans, protection, scientific research and forest management activities. The State environmental inspection under the Ministry of Nature Protection of RA ensures state control over the observation of environmental legislation.

The program on biodiversity monitoring system introduction for Sevan and Dilijan National Parks has been developed for biodiversity monitoring system improvement. Soon its implementation will start. The biodiversity status monitoring system will contribute to clarification of current state of biodiversity and ecosystems, assessment of quantities of useful plant resources and animals for hunting as well as establishment of databases.

Bioresources management should be based on accurate scientific data regarding sustainable renewal of particular plants and animals. For that it is necessary to carry out the inventory of biodiversity including data on quantities of useful plant resources and animals for hunting. On the basis of gathered information the collection/hunting norms and allowable volumes should be developed and approved (according to monitoring data these norms and allowable volumes should be periodically revised).

It is important for resources and biodiversity management to assess the impact of economic activities on biodiversity within the framework of environmental impact assessment. For this it is necessary to develop (or adapt existing methods), approve and carry out new assessment methods.

For bioresources sustainable management it is necessary to ensure information availability and awareness raising. Information on biodiversity species composition, useful plant reserves and quantities of populations of animals for hunting, state of populations of rare and threatened species and other should be freely available.

Improvement of biodiversity monitoring and environmental impact assessment system, development of participatory management models and availability of information are important prerequisites for bioresources management planning and sustainable use. Possible impact of climate change on biodiversity habitats as well as research on ecosystems

vulnerability and adaptability should be included in management planning process, respective guidelines and methods should be developed.

According to the RA Law on Tariffs for Compensation of the Damage Caused to Fauna and Flora due to Environmental Violations the calculation of the compensation of the damage caused to fauna and flora due to environmental violations should be done by inspectors of the State Environmental Inspection.

According to the RA Law on Hunting and Hunting Enterprises Management the list of animals for hunting should be approved and annual allowable quantities envisaged for hunting should be defined by the authorized state body of the Government of the Republic of Armenia (RA Ministry of Nature Protection).

In the field of plant quarantine and protection the authorized body is the State Inspection on Plant Quarantine and Plant Protection of the RA Ministry of Agriculture. The RA Law on Plant Quarantine and Plant Protection regulates the import of plants, plant production and especially harmful organisms for regulated subjects to the territory of the Republic of Armenia.

2.3 Forest Resources

The forest cover of Armenia has significantly reduced due to natural-climatic and negative impact of anthropogenic factors and it is unevenly distributed. The forest cover makes 29% in the northern parts of Armenia, 13% in the southern parts and 2% in the central parts. Uneven distribution of forests is conditioned by natural-climatic peculiarities and negative impacts of anthropogenic factors, which have resulted in reduction of forested areas and forest ecosystem degradation.

According to the official information in Armenia the average site index (bonitet) is 3.6, average crown coverage is 0.55, the average wood stock is 125 m³/ha, the average annual increment is 1.3 m³/ha. For Armenia the wood biomass per capita is 12 m³. The forests are mainly located at steep mountainous slopes at the altitudes of 550-2400 m above sea level. The forested areas have mainly temperate climate, dense hydrological network and rugged relief.

The geographic location of Armenia and mountainous relief has contributed to rich biodiversity and high level of endemism. There are more than 200 forest associations, 274 species of trees and bushes can be found in forest areas out of which the main forest species are oriental beech (*Fagus orientalis*), georgian oak (*Q. iberica*), oriental oak (*Q. macranthera*), caucasian hornbeam (*Carpinus caucasica*) and pine (*Pinus Sosnovski*, *Pinus kochiana*). These species occupy 89.1% of the whole forested areas of Armenia and make 97.2% of the total forest stock. The other tree species such as birch, elm, maple, ash, pear, apple, yew, hazelnut, plane, walnut and others occur in mixture with the main species and occupy 8.4% of the total forest cover.

Beech forests cover mainly northern mountainous slopes at altitudes of 800-2000 m above sea level. Homogenous beech forests are located at the altitudes of 1000-1800 m. In the rest of mixed beech forests there are associated oak, ash, elm, lime-tree, hornbeam, maple and others. The oak stands are characterized by complex and diverse typological composition. They occupy southern light slopes at the altitudes of 600-2200 m above sea level.

In the pine forests of Armenia there are associated species such as hornbeam, oriental oak and rarely beech. There are artificial stands of pine with *Pinus silvestris* as main forest species. At the altitudes of 1900-2300 m there are mainly mixed, sparse subalpine forests. Here the main

forest species are birch (*Betula litvinovii*), maple (*Acer trautvetteri*) and mountain ash (*Sorbus aucuparia*): Open juniper woodlands mainly consist of two species of juniper - *Juniperus polycarpus* and *J. foetidissima*.

2.3.1 Problems

There are many problems conditioned by still high level of poverty in the country, illegal loggings, lack of complete information on forest resources, irregular and not scientifically based and non-coordinated forest use and other reasons, which have resulted in decrease of qualitative and quantitative indicators of forests.

Due to different social-economic reasons and high wood demand the loggings in Armenia still exceed annual increment of wood and legally harvested wood volumes. The accessibility of wood, black economic activities, needs of socially insecure population and their low capacity in terms of payment contribute to the above mentioned.

Among the main objectives of the forest policy are the development and use of criteria and principles of sustainable forest management and rational use of natural resources through balanced social-economic strategy aimed at sustainable demand and supply of forest resources.

For efficient management there is a lack of sufficient data on maximum allowable rates of forest biodiversity, monitoring indicators, possible impacts of climate change, non-anthropogenic factors of forest cover change in Armenia during recent centuries and other thematic research.

There is a need to clarify the competencies of “Hayantar” State Non-Commercial Organization and State Forest Monitoring Center of the Ministry of Agriculture of RA as well as Bioresources Management Agency and State Environmental Inspection of the Ministry of Nature Protection of RA in the field of forest biodiversity and illegal logging monitoring.

The adaptation of state forest management system to established market relations and different forms of ownership is slow.

At present there are serious problems on delineation and the status of the state forest lands and lands within administrative borders of communities. Some part of forest lands has appeared within administrative borders of communities under other land-use forms, which has brought to fragmentation of forest ecosystems.

Forest inventory, forest cadastre, forest biodiversity monitoring and special forest scientific research are not at appropriate level. Forest management plans have not been developed for all forest enterprises. Due to the lack of forest management plans the forest use in forest enterprises is carried out without proper justifications.

There are no sufficient data on current changes in the forests, diseases and pests, maximum allowable rates of forest biodiversity, monitoring indicators, possible impacts of climate change and other observations. The activities on forest reproduction and complex forest rehabilitation (seed production, soil preparation, planting, irrigation, agrotechnical capacities, tending and others) still are not sufficient. The control of pests and diseases without periodical forest-pathological studies has no preventive and regulated nature.

2.3.2 Legislation

In Armenia during recent years the conceptual documents for the forest sector have been developed including National Forest Policy and Strategy (2004), National Forest Program (2005), Illegal Logging Action Plan (2005), Forest Code (2005), State Forest Monitoring Program (2006), some by-laws (2005-2007) and others.

According to the main principle of the RA National Forest Policy the forests are national wealth and should serve also to future generations.

The National Forest Program (2005) is aimed at safeguarding the protection of forest ecosystems, restoration of degraded forest resources, sustainable use and sustainable forest management strategy. The main objectives of the Program include activities on reduction and prevention of illegal loggings, elimination of their economic and social prerequisites, environmental improvement, institutional reforms, scientific-educational strengthening and capacity building.

The improvement of legal framework and enforcement mechanisms is the most important means to achieve the strategic objectives of the RA National Forest Policy. For this purpose the former Forest Code (1994) has been revised with use of international experience and the new Forest Code of RA has been developed (2005) taking into consideration current state and developments. The Forest Code regulates forest relations irrespective of the form of forest ownership. The forests existing in the RA are considered state property (the new Forest Code of RA sets forth the possibility of community and private ownership of forests, Article 4) and managed by state entities.

According to the Forest Code the forests of RA are classified by their purpose to three categories:

- a) Protection forests;
- b) Forests of special significance;
- c) Production forests.

The following forest use activities can be carried out in the forests without causing damage to forest ecosystem (Article 35):

- a) Wood harvesting;
- b) Use of secondary wood products;
- c) Use of non-wood forest products;
- d) Forest use for reproduction and use of fauna;
- e) Forest use for scientific-research purposes;
- f) Forest use for culture, health, sport, recreation and tourism purposes.

For the forests within the system of specially protected nature areas (Article 42) the order of forest use is determined by this Code and the Republic of Armenia legislation on specially protected nature areas.

The development of by-laws on the basis of the Forest Code is carried out by the RA Government (Ministry of Agriculture) with the international support of FAO, WB and Sida. Up to date some part of priority by-laws has been developed based on the Forest Code. However, at present in the list of regulations being developed in the field of forest management there are no regulations having special environmental trend, particularly regulations aimed at prevention of possible impacts of climate change.

According to the RA Forest Code (Article 3) forest lands are forested lands allocated or envisaged for flora and fauna protection, nature protection as well as non-forested lands allocated or envisaged for the running of forest economy. Forest lands can be given on lease for construction purposes exceptionally for the needs of forest economy. The order and terms of forest lands allocation as well as restrictions over forest use and special land use regime are determined by the Land Code, Forest Code and normative legal acts approved on their basis. They are set forth in land planning, forest planning and city planning documents.

According to the RA Law on Environmental Impact Expertise the following envisaged activities in the forest economy sector are subject to expertise:

- Forest rehabilitation;
- Improvement of the qualitative composition of forests.

At present in the field of forest sector regulatory framework it is important to eliminate contradictions between different laws, develop by-laws, regulations and necessary guidelines as well as regulate mechanisms on information provision, exchange and awareness raising.

2.3.3 Management

The Forest Code clarifies the competences of the Government of the Republic of Armenia, state authorized bodies, territorial bodies of state management and local self-governing bodies in the field of sustainable forest management.

It sets forth the right for long-term lease up to 60 years (Article 50) instead of 10 years in the former Forest Code, which was an obstacle for the increase of long-term investments for forest rehabilitation, re/afforestation or forest use, and for increase of volumes of forest multiple use and use of non-wood forest products.

RA state forests are mainly managed by the RA Ministries of Agriculture and Nature Protection including the system of specially protected forested nature areas, which mainly include forest landscapes and 60-70% of the flora and fauna species composition of the country. Some part of the forests (former kolkhoz-sovkhoz forests) is within the administrative borders of communities and at present the activities on clarification of the borders and status of territories are underway.

The Ministry of Agriculture of RA is the state management body authorized by the RA Government in the field of forest protection, guarding, reproduction and use. It fulfills its competences through the Department of Plant Breeding, Plant Protection and Forestry, State Forest Monitoring Center and Hayantar State Non-Commercial Organization (SNCO) (see Appendix 2). Hayantar SNCO through its 22 Forest Enterprises (territorial branches) manages about 75% of the forest areas including 16 out of 25 sanctuaries of Armenia. Hayantar SNCO makes proposals on planning and approval of annual allowable cutting volumes.

The Ministry of Nature Protection is vested with the state control function. This is done by the State Environmental Inspection, which according to its Charter is vested with control function. About 25% of forest areas within the system of specially protected nature areas (Dilijan and Sevan National Parks, Khosrov Forest and Shikahogh Reserves, Plane Grove, Akhnabat Yew Grove and Gilan State Sanctuaries) are managed by the Bioresources Management Agency and its respective subordinate SNCOs (under the Ministry of Nature Protection of RA).

According to the new Forest Code the state forest lands which are non-forested and do not have natural regrowth can be given for free of charge use with the term of getting ownership

rights over the forest if the users carry out afforestation by their own means and according to afforestation rules and transfer the area to the category of forests.

The new Forest Code provides wider competences to territorial and local self-governing bodies in the field of forest management; in particular the mechanisms of accredited management and establishment of community and private forests have been improved.

According to the RA Law on Self-Government the community Heads shall organize the protection of community owned lands, forest and water areas as well as the environment.

Table 3. Key Entities of the Forest Management Sector of the Republic of Armenia

Title of the Entity	Functions
Department of Plant Breeding, Plant Protection and Forestry of the Ministry of Agriculture of RA	Development of state policy, legislation and strategy on forest protection, reproduction and use
Hayantar SNCO with 22 Forest Enterprises (branches) of the Ministry of Agriculture of RA	Implementation of the state policy on forest protection, reproduction and use; guarding, protection, reproduction and efficient use of RA state forest lands
State Forest Monitoring Center SNCO of the Ministry of Agriculture of RA	Monitoring of illegal loggings and state forests
State Environmental Inspection of the Ministry of Nature Protection of RA	Control over observation of rules and requirements set forth by environmental legislation
Bioresources Management Agency of the Ministry of Nature Protection of RA	Provision of services for implementation of forest management policy, in particular state forest stock-taking, inventory and forest management planning (activities by state order).
Department of Environmental Protection of the Ministry of Nature Protection of RA	Development of state policy, legislation and strategy in the field of environmental protection, biodiversity protection, reproduction and use
Forest Research-Experimental Center SNCO of the Ministry of Nature Protection of RA	Forest research-experimental activities including forest management planning

At present the planning and implementation of measures on protection, guarding, reproduction and use of forest resources is regulated by the RA Forest Code. According to the Forest Code forest management plan is a technical document which is the outcome of forest management planning and approved for running forest enterprise. The approval of state forest management plans is in the competences of the RA Government authorized state management body.

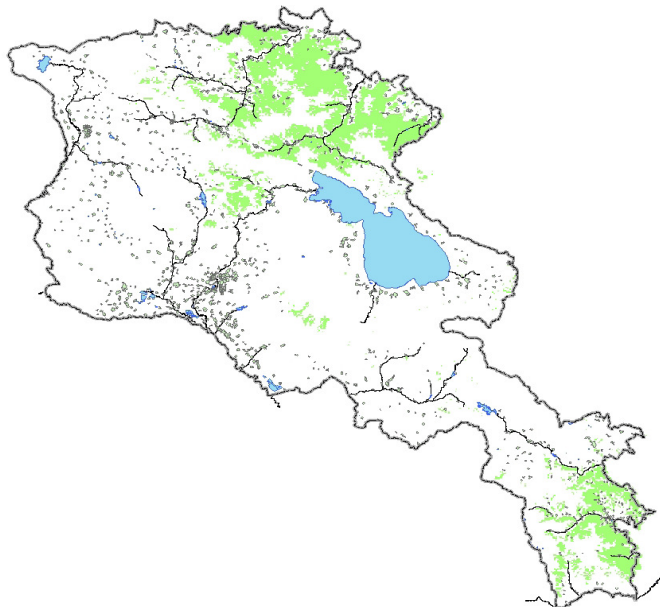
According to the RA Forest Code the forest management planning is the basis for forest management activities and forest use. Forest management plans should be developed in accordance with the Instruction on Forest Management Plans Development approved by the

RA Government. Forest management plans provide the basis for planning and implementation of complex measures on protection, guarding and use for 10 year period including locations, volumes and terms.

In accordance with the RA Forest code (Article 14) “... forest management planning is the basis for sustainable forest management...” and includes the following:

- a) definition of the forest enterprise borders;
- b) implementation of topographic activities and forest mapping;
- c) forest land inventory including description of natural conditions, species and age composition of forests, state of forest, qualitative and quantitative characteristics of forest resources;
- d) definition of the sites, order and methods of implementation of forest restoration, tending, sanitary and other cuttings, forest rehabilitation and re/afforestation and other forest management activities taking into consideration species composition of forests and availability of forest roads;
- e) justification of forest classification by purpose;
- f) logging areas with calculation of volumes of forest restoration, tending, sanitary and other cuttings;
- g) definition of volumes of forest rehabilitation, re/afforestation, forest protection, guarding and other forest management activities;
- h) description of biological diversity, secondary forest use and non-wood forest products, forest lands use for cultural, health and recreational purposes.

Map 1. RA Forest Cover by Satellite Images, Landsat, 2006



2.4 Land Resources

According to 1980-1985 land research data the land fund of the country makes 2560000 ha out of which 1112700 ha or 44% of the total lands are exposed to different level erosion. In the Republic of Armenia arable lands and perennial plantations make 0,12 ha per capita. The majority of arable lands is located on big inclinations and subject to different level erosion due to intensive spring and autumn precipitations and inappropriate agrotechnical activities. The cultivated lands in the country make 463 300 ha, out of which the lands exposed to different level erosion approach 94000 ha or 20,3% of the total territory. Erosion is more intensive in Marzes of Aragatsotn, Syunik, Kotayk, Lori and Vayots Dzor (see Table 4). The forest zone and Shirak Marz area are comparatively under slighter erosion.

The lands with average and severe erosion are mainly concentrated in Aragatsotn Marz and make 4429 ha or 8% of arable lands of the Marz. In Syunik Marz the arable lands with average and severe erosion make 1573 ha or 3,6% of total arable lands of the Marz. In Armavir Marz the lands with average and severe erosion (sub-mountainous zone) make 1188 ha and in Vayots Dzor Marz – 1064 ha or 5.1% of the Marz territory. The analysis of the data on the extent of eroded territories shows that in the country 78900 ha of arable lands is under slight erosion making 17%. The least eroded arable lands are concentrated in Shirak Marz (12183 ha), Syunik Marz (12136 ha) and Gegharkunik Marz (18481 ha).

Table 4. Distribution of Land Resources by Categories and Soil Types

Category	Total	Types of agricultural lands					Other lands
		Total	Arable lands	Perennial plantations	Hay-lands	Pastures	
Lands of agricultural significance	551,0	509,0	368,0	54,0	66,0	21,0	2,0
Lands of settlements	66,0	3,4	4,0	2,3	0,1	2,0	7,6
Lands of industry, transport, communication, etc.	95,0	7,5	1,3	0,5	1,6	4,1	7,5
Lands of nature protection, health, sport, recreational and historical-cultural significance	230,0	4,3	0,3	0,1	0,3	3,6	25,7
Land of forest fund	459,9	18,1	0,5	1,8	3,1	12,7	33,9
Lands of water fund (without the surface of Lake Sevan)	20,0	-	-	-	-	0,1	9,9
Lands of reserve fund	1660,3	344,0	120,2	5,1	67,8	650,9	316,3
Total	2974,3	1391,4	494,3	63,6	139,1	694,4	582,9

2.4.1 Problems

On the territory of Armenia the biggest volume of land use is in the agricultural sector, which during recent years has had negative impact on different ecosystems.

Overexploitation of hay-lands and pastures, unbalanced use and other anthropogenic pressures and factors have resulted in habitat losses with land degradation.

Overexploitation of pastures. In some regions overexploitation of pastures and non-regular use have resulted in severe damage of vegetation, reduced productivity and reduced areals of many valuable plant species. The flora composition is changing with domination of weed, thorny and poisonous species over fodder species. Due to irrational use the pastures lose production capacity and become low-value or non-usable lands.

Overexploitation of hay-lands and pastures, unbalanced use and other anthropogenic pressures and factors have resulted in habitat losses with land degradation. Overexploitation of pastures, the lack of roads (for moving live-stock to mountainous pastures during spring), almost complete lack of improvement measures and non-systematic grazing result in reduction of vegetation on steep slopes, gradual degradation of lands and limited use of hay-lands.

Due to climate change it is predicted that the total surface of pastures and their productivity will drop by 4-10%, including reduction of most valuable productive pastures of sub-alpine and alpine zones by 19-22% and reduction of forest pastures productivity by 7-10%.

Due to predicted climate change dependent on the vegetation stage and site altitude it is expected to have soil humidity reduced by 10-30% and increase of soil humidity lack by 25-50 mm. In case of predicted climate change the productivity of plant-breeding in Armenia may decrease by 8-14%. The productivity of cereal will be reduced in average by 9-13%, water-melon, melon and gourds – by 7-14%, potato – by 8-10%, fruit cultures – by 5-8%. The productivity of grape can grow by 8-10%.

The soils degraded due to different reasons easily lose capacity for restoration, which results in the loss of biological and economic productivity. Due to the damage of plants and vegetation the soil gets eroded. The physical structure of the soil deteriorates due to temperature, winds and water, which results in reduced soil productivity and desertification, reduced productivity of agricultural plants with contribution to poverty.

The natural and anthropogenic factors of desertification in Armenia are as follows:

Natural factors

- Climate change
- Landslide (which includes about 125 settlements)
- Natural salination;
- Torrents;
- Floodings and inundations (of about 56000 ha lands including 30% of the Ararat valley), which are among the causes of salination.

Anthropogenic factors

- city construction activities on valuable agricultural lands, forest lands and natural landscapes;
- agricultural activity with inappropriate rotation, non-observation of ploughing rules, shortcomings of irrigation system and live-stock overgrazing;

- loggings exceeding planned volumes, in some cases due to inappropriate planning of sanitary cuttings;
- use of underground resources – degraded lands and new sites of erosion due to open mining method (about 8000 ha in the country);
- soil pollution due to activities in the agricultural, industrial, energy, transport and municipal sectors.

In Armenia due to lack of suitable lands the steep slopes with rugged relief are used; they are prone to torrents, inundations and subject to flooding, which contribute to soil degradation.

The lack of territorial planning documents (city planning programs, land planning, forest planning) regulating land use, land protection and city construction activities is a key reason for inappropriate and non-regulated use of land resources. Another reason is insufficient mechanisms for observation of the norms determined by the above mentioned documents (in case they exist). The principles of landscape planning and methods are almost not used in the field of land use and land planning.

The classification principles of the land fund determined by the RA Land Code and land inventory order and land balance form approved on the basis of the Land Code do not allow to have clear picture of existing lands in the country, as they combine the concepts of “purpose of the lands” and “legal regimes of land use”. The forests in the specially protected areas (National Parks, Reserves and others) in the determined form of land balance are not included in the category of forest lands.

There are also problems with lands for the objects of energy, communications, transport and municipal infrastructure as the lands located under or above linear infrastructures are defined as a separate category (by purpose). This situation creates serious problems not only for classification and inventory of the land fund, but also during development of planning documents (city planning, land planning, forest planning) as during delineation of separate zones determined by these documents there is always chance for uncertainty and dilemmas.

The control of soil degradation is one of the key aspects of nature protection measures which requires gradually increasing material-technical means. It is more reasonable to prevent degradation rather than fight its consequences, which is more difficult and less efficient.

Thus, the main threats of land resources and biodiversity are connected with anthropogenic impact. The main dangerous processes are the loss and transformation of biodiversity habitats, overuse of biological resources, environmental pollution and others. All these threats bring about degradation of ecosystems.

2.4.2 Legislation

According to the Land Code of RA the state regulation of land relations includes formulation of the state policy directions in the field of land resource management, holding, use and disposal.

According to the Code (Article 19) the lands of specially protected areas are as follows:

1. The plots having decorative, nature protection, scientific, historical and cultural, recreational, health and other values, for which a special legal regime is established. By decision of the state management and local self-governing bodies these areas can be withdrawn partially or fully from economic use and civil circulation.
2. The lands of specially protected areas by their functional significance are classified as

- a) Nature protection lands;
 - b) Lands envisaged for health purposes;
 - c) Lands envisaged for recreational purposes;
 - d) Historical and cultural lands
3. The order for designation, allocation, use and protection of the lands of specially protected areas shall be determined by the Government.
 4. The order for designation of the lands of specially protected areas and restrictions over their use as well as legal regime shall be determined by the law.
 5. Any activity which contradicts to the functional purpose and determined legal regime of the lands of specially protected areas shall be prohibited.
 6. Zones shall be defined in the specially protected areas with determined special legal regime of land use and limitations of plots, including servitudes. The owners' lands shall not be included in these zones, except the cases when by the regime determined for the zone these plots are fully withdrawn from economic circulation as well as in the cases determined by the law.

In Armenia the nature and types of land resources use mechanism are conditioned by the form of land ownership and regulated by the RA Civil and Land Codes. According to the RA Civil Code (Article 168) the property belonging to the Republic of Armenia by ownership rights is the state property. The lands and other natural resources which do not belong to citizens, legal persons or communities are state property.

The plots owned by the state or communities cannot be leased for more than 99 years, the lease term for the lands of agricultural purpose shall be up to 25 years. The right for state and community plots lease shall be given by competition through public biddings. The cases of plots allocation without competition shall be determined by the Government.

The lands within the borders of given community shall be the property of city and rural communities, except lands belonging to the state, citizens, legal persons and other subjects of ownership. Out of the borders of communities the plots given to community ownership or those acquired by communities can also be the community property.

According to the RA Law on Environmental Control the environmental control in the field of land protection shall ensure the following:

- a) observation of determined restrictions and norms for protection of soils from wind and water erosion, inundations, waterlogging, salination, industrial and domestic wastes, pollution by chemical substances, landslides and other impacts causing deterioration of lands as well as implementation of nature protection measures;
- b) observation of requirements on removal, storage and use of the fertile layer of soil during the activities connected with the damage of the soils;
- c) observation of environmental restrictions and norms for use of lands allocated for nature protection, including specially protected nature areas and for underground resource extraction, as well as of forest and water lands;
- d) Observation of the norms on the use by purpose and functional significance of lands for nature protection, water and forest fund lands, those allocated for underground resource extraction, as well as observation of the norms determined by land planning, forest planning, city planning documents and land zonation and use schemes for the sanitary

and buffer zones (except sanitary and inalienable lands of water systems) of the mentioned lands.

2.4.3 Management

In Armenia the monitoring of lands is not regulated and different organizations deal with monitoring which results in the lack of clear indicators on land resources as well as coordinated process of data collection and processing.

The management system for land resources differs from the other sectors of natural resource management, where there are certain authorized bodies in the field of use and protection. The functions and competences related to the management of land resources are distributed among local self-governing and territorial governing bodies, as well as 13 bodies of state management.

In the result of land prioritization the fragmentation of the lands of agricultural purpose cause obstacle for using lands as a production factor. In some regions of the country the lands belonging to one household are divided in more than 5 plots. In addition, in some regions the total land area belonging to one household does not exceed 1 ha, which is also an obstacle for effective agricultural activities. The state is still the biggest land owner, though at present the role of local self-governing bodies has increased in the fields of land resource management and protection.

The RA Land Code sets forth that land relations in the RA should be regulated on the basis of combination of the followings:

- Land is natural resource;
- Land is a real estate object;
- Land is a main means of production;
- Land is a territorial basis.

According to the mentioned classification the authorized bodies for land resource management are as follows:

- Land as natural resource – RA Ministry of Nature Protection;
- Land as real estate – the State Committee on Real Estate Cadastre adjacent to the RA Government, private land owners;
- Land as a means of production – RA Ministry of Agriculture;
- Land as territorial basis – RA Town Planning Ministry.

The territorial bodies of state management are vested with certain (mainly control) authorities and local self-governing bodies are the core bodies of land resource management. Starting from 2008 after inclusion of the lands out of the administrative borders of communities in the administrative borders of communities the local self-governing bodies will also be vested with the authority (as delegated authority) to alienate and allocate for use the state owned lands.

According to the Law on Territorial Management the community is vested with the following authorities in the field of land use:

1. development of zonation and use schemes of town and rural communities lands by the order established by the Government;

2. alienate or allocate for use community owned lands by the established order and according to the community lands zonation and use schemes, other documents on zonation and town planning program documents with respective consent of community councils and by established terms.
3. by the order established by the law control over appropriate use of the lands within administrative borders of communities and over observation of land legislation requirements by land users.

The head of community is vested with the following obligatory authorities in the field of nature and environmental protection:

- Protection of community owned lands, forest and water areas as well as the environment;
- Control in the field of nature protection;
- Implementation of measures on use and protection of underground resources, forest, water and air areas as well as flora and fauna;
- Safeguarding land protection from erosion, inundation, waterlogging and pollution with chemical and radioactive substances and industrial waste.

The Center for Ecological-Noosphere Research SNCO of the National Academy of Sciences of RA implements activities on land pollution monitoring.

2.5 Water Resources

The surface water resources of the country make annually 6250 mln m³ and confirmed underground water resources available for use – 1200 mln m³.

In Armenia there are 9480 small and large rivers with the total length of about 23000 km. 14 out of them are longer than 35 km. 379 rivers have the length exceeding 10 km. Some part of small rivers has temporary flows.

Mountainous rivers of Armenia mainly have low water-level with average flow of 7.187 billion m³ during summer months and 5.2 billion m³ during arid years. Due to the high mountainous nature of the country almost all rivers flow out of the borders of Armenia.

The lakes of Armenia are small. Many of them are located at high altitudes in the river-heads of mountainous rivers. A part of rivers have been formed in craters and volcanic structures. Mountainous lakes have fragile ecosystems, but the level of anthropogenic activities within their watershed basins is low.

The Lake Sevan is the biggest lake of Armenia. It is also one the biggest high mountainous lakes of the world with unique water ecosystem and a few endemics; its water has high content of phosphorus and low content of nitrogen. The size of the lake, its chemical composition as well as fauna and flora have been significantly changed during recent 50 years due to the decrease of the water level (19m) and anthropogenic impact. The former oligotroph lake has turned into mesotrophic. The drop of the water level has resulted also in drying of the breeding areas of certain subvarieties of Sevan trout. Some 100000 ha of littoral marshlands have been dried including nesting areas of migratory birds.

There are not many marshlands and wetlands in Armenia. In the Ararat valley about 1500 km² of marshlands have been drained and turned into agricultural lands. The Lake Gilli has lost 80 km² of marshlands due to the decrease of the level of the Lake Sevan. In mountainous marshlands the water resources have low content of salts and in low altitude marshlands,

particularly in the Arax valley the waters are more salty, which is the result of intensive evaporation.

The reservoirs in Armenia have been constructed for irrigation and hydroenergy purposes, they mainly have bigger volume than lakes and they are located close to settlements. As they are the structures with regulated inflow and outflow they are of limited interest from ecological perspective. Higher plants (macrophytes) and many fish species do not adapt to water reservoirs due to periodic changes of the water level. For meeting the requirement of surface water in the periods of low water-level 74 water reservoirs have been constructed with total useful volume of about 1000 mln m³. About 15 irrigation dams need serious reparation and some dams are under the high risk of destruction if used at full capacity. About 10 new dams are under construction, which can reserve additional 400 mln m³ water.

Armenia has significant underground water resources and about 70% of this reserve is being drained to the Ararat valley. Deep ground waters are of high quality and mainly well protected from pollution. Higher ground waters and spring waters are also of high quality, but are more vulnerable to agricultural, industrial and domestic pollution.

Armenia is rich in underground freshwaters and mineral waters, which are the important component of natural mineral resources. Underground waters are mainly fed from atmospheric precipitations and water steams being condensed in mountainous massifs and soils as well as water from lakes, reservoirs and surface flows. Andesite-bazalt longwalls and their fission-fragmented varieties have exceptionally important role in the formation of underground waters. Being porous they easily absorb 70% of precipitations and make significant water flows at different levels of the longwalls or on the border of the longwalls and old rock bases. These waters flow out to the earth surface in the form of springs (Goght-Garni, Akunk, Arzni, Gyumush, Sarukhan, Shaki and many others).

In inter-mountainous concavities the main reserves of water under pressure are located in Ararat and Shirak artesian basins in the lake sediments and longwalls. Mineral waters saturated with gases are formed deep in the ground and flow out to the earth surface in the form of cold and warm springs. The majority of mineral waters are saturated with carbon dioxide, therefore Armenia is considered a land of carbon dioxide mineral waters. The biggest mineral water areas in Armenia are Jermuk hot (similar to Carlsbad), Hankavan and Lichk (similar to Esentuki), Arzakan and Bjni warm (similar to Vishi), Dilijan cold (similar to Borjomi), Ararat and Tatev warm (similar to Narzan) water sources. In Ijevan region there are sulfate mineral waters similar to Narzan. In the vicinities of Yerevan there are salty-alkaline waters with different mineralization level such as Arzni, Getamej and Avazan.

2.5.1 Problems

In the field of water resource management at present there are the following main problems: pollution of surface and underground water resources, unsustainable use of water resources, floodings and non-complex management of water resources.

The economic crisis and non-functioning of industrial objects have resulted in the improvement of surface water quality. However, according to predictions in parallel with economic development the quality of surface waters will decrease due to industrial and domestic sewage waters and pollution from agriculture. At present this prediction is already the case.

Water resources of the country have uneven distribution by territories and seasons, which results in lack of water in some regions with unused water reserves in some other regions.

Poor maintenance of the drainage systems has caused soil salination and contributed to malaria cases in the large areas of Ararat valley.

One of the problems of water resource protection and sustainable use in the country is the protection of the Lake Sevan with its freshwater as the only source of drinking freshwater for the region in future. The lake occupies 1240 km² area, it is located at the altitude of 1897 m above sea level. During recent years the problem of the lake water level has been regulated to some extent, however the problem of fish and crayfish overuse still exists. A new problem related with the lake is connected with flooding of littoral areas and forests due to the water level increase during the recent years.

In the Republic of Armenia annually about 400-500 mln m³ sewage waters flow into open water basins. In Armenia all towns and about 100 villages have sewage networks and domestic sewage waters flow into surface water reservoirs or non-water areas without cleaning. Formerly functioning 20 sewage cleaning stations at present do not function. The only exception is the Yerevan sewage cleaning station where the partial mechanical cleaning is done. The drainage system of Yerevan ensures the drainage of sewage water from 97% of the total territory of the city. The total length of the drainage collectors and networks of the settlements makes about 4200 km. Industrial sewage waters also flow into surface water reservoirs without cleaning, including mining waters. Water drainage systems in rural settlements are mainly absent.

Inappropriate use of fertilizers causes pollution of water resources with organic matters through irrigation and precipitations. Poor management of solid domestic waste, poor state of landfills for solid domestic waste or their absence, hazardous waste, pesticides, surface flows coming from precipitation and containing oil products and products of human economic activity are also the factors of surface and underground water pollution.

The pollution of surface and underground water resources brings about degradation of river ecosystems and littoral areas, disturbance of ecological balance, a number of health and social-economic problems (epidemics, productivity decrease, economic decline). The decreased supply of quality water can cause migration of population.

Unsustainable use of water resources results in drastic decrease of water quantity and springs exhaustion. In its turn it brings to decreased supply of sufficient quality and enough volumes of water to population, reduced productivity of agricultural lands in the low streams, degradation of water and littoral ecosystems, intensification of desertification, biodiversity loss or change of species composition/succession.

Floodings periodically cause problems to town and agricultural areas, settlements, industrial and construction objects and communication lines. Their impact results in significant material losses and human death. Simultaneously the floodings cause pollution and degradation of environment and water resources as well as climate change, non-efficient management of water resources, failure of hydrotechnical structures and global climate change.

Floodings and torrents cause big damages also to households, disturb supply of drinking and irrigation water and water of industrial enterprises as well as communication systems of settlements. They can cause drastic economic decline and epidemics.

Poor watershed management, poor basis for water resources supply and demand can bring to exhaustion, pollution and lack of water resources, degradation of water and terrestrial ecosystems, biodiversity loss, conflicts between water users and reduced capacities for fulfillment of commitments by international agreements.

Non-rational use of water brings to wrong assessment of water demand by water users, which results in wrong distribution of water resources, lack of water required for ecological balance of water resources (rivers) causing conflicts within and between watersheds as well as transboundary conflicts.

In case of the most possible scenario of climate change it is expected to have decrease of annual water flow of rivers by 15% and increase of the Lake Sevan surface evaporation by 13-14%.

2.5.2 Legislation

In Armenia during recent years the Water Code, National Water Program and National Water Policy have been approved. The Policy sets forth the following:

1. it defines perspective aims and objectives of strategic development of water resources use and protection, which serve as the basis for definition of priority principles of water use;
2. it has provisions on policies implemented in the field of water relations, including the development of water basins strategies and plans for coming 10-15 years;
3. it provides preliminary assessment of the quantity and quality of water subject to distribution, assessment of current and future demand of population and the economy in order to solve the problems connected with provision of appropriate quantity and quality of water resources.

The mechanisms of water use in Armenia are regulated by the following:

- RA Water Code (adopted 23.03.92, N HN-0533-1-HO-14);
- RA Law on Nature Protection and Nature Use Fees (adopted 28.12.98, N HO-270);
- RA Governmental Decision N 864 from 30.12.1998 on Tariffs on Nature Use Fee, and other legal acts.

According to the Water Code “water use is the use of water objects, surface and underground waters of the country for meeting the requirements of population and the economy”.

Specially protected watersheds and wetlands are those watersheds and wetlands or their parts, which are regarded as important from the perspective of water standards protection and require respective management and have international importance from the perspective of water standards protection.

Transboundary water resources are those surface and (or) underground water resources which cross the state border, touch the state border or are located on the state border and having the bottom and banks on one of the sides of demarcation line belonging to the Republic of Armenia. Transboundary impacts are those harmful consequences of environmental impacts, which are the result of the change of transboundary water resource state if the source of the change is anthropogenic and located in one of the transboundary water resource countries and its impact spreads also over the environment of the other country. The terms of transboundary water resources use and protection on the state borders are determined by interstate agreements and (or) contracts between the Republic of Armenia and the border countries.

According to the RA Land Code (Article 26):

1. Water lands are the lands covered by water objects – rivers, natural and artificial reservoirs and lakes as well as the lands allocated for hydrotechnical, water economy and other objects required for the use and protection of water objects;
2. Water lands can be used for drinking water, domestic, health and other needs of population as well as for construction and exploitation of the objects required for meeting the state and community needs of water economy, agriculture, nature protection, industry, fish economy, energy and others.
3. Sanitary protection zones with special land use restrictions set forth by land planning and town planning documents shall be designated in accordance with the legislation for the protection of natural and artificial water objects requiring special sanitary protection as well as for the protection of population from negative impacts of industrial, transport and other objects.

According to the RA Law on Environmental Impact Expertise the following in the field of water economy shall be subject to environmental impact expertise:

- Water reservoirs and dams, deep canals, pump stations and other water economy structures;
- Extraction of underground waters.

According to the RA Law on Environmental Control the environmental control in the field of water protection shall ensure:

- a) observation of restrictions on unauthorized and irrational use of water resources;
- b) observation of the requirements of water use requiring permit and free water use;
- c) observation of restrictions on pollution of water resources exceeding defined rates and on water regimes of watershed basins;
- d) observation of the rules on state stock-taking of water resources;
- e) observation of the requirements on locating waste disposal areas, landfills, graveyards and other objects having indirect negative impact on water resources;
- f) observation of the requirements defined for the activities having impact on the state of water resources;
- g) observation of the requirements defined for use of water resources for recreation and sport;
- h) observation of the norms – rates and restrictions – for water resources protection and use determined by the national water program.

According to the RA Law on Hydrometeorological Activities in the field of hydrology the activities of the hydrometeorological service shall be done with the aim of collecting data on rivers, lakes, reservoirs, canals, marshlands, underground resources, other water objects and water resources, which are necessary for.

- a) meeting the needs of the population and economy by use of information on changes of hydrological regime of water objects (floodings, inundations and others);
- b) studying the spacial-time patterns of water regime, carrying out state stock-taking of waters, maintaining water cadastre, calculating water resources and water balance of water reservoirs and lands, assessing the impact of economic activities on water objects regime and water resources.

2.5.3 Management

According to the RA Water Code “... water resources are all surface and underground waters including streams, rivers, springs, wetlands, lakes, small lakes, snow covered areas, glaciers, water layers and any other water bodies including temporary water resources”.

The highest advisory body in the field of water resources management is the National Water Council, which through intersectoral participatory process discusses and makes proposals on national water policy, national water program and other legal acts related to the sector. The Chair of the National Water Council is the Prime Minister of the Republic of Armenia.

The water resources of the territory of the Republic of Armenia are state property and shall be alienated, possessed and used by the order determined by the legislation. In the state owned water systems the state and (or) private management can be implemented.

In Armenia water users can be state management bodies, organizations, institutions and citizens. The water objects shall be given for use to meet domestic needs of population as well as to meet health, industrial, energetic, transport, fish breeding, state and other public needs.

In the result of the Water Code and National Water Program adopted in the country during recent years and institutional reforms implemented on their basis the competences in the field of water resource management and protection have been clarified and distributed among a number of bodies such as the National Water Council, Dispute Resolution Committee, 5 bodies of Watershed Management, River Basin Councils, Water Resource Management Agency, State Committee of Water Economy, Water Users Associations and others.

The Water Resource Management Agency functions within the structure of the Ministry of Nature Protection of RA with the aim of water resource management and protection. It is a body authorized by the RA Government to carry out water resource management and protection in the framework of National Water Policy and National Water Program. It ensures the development and implementation of watershed management plans, provides support to water resource monitoring, includes its results in the planning and management processes, coordinates the activities on development and implementation of the programs related to water resource management and protection and others. The body on water resource management and protection in cooperation with respective stakeholder state management bodies shall develop draft standards on water quality. The water quality standards are included in the National Water Program and should correspond to the established classification system.

The State Committee of Water Economy functions within the structure of the RA Ministry of Territorial Management with the aim of water systems management. It is a body authorized by the RA Government to be responsible for water supply, water drainage, water systems management, safeguarding their security and protection. It is responsible for the management and secure use of water systems owned by the state.

Water resource management is carried out in accordance with the watershed management plan, which is a complex document on watershed management with the description of management and protection activities to be implemented in the watershed. It should be developed on the basis of the National Water Program with coordination of sectoral and public interests. The Management Plans should be approved by the RA Government.

The watershed management plans establish those types of activities, which should be prohibited or restricted on certain areas to prevent or minimize the damages caused by the

disasters. The order of construction activities on those territories should be established by the Government.

The polluter of water resources should immediately inform the water resource management and protection body about the case. The water resource management and protection body should immediately inform the public about the case with guarantee of the risk level for persons under the risk and inform about possible consequences.

Water Users Associations and their Unions are non-profit organizations with the status of legal persons, which carry out the use and maintenance of irrigation water supply on the basis of public interests.

The list and status of specially protected water resources are established by the RA Government. The status and protection regime of the specially protected water resources of international significance are approved by international agreements of the Republic of Armenia.

Water objects which are natural monuments can be designated as reserves or be given to reserves for use without time-limit. The publicity of the information on protection of water objects which are natural monuments is ensured by the Water resource management and protection body.

In accordance with the Law on Territorial Management the heads of communities shall organize the protection of community owned lands, forest and water resources as well as the environment.

The Environmental Monitoring Center of the Ministry of Nature Protection of RA is responsible for the monitoring of the quality of surface waters such as rivers, lakes and reservoirs. There are about 130 stations of water monitoring. The Center for Ecological-Noosphere Research of the RA National Academy of Sciences carries out the activities on water quality monitoring.

2.6 Underground Resources and Minerals

The territory of the Republic of Armenia is rich in minerals. In Armenia mineral mines have been known since historical times. They have been used not only to meet own needs, but also to be used for exchange of commodities. According to archeological data still in the ancient times there have been known mines of copper, gold, iron and other minerals and some of them have been even partially exploited.

Before the 20-ies of the 20th century a couple of small metal mines and possible mines have been known on the territory of Armenia, which were poorly studied. Since 1930-ies a number of mines and numerous possible mines of metal and non-metal minerals have been identified and studied. Among them the mines on copper, molybdenum, gold and silver, lead and zinc, iron, aluminum, perlite, bentonite clay, food salt and others are of industrial significance.

Among metal minerals in Armenia copper-molybdenum mines are the most important ones. They are mainly located in the south-eastern part of the country on the Zangezur mountainous range (Kajaran, Agarak, Dastakert, Lichk, Shikahogh and others). Relatively smaller copper-molybdenum mines are known also from the central (Yelpin, Vardenis) and northern (Hankavan, Teghut) regions of Armenia.

Out of the mentioned mines at present the Kajaran and Agarak mines are under exploitation. The Kajaran copper-molybdenum mine is the biggest metal mineral mine on the territory of Armenia; it includes a number of mining areas.

The next important group of the metal mineral mines identified on the territory of Armenia is pyrite mines. They are represented by sulfur-pyrite (Tandzut), copper-pyrite (Alaverdi, Shamlugh, Kapan and others), multimetal pyrite (Akhtala) and pyrite gold-multimetal (Shahumyan, Khalaj and others) formation types.

On the territory of Armenia a number of gold mines have been identified and explored (Sotq, Meghradzor and others), which are very different by the mineral composition and geological structure.

On the territory of Armenia there are also small mines and possible mines of iron (Abovyan, Hrazdan and Svarantsi), chromite (Shorzha), magnesium (Sarighyugh, Sevkar), antimony (Amasia), mercury (Khosrov, Vardenis) and arsenic (Salvard), which are not exploited.

The territory of the Republic of Armenia is also rich in non-metal minerals, which are widely used in the economy: chemical industry (baryte, sulfur pyrite, rock salt), construction (andezite-basalt rocks, granites, volcanic tufos, volcanic slag, lime, travertines, pumice-stone, perlite) and oil industry (bentonite clays).

At present diverse and multi-color volcanic tuffs, andesites, basalts, volcanic slags, perlites, pumice-stones, bentonite and fire-clays, travertines and others are being exploited.

According to the state balance of Armenia on the territory of Armenia there are 417 identified mines of solid minerals (black, color and precious metals, facing and construction stones, for production of construction materials, decorative stones) and other multipurpose raw materials. At present out of them 135 are being exploited. The rest 282 mines (including 15 metal mineral mines) are registered in the state balance as explored reserve objects (mines).

2.6.1 Problems

The territories disturbed by the mining industry cause landscape destruction, loss of biodiversity and agricultural significance of lands as well as pollution of surface and underground waters and air. The disturbed areas along with the landfills and tails in the dry and windy seasons turn into the areas of dust and chemical pollution putting at risk the health of population in mining and neighboring areas.

The restoration of the territories disturbed by the mining industry (recultivation) will give a chance to restore deteriorated lands, make them suitable for use for agricultural and forest needs, reduce the territories under severe and mild desertification, support the environmental balance of mining areas and prevent technogenic factors causing desertification.

2.6.2 Legislation

According to the RA Land Code the land fund is classified by purpose significance (categories) to the categories of "... industrial, underground resource use and other production significance...". In Armenia the use of underground resources including extraction of minerals is mainly regulated by the RA Law on Underground Resources, RA Law on Concession of Underground Resources for Exploration with Mineral Extraction Purposes and for Mineral Extraction, the Regulation on the Use of Underground Resources for Mineral Extraction adopted by the RA Government by decision N 374 from 5 August 1994 and other legal acts.

According to the above mentioned Code (Article 5) the state management of the use and protection of underground resources in Armenia is done by the Government of the Republic of Armenia and state management bodies authorized by the Government of the Republic of Armenia by the order established by the legislation of the Republic of Armenia.

The underground resources can be used for the following purposes:

- Geological studies;
- Extraction of minerals;
- Use for the purpose having no connection with the mineral extraction.

The use of certain areas of underground resources can be restricted or prohibited by the law of the Republic of Armenia and other legal acts (Article 8) to ensure human health, national security and environmental protection. Requirements include the use of methods and ways ensuring human security and environmental protection (Article 25).

The authorized body in the field of underground resource use and protection (Article 6) ensures control over the observation of established norms and rules in the field of underground resource use and protection, as well as development and implementation of the plans on underground resource use and protection. The negative impact on the environment in the process of underground resource use and implementation of environmental measures are subject to state control.

The users of underground resources can be the organizations, which have the respective field of activities mentioned in their charters. The use of underground resources by foreigners and international organizations as well as by citizens should be done by the order established by the RA legislation.

The use of underground resources is a paid activity and should be done by the patent and according to the contract. The tariff for use of underground resources is defined by the order established by the RA Government. In case of mineral mines exploitation the fee should be equivalent to the type and volume of the raw material extracted.

According to the RA Law on Environmental Control the environmental control in the field of underground resource protection ensures the following:

- a) observation of established requirements on underground resource use, protection and concession of underground resources for use;
- b) observation of established requirements of underground resource use and environmental protection for geological study, exploitation of mineral mines, construction of underground structures having no connection with mineral extraction (including transport ways) and disposal of industrial waste as well as their use;
- c) observation of established requirements on having complete geological and mine-surveyor documentation during underground resource use as well as on stocktaking of the minerals extracted and those left as underground resource and provision of information;
- d) implementation of underground resource use activities in accordance with the respective approved plans;
- e) implementation of environmental measures for prevention of negative impacts on the environment during underground resource use;
- f) observation of the responsibilities established by patent and (or) license and (or) contract by underground resource users.

2.6.3 Management

The Mineral Resource Agency of the Ministry of Nature Protection of the Republic of Armenia provides state expertise services in the field of underground resources study, industrial assessment and extraction.

To achieve its goals and objectives the Agency implements the following functions by the order established by the legislation of the Republic of Armenia:

- a) underground resource state expertise of the substances of industrial assessment during different stages of mineral mines exploration and mine exploitation and approval of respective parameters;
- b) underground resource state expertise (hereinafter expertise) of calculated reserves of minerals in the underground resources by the results of detailed exploration and reassessment of mines as well as verification and reverification of these reserves;
- c) writing off resources that have lost industrial significance as well as if mineral resources were not confirmed during further geological exploration and (or) exploitation activities;
- d) participation and coordination (in case of respective financing) of the activities on development of the classifications of interdepartmental significance for mine reserves of solid minerals, underground waters, oil and gas (hereinafter classification) and their submission by the established order for approval by the Government of the Republic of Armenia.
- e) development and submission for ministerial approval of instructions defining requirements for the content and format of the materials subject to state underground resource expertise;
- f) participation and coordination (in case of respective financing) of the activities on development of instructions and other methodological documents regarding the use of classifications for different types of mineral mines;

The aims and objectives of the Geological Agency of the Ministry of Nature Protection of the Republic of Armenia are as follows:

- a) ensure complex geological studies for minerals identification on the territory of the Republic of Armenia including geological, hydro-geological, engineer-geological, geo-chemical and geo-physical mineral surveys, ensure accompanying general search activities as well as other geological investigation activities carried out for other than minerals identification purpose;
- b) Within the limits of its authorities coordinate geological-investigation activities carried out on the territory of the Republic of Armenia;
- c) Ensure methodological basis for geological-investigation activities carried out on the territory of the Republic of Armenia;
- d) Ensure drawing and publication of geological, tectonic, hydro-geological, engineer-geological, geo-physical, geo-chemical and other maps of state significance;

As a rule the use of underground resources has terms. The terms of use are defined in the respective agreement on the basis of the patent. The underground resources are given for use for mineral extraction through specially authorized state bodies in the field of underground resource use and protection, which issue the permit (patent). Issuing of patents for mineral extraction is prohibited without having resources confirmed by the established order.

On the basis of issued permits (patent) a contract is made between the underground resource user and the Ministry of Nature Protection of the RA; it is a legal act regulating relations between contracting parties during the use of underground resources.

According to the RA Law on Concession of Underground Resources for Exploration with Mineral Extraction Purposes and for Mineral Extraction (Article 59) the programs on environmental protection should include provisions aimed at "...protection and maintenance of air and water basins, soil, fauna and flora as well as areas having cultural, architectural, archaeological, historical and geographical significance..", which should comply with the national standards of environmental protection.

2.7 Atmosphere Protection and Climate Change

The 1980-1990-ies were the years of most intensive air quality control of settlements, however the network of air basin quality control stations in the country was not sufficient. In 2006 the monitoring of air pollution was implemented in Yerevan (5 stations), Vanadzor (3), Alaverdi (2), Hrazdan (1), Ararat (1), and Gyumri (1). The air samples were tested for the content of dust, sulfur dioxide, carbon oxide, nitrogen dioxide and monoxide, benzene, toluol, xylol, ethyl benzene, ozone and chloroprene.

The data received are summarized in monthly and annual reports and provided to official persons, the Ministries of Nature Protection, Health and Agriculture and other stakeholder organizations.

According to the summary report of the Environmental Inspection of the RA Ministry of Nature Protection, in 2005 on the territory of the RA the number of stationary sources of emissions was 2043, out of which 81.1% were within the maximum allowable limits. The quantity of harmful substances in the emissions from stationary sources made 190.4 thousand ton, out of which 73.2% was captured and 26.8% - emitted to the atmosphere. The emissions made 81.1 ton per each organization causing emissions, 15.8 kg per capita and 1.7 ton per 1 square km (without the surface of the Lake Sevan – 1253,8 square km by the average from 2005). The sulfur anhydrite made 48.6% (24.8 thousand ton) of the harmful substances emitted to the atmosphere, carbon oxide – 40.0% (20.4 thousand ton) and nitrogen oxides – 3.3% (1.7 thousand ton). The cumulative amount of heavy metals in emissions made 35.2 ton. The amount of the dust emissions made 2.8 thousand ton, out of which 16.2% (0.5 thousand ton) was organic dust. In 2005 the amount of evaporating organic substances in the total atmospheric emissions made 121.3 ton.

In 2005 in Armenia the emissions from the transport made only 1354119 ton, out of which the harmful emissions made 146873 ton.

In 1992 Armenia joined the UN Framework Convention on Climate Change. The Ministry of Nature Protection has implemented a number of activities in the framework of the Convention on Climate Change. In 1998 the First National Communication of RA on the climate change was submitted. It presents the national cadastre of greenhouse gases, the predictions of their emissions till 2010, the reflection of the global climate change on the climate of Armenia and possible impact of this change on the economy, ecosystems and human health in the country.

The second phase of the Project on Technological Needs Assessment for Solution of the Climate Change Problems and Development of Technology Transfer Potential in Armenia has been implemented. It has analyzed the technological needs related to mitigation of climate change consequences for the branches of economy in Armenia aimed at reduction of greenhouse gases emissions as well as adaptation technologies and technological needs for

strengthening the potential for the development of climate observation network, environmental monitoring and climate change studies.

The State Hydrometeorological and Monitoring Service (Armstatehydromet) of the RA Ministry of Nature Protection in 2000-2006 implemented the activities aimed at improvement of climate observations, improvement of warning system on unfavorable hydrometeorological phenomena and natural calamities connected with the climate fluctuation and change, development of the assessment methodology for social-economic consequences of climate fluctuation and change, giving instructions on the strategy for economy adaptation to the climate change and new climatic conditions, mitigation of unfavorable impact of climate change on the population health and ecological security as well as provision of information to the public.

In the concept on sustainable development the development of the action plans on adaptation to predicted climate change is specially emphasized and for this purpose the studies aimed at climate change impact on the economy and natural ecosystems are being implemented.

In Armenia the fundamental research on climate change can contribute to fulfillment of the RA commitments envisaged by the Convention on Climate Change. Simultaneously, for the development of plans on social-economic development to adapt to the climate change, it is necessary to strengthen the climate monitoring system. It is important to have permanent focus on the problems connected with the reduction of greenhouse gases emissions, use of alternative sources of energy, predictions on possible climate changes, scientific research on climate change, public awareness raising and other related issues.

Since 2006 the Ministry of Nature Protection of RA has been carrying out the works on preparation of the Second National Communication of RA on climate change.

2.7.1 Problems

The control observation over atmosphere protection is carried out only from the perspective of their impact assessment on human health.

The air quality observations are mainly carried out with out-dated equipment with the measurement error in the range of 25-30%. The air samples are taken in the laboratory observation stations by the electroaspirators produced in 1978. The number of observations has also decreased due to the lack of chemicals and means.

In order to extend the atmosphere pollution monitoring system, widen the list of tested substances and increase the accuracy of observation results since 2000 the number of observation stations has been gradually increased including special observations near the enterprises having the most harmful emissions. These activities are implemented by the Environmental Impact Center State Non-Commercial Organization (Armecomonitoring), which it authorized to organize and implement environmental monitoring processes (RA Government decision N 1872 from 26.11.2002).

The Armecomonitoring carries out observations of the air in the settlements, atmospheric precipitations, quality of surface waters and soil. The data of the state monitoring are official data; they have legal force and are used in the field of implementation of environmental activities.

Since 1990 no state or public entity has been functioning in the country to carry out full ecological monitoring, therefore it was not possible to assess the actual state of the environment quality in the country. Moreover, up to date in Armenia the state monitoring has

not been carried out in the rural areas and suburbs, therefore it is not possible to assess the impact of harmful substances on ecological receptors such as natural vegetation, agricultural yield and others.

At present there are numerous problems in the field of air protection regarding comprehensive and accurate data on the state of the air connected with the legislation, management and monitoring. The development of this field will make significant contribution to the fulfillment of the state, community and international commitments. Therefore it is necessary to widen the monitoring network and upgrade the equipment. In order to have the full assessment of the air pollution it is necessary to develop scientific and research activities in this field in the country. There are problems on development of fundamental methodologies for the assessment of the risks and damages caused by air pollution in general and to the economy of the country, human health and environment.

The problems and priorities of climate change have been summarized in the First National Communication of Armenia on climate change, they are based on the possible consequences of climate change. It is assessed that in the result of global climate change the average temperature in Armenia by 2100 will rise by 2° C and precipitations will decrease by 10% in comparison with the norm. These changes will have significant impact on the water resources and agriculture of Armenia. The rate of desertification will increase, the climatic zonation of the territory of the country will be changed with all negative consequences on ecosystems.

According to the analysis of the “Climate Change Study in Armenia” carried out in the framework of the First National Communication, in the result of climate change it is predicted to have extension of dry landscapes, reduction of the areas occupied by forest, sub-alpine and alpine landscapes and increased vulnerability of forests. In the ecologically unstable forests of southern disposition there will be shift to xerophyte condition and dry open woodlands will shift up vertically. On the lower timberline of forests it is expected to have decreased seed reproduction, invasion of semidesert species as well as the shift of the lower timberline up. In the lower forest zone in the central and southern forests of Armenia the impact of mountainous-steppe vegetation and retreat of coppices will be notable. The extension of dry landscapes with high surface flow will bring to intensification of erosion-torrent processes and forest landslides, decrease of quality and quantity indicators of surface flow and disturbance of water balance. Due to aridization the activation of erosion processes without preventive measures in its turn will result in worsening of forest growth conditions and reduction of forest cover in the lower forest zone of Central and Southern Armenia and on the slopes of southern disposition.

2.7.2 Legislation

In the Republic of Armenia the field of atmosphere protection is regulated by the RA Law on Atmosphere Air Protection. Respective decisions on the ecological normative acts for restriction of the harmful impacts on the atmosphere and registration of these impacts were adopted by the Government in 1998. In the field of state register and regulation of emissions there are about 1000 organizations with more than 2200 sources of atmosphere emissions. They include about 92% of the emissions from stationary sources in the country, which are under the state control.

In the field of atmosphere air protection the competences of the Government of the Republic of Armenia are as follows:

- Approval of a complex action plan on atmosphere air protection;

- Establishment of maximum allowable densities of air polluting substances and maximum allowable standards for harmful physical impacts;
- Establishment of the order on development and approval of the maximum allowable densities of air polluting substances and maximum allowable standards for harmful physical impacts;
- Establishment of the order on state registration of emissions;
- Organization of the monitoring of the state of atmosphere air;
- Establishment of the order on atmosphere air protection;
- Establishment of the fee for atmosphere air pollution;
- Other competences established by the law.

According to the RA Law on Environmental Control the State Environmental Inspection of the RA Ministry of Nature Protection by the determined order should carry out the control "... aimed at protection and restoration of the environment – atmosphere, waters, lands, underground resources, fauna and flora including forests and specially protected nature areas and areas of common use (trees, bushes, parks and other green zones), as well as observation of the norms on rational use of natural resources and biosecurity secure use of hazardous substances and waste, radioactive pollution, registration of payments for nature protection and nature use, calculation of actual quantity of the objects subject to payment, submission of administrative statistical reports and other norms established by the legislation of the Republic of Armenia...".

Environmental control over observation of the norms on atmosphere air protection established by the environmental legislation is carried out in the following directions:

- a) availability of the permits on the maximum allowable emissions of atmosphere air polluting substances and observation of the standards determined by the permits;
- b) observation of the maximum allowable standards of harmful physical impacts on fauna and flora objects;
- c) availability of the structures and equipment on cleaning and control of atmosphere air polluting emissions and observation of the requirements and rules of atmosphere air protection in the process of their construction and exploitation;
- d) observation of the established standards and measurement rules for atmosphere air polluting substances in the process of exploitation of means of transportation, airplanes, ships and other means of conveyance.
- e) Observation of the limitations and requirements for the storage or burning of industrial and domestic waste in the settlements and the waste being the source of air pollution with dust, harmful gases and stinking substances;
- f) Observation of the rules of state registration of the emission of harmful substances causing pollution of atmosphere air;
- g) Observation of the established restrictions and requirements on ozone layer protection.

The harmful impact on environment is defined as the impact which exceeds the established rates of emission, outflow and disposal of harmful elements in environmental objects (atmosphere, water, soil, underground resources, bioresource including forest and specially protected nature areas).

According to the RA Law on Hydrometeorological Activity the hydrometeorological activity under special circumstances (natural calamities, accidents and other extreme situations and addressing their consequences on the territory of Armenia) is a component of the complex state system of warning on extreme situations of natural and technogenic nature and addressing consequences.

The RA Law on the Substances Causing Damage to the Ozone Layer defines the substances causing damage to the ozone layer as chemical substances which have or can have unfavorable impact on the ozone layer as pure substances or in mixtures with more than 1 percent of the ozone layer damaging substance per one unit of the mass. The production and import of the substances causing damage to the ozone layer are prohibited in the Republic of Armenia.

2.7.3 Management

The control and supervision of the state of atmospheric air by chemical, physical and biological indicators is done by the respective services on control and supervision over environmental pollution by the order established by the legislation of the Republic of Armenia. The Ministry of Nature Protection of RA is a specially authorized state management body in the field of atmospheric air protection. The main competence of the authorized body is:

- The implementation of the state policy in the field of hydrometeorological activities, participation in the development and implementation of state programs.

The national hydrometeorological system of the Republic of Armenia includes the following structures:

- a) State Hydrometeorological Service;
- b) Departmental Hydrometeorological Services;
- c) Different legal and physical persons dealing with observation of hydrometeorological processes;

The object of the observation network is the primary production administrative unit of the national hydrometeorological system and international hydrometeorological network, which makes observations, processes and reports to hydrometeorological stations the results of observations of hydrometeorological processes. In order to get accurate information on natural processes, the buffer zones with restriction of economic and other activities are established on the territory of the objects dealing with the observation of hydrometeorological processes.

The national hydrometeorological system of the Republic of Armenia is the part of the international hydrometeorological network. The Republic of Armenia participates in the formation and development of the global and regional united international systems on observation of hydrometeorological processes and information exchange.

In Armenia the main source of information on climate change, natural fluctuations and anthropogenic changes is the information from hydrometeorological observations by the Armstatehydromet base network. The Ecological-Noosphere Research Center SNCO also implements activities on atmosphere air monitoring.

Continuous reforms are underway for information obtaining and processing, improvement of technological level of the use of knowledge on climate, development of plans on climate related information and social-economic development of the country and improvement of the

level of strategy development to address possible ecological and social-economic consequences of climate change.

Draft programs in the field of atmospheric air protection developed by state management bodies, enterprises, institutions and organizations should be agreed with the specially authorized state body in the field of atmospheric air protection. Local bodies of state management in accordance with the legislation of the Republic of Armenia participate in development and implementation of the measures on atmospheric air protection.

Since 2004 activities have been implemented for introduction of the principle of territorial and technological standards of harmful substances emissions. So far there have been no tangible results; this is connected with the lack of appropriate methodologies.

The principles on assessment of the proportion of transport emissions in the total air pollution in the settlements have been developed and activities are carried out on development of the mechanisms for introduction of the best technologies. By data the transport emissions in the country make 85% of the total volume of emissions and in Yerevan – 97%.

In 2003-2005 certain practical steps were implemented in prohibiting the import of the cars without devices of harmful emissions neutralization, initiation of clean development mechanism processes, establishment of environmental fund system, approval of the lists of hazardous waste, chemical substances and pesticides, reduction of transport emissions and environmentally secure disposal of hazardous waste.

For the assessment of the atmospheric air state the maximum allowable concentrations of the atmospheric air polluting substances and the maximum allowable standards of harmful physical impacts are established. These standards should comply with the interests of nature protection and human health.

The state management bodies control the planning, construction and exploitation of the structures, equipment and devices which clean polluting substances from the atmospheric air emissions and reduce harmful physical impacts on atmospheric air.

In order to prevent or reduce the atmospheric air pollution the local bodies of state management should take measures on improvement of the settlements and the enterprises, institutions and organizations – of occupied production and other territories.

The lists of plant protection measures, their growth stimulators, mineral fertilizers and other blends which are allowed for use in the economy as well as the means of their use should be agreed with the bodies carrying out state control in the field of atmospheric air protection.

CHAPTER 3. THE SYSTEM OF THE SPECIALLY PROTECTED NATURE AREAS OF THE REPUBLIC OF ARMENIA

3.1 Specially Protected Nature Areas of the RA

The specially protected nature areas (SPNA) have national value and they are designated to protect unique and typical natural complexes, objects and their genetic fund (see Appendix 7). In Armenia the strategic aim of the SPNA establishment is the protection of landscape and biological diversity of natural complexes (as samples).

In the framework of the project “Capacity Need Assessment for Biodiversity of Armenia” (UNDP/GEF ARM/97/G/31) the State Strategy on the Development of Specially Protected Nature Areas of Armenia and National Action Plan for 2003-2010 was developed and approved by the protocol decision (N 54, 26 December 2006) by the Government of the Republic of Armenia. It envisages a number of activities aimed at legislation and management improvement, capacity strengthening and extension of the system of SPNAs. The objective of the National Action Plan is to ensure the followings through the improvement of the system of specially protected nature areas:

- Improvement of the protection, restoration and sustainable use of landscape and biological diversity of Armenia;
- Harmonic integration of the system of SPNA in the strategy of social-economic development of the country;
- Compliance of the network of specially protected nature areas with international agreements, standards and criteria.

The total area of the RA specially protected nature areas makes about 309 thousand ha including the surface of the Lake Sevan. The system of the RA specially protected nature areas was established in 1958. It includes the following categories of protected areas:

- Reserves. There are 3 state reserves (Khosrov Forest, Shikahogh and Erebuni State Reserves) where human activity is limited only to scientific works as well as limited scientific-cognitive excursion;
- Sanctuaries. They were established in the country during 1950-80ies. At present there are 25 sanctuaries. On the territory of the sanctuaries any activity contradicting the aim of the sanctuary should be limited or prohibited.
- National Parks. There are two national parks in Armenia – Sevan and Dilijan National Parks. Sevan National Park was established in 1978 with the territory of 150,1 thousand ha out of which 125,2 ha is the surface of the Lake Sevan and 24,8 ha is the terrestrial area. Dilijan National Park was established in 2002 on the basis of Dilijan State Reserve with the territory of 28,2 thousand ha.
- Natural monuments. The Republic of Armenia is rich in living and lifeless natural monuments. At present the works on inventory and passportization of the natural monuments are underway in the country. So far there is not a list of natural monuments approved by the Government of RA.

Since 1995 the state reserves and national parks of RA have been included in the structure of the RA Ministry of Nature Protection. The relations in the field of their management, protection, use and restoration are regulated by the RA Law on Specially Protected Nature Areas and other legal acts.

At present the management functions of Sevan and Dilijan National Parks, Khosrov Forest, Erebuni and Shikahogh State Reserves, Plane Grove, Vordan Karmir, Akhnabad Yew Grove, Sev Lich, Khor Virap, Goravan Sands and Gilan Sanctuaries are implemented by the Sevan National Park, Dilijan National Park, Khosrov Forest State Reserve, Shikahogh State Reserve and Reserve-Park Complex State Non-Commercial Organizations (SNCO).

By the RA Governmental decision N 1236N from 8 August 2002 the Bioresource Management Agency was established in the structure of the Ministry of Nature Protection of RA. The Sevan and Dilijan National Parks, Khosrov Forest, Erebuni and Shikahogh State Reserves, Vordan Karmir, Sev Lich, Akhnabad Yew Grove and Plane Grove, Khor Virap, Goravan Sands and Gilan Sanctuaries were moved to subordination of the Agency. The Agency through the Departments of SNPAs and Arboretums carries out the function of support to the management of in-situ and ex-situ protection objects (see Table 5).

Table 5. In-situ and ex-situ protection objects in the structure of the SPNAs

N/N	In-situ Protection objects in the structure of the SPNAs	Ex-situ protection objects in the structure of the Reserve-Park Complex SNCO of the RA Ministry of Nature Protection
1	Khosrov Forest State Reserve SNCO <ul style="list-style-type: none"> • Khosrov Forest State Reserve • Khor Virap Sanctuary • Goravan Sands Sanctuary • Gilan Sanctuary 	1. Jrvezh Forest-Grove 2. Stepanavan Pine-stand Arboretum 3. Tavush Saronner Arboretum 4. Vanadzor Arboretum 5. Ijevan Arboretum
2	Shikahogh State Reserve SNCO <ul style="list-style-type: none"> • Shikahogh State Reserve • Plane Grove Sanctuary 	
3	Dilijan National Park SNCO <ul style="list-style-type: none"> • Dilijan National Park • Akhnabad Yew Grove Sanctuary 	
4	Sevan National Park SNCO <ul style="list-style-type: none"> • Sevan National Park 	
5	Reserve-Park Complex SNCO <ul style="list-style-type: none"> • Erebuni State Reserve • Sev Lich Sanctuary • Vordan Karmir Sanctuary 	

Out of 25 sanctuaries of the country at present only 7 are in the structure of RA Ministry of Nature Protection and 6 of them have Charters approved by the RA Government. 14 out of the rest 18 state sanctuaries at present are in the structure of Hayantar SNCO of the RA Ministry of Agriculture and included in the forest enterprise branches. One sanctuary - Aragats Alpine Sanctuary is in the structure of the Institute of Physics of the RA Ministry of Industry. Hankavan hydrological, Jermuk hydrological and Juniper open woodland Sanctuaries are on the reserve lands.

Table 6. The Sanctuaries subordinate to the Hayantar SNCO

N	Name	Area	Decision
1	Hazel-nut Sanctuary (Corylus Columna) Ijevan Forest Enterprise	40 ha	ArmSSR Council of Ministers (CM) decision N 341, 13.09.1958
2	Banx Pine Sanctuary (Hrazdan Forest Enterprise)	4 ha	ArmSSR CM decision N 20, 29.01.1958
3	Her-Her Open Woodland (Yeghegis Forest Enterprise)	6139 ha	ArmSSR CM decision N 341, 13.09.1958
4	Jermuk (Jermuk Forest Enterprise, Arpa River basin)	3865 ha	ArmSSR CM decision N 341, 13.09.1958
5	Gyulagarak Pine (Stepanavan Forest Enterprise)	2576 ha	ArmSSR CM decision N 341, 13.09.1958
6	Caucasus Rhododendron Sanctuary (Gugark Forest Enterprise, Pambak and Tsakhkunyats Mountainous Ranges)	1000 ha	ArmSSR CM decision N 20, 29.02.1959
7	Margahovit Sanctuary (Gugark Forest Enterprise, Pambak River basin)	3368 ha	ArmSSR CM decision N 75, 16.11.1959
8	Arzakan and Meghradzor Sanctuaries (Hrazdan Forest Enterprise, Marmarik and Ghalarik Rivers basin)	13532 ha	ArmSSR CM decision N 375, 16.11.1971
9	Ijevan Sanctuary (Ijevan Forest Enterprise, Ijevan and Kayen Mountainous Ranges)	5908 ha	ArmSSR CM decision N 375, 16.11.1971
10	Gandzakar Sanctuary (Ijevan Forest Enterprise, Paytajur and Aghstev Rivers basin)	6813 ha	ArmSSR CM decision N 375, 16.11.1971
11	Getik Sanctuary (Jambarak Forest Enterprise)	5728 ha	ArmSSR CM decision N 375, 16.11.1971
12	Yeghegis Sanctuary (Yeghegis Forest Enterprise, Arpa River right tributary)	4200 ha	ArmSSR CM decision N 375, 16.11.1971
13	Boghakar Sanctuary (Meghri Forest Enterprise)	2728 ha	ArmSSR CM decision N 400, 10.08.1989
14	Goris Sanctuary (Goris Forest Enterprise)	1850 ha	ArmSSR CM decision N 775, 16.11.1972
	Total	46 815 ha	

The small territory of the country, high density of population (more than 100 persons/sq.km) and formerly high level of industrial and agricultural development have resulted in the fundamental change of the landscapes structure. The dense network of settlements has made difficult the designation of SPNAs with comparatively large and non-fragmented areas. For

this reason the majority of the SPNAs has rugged borders, between some parts of SPNAs there are settlements with their lands and roads, there are also non-protected enclave areas. The integrity of ecosystems and landscapes often has not been considered during establishment of the SPNAs.

3.2 Legal Framework for the RA SPNAs Management

The legal relations in the field of nature protection and nature use in Armenia are regulated by the RA Constitution and related laws as well as other legislative and regulatory acts. The Constitution declares about the state function on “...safeguarding environmental protection and rational use of natural resources...”. Before the Constitution was adopted in 1995, the Supreme Council of the Republic of Armenia in 1991 had adopted the “Green Constitution” which is the Foundations of the Republic of Armenia legislation on Nature protection reflecting the above-mentioned “umbrella principle” and having the aim to summarize environmental laws with the establishment of the main principles of state policy in the field of environmental protection.

In the Convention on Biological Diversity (Article 9, in-situ protection) the biodiversity in-situ protection is emphasized as strategic priority, which is fully implemented in the framework of specially protected nature areas. They ensure protection of rare, threatened, endemic and relict species in their natural habitats. The strategic objective of the SPNA network in Armenia should be the protection of biological and landscape diversity in natural complexes.

The activities of the Biodiversity Strategy and Action Plan emphasize the importance of the development of management plans for SPNAs. In Armenia the key law regulating legal relations connected with the management of SPNAs (RA Law on Specially Protected Nature Areas, 2006) sets forth the order of organization, protection and use of specially protected nature areas.

According to the Law the specially protected nature areas are the territories designated by this Law and separate natural objects of terrestrial nature (including surface and underground waters and underground resources) with respective air basin, which have environmental, scientific, educational, health, historical-cultural, recreational, tourism and decorative value and have the established special protection regime (Article 1). By the Law the specially protected nature areas of Armenia are classified by categories to state reserves, national parks, state sanctuaries and natural monuments and by purpose – to international, national and local specially protected nature areas.

3.3 Key Environmental Legislation of RA

According to Article 10 of the RA Constitution the state should ensure the protection and reproduction of the environment and rational use of natural resources.

Before the Constitution was adopted in 1995, the Supreme Council of the RA in 1991 had adopted the Foundations of the Republic of Armenia Legislation on Nature Protection, which established the principles of state policy in the field of nature protection.

At present the following laws are functional in the Republic of Armenia: Foundations of the Republic of Armenia Legislation on Nature Protection, Law on Specially Protected Nature Areas, Law on Atmospheric Air Protection, Law on Environmental Impact Expertise, Law on

Nature Protection and Nature Use Fees, Law on Flora, Law on Fauna, Law on Plant Protection and Plant Quarantine, Law on Tariffs of Environmental Fees and others.

In the Republic of Armenia the Forest code, Water Code, Land Code and Underground Resource Code are also functional.

The Land Code is of special importance for the nature protection field. It classifies land areas by different categories, by the level of importance and use purposes as well as sets forth the competences of state management bodies and land users (nature users), land protection functions (Articles 59-62), the status and structure of the state land cadastre (Articles 66, 67) and others.

There are also laws with certain provisions regulating relations in nature protection and nature use, particularly the Law on Local Self-Governance, which sets forth the authorities of community heads in the field of environmental and nature protection; Law on Medicines, which regulates the issues connected with environmental protection during elimination of useless medicines; Law on Energy which regulates the issues of environmental protection connected with the rules of activities in the energy sector; Law on Town Planning, Law on Budget System, Law on Sanitary-Epidemiological Security of Population, Law on Population Protection in Extreme Situations and Law on Agrarian State Inspections.

In the Republic of Armenia the legislation on environmental protection develops in the direction of sustainable use of natural resources and nature protection. The use of sanctions for violation of established requirements and standards of the RA environmental legislation is regulated by separate articles of the RA Civil Code, Law on Administrative Infringements and the Criminal Code. In the RA Civil Code the legal relations in the field of environmental protection are regulated by numerous articles in the chapters on getting ownership rights (Chapter 11), ownership rights and other estate rights over land (Chapter 13), duties and safeguarding their fulfillment (Chapter 26) and responsibility for caused damage and damage compensation (Chapter 60). More than 40 Articles of the RA Code on Administrative Infringements regulate the sanction mechanisms for violating the established requirements by nature protection and nature use legislation.

The respective Articles of the RA Criminal Code chapter 6 on Economic Crimes establish sanctions for violation of rules for plant diseases and pests control, illegal fishing and hunting or breaking their rules, illegal logging, damaging stands, violation of the rules of underground resource use, cases of illegal circulation of hazardous and other wastes.

The legal acts in the field of nature protection and nature use are mainly represented by the RA Governmental decisions. Since September 1990 about 140 decisions have been adopted, which regulate the relations in the fields of forests, lands, waters, air, specially protected nature areas, bioresources and underground resource protection.

Departmental legal acts make an important part of the RA environmental legislation. After the RA Governmental decision N 13 from January 15, 1996 on the Order of State Registration of Departmental Normative Acts the Ministry of Nature Protection of the RA has adopted “Instructions” and “Orders” of different nature (totally 8 acts), which then were registered by the Ministry of Justice according to the established order. The mentioned acts regulate as relations connected with commercial fishing, nature protection and nature use fees, special water use, geological investigation of underground resources and extraction of minerals.

The RA National Assembly has ratified 12 environmental conventions related to environmental impact assessment, biodiversity, climate change, air pollution, disposal of hazardous waste, ozone layer protection, combating desertification and others (see Appendix 2).

3.4 Legislation of Related Fields

The Republic of Armenia legislation of environment related fields is represented by about 40 laws and more than 90 related by-laws with separate provisions regulating separate issues of nature protection and nature use. Examples are as follows.

According to Article 5 of the RA Law on Tourism and Touristic Activities the main aims, priority directions and measures of the state policy in the field of tourism are as follows:

- The establishment of a tourism system, which contributes to protection of resources and environment having attraction for tourism, to rational use of historical-cultural heritage and nature;
- Safeguarding development of touristic regions and (or) centers having rich natural, social-cultural and health rehabilitation resources and subject to priority development in Armenia.

Articles 15, 16, 17 and 20 of the RA Law on Town Planning regulate environmental protection, particularly with the provisions ensuring obligatory observation of the legal requirements on environmental protection of town planning normative-technical documents and town planning cadastre.

Some provisions of Articles 13, 15, 16 and 36 of the RA Law on Energy regulate environmental protection issues, connected with obligatory observation of the rules on energy related activities.

Article 13 of the RA Law on Motor Transport Roads defines motor road layers subject to alienation and buffer zones.

Article 12 Provision 4 of the RA Law on Local Self-Government regulates legal relations connected with land use schemes.

Articles 17 and 18 of the RA Law on Budget System set forth the status of state budget incomes and costs in the environmental field and others.

Article 14 of the RA Law on Medicines regulates the requirement on observation of norms and rules on environmental protection during elimination of useless medicines (as waste).

In the RA Law on Safeguarding Sanitary-Epidemiological Security of Population some provisions of Articles 9, 10, 14, 16, 17, 18, 20, 23, 24 and 25 regulate legal relations on environmental protection.

Some provision of Articles 4, 5 and 15 of the RA Law on Protection of Population in Extreme Situations regulate the environmental protection issues and legal relations.

Some provision of Articles 3, 8, 9, 12, 13 and 14 of the RA Law on State Statistics regulate requirements on development of state statistical reports related to nature protection and nature use and their submission.

Some Articles of the RA Law on Standardization and Certification, in particular Articles 9 and 14 regulate environmental protection norms for economic activities subject to compulsory certification.

The use of sanctions for violation of requirements and norms established by the RA legislation on environmental protection is regulated by some articles of the RA Civil Code, RA Code on Administrative Infringements and RA Criminal Code. For example:

- In the RA Civil Code the legal relations connected with the environmental protection are regulated by the Articles of the Chapters on getting ownership rights (Chapter 11), ownership rights and other estate rights over land (Chapter 13), duties and safeguarding their fulfillment (Chapter 26) and responsibility for caused damage and damage compensation (Chapter 60);
- More than 40 Articles of the RA Code on Administrative Infringements regulate the sanction mechanisms for violating the established requirements by nature protection and nature use legislation;
- Respective Articles (166-172, 237/6) of the RA Criminal Code chapter 6 on Economic Crimes establish sanctions for violation of rules for plant diseases and pests control, illegal fishing and hunting or breaking their rules, illegal logging, damaging stands, violation of the rules of underground resource use and gold submission to the state, cases of illegal circulation of hazardous and other wastes.

By-laws in the field of nature protection and nature use are mainly represented by the RA Governmental decisions.

In the field of nature protection and reproduction the structure of the state management system, the status of the bodies, functions and authorities are defined not only by Governmental decisions, but also Presidential Orders, Prime Ministerial Decisions and others.

Departmental and interdepartmental normative acts are also important. They include instructions, methodological manuals and prescriptions, standards, orders (including joint ones), rules, charters, protocols and others.

3.5 Classification of Specially Protected Nature Areas

By the RA Land Code (Article 20) the nature protection lands are those having natural, scientific, decorative and recreation significance and the lands of natural monuments, reserves, national parks and arboretums and parks, botanical gardens and sanctuaries (except for hunting) designated for special protection. In nature protection lands it is prohibited to carry out activities having no connection with protection and research of natural complexes and objects and any other activity not envisaged by the law. The alienation of nature protection lands is prohibited if it contradicts their purpose and functional significance.

In the Republic of Armenia the specially protected nature areas are classified by the Law on Specially Protected Nature Areas as follows:

- a) by significance – international, national and local specially protected nature areas;
- b) by category – state reserve, national park, state sanctuary and natural monument.

Specially protected nature areas of different categories can be combined in ecological networks through ecological corridors and buffer zones.

State Reserve is the area of international and (or) republican significance having unique nature protection and decorative features of scientific, educational and historical-cultural value, where the habitat evolution processes are ongoing without direct human intervention. The reserves are established to ensure the protection and scientific research of the habitats and biodiversity.

National Park is the area (water areas) of international and (or) republican significance having nature protection, scientific, historical-cultural, decorative and recreational values and which is due to combination of natural landscape and cultural values can be used for scientific,

educational, recreational, cultural and economic purposes and which has a special protection regime.

State Sanctuaries are areas having scientific, educational, historical-cultural and economic value and which ensure the protection and natural reproduction of ecosystems and their components. The main aims of designation of sanctuaries are the protection of ecosystems and certain species which are rare, threatened or of high scientific-cognitive significance as well as the restoration of resources in the ecosystems under active economic use.

Natural Monuments are natural objects having exceptional or typical, scientific and historical-cultural special value. Their list is established by the RA Government.

3.6 The RA SPNAs Management Categories by IUCN Guidelines

According to the acting legislation the specially protected nature areas in the country are State Reserves, State Sanctuaries, National Parks and Natural Monuments.

According to the IUCN guidelines the specially protected nature areas are classified as follows:

IA. STRICT NATURE RESERVE – Nature reserve (intact ecosystems) with strict protection regime and used for scientific purposes. The RA Reserves belong to this category.

IB. WILDERNESS AREA – An area with strict protection regime used mainly for wilderness protection.

II. NATIONAL PARK – Ecosystem protection and tourism. The National Parks of RA belong to this category.

III. NATURAL MONUMENT – Protection of the objects (complexes) having unique natural features. The Natural Monuments of the RA belong to this category. Their inventory and approval of the list is underway.

IV. HABITAT/SPECIES MANAGEMENT AREA - Sanctuary – protection of species and their habitats through active management. The Sanctuaries of the RA belong to this category.

V. PROTECTED LANDSCAPE/SEASCAPE – protection of terrestrial and marine landscapes, recreation.

VI. MANAGED RESOURCE PROTECTED AREA - Protected areas with management resources - careful (sustainable) use of resources.

3.7 SPNAs Status/Category

The status of SPNAs is defined according to the requirements of the RA Law on Specially Protected Nature Areas and the peculiarities of the objectives and regime are set forth by the SPNA Charters approved by the RA Governmental decisions.

The fulfillment of the requirements established in the SPNAs Charters (except Natural Monuments) by the RA Governmental decisions is ensured by the State Non-Commercial Organization; the state-owned asset is handed over to it by property right as well as buildings, constructions and respective land areas – for free of charge use without time limits.

According to the RA Law on State Non-Commercial Organizations (2001) the State Non-Commercial Organization is a non-profit non-commercial organization with the status of legal

person established for carrying out activities in environmental and other non-commercial fields.

The State Non-Commercial Organizations which carry out the SPNA Charter requirements are nature protection, scientific-research and scientific-cognitive (ecoeducational) organizations having the status of legal person. They function in compliance with the Republic of Armenia Constitution, Republic of Armenia Civil Code, Republic of Armenia Laws on State Non-Commercial Organizations and on Specially Protected Nature Areas, other laws, their Charters and other legal acts.

The financial resources of the State Non-Commercial Organization come from the Republic of Armenia state budget allocations and fees from activities implemented and services provided by the organization, sponsorship, donations and other sources not contradicting the legislation of the Republic of Armenia.

The income collected during the entrepreneurial activities by the organization should be used in accordance with its charter objectives.

3.8 SPNAs Establishment

According to the RA Law on Specially Protected Nature Areas (Article 5) the establishment and definition of the category for the new SPNAs in the country should be done by the RA Government. The proposals on designation of specially protected nature areas for the specially protected nature areas and objects of local significance are done by the local self-governing bodies to the state authorized body; then it is submitted for Governmental approval.

The establishment of new SPNAs is done in accordance with the RA Law on Legal Acts (2002) by the established procedure for the approval of the RA Governmental draft decisions. In accordance with this procedure the draft package of the RA Governmental decision on the establishment of new SPNAs should include the justification for the need to establish a proposed SPNA, the reference document on changes in the expenses and incomes of the budget of the state or local self-governing body as well as in acting legislation connected with the approval of the draft decision. The package should be submitted for consideration of the stakeholder ministries and organizations connected with the new SPNA, including the RA Ministry of Justice. After discussion and summarization of the remarks and comments received from the Ministry of Justice the draft decision package is submitted for consideration of the RA Governmental session.

CHAPTER 4. SPNAs MANAGEMENT PLANNING

4.1 Current State

In general the main outcome of territorial management planning is the justification of further management decisions on the basis of the analysis of accurate data as well as identification of certain measures and planning of activities. The planning includes the analysis of the current state of the managed object, identification and prioritization of obstacles, clarification of the ways and methods of tackling problems, prediction and prevention of threats, involvement of stakeholders and risk mitigation.

Management plans (short-, mid- and long-term) are subject to further revision to reflect legislative, institutional and situational changes, be adapted to solution of certain raising problems and implementation of purpose-oriented activities of SPNAs. The lack of the management plans has negative impact on SPNAs protection, ecotourism, effective organization of scientific and monitoring activities.

The clarification of administrative borders of communities, development of land use schemes and land privatization activities are underway and the process of redistribution of reserve lands out of the administrative borders of communities is implemented in the country. In this respect it is important to have scientifically justified demarcation of reserves and sanctuaries as well as management plans developed, protection and use regimes clarified and regulated information database established for SPNAs system.

In order to improve the system management, increase the role of protected areas in natural heritage protection and develop the ecological network in the country complying with international criteria it is necessary to assess the current state of SPNAs, analyze the system (etalone of the country nature), carry out inventory, stock-taking and monitoring of typical elements of the flora and fauna.

In the biodiversity strategy and action plan the development of management plans for SPNAs is emphasized. Management plans are key documents which ensure the efficient management and development of the territory, contribute to application of legislative requirements of the sector, consider natural heritage and social-economic peculiarities of the territory, perspective trends of the territory development, complex approaches on efficient and rational use of resources as well as identify certain realistic measures.

The importance of this issue is also emphasized in the new Law on Specially Protected Nature Areas which provides the definition of management plan. In order to regulate the management plan development activities at present the Methodological Instruction on Management Plan Development for Specially Protected Nature Areas is under development. Management planning related documents are also developed with the support of international organizations; in particular, in the framework of the KfW “Caucasus Initiatives” the Project on Transboundary Joint Secretariat developed with the aim to support biodiversity protection is developing the regional concept on protected areas management planning and national guidelines for the South Caucasus countries.

In 2007 the Management Plans of Sevan and Dilijan National Parks were approved by the RA Government and activities on research of Sevan and Dilijan National Parks flora and fauna, technical assistance, awareness raising and others were implemented. The development of management plans for Khosrov Forest and Shikahogh State Reserves is underway (WWF). The programs on establishment of Arevik State Reserve, Arpi, Jermuk and Arpi Lich National Parks, Vorotan and Kirants Nature Parks have been developed by the RA Ministry of Nature Protection. In 2006 the RA Government approved the borders of Shikahogh State Reserve as

well as the decision on the extent of the territory of Plane Grove State Sanctuary, change of purpose significance of lands and allocation of plots.

The activities on inventory, passportization, preparation and approval of the list of Natural Monuments of Armenia are under implementation. On the territory of Sevan National Park the pilot project on landscape planning is implemented by the RA Agrarian Academy with the outcomes to be then used in the general process of management planning.

At present there are sufficient legislative foundations for the SPNAs management planning. However, there are obstacles for implementation of the activities envisaged by management plans, which are connected with unclear mechanisms of legislation enforcement, poor capacities of SPNAs, social-economic level of local population, insufficient infrastructures, domination of traditional methods of nature use, limited alternative nature use and the lack of tax privileges and compensation mechanisms stimulating the enforcement of SPNAs regime. Ecologically unjustified borders of the SPNAs also cause obstacles for sustainable management of territories as the clarification of borders in the process of management plans development brings about numerous problems of social-economic nature.

4.2 Legal Regulation of Management Planning

According to the RA Law on Specially Protected Nature Areas (27.11.2006, Article 6) the management plan of the specially protected nature areas should be developed in compliance with the methodological instructions approved by the state authorized body in the field (it is in the process of development).

The management plan should include the followings:

- a) key information about the specially protected nature area including description of ecosystems and their components (including their resources, state and threats) as well as evaluation of the changes during previous period and development perspectives;
- b) thematic maps and plans on specially protected nature areas zonation, borders and biological diversity including distribution of natural resources, land use and others;
- c) social-economic and nature use peculiarities of the specially protected nature area;
- d) ways of stakeholder participation in protection and use of the specially protected nature area;
- e) annual plan and timetable for the activities aimed at prevention and mitigation (elimination) of negative anthropogenic impact on the basis of the monitoring data from the specially protected nature area;
- f) sources of required financing for protection, scientific-research studies and other activities in the specially protected nature area.

The management plan aims to ensure natural development of ecosystems, protect and monitor landscape and biological diversity, genetic fund and nature heritage, develop effective ways of protection, carry out ecological education and public awareness raising activities.

4.3 Management Planning Authorities

The authorities of the Republic of Armenia Government in the field of establishment, designation, management, protection and use of specially protected nature areas in the

Republic of Armenia are the approval and revision of the management plans of specially protected nature areas of international and republican significance.

The authorities of the authorized state management body in the field of management, protection and use of specially protected nature areas in the Republic of Armenia are the management of specially protected nature areas of international and republican significance and approval of the management plans of specially protected nature areas of local significance. The RA Ministry of Nature Protection is the state management body in the field of RA SPNAs management authorized by the RA Government. In the field of protection and use of specially protected nature areas of the Republic of Armenia the territorial bodies of state management participate in the development of state programs related to specially protected nature areas and of management plans.

The activities on SPNAs management plans development are organized by the state management body authorized by the Republic of Armenia Government in the field of environment. The development of management plans should be done at least once in five years by the means of state and others sources established by the RA legislation.

The activities on development of SPNA draft management plans are implemented by organizations having respective professional capacities and experience with involvement of a given SPNAs staff and other stakeholders.

4.4 Participatory Management

By the order established by the Republic of Armenia legislation the public should be provided with information on the followings:

- a) activities envisaged on the territory of the specially protected nature area;
- b) decisions on the protection and use of specially protected nature area;
- c) ecological state of the specially protected nature areas.

The measures established in the SPNAs management plan envisage the protection of biodiversity and landscapes with balancing the nature protection measures and activities aimed at social-economic development of local population and integration of SPNAs in the processes of regional social-economic development.

The development of draft management plan is a participatory process with involvement of stakeholder physical and legal persons. The measures in the management plan are aimed at improvement of collaboration between state bodies, local self-governing bodies, scientific and nature protection institutions and SPNAs. There is no much experience in such collaboration as the management planning process on the territory of RA is still in its first stages of development.

The stakeholders of SPNA participatory management are state and territorial management bodies, local self-governing bodies, specialized and academical scientific-research organizations, higher education institutions, land users, touristic and public organizations, mass media, representatives of private sector and others.

In order to ensure participatory management it is necessary to clarify the range of stakeholders for the given SPNA, organize meetings, analyze possible conflicts, collect suggestions, collaborate with local self-governing bodies and local population and inform stakeholders on the process of planning activities.

4.5 Management Plan Structure

At present the management plans being developed for the SPNAs on the territory of RA mainly include the following information:

- Description of natural conditions, borders and territorial-functional zones of the area;
- Data on biodiversity and natural resources (including SPNAs buffer zones);
- Social-economic indicators of the territory;
- Evaluation of touristic and recreational characteristics as well as services of the area;
- Existing and potential threats (natural and anthropogenic) of biological and landscape diversity;
- Direct impact of the climate (aridization and others) and vulnerable territories;
- Characteristics of administrative-economic arrangement and territorial structure;
- Description of infrastructures;
- Assessment of the protection of natural systems and objects, control over environmental infringements, protection staff, its number and professional and education level, current state and needs of necessary equipments, arms and means of transportation;
- Organization of scientific-research activities;
- Analysis of ecological awareness, elucidation and propaganda activities;
- Analysis of the measures implemented in the field of historical-cultural heritage and protection;
- Ways to integrate SPNAs in social-economic structure of the territories;
- Main indicators of activities and financing of organization;
- Action plan.

4.6 SPNAs Monitoring

The monitoring of the specially protected nature areas is implemented by the state management body authorized by the Republic of Armenia Government in the field of nature protection (hereinafter authorized state body) and the monitoring of the specially protected nature areas of local significance located within the administrative borders of communities is organized by the local self-governing bodies. The monitoring of specially protected nature areas of all categories and significance is organized and implemented in compliance with the methodological instructions approved by the authorized state body.

Complex monitoring activities are not implemented in the specially protected nature areas of Armenia, they are not purpose-oriented and interrupted time to time due to insufficient financing, lack of respective qualified staff as well as legislative and scientific-methodological basis. This has negative impact on the effectiveness of fauna and flora protection and management.

In Armenia in the process of implementation of scientific-research activities the research carried out by different institutions (mainly institutions of the National Academy of Sciences) sometimes has some elements of monitoring. The following examples can be mentioned:

research on species and genetic diversity, inventory of rare and threatened species, hunting animals, plants and animals of economic significance, identification of invasive and introduced species, research of their features and others.

According to the RA Law on Specially Protected Nature Areas (Article 14) the monitoring of the specially protected nature areas is aimed at:

- Identification of the current state of distribution, species composition, quantity and habitats of biological diversity as well as of animal migration ways;
- Assessment and prediction of quantitative and qualitative changes of ecosystems and their components;
- Identification of the impact of natural and anthropogenic factors on ecosystems and their components;
- Development of the measures on prevention and mitigation (elimination) of the negative impacts on ecosystems and their components;
- Research, assessment and prediction of the state of flora and fauna objects registered in the Republic of Armenia Red Data Book;
- Improvement of reserve management;
- Assessment of the state and protection of biodiversity;
- Prediction of the dynamics of natural and anthropogenic impacts;
- Contribution to natural development of ecosystems.

The objectives of biodiversity monitoring system introduction are as follows:

- Identification of the current state of species composition, distribution, quantitative indicators, habitats of biological diversity as well as of migration ways;
- Identification of the impact of anthropogenic factors on ecosystems and their components;
- Assessment and prediction of quantitative and qualitative changes of natural ecosystems components;
- Contribution to further development of management plans with involvement of the measures on prevention and mitigation (elimination) of negative impact on ecosystems and their components.

4.7 Main Objectives of SPNAs Monitoring

The decision on Establishment of the Order for Monitoring Implementation in the Specially Protected Nature Areas was developed and approved by the RA Government (30.08.07, N 1044-N). By this decision the RA Minister of Nature Protection is assigned with the task to develop and approve methodological instructions on monitoring implementation in specially protected nature areas as well as necessary formats for monitoring protocols and field forms.

Monitoring includes the activities on inventory and stocktaking, which make possible clarification and designation of the territories subject to monitoring and select respective indicators. The main factors of monitoring implementation are physical-geographical, landscape, ecosystem, vertical zonation, flora, fauna, infrastructure and other characteristics of SPNAs.

The objectives of monitoring are as follows:

1. provide necessary information to managers of specially protected nature areas for respective decision-making;
2. identify the current state of distribution, species composition, quantity, habitats of biological diversity as well as of animal migration ways;
3. Assess and predict quantitative and qualitative changes of natural ecosystems components;
4. Identify the negative impact of anthropogenic factors on ecosystems and their components and develop preventive measures;
5. Contribute to justification of norms on nature resource use by volumes and terms;
6. Contribute to establishment of information database on specially protected nature areas and its smooth functioning;
7. Contribute to development of management plans for specially protected nature areas.

4.8 Proposals on Improvement of the SPNAs System and Biodiversity Protection

The priorities for safeguarding biodiversity protection and improvement of SPNAs system are as follows:

- Improvement of SPNAs management system and legislation;
- Improvement of territorial-functional structure of SPNAs system with application of bio-geographical principles;
- Extension of SPNAs system (arboretums, botanical gardens, natural parks, biosphere reserves, natural monuments);
- Compliance of the SPNAs of Armenia with international standards, establishment of ecological networks (ECONET);
- Improvement of protection and nature use regimes of SPNAs;
- Improvement of environmental awareness and ecoeducation;
- Development of recreation and ecotourism in SPNAs;
- Introduction of mechanisms of financial sustainability and development of SPNAs;
- Establishment of monitoring system;
- Capacity building of SPNAs.

**ENVIRONMENTAL LEGAL ACTS
OF THE REPUBLIC OF ARMENIA**

1. Republic of Armenia Legislative Foundations on Nature Protection, 29.07.1991

Republic of Armenia Codes

1. Republic of Armenia Land Code, 04.05.2001
2. Republic of Armenia Water Code, 01.07.2002
3. Republic of Armenia Law on Underground Resources, 06.11.2002
4. Republic of Armenia Forest Code, 24.10.2005
5. Republic of Armenia Civil Code, 1998
6. Republic of Armenia Code on Administrative Infringements, 06.12.1985
7. Republic of Armenia Code on Criminal Infringements, 18.04.2003

Republic of Armenia Laws

1. Law on Tariffs of Nature Protection Fees, 20.12.2006
2. Law on Nature Protection and Nature Use Fees, 28.12.1998
3. Law on Tariffs for the Compensation of the Damage Caused to Fauna and Flora due to Environmental Infringements, 31.05.2005
4. Law on Environmental Control, 10.05.2005
5. Law on Specially Protected Nature Areas, 16.12.2006
6. Law on Plant Quarantine and Plant Protection, 27.11.2006
7. Law on Flora, 16.12.2006
8. Law on Underground Resource Concession for Research and Extraction with the Aim of Mineral Exploitation, 27. 11. 2002
9. Law on Purpose-Oriented Use of Environmental Fees Paid by Companies, 11.06.2001
10. Law on Waste, 21.12.2004
11. Law on Fauna, 03. 05.2000
12. Law on Hydrometeorological Activity, 09.03.2001
13. Law on Air Protection, 01.11.1994
14. Law on Expertise of Environmental Impact, 12. 12. 1995
15. Law on Hunting and Hunting Enterprises, 11.05.2007
16. Law on Seismological Protection, 06.07.2002
17. Law on Approval of Annual and Complex Action Plan on Restoration, Protection, Reproduction and Use of Sevan Lake Ecosystem, 14.12.2001

18. Law on Lake Sevan, 14. 07, 2001
19. Law on Substances Depleting Ozone Layer, 18.12.2006
20. Law on Ecological Education and Upbringing of Population, 17.12.2001
21. Law on Unions of Water Users Associations, 01.07.2002
22. Law on Legal Acts, 2002
23. Law on State Non-Commercial Organizations, 2001
24. Law on Local Self-Government, 05.06.2002

**INTERNATIONAL ENVIRONMENTAL AGREEMENTS
OF THE REPUBLIC OF ARMENIA**

Conventions and Related Protocols

1. Convention on Wetlands of International Importance especially as Waterfowl Habitat (Ramsar, 1971), Ratified by the National Assembly 06.11.1993.
2. UN Convention on Biological Diversity (Rio de Janeiro, 1992), Ratified by the National Assembly 31.03.1993.
 - Cartagena Protocol on Biosafety, Ratified by the National Assembly 15.03.2004
3. UN Framework Convention on Climate Change (New York, 1992), Ratified by the National Assembly 29.03.1993.
 - Kyoto Protocol (Kyoto, 1997), Ratified by the National Assembly 27.12.2002
4. UNECE Convention on Long-Range Trans-boundary Air Pollution (Geneva, 1979), Ratified by the National Assembly 14.05.1996
 - Protocol on Heavy Metals, signed 14.12.1998
 - Protocol on Persistent Organic Pollutants (Aarhus, 1998), signed 14.12.1998
 - Protocol on Abate Acidification, Eutrophication and ground-level Ozone Formation, signed 01.12.1999
5. UNECE Convention on Environmental Impact Assessment in a Transboundary Context (Espo, 1991), Ratified by the National Assembly 14.05.1996
 - Protocol on Strategic Environmental Assessment (Kiev, 2003), signed 21.05.2003
6. UNECE Convention on Transboundary Effects of Industrial Accidents (Helsinki, 1992), Ratified by the National Assembly 14.05.1996
 - Protocol on Civil Liability and Compensation for Damage caused by the Transboundary Effects of Industrial Accidents on Transboundary Waters (Kiev, 2003), signed 21.05 2003
7. UN Convention to Combat Desertification (Paris, 1994), Ratified by the National Assembly 23.06.1997
8. UN Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal (Basel, 1989), Ratified by the National Assembly 26.03.1999
9. Convention for the Protection of the Ozone Layer (Vienna, 1985), Ratified by the National Assembly 28.04.1999
 - Montreal Protocol on Substances that Deplete the Ozone Layer (Montreal, 1987), Ratified by the National Assembly 28.04.1999
 - London amendments to the Montreal protocol, Ratified by the National Assembly 22.10.2003

- Copenhagen amendments to the Montreal protocol, Ratified by the National Assembly 22.10.2003
10. UNECE Convention on Access to Information, Public Participation in Decision Making and Access to Justice in Environmental Matters (Aarhus, 1998), Ratified by the National Assembly 14.05.2001
 - The Protocol on Pollutant Release and Transfer Registers (Kiev, 2003), signed 21.05.2003
 11. Convention on the prior informed consent procedure for certain hazardous chemicals and pesticides in international trade (Rotterdam 1998), Ratified by the National Assembly 22.10.2003
 12. UNECE Convention on the Protection and Use of Transboundary Watercourses and International Lakes (Helsinki, 1992), Ratified by the National Assembly 22.10.2003
 - Protocol on Water and Health (London, 1999), signed 17.06.1999
 13. Stockholm Convention on Persistent Organic Pollutants (Stockholm, 2001), Ratified by the National Assembly 22.10.2003
 14. Convention on the Prohibition of Military or Any Hostile Use of Environmental Modification Techniques (Geneva, 1976), Ratified by the National Assembly 04.12.2001
 15. Convention Concerning the Protection of the World Cultural and Natural Heritage (Paris, 1972), Ratified by the National Assembly 1993
 16. European Landscape Convention (Florence), Ratified by the National Assembly 23.03.2004
 17. Conventin on the Conservatin of European Wildlife and Natural Habitats (Bern, 19.09.1979), signed 13.03.2006
 18. Decision NH-479 (12.02.2000) on ratification of the Convention on Informational Cooperation in the Field of Ecology and Environment
 19. Decision NH- 480 (12.02.2000) on ratification of the Convention on Cooperation in the Field of Ecological Monitoring

Conventions to be joined on the basis of the National Action Plan on Development of Specially Protected Nature Areas of Armenia (2002)

1. Convention on International Trade of Endangered Species of Wild Fauna nad Flora (CITES), was envisaged to join in 2006 (the justification is under development).
2. Convention on the Conservation of Migratory Species of Wild Animals (CMS), was envisaged to join in 2006 (the package of documents was submitted to the RA Ministry of Foreign Affairs).
3. Convention on African-European-West Asian Waterfowl (AEWA), was envisaged to join in 2007 (the package of documents was submitted to the RA Ministry of Foreign Affairs).

Short List of By-Laws Regulating the Management of Biodiversity and Specially Protected Nature Areas of Armenia

1. RA Governmental Decision N 920N, 2002 on Approval of the Charters of Dilijan National Park State Non-Commercial Organization and Dilijan National Park.
2. RA Governmental Decision N 927 N, 2002 on Restructuring of Sevan National Park Entity and Approval of the Charters of Sevan National Park State Non-Commercial Organization and Sevan National Park.
3. RA Governmental Decision N 926 N, 2002 on Restructuring of Shikahogh State Reserve Entity and Approval of the Charters of Shikahogh State Reserve State Non-Commercial Organization and Shikahogh State Reserve.
4. RA Governmental Decision N 925 N, 2002 on Restructuring of Khosrov State Reserve Entity and Approval of the Charters of Khosrov State Reserve State Non-Commercial Organization and Khosrov State Reserve.
5. RA Governmental Decision N 1046 N, 2002 on Restructuring of Resesrve-Park Complex State Entity and Approval of the Charter of Resesrve-Park Complex State Non-Commercial Organization.
6. RA Governmental Decision N 631, 2002 on Approval of the Charter of Sev Lich State Sancturay.
7. RA Governmental Decision N 941 N, 2003 on Losing validity of the RA Governmental Decision N 23, 26.01.1996
8. RA Governmental Decision N 1380 N, 2002 on Approval of the Order on Giving Licenses and Making Contracts for Use of Fauna Objects for the RA Agricultural and Production Purposes.
9. RA Governmental Decision N 1174 N, 2002 on the Order of the Export from the RA Territory and Import to the Republic of Armenia Territory of Wild animals and Zoological Collections and Separate Specimen.
10. RA Governmental Decision N 884 N, 2003 on Astablishing the Order on Making Contracts for Fauna Objects Use for Social Purposes.
11. RA Governmental Decision N 1173 N, 2002 on the Order of the Export from the RA Territory and Import to the RA Territory of Botanical Collections and Separate Specimen.
12. RA Governmental Decision N 958 N, 2003 on Amendments in the RA Governmental Decision N 864, 30.12.1998
13. RA Governmental Decision N 827 N, 2003 on Approval of the Charter of Erebuni State Reserve.
14. RA Governmental Decision N 830 N, 2003 on Approval of the Charter of Vordan Karmir State Sanctuary.

15. RA Governmental Decision N 560, 2000 on Vesting the RA Ministry of Nature Protection with the Competences of Authorized Body in the Field of Flora and Fauna Protection, Conservation, Use and Reproduction.
16. RA Governmental Decision N 1236, 2002 on Establishment of Bioresources Management Agency in the Structure of the Republic of Armenia Ministry of Nature Protection.
17. RA Governmental Decision N 975 N, 2007 on Establishment of Khor Virap State Sanctuary and Making Amendments and Changes in the Republic of Armenia Governmental Decision N925 N, 30.05.2002.
18. RA Governmental Decision N 673 N, 2007 on Establishment of Gilan State Sanctuary on the Territory of Khosrov Forest State Reserve.
19. RA Governmental Decision N 930 N, 2007 on Approval of the Charter of Gilan State Sanctuary.
20. RA Governmental Decision N 204 N, 2007 on Approval of the Management Plan (Land Use Scheme) of 2007-2011 for Dilijan National Park.
21. RA Governmental Decision N 205 N, 2007 on Approval of the Management Plan (Land Use Scheme) of 2007-2011 for Sevan National Park.
22. RA Governmental Decision N 204 N, 2007 on Establishment of the Order on Organization and Implementation of Monitoring in Specially Protected Nature Areas.

**STRUCTURE
OF THE MINISTRY OF NATURE PROTECTION
OF THE REPUBLIC OF ARMENIA**

1. Structural Sub-divisions

Department on Environmental Protection
Department on Underground Resources Protection
Department on Management of Hazardous Substances and Waste
Normative-Methodological Department
Legal Department
Department on International Cooperation
Secretariat
Division on Meteorology and Atmosphere Pollution Monitoring
Division on Environmental and Nature Use Economics
Division on Public Relations
Division on Finances and Accounting
Division on Staff Management
First Division

2. Separate Sub-divisions

Water Resources Management Agency
Agency on Mineral Reserves
Geological Agency
Bioresources Management Agency
State Environmental Inspectorate
Inspectorate on State Regulation of Nuclear and Radiation Security

**THE STRUCTURE OF
STRUCTURAL SUBDIVISIONS OF
THE REPUBLIC OF ARMENIA
MINISTRY OF NATURE PROTECTION**

STATE ENVIRONMENTAL INSPECTORATE

1. Structural sub-divisions

Division on Evaluation and Analysis

Division on Geological and Mine-Surveyor Control

Division on Water Control

Division on Atmosphere Control

Division on Forest Control

Division on Biodiversity, Land, Waste and Hazardous Substances Control

Central Laboratory

2. Territorial sub-divisions

Yerevan Territorial Division

Syunik Territorial Division

Ararat Territorial Division

Armavir Territorial Division

Aratatsotn Territorial Division

Gegharkunik Territorial Division

Kotayk Territorial Division

Tavush Territorial Division

(Decisions N 292N, 11.03.04 and N 363N, 18.03.04 on changes of the structure)

WATER RESOURCES MANAGEMENT AGENCY

1. Structural sub-divisions

Division on Water Resources Policy and Analysis

Division on Water Resources Cadastre and Monitoring

Division on Water Use Permits

Division on Watershed Management Planning

2. Territorial sub-divisions

Northern Territorial Watershed Management Division

Sevan-Hrazdan Territorial Watershed Management Division

Ararat Territorial Watershed Management Division

Akhuryan Territorial Watershed Management Division

Southern Territorial Watershed Management Division

AGENCY ON MINERAL RESERVES

Division on Industrial Assessment of Mines

Division on Mineral Reserves

GEOLOGICAL AGENCY

Division on Minerals

Territorial Geological Division

BIORESOURCES MANAGEMENT AGENCY

Division on Fauna Resources Management

Division on Flora Resources Management

Division on the Management of Specially Protected Nature Areas

Division on Arboretum Management

**INSPECTORATE ON STATE REGULATION OF NUCLEAR AND RADIATION
SECURITY**

Division on Nuclear Security

Division on Radiation Security and Accident Planning

Division on Nuclear Information and Analysis and International Cooperation

Technical Division

ACTUAL PLANNING EXAMPLES

1. Territorial Planning – Sevan Lake Watershed Basin, Gegharkunik Marz

The main purpose of plan development is the organization of rational territorial planning of the territory with establishment of interconnections between natural and urbanized areas under different level of exploitation, establishment of a balanced settling system as well as evaluation of the integrity of diverse town planning, economic, recreational and ecological links.

The Plan includes the following analyses:

- Natural resources and trends of their use;
- Analysis and evaluation of town-planning and economic use of the territory;
- Analysis and evaluation of territorial resources;
- Analysis and evaluation of linear elements of town-planning framework;
- Analysis and evaluation of ecological framework of the territory;
- Ecological problems of protected areas;
- Protection of air basin;
- Functional zonation of the Marz territory by the level of town-planning and economic use;
- Analysis of border zone and neighboring areas of Gegharkunik Marz;
- Directions on perspective town-planning organization and improvement of the territory;
- Principles of territorial planning and organization of recreational zone;
- Functional zonation of the territory and measures on improvement of planning conditions;
- Definition of functional capacity of the recreational zone;
- Perspective planning structure of the recreational zone;
- Perspective development possibilities of the agricultural and agro-food system of RA Gegharkunik Marz;
- Calculation of demographic capacity of the territory;
- Urban-ecological zonation and regimes on improvement of town-planning organization of the zones;
- Development problems of town communities;
- Improvement of ecological framework of Sevan watershed basin;
- Town-planning measures on improvement of ecological framework;
- Engineer and planning measures on improvement of ecological framework;

- Priority measures of territorial planning of Sevan Lake watershed basin;
- Technical-economic indicators of the territorial plan.

2. Territorial Planning – Shikahogh State Reserve, Syunik Marz

The efficiency of nature protection activities decreases if there are conflicts with local population. These conflicts are mainly conditioned by overlaps of the reserve and community borders, practical impossibility to apply the reserve regime, lack of roads to pastures and hay-making areas envisaged for communities and others. Taking into account the above mentioned it is expedient to demarcate some territories of the reserve and sanctuary as well as to provide possibilities for transit roads in order to mitigate these conflicts with communities.

In the present period of the establishment of public and market relations it is urgent to initiate activities on integration of environmental and economic fields. From this perspective one of the measures on protection of the natural ecosystems and their components in the reserve and buffer zones is the compliance of the borders of the reserve and buffer zones with both environmental norms and social-economic development norms of neighboring communities. This will support the full use of resources and human resources in neighboring areas with contribution to the increase of the living standard of local population and improvement of the state of the environment.

The revision of the territory of Shikahogh State Reserve, clarification of borders and mapping has been a priority issue. The activities implemented in this field were aimed at the protection of landscape and biological diversity, genetic fund and natural heritage on the territory of Shikahogh State Reserve and buffer zones. In particular, the efficiency of protection, scientific-research and other activities being implemented in Shikahogh State Reserve depends on the clarified borders, which comply with social-economic conditions and include biological and landscape diversity of the region to the most possible extent as well as on availability of up-to-date maps.

The integrity of ecosystems and landscapes, ecological-geographical criteria such as geographical appropriateness of altitude-zonation distribution of landscapes and their components, river-basin principles of territory demarcation and others were not taken into account during the establishment of the Reserve. All these have caused difficulties for safeguarding and control of the reserve regime.

Last time the activities on border clarification and mapping of Shikahogh State Reserve were carried out in 1989; by this in accordance with forest management plans the territory of Shikahogh State Reserve was 10330 ha.

To fulfil the Republic of Armenia Governmental decision N 216N from 12.14.2004 by the order of the Republic of Armenia Ministry of Nature Protection in the framework of Mid-Term programs the activities on revision of the territory, clarification of borders and mapping of Shikahogh State Reserve have been implemented.

In the result of these activities in 2006 the Republic of Armenia Governmental decision approved the description of the borders of Shikahogh State Reserve (12137.075 ha) and the size of the territory of Plane Grove State Sanctuary (64.2 ha).

According to Provision 1 of this decision 1505.073 ha of lands, including 490.08 ha of lands within administrative borders of Syunik Marz communities and 1014.993 ha of lands out of administrative borders of Syunik Marz communities were transferred to the land category of

specially protected areas and allocated to Shikahogh State Reserve State Non-Commercial Organization of the Ministry of Nature Protection of the Republic of Armenia with the right of free of charge (permanent) use. At the same time in accordance with the same decision the territory of 112.275 ha of Shikahogh State Reserve under the management of Shikahogh State Reserve State Non-Commercial Organization was transferred to the land category of agricultural purposes and allocated to rural communities of Shikahogh, Tsav and Srashen.

In 2006 by the order established by the legislation the territorial sub-division of the State Committee of Real Estate Cadastre adjacent to the Government of the Republic of Armenia made state registration of the rights over 12137.075 ha of Shikahogh State Reserve and 64.2 ha of Plane Grove State Sanctuary areas and other property, which is given to Shikahogh State Reserve State Non-Commercial Organization with the right of free of charge (permanent) use.

By joining the above mentioned territories to Shikahogh State Reserve it became possible to fix ragged borders and secure better integrity for the territory. At the same time more flora and fauna species including rare and threatened ones appeared under the regime of special protection. For some rare species (Bezoar goat, Caucasian leopard) it became possible to move freely and migrate within their areals.

The most important issue in the border revision and clarification of the Reserve was to include different landscape types within proposed revised borders of the Reserve including alpine meadows, mountainous steppes, stony mountainous slopes, wetland ecosystems, separate forest areas and others. In the result much more flora and fauna habitats and other key biotops were taken under protection, which previously were not fully included. Simultaneously, in future it will make possible to restore naturally the degraded landscapes and biodiversity of the territories damaged due to economic activity as well as to increase the efficiency of the protection, coordination of scientific-research activities and management of the Reserve.

The existence of optimal borders of the Reserve and buffer zones will make possible to contribute to clarification of responsibilities and rights of respective state structures and the subjects running economic activity in the fields of natural resource protection, reproduction and use by the order established by the legislation. It will make possible to apply flexible management mechanisms, which are efficient enough not only to contribute to protection of natural and cultural heritage in the Reserve and its buffer zones, but also to be mutually beneficial.

In particular, the development of scientific-cognitive tourism and related branches instead of natural resource exploitation is the most effective means to increase the living standard of the reserve neighboring population, economic development and income.

CHARACTERISTICS OF THE RA PROTECTED AREAS

№	Title	Year of establishment and approval of borders and areas	Area, ha	Sub-ordination	Location	Protected objects	State of protection
<u>Reserves</u>							
1.	Khosrov Forest State Reserve	13.09.1958 Council of Ministers Arm SSR № 341	29196 -5000	Ministry of Nature Protection of RA, Khosrov Forest State Reserve State Non-Commercial Organization	Central Armenia, Ararat Marz. Southern slopes of Gegham Mountain Range; slopes of Urts and Yeranos Ranges nearby Arax River; Rivers Azat and Vedi with tributaries. 700 - 2800 m above sea level	Dry, open woodland and friganoid landscapes, 1800 species of vascular plants, more than 210 species of vertebrate animals	One of the important SPNAs of Armenia. The state of protection is comparatively good. Need for material-technical support, clarification of borders and their correspondence to the main watershed ranges.
2.	Shikahogh State Reserve	13.09.1958 Council of Ministers Arm SSR № 341. Reorganized into	12137,075	Ministry of Nature Protection of RA, Shikahogh State Reserve State Non-Commercial	Southern Armenia, Syunik Marz, Kapan District. Tsav and Shikahogh River Basins.	Oak-hornbeam forests and typical plant and animal associations. 1074 species of vascular plants, plane grove	Lack of material-technical base. Clarification of borders. The Plane Grove

		sanctuary in 1961 The status of Reserve restored 27.10.1975, № 728 In 1998 given the status of legal person. Decision of the RA Government 07.09.06 № 1401-H		Organization	Northern slopes of Meghri Range. 700-1000 m	and yew grove, porcupine, leopard, Armenian mouflon, Bezoar goat.	Sanctuary has been joined.
3.	Erebuni State Reserve	1981 in the structure of Reserve-Park Complex. It has no autonomous status of legal person.	89	Ministry of Nature Protection of RA, Reserve-Park Complex State Non-Commercial Organization	Eastern vicinities of Yerevan City, between villages Shorbulakh and Geghadir. On the junction of mountainous steppes and semideserts. 1300-1400 m above sea level. Western slopes, mountainous xerophytes.	293 species of vascular plants. Wild relatives of cereal, more than 100 varieties of wheat. 9 species of reptiles, 50 species of birds, 13 species of mammals. Rye, barley.	The fence of the Reserve has been destroyed. Need for protection infrastructure. On the borders of the Reserve active construction of summer-house buildings.
<u>National Parks</u>							
4.	Sevan National Park	1978 Decision of the RA	150100 out of which 125200 is the	Ministry of Nature Protection of RA, Sevan National	Lake Sevan and littoral zone from several meters to	High mountainous lake ecosystem.	Lake pollution due to industry, town building,

		Government 19.01.07 № 205-H	Lake Sevan	Park State Non-Commercial Organization	several kilometers between the road and the shore. Gegharkunik Marz, surrounded by Areguni, Gegham, Vardenis, Pambak and Sevan Ranges. 2000 m above sea level	Endemic species of plants and animals (fish). Resting sites for migratory waterfowl.	agricultural activity and tourism. Water level decrease due to irrigation and energy production.
5	Dilijan National Park	2002 on the basis of Dilijan State Reserve Established by Decision № 341, 13.09.1958 of the Council of Ministers of ArmSSR. RA Government Decision N 204-H, 19.01. 07	28002	Ministry of Nature Protection of RA, Dilijan National Park State Non-Commercial Organization	Northern Armenia, Pambak, Areguney, Miapor and Gugark Ranges. Valleys of Rivers Aghstev and Getik within the border of Tavush administrative region. 1070-2400 m above sea level	Mesophilous oak and beech forests, yew grove, natural and cultural monuments. 902 species of vascular plants, 172 species of vertebrate animals	Illegal logging and forest use. Clarificaiton of borders of reserve, recreational and economic zones.
	<u>Sanctuaries</u>						
6	Akhnabat Yew Grove	29.01.1959 Decision of the Council of Ministers of	25	Ministry of Nature Protection of RA, Dilijan National Park State Non-Commercial	Tavush Marz, North-Eastern Armenia, Polad River Basin, on Tsaxhkot slope of Miapor Range near	Relict yew grove 300-400 year old	Sufficient protection

		ArmSSR № 20		Organization	the village Aghavnavank. 1400-1700 m above sea level		
7	Pine of Banx	29.01.1959 Decision of the Council of Ministers of ArmSSR № 20	4	Ministry of Agriculture of RA, Hayantar State Non-Commercial Organization	Kotayk Marz. Central Armenia, Hrazdan region. Marmarik River valley. Northern slopes of Tsakhkunyats Range. 1800-2000 m above sea level	Unique planted stands of pine of Banx	Insufficient state. Tsakhkadzor Forest District of Kotayk Forest Enterprise.
8	Goravan Sands	29.01.1959 Decision of the Council of Ministers of ArmSSR № 20 Decision of the RA Government 25.01.07 № 975-H	95,99	Ministry of Nature Protection of RA, Khosrov Forest State Non-Commercial Organization	Central Armenia, Ararat administrative region (Marz). On the southern outskirts of the town Vedi, nearby the village Goravan	Remnant sands with unique species of plants and animals.	Exrtremely insufficient state. Use of sands for construction purposes.
9	Juniper open woodlands of Sevan (Gyuney)	13.09.1958 Decision of the Council of Ministers of Arm SSR № 341	3312	Ministry of Nature Protection of RA, Sevan National Park State Non-Commercial Organization	Eastern Armenia, Gegharkunik Marz. Western slopes of Areguney and Sevan Ranges	Unique relict treelike, juniper and oak open woodlands with typical fauna and flora	No protection, live-stock grazing. Martuni Forest Enterprise.

10	“Arjatkhleri” Hazel-nut (Corylus Colurna)	13.09.1958 Decision of the Council of Ministers of Arm SSR № 341	40	Ministry of Agriculture of RA, Hayantar State Non-Commercial Organization	Northern Armenia, Tavush Marz. Northern slopes of Ijevan Range. Khakhaghaghbyur River basin. 1500-1800 m above sea level	Relict groves of yew and hazel-nut	Insufficient state.
11	Her-Her Open Woodland	13.09.1958 Decision of the Council of Ministers of Arm SSR № 341	6139	Ministry of Agriculture of RA, Hayantar State Non-Commercial Organization	Southern Armenia, Vayots Dzor Marz, River Her-Her basin (right tributary of River Arpi). 1400-2000 m above sea level	Relict yew open woodland and remnant orchards of pear, tragacanth milk vetch.	Insufficient state. Kotayk Forest Enterprise
12	Jermuk	13.09.1958 Decision of the Council of Ministers of Arm SSR № 341	3865	Ministry of Agriculture of RA, Hayantar State Non-Commercial Organization	Southern Armenia, Vayots Dzor Marz, River Arpa basin. 1100-2800 m above sea level	Mountainous forests. Rare species of animals (leopard, Bezoar goat, Armenian mouflon, bear and others)	Insufficient state. Kotayk Forest Enterprise
13	Gyulagarak	13.09.1958 Decision of the Council of Ministers of Arm SSR № 341	2576	Ministry of Agriculture of RA, Hayantar State Non-Commercial Organization	Northern Armenia, Lori Marz. Northern slopes of Bazum Range. 1400-1900 m above sea level	Unique pine grove	Insufficient state.

14	Plane Grove	13.09.1958 Decision of the Council of Ministers of Arm SSR № 341 RA Governmental Decision 15.07.04 № 1044-H RA Governmental Decision 07.09.06 № 1401-H	64,2	Ministry of Nature Protection of RA, Shikahogh State Reserve State Non-Commercial Organization	Southern Armenia, Syunik Marz, Tsav River valley	The only plane grove in the Caucasus	Restoration activities are underway, included in the structure of Shikahogh State Reserve State Non-Commercial Organization
15	Rhododendron	29.01.1959 Decision of the Council of Ministers of ArmSSR № 20	1000	Ministry of Agriculture of RA, Hayantar State Non-Commercial Organization	Northern Armenia, Lori Marz. Rhododendron brushwood on the northern slopes of Pambak and Tsakhkunyats (Miskhana) Ranges. 1900-2200 m above sea level		Insufficient state
16	Aragats Alpine	29.01.1959 Decision of the Council of Ministers of ArmSSR № 20	300	Institute of Physics	Central Armenia, Aragatsotn Marz, southern slope of the Mount Aragats	“Stone” Lake of the Mount Aragats and surrounding alpine meadows.	Insufficient state.
17	Margahovit	19.04.1971 Decision of the	3368	Ministry of Agriculture of RA,	Northern Armenia, Northern slopes of	Forest animals: bear, roe-deer,	Insufficient state. Gugark Forest

		Council of Ministers of ArmSSR № 212		Hayantar State Non-Commercial Organization	Pambak Range. River Pambak basin. 1900-2200 m above sea level	caucasian black grouse, red deer	Enterprise Hamzachiman Forest District
18	Arzakan (7280 ha) and Meghadzor (6252 ha)	19.04.1971 Decision of the Council of Ministers of ArmSSR № 212	13532	Ministry of Agriculture of RA, Hayantar State Non-Commercial Organization	Central Armenia, Kotayk Marz. Marmarik and Dalarik River basins. 1600-2100 m above sea level	Rare species of valuable animals (bear, roe-deer, black grouse)	Insufficient state. Hrazdan Forest Enterprise. Arzakan and Meghradzor Forest Districts
19	Ijevan	19.04.1971 Decision of the Council of Ministers of ArmSSR № 212	5908	Ministry of Agriculture of RA, Hayantar State Non-Commercial Organization	Northern Armenia, Tavush Marz. Slopes of Ijevan Range, River Aghstev basin. 900-2100 m above sea level	Rare and valuable species of animals: bear, roe-deer, black grouse.	Insufficient state. Ijevan Forest Enterprise. Ijevan Forest District
20	Gandzakar (Upper Aghdan)	19.04.1971 Decision of the Council of Ministers of ArmSSR № 212	6813	Ministry of Agriculture of RA, Hayantar State Non-Commercial Organization	Northern Armenia, Tavush Marz. River Paytajur basin, right tributary of River Aghstev. 2500 m above sea level	Rare and valuable species of animals: bear, roe-deer, black grouse. Mountainous forests	Insufficient state. Ijevan Forest Enterprise. Aghdan Forest District
21	Getik	19.04.1971 Decision of the Council of	5728	Ministry of Agriculture of RA, Hayantar State	Eastern Armenia, Gegharkunik Marz. Right tributary of	Rare and valuable species of animals: bear, roe-deer,	Insufficient state. Krasnoselsk

		Ministers of ArmSSR № 212		Non-Commercial Organization	River Aghstev, River Getik basin. 1500-2700 m above sea level	black grouse. Mountainous forests	Forest Enterprise. Getik Forest District
22	Yeghegnadzor	16.11.1971 № 375	4200	Ministry of Agriculture of RA, Hayantar State Non-Commercial Organization	Southern Armenia, Vayots Dzor Marz. Right tributary of River Arpa, River Yeghegis basin nearby village Aghavnadzor. 1200-2800 m above sea level	Rare and valuable species of animals: Bezoar goat, Armenian mouflon, leopard, rich diversity of wild wheats.	Insufficient state.
23	Goris	16.11.1972 Decision of the Council of Ministers of ArmSSR № 775	1850	Ministry of Agriculture of RA, Hayantar State Non-Commercial Organization	Southern Armenia, Syunik Marz, basins of the River Vorotan basin and its tributary Vararakn. 1400-2800 m above sea level	Unique flora and fauna of the region.	Insufficient state.
24	Hankavan hydrological	23.03.1981 Decision of the Council of Ministers of ArmSSR № 148	9350	Ministry of Agriculture of RA, Hayantar State Non-Commercial Organization	Central Armenia, Kotayk Marz, upper course of River Marmarik.	Mineral water Hankavan	Insufficient state.
25	Jermuk hydrological	23.03.1981 Decision of the	18000	Ministry of Agriculture of RA,	Southern Armenia, Vayots Dzor Marz,	Mineral water	Insufficient state.

		Council of Ministers of ArmSSR № 148		Hayantar State Non-Commercial Organization	upper course of River Arpa	Jermuk	
26	Ararat Cochineal (“Vordan Karmir”)	03.02.1987 №61	218	Ministry of Nature Protection of RA, Reserve-Park Complex State Non-Commercial Organization	Central Armenia, Armavir Marz. Ararat Valley, semidesert zone. 850-1100 m above sea level	Ararat cochineal and typical semidesert vegetation.	Average sufficient state.
27	Boghakar	10.08.1989 №400	2728	Ministry of Agriculture of RA, Hayantar State Non-Commercial Organization	Southern Armenia, Syunik Marz, southern slopes of Zangezur Range. 1400-2100 m above sea level	Unique species of Armenian flora and fauna.	Average sufficient state.
28	Sev Lich	12.10.2001 on the basis of the Reserve established by decision №717 in 17.10.1987	240	Ministry of Nature Protection of RA, Reserve-Park Complex State Non-Commercial Organization	Southern Armenia, Syunik Marz. The slope near the crater of the Mount Mets Ishkhanasar. 2658 m above sea level In the southern part of Kharabagh volcanic plateau.	High mountainous lake (relict reservoir), 102 species of vascular plants, alpine meadows	Average sufficient state.
29	Khor Virab	25.01.07 Decision of the RA	50.28	Ministry of Nature Protection of RA,	Central Armenia, Ararat Marz, Ararat	Wetland ecosystems and	Average sufficient state.

		Government № 975-H		Khosrov Forest State Reserve State Non-Commercial Organization	Valley, nearby monastery complex Khor Virab	typical species of plants and animals, near the ancient city Artashat	
30	Gilan	Decision of the RA Government 24.05.07 № 673-H Decision of the RA Government 09.08.07 № 930-H	118	Ministry of Nature Protection of RA, Khosrov Forest State Reserve State Non-Commercial Organization	Central Armenia, Ararat Marz. Located in Garni tract of Khosrov Forest Reserve,	Mountainous- forest ecosystems, juniper open woodlands	Average sufficient state.

REFERENCES

1. “Biodiversity of Armenia” First National Report, RA Ministry of Nature Protection, Yerevan, 1999.
2. National Action Plan to Combat Desertification in Armenia”, Yerevan 2002, RA Ministry of Nature Protection.
3. Capacity Assessment for Biodiversity of Armenia Project (UNDP/GEF ARM/97/G/31)
4. Republic of Armenia State Strategy on Developing Specially Protected Areas and National Action Plan, RA Ministry of Nature Protection, Yerevan, 2003.
5. “Creation of Favorable Conditions for Development of the RA Second National Communication on Climate Change” UNDP/GEF/2007.
6. Armenia: Problems of Climate Change (collection of articles), Yerevan, 1999, 373 pages.
7. Republic of Armenia National Forest Policy and Strategy, 2004.
8. Republic of Armenia National Forest Program, 2005.
9. Illegal Logging Action Plan, 2005.
10. Hayantar SNCO, annual reports.
11. Draft Management Plan of Khosrov Forest State Reserve, 2006.
12. RA Law Bulletin, 2007.
13. Territorial Planning, Sevan Lake watershed basin, Gegharkunik Marz.
14. Sevan and Dilijan National Parks Management Plans, 2007.
15. Reserves of the Caucasus (edited by V.E.Sokolov and E.E.Siroechkovski), M., “Misl”.
16. Dal S.K., 1954, Fauna of Armenian SSR, volume 1, Vertebrate Animals, Yerevan, Edition of Academy of Sciences of ArmSSR, 415 pages.
17. Red Data Book of Armenian SSR, 1987, Rare and Threatened Species of Animals, Yerevan, Hayastan, 123 pages.
18. Complex Scheme of Nature Protection and Rational Use of Natural Resources of the Lake Sevan Basin”, Moscow, “Soyuzgiprovodkhoz” Institute, 1982.

Web-sites

www.ipcc.ch, www.unfccc.int, www.ncsp.undp.org, http://www.choicesmagazine.org/2004-3/climate/2004-3_07.htm, <http://www.caucasus-conference.org/en/background.htm>