



The System of Lithuanian Protected Territories from Environment Conservation Point of View

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Abstract. The article analyses the system of Lithuanian protected territories as well as their types from environment conservation point of view. The system of protected territories of LR includes the following types of areas: 6 state reserves, 1 biosphere reserve, 396 strict reserves, 5 national parks, 30 regional parks, 29 biosphere polygons and 3 recuperation plots. The system of protected territories, the order of establishment, management and the legal basics of protection of protected territories is determined by the law of protected areas of LR that was approved in 1993. The purpose of reserves is to preserve unique landscape complexes, their biota gene pool, to organize scientific research and observation, to promote natural and cultural values. The aims of the establishment of Lithuanian national and regional parks are not only to preserve naturally and culturally valuable landscape but also to support ethno cultural traditions of Lithuanian regions and to provide conditions for recreation. The purpose of strict reserves is to preserve the complexes of natural and cultural heritage or separate landscape elements, plant and animal species, to secure landscape diversity and ecological balance. Live and inanimate natural monuments are preserved naturally for scientific, cultural, educational and aesthetic needs. The purpose of biosphere polygons is to preserve bird species by assuring favorable conditions, to perform the monitoring of protected species, scientific research, etc. The aim of the recuperation plots is to restore natural resources. The system of Lithuanian legal acts allows applying such limitations that are necessary to preserve existing values in every protected territory.

Keywords: protected natural territories, reserves, strict reserves, national and regional parks, natural monuments, biosphere polygons, recuperation plots.

I INTRODUCTION

Due to the development of industry, transport, agriculture and other economic activities as well as the impact of urbanization country landscape is also undergoing significant changes; therefore, different protected territories have been established.

Environmental conservation traditions in Lithuania are very old. Sacred forests situated near the river Nevėžis were mentioned in Salyno pact in 1398. Since 1420 cuttings of old oaks were prohibited in Lithuania. The Wallach reform of 1557 identified the order of forest fellings, hunting, mushroom and berry picking. During the Soviet period (in 1959) the environment protection law of Lithuania SSR was passed. After the restoration of independence the law of protected territories of the Lithuanian Republic was passed in 1993 [2].

Exceptional character of protected territories as the object of used and protection is shown by the peculiarities of its protection regime that are determined by the specifics of their aim and functions. [3]. The aim of protected territories is complex: the territories are established in order to preserve not only natural, but also cultural-historical landscape and its objects. They should

provide conditions for the organization of recreational, scientific research, environment observation activities.

Every country creates its unique system of protected territories. In this process Lithuania has chosen an integrated approach, i.e. integrated protection of natural and cultural heritage when both animate and inanimate natural values are preserved.

Big changes in the system of protected territories take place because of the obligations of Lithuania to the European Union to establish the network of protected territories „Natura 2000“ by the year 2015.

The system of protected territories is not stagnant; the network is constantly reviewed and supplemented.

Aim: To analyze the structure, types and functions of the system of Lithuanian protected territories from the environment conservation point of view.

II MATERIALS AND METHODS

Work methods:

1. Analysis of scientific references.
2. Statistic data analysis.
3. Analysis of the use and legal protection regulation of protected territories.

Work object: The types of the Lithuanian protected areas: reserves, national and regional parks, strict reserves, biosphere polygons, recuperation plots.

III RESULTS

Protected territories are dry land and (or) water areas that have approved scientific, ecological, cultural and other value and where special protection and use regime has been established [1].

In Lithuania the system of protected territories has been started to be created in 1937 when following the initiative of T. Ivanauskas the Žuvintas reserve was established. Since 1960 quite a big number of strict reserves have been established. In 1974 the first Lithuanian national park has been founded. After the restoration of Lithuanian independence (in 1992) a lot of protected areas, especially regional parks have been established. Preservation of values is not possible without legal foundation that is why the legal base for protected territory system, its establishment, management and protection is defined by the law of protected areas of LR approved in Lithuania in 1993. The system of protected territories of LR includes the following types:

6 state reserves,
1 biosphere reserve,
396 strict reserves,
5 national parks,
30 regional parks,
29 biosphere polygons,
3 recuperation plots.

Lithuanian protected territories take up about 14 % of the country territory area [5]. The distribution of the types of protected territories according to the area is the following: regional parks – 44 %, biosphere polygon – 23 %, strict reserves– 15 %, national parks – 14 %, reserves – 2 % and recuperation plots – 0,1 % [1].

Reserves are protected areas established for the protection of extremely valuable natural or cultural territorial complexes as well as for scientific research, maintenance of natural flow of nature processes or the authenticity of cultural values, and the propagation of the protection of territorial complexes of natural and cultural heritage [5].

Reserves are divided into natural (for the preservation of extremely valuable natural landscape complexes) and cultural (for the preservation of extremely valuable cultural landscape complexes).

The characteristics of reserves are presented in Table 1.

TABLE 1
CHARACTERISTICS OF LITHUANIAN RESERVES (MARGELIENĖ, 2013)

Reserve	Category	Year of establishment	Area, ha	Environmental characteristics
Čepkeliai	Natural	1975	11212	It is the moor and forest complex of peculiar natural value which has not been damaged by human activity. The peat-moss swamps contain dwarf pines; Eurasian curlews, European Golden Plovers and wood sandpipers brood in open areas, cranberries grow their berries. Upland moor contains over 20 small lakes. In the Southern part the moor changes into the lowland moor, sedge wet meadows that give the origin to Musteika rivulet. Katra rivulet flows along the Southern boundary of the reserve. There are a lot of rare species of plants, white-tailed eagles, ospreys, black storks, little eagles, Western capercaillies as well as black grouse brood here. It contains the largest population of cranes (up to 25 pairs), moose, wolves, and lynxes.
Kamanai	Natural	1979	3938	The biggest part of the reserve is occupied by a moor with numerous swamps and lakelets (up to 120). Several decades ago the moor was drained. This had a significant impact on it and the plants growing there. At the moment the reserve water regime has been restored, nature processes are naturalizing. The most impressive lakelets are Nimfėjai and Salų as well as Kamanų lake, the area of which is 6 ha. The moor is surrounded by mixed forests and shady spruce forests. A lot of rare species of plants are found in the reserve. Cyripedium calceolus are abundant here. European Golden Plovers, black storks, black grouse brood here. Wolves and lynxes live here.
Viešvilė	Natural	1991	3216	Reserve is composed of Artosios and Gličio moors with Buveinių and Gličio lakes, Viešvilės rivulet and impressive part of Karšuva forest. Only about 15 km long Viešvilės rivulet outflows from boggy Buveinių lakelet and flows into the river Nemunas. The rivulet flows through moors, meadows and shadowy mixed forests. It is the home for trouts and otters. Away from the rivulet and the moor there are nice pine forests. European Golden Plovers, cranes brood in the reserve moors, little eagles, stock doves brood in the forests. There are wolves, moose, and lynxes.

Kernavė	Cultural	1989	199	Lithuania has the only archeological and historical museum-reserve in Kernavė. It was established in 1989 in Širvintai dist. Its area is 196,2 ha. Reserve was established close to the river Neris, in Pajauta valley. It has a complex of 5 mounds as well as the places that have a lot of archeological findings that are important for Lithuanian history. Kernavė was mentioned in written sources in 1279. Following archeological findings it was identified that the first inhabitants settled down in this place in IX–VIII centuries BC. In XII century Kernavė became the town, the centre of which was 4 mounds.. Altar mound contained duke estate, the others – protective castles. In the base of mounds the town was created with the quarters of craftsmen and merchants. After the Teutonic Order attacks in 1390 the town was abandoned; it was buried and preserved for future research by the silt of the river Neris.
Vilnius castles	Cultural	2002	360	State cultural reserve of Vilnius castles is the heart of Vilnius old town. Archeological values: Vilnius mound (A1961 K) – which is called Kreivuoju (Crooked) mound, Plikuoju (Naked) mound, the mound of Three Crosses (A1961 K1) together with low castles is also called Bekešo mound (A1961 K2), Gediminas grave mound (A1961 K3) and Stalo (Table) mound (A1961 K4). The area of the territory is 33,87 ha. Vilnius castle land (A1960) is called Gediminas castle mound, Upper castle, Lower castle. The area of the territory is 18,70 ha. Architectural values: the complex of Arch cathedral basilica, Lower and Upper castle and their remnants (G205 K). Building complex (G390 K): Palace, called Kirdieju (G390 K1), Barboros Radvilaitės, Office (G390 K2), cart shed (G390 K3), fence (G390 K4). Other values: The monument of Three Crosses (D R1332), sculptural composition „Lithuanian ballad" (D V3557).
Dubrava	Reserve area	1994	120	The purpose is to preserve rare forest plantings, productive coniferous plantations and valuable plant communities. Very valuable natural high moor.
Žuvintas	Biosphere	2002	18493	Žuvintas biosphere reserve territory contains a lot of valuable biotypes. Active high moors, intermediate moors, low moors, high moor pine stands, wet black alder stands as well as eutrophic Žuvintas lake can be found in Žuvintas natural reserve. Žuvintas is the most famous because of birds. Since 1980 227 bird species were observed in Žuvintas biosphere reserve. 153 species have brooded here. 108 of mosses, 105 algae, 107 fungi and more than 600 species of higher plants are found here. About 2000 species of insects, 5 reptiles and 10 recorded, over 40 species of mammals were found. 22 species of fish are found in Žuvintas lake.

National parks are the territories protected by Lithuanian state with specific landscape, unique settlements, and cultural values [5]. Sightseeing tourism is promoted in national parks and the attempt to introduce visitors to natural and cultural values has been made. Human activity limited in these areas, it carefully combined with environmental conservation. Lithuania has five national parks: Aukštaitija, Žemaitija, Trakai historical, Dzūkija and Kuršių Nerija (fig 1.).



Fig. 1. Lithuanian national parks (www.lvmi.lt)

Characteristics of the Lithuanian national parks are presented in Table 2.

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TABLE 2.
CHARACTERISTICS OF LITHUANIAN NATIONAL PARKS (MARGELIENĖ, 2013)

National park	Year of establishment	Area, ha	Conservation characteristics
Aukštaitija	1974	40570	120 lakes and 70 rivers are scattered among the woods and hills. Šilinkų ridge is situated here. 50 % of the territory is occupied by forests. Moors are concentrated in the hollows. 900 species of plants grow there; 60 of them are included into Lithuanian Red List (<i>Cypripedium calceolus</i> , <i>Liparis loeselii</i> , <i>Saxifraga hirculus</i> , etc.). About 200 bird species have been found in the park. Ažvinčių old forest and Minčios forest are of a special value.
Dzūkija	1991	55920	This is the biggest and the most forested national park in Lithuania. Two thirds of the territory is located in the sandy plain of the southeast of Lithuania. There are lots of rivers – Merkys, Ūla, Grūda etc. 50 lakes. Surroundings of Merkinė are especially spectacular. Almost all territory of the park is overgrown by forests. Lichen Scots pine and whortleberry pine forests dominate. 750 species of higher plants, 300 species of fungi, 40 species of mammals and 150 species of birds are found here.
Kuršių nerija	1991	26464	The aim is to preserve the grand ridge of Kuršių Nerija, old dunes near Juodkrantė, grey dunes in Agila-Naglis strip. The peak of the majority dunes is 60 m. This landscape is the youngest in Lithuania. The dry land occupies 50 % of park territory, the remaining part is the Baltic sea and Curonian Lagoon. About 70 % of dry land is occupied by forests dominated by pines. 1000 species of rare and interesting plants such as <i>Eryngium maritimum</i> , <i>Erica tetralix</i> , <i>Gypsophila paniculata</i> , etc. grow there. There is a huge variety of birds.
Trakai historical	1991	8200	This is the smallest national park. Almost half of the territory is overgrown by forests and 16 % of the park is occupied by water. Park territory is connected by the system of 30 lakes – Galvės, Skaisčio, Bernardinų etc. Coregonus albula live in the lakes. The castles of Trakai Island and Peninsula are situated there. There are a lot of black storks, Montagu's Harriers, Cormorants and other species of birds. The highest place of the park is Nuobariškiai hill.
Žemaitija	1991	21720	Plateliai lakes and their surrounding natural complex is a very important part of the park. Forests occupy almost half of the park territory, spruce forests dominate. 26 lakes are located in the park. The biggest of them is Plateliai lake (1200 ha). The biggest river is Babrungas. 60 plant species included into Lithuanian Red List grow there. 180 species of birds, 50 species of mammals are discovered there. Rare insects such as clouded apollo, the Old World Swallowtails, the Large Coppers are found there. Different species of bats are found in the old park trees.

The purpose of establishing Lithuanian national and regional parks is not only to preserve naturally and culturally valuable landscape, but also to support Lithuanian regional ethno cultural traditions, to provide conditions for recreation [1].

Regional parks are protected territories that have been established to protect the landscape important from natural, cultural and recreational point of view as well as to regulate their recreational and economic use. Lithuania

has 30 regional parks (one of them is historical), the area of which is 439842 ha. Regional parks were established in 1992. They are divided into four groups: sea and large water reservoirs (Kaunas reservoir), river valleys of different sizes (Dubysa, Venta, Nemunas loops, etc.), forested lakes and hills (Labanoras, Verkiai, Sartai et..) as well as plateaus and plains (Biržai, Tytuvėnai, Žagarė) [6].

TABLE 3.
CHARACTERISTICS OF LITHUANIAN REGIONAL PARKS (MARGELIENĖ, 2013)

Regional park	Area, ha	The most important park values
Anykščiai	16269	The park is famous for: The forest of Anykščiai, Puntukas stone, „Queen’s swamp“, etc.
Asveja	11589	Park focus – Asveja lake which is the longest in Lithuania
Aukštadvaris	15350	The standard of Lithuanian flora – Mergiškiai forest, where linden trees grow together with oak, maple and a mixture of hornbeam trees.
Biržai	14659	Unique landscape of Lithuanian sinkhole region.
Dieveniškiai historical	8747	Culturally valuable relics of old Baltic, Dzūkija and Aukštaitija ethno culture.
Dubysa	10571	Dubysa – one of the biggest and the most beautiful Lithuanian rivers.
Gražutė	29700	The landscape of Šventoji source full of lakes (70 lakes), rivers.
Kaunas reservoir	10221	This artificial water pond created by humans with impressive bank uncovering of 20-40 m.
Krekenava	11968	Protected river valleys of Nevėžis, Upytė, Liaudė, Vešėta and Linkava.
Kurtuvėnai	15090	90 % of the park is occupied by forests. About 100 Svilė sources of different size well up in Venta-Dubysa old valley.
Labanoras	55344	It is the biggest Lithuanian regional park in Lithuania. There are 260 lakes, Kanis, Snieginis and other moors.
Meteliai	17729	Hornbeams are preserved in Giraitė forest. There are big lakes: Dusia, Metelys and Obelija.

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Nemunas delta	28870	It is a low flat plain, made from alluvial silt and lined by rivers and rivulets. It has Ventė cape, Kniaupas bay, Galzdonai islands, etc.
Nemunas loops	25171	Meandrous Nemunas valley with high, steep slopes, lined by rivulet valleys and washes. The biggest loops: Punia, Balbieriškis, Prienai and Birštonas.
Neris	10588	The landscape complex of the Northern edge of Dzūkija highland.
Pagramantis	14420	The landscape of the confluence valley of Akmena and Jūra rivers and forests
Seaside	5070	Unique formation – Dutch cap (ridge).
Panemuniai	11563	The towns of the park are famous because they are valuable from natural and cultural points of view.
Pavilniai	2153	The value of the landscape is determined by the relief marked by the differences up to 100 m. Ribiškis wash (hills) is especially unique.
Rambynas	4786	It is the smallest regional park in Lithuania. Its values: the landscape of Nemunas bends and Rambynas mound.
Salantai	13630	Natural heart of the park includes the valleys of Minija, Salantas, Bartuva and other rivers.
Sartai	12547	Sartai lake is the eighth lake in size in Lithuania; it has 7 islands. The line of the lake coast is 80 km.
Sirvėna	8735	Forests occupy 40 % of the territory. Mixed forests dominate. There are 30 lakes.
Tytuvėnai	10152	Unique heritage of the glacial period is Rūža or Velniakelis (Devil's Road), where a stone belt is extended for several kilometers.
Varniai	33800	The park contains a lot of mounds such as Medvėgalis, Šatrija, Sprūdė and others. The biggest lake is Lūkstas – over 1000 ha.
Veisiejai	12200	There are a lot of narrow and long lakes reminding about rivers.
Venta	10630	There are a lot of rivers, no lakes. The river Venta is abundant of fluvial fish – spined loach and European bitterling
Verkiai	2673	The adornment of the park is five green lakes situated among the hills overgrown by pine and spruce forests. Their underground waters are very carbonated.
Vištytis	10833	Vištytis lake. Mature broadleaf forests, oak forests with hornbeam and linden are especially valuable.
Žagarė	4784	The most valuable is the structure of Žagarė town.

Strict reserves are protected territories that have been established to protect scientifically and cognitively valuable natural and cultural places as well as their complexes and objects, for the preservation of landscape biological and genetic diversity unimposing economic activity [5]. The purpose of strict reserves is to preserve the complexes of natural and cultural heritage or separate landscape elements, species of plants and animals, to

ascertain landscape diversity as well as ecological balance. In Lithuania the network of strict reserves has been started to form in 1960, and the last strict reserves were finished to be established in 1997. At the moment there are 396 strict reserves in Lithuania. Depending on protected values strict reserves can be of different kinds (table 4).

TABLE 4.
CHARACTERISTICS OF STRICT RESERVES (MARGELIENĖ, 2013)

Types of strict reserves	Number	Protected values
State strict reserves - 285		
Landscape	48	Landscape heritage objects of a special value
Geological	10	Deep earth structures, exposures, boulders and sinkholes
Geomorphologic	40	Variety of relief forms
Hydrographic	34	Structure of rivers, rivulets and lakes
Pedologic	11	Soil structure
Botanical	35	Types and communities of plants, fungi, biotopes
Botanical-zoological	29	Plant types and communities as well as types of animals
Zoological:		
teriologicalal	1	Bats
ornithological	10	Birds and their breeding - grounds
herpetological	3	European pond turtles
ichtiologial	9	Fish and their resources
entomological	6	Extinct insects and their habitats
telmological	51	Moors
talasological	1	Valuable sea ecosystems
Municipality strict reserves - 111		

Biosphere polygons have been established for the observation of national and regional environment in the territories of special geo ecological importance. They have been established in Lithuania since 2004 to 2006. There are 26 biosphere polygons; their total area is 188777 ha. According to their nature they can be complex or specialized (hydrologic, zoological, etc.). Their purpose is to preserve extinct bird species by assuring favourable conditions, to carry out the monitoring of protected species as well as scientific research, etc. [3]. The most valuable state protected objects of natural heritage are declared as natural monuments.

TABLE 5.

CHARACTERISTICS OF NATURAL MONUMENTS (MARGELIENĖ, 2013)

Types of natural monuments	Number
Stones	47
Exposures	22
Sinkholes	3
Botanical objects (oak woods, linden, ash woods, etc)	28
Geomorphologic objects (hills, dunes, etc.)	29
Hydrographic objects (lakes, peninsulas, islands, etc.)	13
Hydro geological objects (springs, sources)	19

Recuperation plots are protected areas for the protection, profusion and limited use of natural resources and their complexes emasculated by human activity. Their purpose is to restore natural resources; they are given the „Natura 2000“territory status which is the

network of protected territories of European importance consisting of two directives (Habitations and Birds). Rich Lithuanian biological diversity is very important for ecological EU network „Natura 2000“(Western taiga habitation in Prienai forest, etc.) [6]. Regarding the peculiarities of natural resources protected natural plots of phyto resources (trees, berries, mushrooms, herbs), zoo resources (animal biotopes) and complex resources (recuperation moors as well as underground water ponds) have been established [3].

Some protected territories of Lithuania are important on international level. Čepkeliai, Kamanai and Viešvilė natural reserves as well as Žuvintas bio sphere reserve and the regional park of Nemunas delta were included into Convention on Wetlands, Ramsar, and the list of the wetland of international importance in 1993. Kuršių nerija, Trakai historical national park and Vilnius castle as well as Kernavė cultural reserve are included into the list of World heritage (UNESCO). Kuršių nerija national park, regional parks of Nemunas delta and the Seaside were included into the system of the Baltic Sea Protected Areas [2].

The system of Lithuanian legal acts allows applying such limitations that are necessary to preserve existing values in every protected territory (Table 6).

The activity of protected areas is coordinated by the state service of protected territories at the Ministry of Environment.

TABLE 6.

PROTECTION REGIME OF THE PROTECTED AREAS (MARGELIENĖ, 2013)

Protected territory type	Forbidden activity
Reserves	The change or damage to relief forms; the search and mining of minerals; construction of buildings, not related to the reserve activity; construction of roads, mains; use of chemicals or other types of environmental pollutants; change in hydrological regime; fishing and hunting; plant and animal introductions; any other activity that is considered harmful for the protected ecosystem.
Strict reserves	Commercial - economical, construction, recreational and other activity that is harmful to the environment; construction of industrial objects as well as stationary recreational institutions; exploitation of minerals; giving land to gardening communities, construction of individual summerhouses; land drainage; building or deepening of riverbeds; soil destruction; forestation of glades, natural meadows and pastures; hunting of protected species of animals, introduction of new animal species; use of pesticides.
Natural objects	Any activity that can damage natural values: to damage or to change relief; construction of mechanisms that are not related to the heritage exploitation or management, etc.
National and regional parks	Installation of new mining mineral quarries; expansion or construction of industrial as well as waste management enterprises; building new communications; construction of big bird, game and animal farms; establishment of new enterprises; damage or changes in relief; changes in hydrological and hydrographic regime; giving land to gardening communities, construction of individual summerhouses; damage to natural and cultural monuments, etc.
Biosphere polygons	Certain protection regime is introduced into protective zones. For example, in the protective zone of a sinkhole region it is forbidden to use the sinkholes for rain and water drainage, to dump rubbish and waste, to cover them with soil, to mine peat, etc.
Recuperation plots	Mineral mining and exploitation, the use of land, forests and water are restricted.

III CONCLUSIONS

The investigation of scientific and legal documents as well as data revealed that different types of protected areas have been established in Lithuania. They include: 6

state reserves, 1 biosphere reserve, 396 strict reserves, 5 national parks, 30 regional parks, 29 biosphere polygons and 3 recuperation plots. The protected territories occupy about 14 % of the total country territory area. While analyzing the types of protected areas their environmental

characteristics that represent unique landscaping and biological diversity values that are clearly different from those of unprotected territories were presented. The investigation revealed that the sufficient number of territories has been established. The size of the territories is also adequate which ensures their preservation. The territories are located evenly what allows for their expansion for visiting. After the identification of the forbidden activities of protected areas protection regime it is possible to say that some problems may be encountered when ensuring the identified protection and use regime. The problems include the undergoing land reform, the regulation of private interests' conflict as well as the lack

of legal acts. The protected territories are gradually becoming the part of environmental conservation.

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