
CONSERVATION AND PROTECTION OF RESERVED AREAS

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FORMING THE ECOLOGICAL NETWORK FOR UKRAINIAN CARPATHIANS ON PRINCIPLES OF CARPATHIANS CONVENTION STRATEGY

For the preservation purpose of valuable and typical components of landscape and biological variety the role of the forests and natural protected territories of the Bukovina Carpathians and Precarpathians in formation of an ecological network of the Carpathian region on the basis of the Carpathian Convention principles is investigated.

The Carpathian Convention plays an outstanding role as the multilateral agreement between Poland, Romania, the Czech Republic, Slovakia, Serbia, Hungary and Ukraine concerning concentration of joint efforts for preservation, renewal and balanced usage Carpathian region natural resources and also for inconsistencies overcoming of the social, economic and ecological normative and target principles of natural resources management.

Cause-and-effect relations of the forests and reserved territories development as compound structural elements of an econetwork of the region and observance of the principles of a sustainable development are established, in particular:

- multi-purpose forest exploitation with increase of ecologization of production;
- woodiness increasing of the territory;
- biological variety preservation of forest ecosystems;
- steadiness increasing of forest ecosystems to negative environment factors;

The scheme of the structurally functional organization of the harmonization program for an econetwork of the region has been developed.

It has been proved that for implementation of harmonization system of structural and component elements of an econetwork it is necessary to develop at the state level the National Program of an ecological safety of the Carpathian region, where to consider implementation of a complex of nature protection actions. It will give the chance to work productively for realization of the of the Carpathian Convention principles, in particular:

- to improve an ecological situation in the region by adhering control of requirements of the environmental protection legislation by stakeholders;
- to provide the balanced development of productive forces of the region taking into account ecological components, intersector harmonization of the action plans, achievement of the integrated regulation of development of mountain and foothill areas;

– to improve environmental protection by ecological standards implementation of anthropogenous loads regulation of ecosystems, decrease economic influence on environmental risks development.

Formation of the Ukrainian Carpathians econetwork on the basis of the Carpathian Convention principles creates favorable conditions for the organization and maintenance of the balanced environmental management and mountain region development.

Keywords: ecological network, Bukovina Carpathians, Carpathian Convention, preservation of biodiversity, ecologization of environmental management, balanced development of region.

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ФОРМУВАННЯ ЕКОМЕРЕЖІ УКРАЇНСЬКИХ КАРПАТ НА ПРИНЦИПАХ СТРАТЕГІЇ КАРПАТСЬКОЇ КОНВЕНЦІЇ

З метою збереження цінних і типових компонентів ландшафтного та біологічного різноманіття досліджено роль лісів та природно-заповідних територій Буковинських Карпат та Передкарпаття у формуванні екомережі Карпатського регіону на базі принципів Карпатської конвенції.

Показано, що для подолання неузгодженостей соціальних, економічних та екологічних нормативно-цільових засад управління природними ресурсами, Карпатська конвенція відіграє визначну роль як багатостороння угода між Польщею, Румунією, Чехією, Словаччиною, Сербією, Угорщиною та Україною стосовно зосередження спільних зусиль щодо збереження, відновлення та збалансованого використання природних ресурсів Карпатського регіону.

Встановлено причинно-наслідкові зв'язки розвитку лісів і заповідних територій, як складових структурних елементів екомережі регіону, та дотримання принципів сталого розвитку, зокрема:

- багатоточкового лісокористування з наростанням екологізації виробництва;
- збільшення лісистості території;
- збереження біологічного різноманіття лісових екосистем;
- підвищення стійкості лісових екосистем до негативних факторів середовища;

Розроблено схему структурно-функціональної організації програми гармонізації екомережі регіону. Доведено, що для впровадження системи гармонізації структурних та складових елементів екомережі слід на державному рівні розробити Національну Програму екологічної безпеки Карпатського регіону, де врахувати здійснення комплексу природоохоронних заходів. Це дасть змогу результативно працювати над реалізацією принципів Карпатської конвенції, зокрема:

- поліпшити екологічну ситуацію в регіоні шляхом дотримання суб'єктами діяльності вимог законодавства про охорону довкілля;
- забезпечити збалансований розвиток продуктивних сил регіону з урахуванням екологічних складників, міжсекторальної гармонізації планів дій, досягнення інтегрованого регулювання розвитку гірських та передгірських районів;
- удосконалити охорону довкілля шляхом впровадження екологічних нормативів регулювання антропогенних навантажень на екосистеми, зниження господарського впливу на розвиток екологічних ризиків.

У цілому формування екомережі Українських Карпат на базі принципів Карпатської конвенції створює сприятливі умови для організації і підтримання збалансованого природокористування та розвитку гірського регіону

Ключові слова: екомережа, Буковинські Карпати, Карпатська конвенція, збереження біорізноманіття, екологізація природокористування, збалансований розвиток регіону.

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ФОРМИРОВАНИЕ ЭКОСЕТИ УКРАИНСКИХ КАРПАТ НА ПРИНЦИПАХ СТРАТЕГИИ КАРПАТСКОЙ КОНВЕНЦИИ

С целью сохранения ценных и типичных компонентов ландшафтного и биологического многообразия изучено доминирующую роль лесов и природно-заповедных территорий Буковинских Карпат и Предкарпатья в формировании экосети Украинских Карпат на базе принципов Карпатской конвенции.

Ключевые слова: экосеть, Буковинские Карпаты, Карпатская конвенция, сохранение биомногообразия, экологизация природопользования, сбалансированное развитие региона.

At the boundary between the XX-th and the XXI-st centuries by the world community was recognized that exhaustion of biotic resources is one of key problems of a planet which reduces stability of natural ecosystems, causes degradation of environment and needs implementation of the large-scale and coordinated international actions which must be calculated on long-term prospect. It is proved that one of effective methods for preservation of biovariety, protection of the nature reserve fund (NRF), optimization of structure and use of land fund of the state and creation of functionally balanced landscapes there is an ecological network development.

The solution of environmental problems in mountain regions of the Ukrainian Carpathians is especially actual. In particular, in the Bukovina Carpathians still on the considerable area ecosystems which have exclusive resource, cultural and scientific value as standards of the primitive nature with unique landscapes and biotic variety. However long environmental management without the appropriate accounting of mountain conditions entailed violation of stability of development of catchment basins. After an excessive precipitation more often began to be shown catastrophic floods which cause destructive a mudflow and shifts, soil erosion, long floodings of territories (1998, 2000, 2008, 2010) to be shown. These negative processes first of all are predetermined by decrease in a water adjusting role of the woods owing to economic transformation of their structure, reduction of woodiness of mountain reservoirs, the hydrological capacity of forest ecosystems.

"The national plan of actions for environmental protection for 2011–2015" and "The basic principles (strategy) of the state ecological policy of Ukraine for the period till 2020" provide solutions of complex ecological and economic problems which collected in the country as a result of insufficiently coordinated with modern requirements the environmental management, in particular, methods of optimization of the structurally functional organization of landscapes, biovariety preservations, and also increase of a protective, nature protection, recreational role of the woods. The considerable complex of works in a context of implementation the nation-wide Program of formation of a national ecological network of Ukraine according to the Law "About an Ecological Network of Ukraine" is executed in recent years.

In Bukovina Carpathians and the Precarpathians starts up standards of the balanced development on the basis of the principles of the Framework convention on protection and a sustainable development of the Carpathians (further – Carpathian agreements), Strategy of introduction of the Framework convention on protection and a sustainable development of the Carpathians (further – Strategy of introduction of the agreement of Carpathian), and

also to the Protocol of the Parties of the agreement of Carpathian on continuous management the forests, main purpose of these is overcoming of inconsistencies of the social, economic and ecological standard and target principles of management by natural resources. The Carpathian convention plays an important role as the multilateral agreement between Poland, Romania, the Czech Republic, Slovakia, Serbia, Hungary and Ukraine for the purpose of concentration of joint efforts for preservation, renewal and balanced use of natural resources of the Carpathian region.

MATERIALS AND RESEARCH METHODS

Researches carried out on the basis of Chernivtsi region which is noted by a variety of natural climatic conditions: from forest-steppe of Prut-Dniester interfluvium to the foothills and ridges of the Bukovina Carpathians. The total area of the woods of region represents 258 thousand ha and, woodiness – over 30 percent of the territory of the region. The geographical position within three natural zones – (forest-steppe, forest, mountain), a variety of types of soils, climatic conditions, richness of specific structure of flora and fauna makes Chernivtsi region by the ideal range for econetwork formation. Integration of a regional econetwork into structure of the Pan-European econetwork is promoted by cross-border cooperation of area with countries of Western Europe and immediate vicinity with Romania and Moldova.

On the basis of fund materials of forest management, the scheme of an ecological network of Bukovina which is developed by scientists of the region and researches in this branch (Масікевич, 2005), the role of forest landscapes is studied when forming structural territories of an econetwork. In view of that forest landscapes of a different taxonomical rank are a part of 120 territories of NRF and occupy 85 percent of the area of nature reserve fund of the region, changes which are made by the human to forest landscapes are established.

All researches are executed with observance of requirements of regulatory standards of the balanced forest usage. It is considered that formation of an econetwork of the region is carried out on the principles of ensuring integrity of ecosystem functions of structural elements making it – territories of NRF, water and forest funds; protective plantings, lands of health-improving and recreational appointment; territories which have special value, - places of distribution of types and groups that are brought in Red and Green books of Ukraine, and also to lands of extensive usage and radioactive polluted lands.

It is considered that the basic principles of the Carpathian convention at the Bukovina Carpathians and Precarpathians are realized by the directions: integrated approach to land resources management; preservation and continuous usage of biological and landscape variety; spatial planning; the continuous and integrated water resources management and river pools; constant agriculture and forestry; continuous tourism; system of estimation of information about conditions of natural environment, monitoring and early prevention; participation of the society. According to the specified directions, program and system approaches, a scientific problem concerning the principles and the mechanism of realization of Strategy of implementation of the Carpathian convention investigated by the algorithm: "principles (task) of the Carpathian convention" → "normatively-legal base introduction" → "directions of realization of tasks of the Carpathian convention" → "mechanisms of realization of tasks" → "legislative, resource or organizational obstacles of realization of tasks".

RESULTS AND DISCUSSIONS

The law "About an Ecological Network of Ukraine" defined structure of elements of an econetwork to which key, connecting, buffer and restored territories belong. Key territories provide preservation of the most valuable and typical components of landscape and biological variety. Connective territories (ecological corridors) – natural sites which combine among themselves key territories, provide migration of animals and an exchange

of a genetic material. Territories which provide protection of key and connecting territories against external influences belong to the buffer, and restored territories provide formation of spatial integrity of an econetwork – base for creation of ecological equilibrium in the long term, reconstructions of natural landscapes.

Was developed the scheme of the Program of harmonization of interaction of elements and components of an econetwork of Bukovina for the purpose of regulation of straight connection and feedback which includes subprogrammes "System of the balanced management of natural resources of an econetwork", measures of precautions, emergency actions and "Monitoring of threats" (fig. 1.).

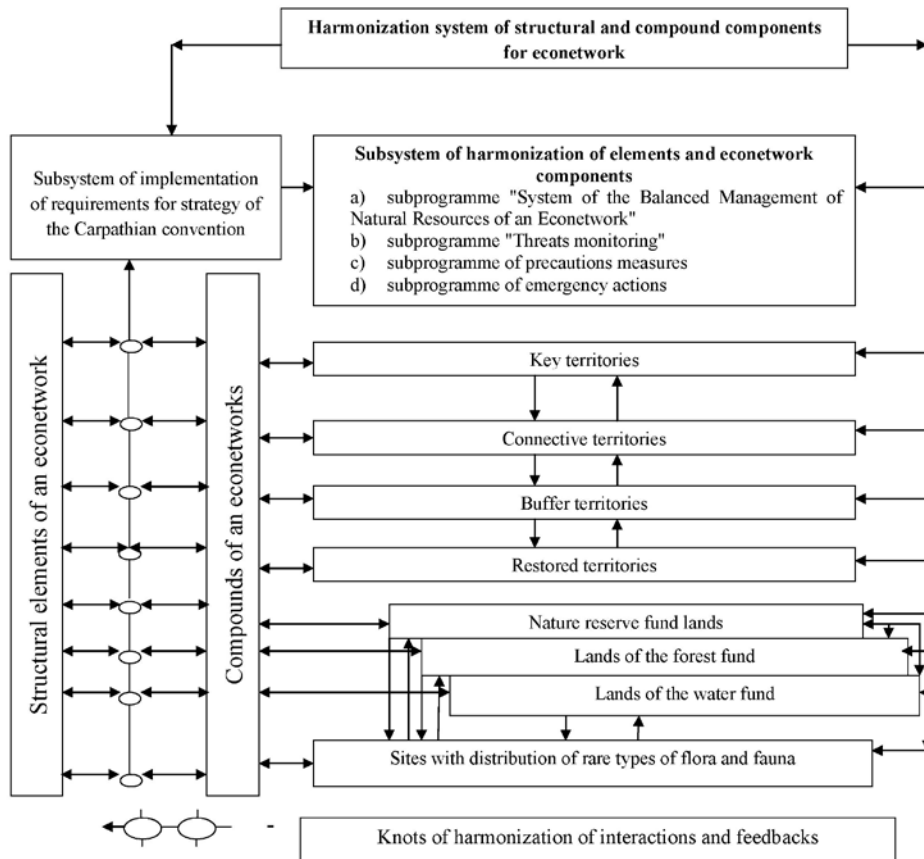


Fig. 1. Scheme of the structurally functional harmonization program organization of an econetwork

According to art. 5 of the Law "About an Ecological Network of Ukraine" of territories and objects of nature reserve fund and the lands of forest fund join as the main components of structural elements of an econetwork (fig. 2).

Key territories of an econetwork of Chernivtsi region plays extremely important value for preservation valuable forest stands, types of rarities of a biodiversity and which are characterized by a big variety of types, forms of landscapes and existence environments. They are nodal elements of an econetwork, connect several connecting territories. We carry territories with domination of forest landscapes more than one thousand hectares and natural limits to the key territories, in particular:

- territories of natural and reserved fund;

- places where not less than 50 views from the Red Book of Ukraine and types which are subject to protection according to the international lists;
- sites with existence of endemic rare species, and also vegetable groups from the Green Book of Ukraine;
- territories where preservation of valuable and typical components of landscape and biotic variety is most effectively provided.

We defined eight key territories of an econetwork with a forest dominant with a total area of 125,2 thousand hectares on the Bukovina (tab. 1).

Table 1

The characteristic of key territories of an econetwork with a forest dominant

The name of key territories of an econetwork with a forest dominant	Total area (thousand hectares)	Forest Square (%)
Vizhnitsky National Park	11,2	84
Cheremosh National Park	7,1	92
Hotynsky National Park	9,4	56
Storozhinetsky projected national park	12,6	86
Projected national park "Bukovina Mountain Forests"	14,1	98
Cheremosh regional landscape park	22,1	94
Chernivtsi regional landscape park	21,4	84
All-zoological wildlife area "Zubrovitsya"	27,3	87



Fig. 2. Sample of typical landscape structure of the Bukovina Carpathians – the territory of designed NRF "Bukovina Mountainous Forests" in a combination from the river Cheremosh valley connecting ecological corridor

As a whole, environmental management in key territories of an econetwork has to be reoriented on ecologically acceptable norms of anthropogenous loads of natural ecosystems. It will create conditions of increase of productivity and firmness of ecosystems, their ecological resource role, biovariety preservation – the basic principles of

transition to a sustainable development of Bukovina according to the principles of the Carpathian convention.

Connecting territories of an econetwork of Chernivtsi region – connect among themselves key territories and include existing biovariety of different degree of naturalness and its existence environment. Their main function is support of ecological equilibrium, ensuring processes of reproduction, an exchange of a genetic fund, migrations of types, distributions of types on adjacent territories and covering them from adverse conditions etc. The majority of indicators behind which connecting territories of the region are allocated, coincide with indicators for establishment of key territories. In general, they have optimum conditions for a survival of organisms, opportunities for distribution and the migrations suitable for rest and top dressing of migratory animals, opportunities for integration into the only national econetwork.

- occupy rather big spaces therefore biotopes which are in their limits can grant a shelter to separate types, populations of types or their parts;
- haven't barriers which can interfere with migrations of some types;
- the configuration, the sizes, length and structure of the existence environment of forest territories meet biological requirements of separate types.

We allocated the 5 types 11 connecting territories of an econetwork of Chernivtsi region with a forest dominant with a total area of 92,1 thousand hectares (tab. 2).

Buffer territories of an econetwork of region are located round key and connecting territories and provide their protection against external influences, in particular prevent negative influence of economic activity on adjacent sites. buffer territories of an econetwork includes the forests of the first group, green zones of the cities, and also natural vegetation which people use regulated, - the operational forests, meadows and so forth.

Table 2

The characteristic of connecting territories of an econetwork with a forest dominant

Types of connecting territories econetworks with a forest dominant	Name of connecting territories	Total area (thousand hectares)	Forest Square (%)
The mid-mountain and forest	Grinyavska Mid-mountain and Forest	16,2	89
The low mountain and forest	Pokutsko-Bukovinska Low Mountain and Forest	18,1	94
Forest	Prutsko-Siretska Forest	9,1	87
	Hotynska Forest	5,2	78
Forests and steppes	Tovtrivska Forest and Steppe	5,1	72
	Sokiryanska Forest and Steppe	6,2	68
	Ivanivska Forest and Steppe	7,4	76
Valleys and rivers	Dniestrovaska Valley and River	6,4	54
	Prutaska Valley and River	5,3	56
	Cheremoshska Valley and River	7,4	67
	Siretska Valley and River	5,7	52

The sizes of buffer territories are defined according to type and purpose of key and connecting territories, and also on the basis of special inspections of landscapes and economic activity in adjacent territories and represent as a rule to 100 meters (on perimeter of key and connecting territories). The sizes of buffer territories of nature reserve fund coincide with their security zones and make 50–100 meters depending on their status. The forest dominant of buffer territories of an econetwork of the region makes 50–95 percent depending on category, type and a character of key and connecting elements of an econetwork.

Regenerated territories of an econetwork of the region. In view of a considerable violation of natural ecosystems of the studied territory, especially within Prut-Dnestrovsky and Prut-Siretsky interfluves, and also radiation pollution within nine village councils of Zastavniivsky and Kitsmanskyy regions, are offered 32 Regenerated territories and recommendations for improvement of an available ecological situation. First of all it is provided a rekultivation and afforestation of the degraded and unproductive lands, afforestation and a grassing of coastal strips, exceptions of coastal strips of the rivers and reservoirs from economic activity. In total is provided forest planting of 1630 hectares of the degraded and unproductive lands, 525 hectares of coastal strips.

Specific weight of forest landscapes in formation of an ecological network of Chernivtsi region testifies to their priority role in maintenance of landscape and nature protection stability of the region which demands acceptance of the appropriate measures on their protection and preservation. In this regard the ripened need for justification of new model of forestry of Chernivtsi region (as well as the Carpathian region as a whole) which would unite the economic, social and ecological targets. It answers the principles of the Carpathian convention where it is noted need of development reorientation of forest branch from resource on the biospheric direction. Therefore considering that the forests of Chernivtsi region carry out mainly nature protection and protective functions it is expedient to translate them in accordance with the established procedure to categories of protective, recreational and improving, nature protection and scientific appointment which will provide reduction of operational loading first of all on mountain ecosystems and improvements of a mode of forest exploitation in respect of unconditional use of nature protection functions of the forests. In this regard it is necessary to develop at the state level the National Program of ecological safety of the Bukovina Carpathians and Precarpathians (Carpathian region) with the corresponding financial guarantees where to consider implementation of a complex of nature protection actions (first of all in the forests that enter into structural elements of an econetwork) taking into account requirements of strategy of the Carpathian convention, in particular:

- development of wood-cutting areas in mountain conditions needs to be carried out only with use of special wheel tractors and a cartage with gradual introduction air-flying installations;
- for ensuring preservation of natural landscapes from destructive influence of a water erosion, the prevention of pollution of mountain streams it is necessary to project in coniferous forests of the Carpathians (to carry out) only tightly wood-cutting up to 50 m wide, with term of an adjunction of cutting areas not less than 5 years;
- to enter the exclusively regular gradual cabins (RGC) in the mixed woods. Carrying out RGC gives the chance to reduce considerably negative influence on environment, to cut expenses on creation of new plantings, to reduce terms of cultivation of radical afforestations. Thus in the course of natural selection copies are stored are most adapted for conditions of a place of growth, id est occurs a natural renewal of radical plantings in the most widespread types of the wood (fig. 3);
- in silvicultural work on erosion dangerous sites to consider that the forest ecosystem fully carries out water adjusting function only at the age of 100 and more years (ripe and overmature stands plantings);
- on slopes more than 20 degrees to perform continuous cabins in fir forests on sites no more than 1 hectare;
- only the mixed forest cultures according to radical types of the wood, preferring fir and beechen, spruce beech-fir plantings.

At the same time it is necessary to consider the Carpathian region – first of all the region of an All-Ukrainian and European health resort. Here is many unique natural objects which wills need, however they can't be approved due to the lack of a consent of the land user. It is necessary to suggest some changes to the Law of Ukraine "About Nature Reserve

Fund of Ukraine" concerning the statement of valuable natural objects into reserved objects, without a consent of the land user, in the presence of a conclusion characteristic of the relevant competent scientific institution.

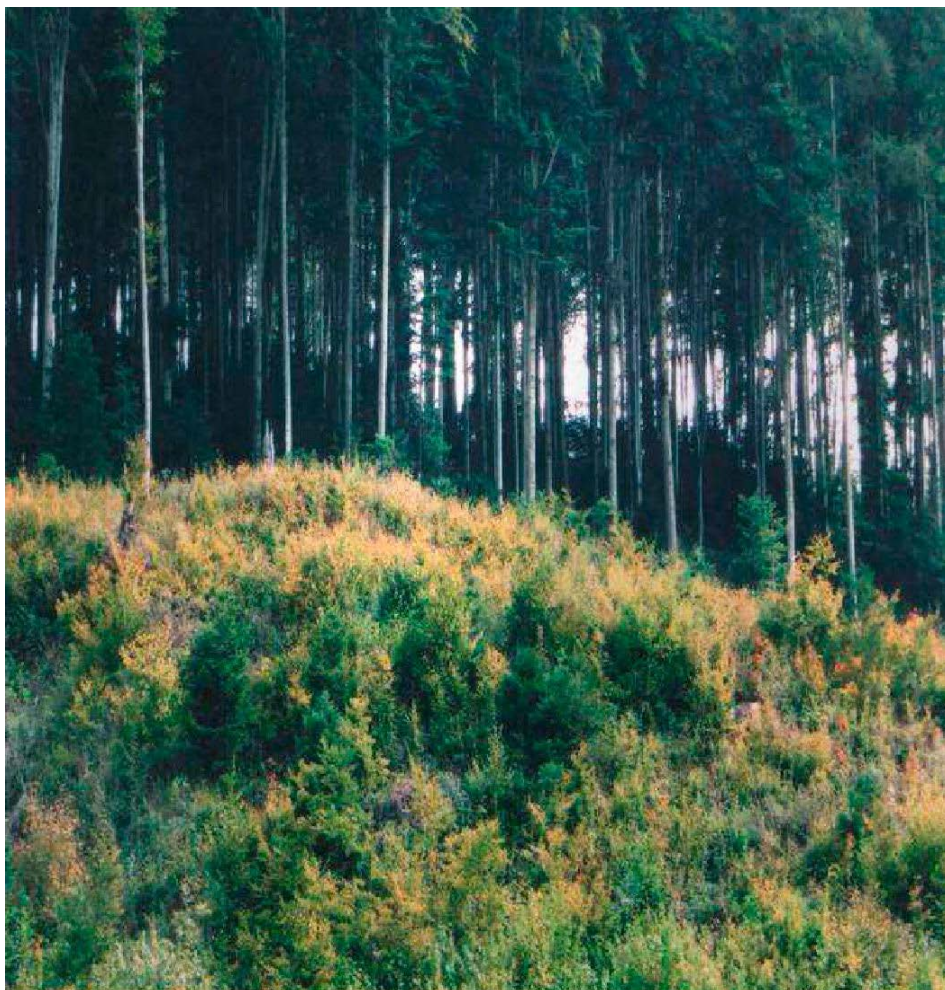


Fig. 3. In connecting territories of an econetwork is provided regular gradual cabins as a result of which natural renewal beechen and fir forests stand are applied (Girsko-Kutske state enterprise forest district "Beregomet Forest and Hunting Enterprise" – Pokutsko-Bukovynska low mountain and forest connecting territory)

This need comes up not only that the natural and reserved fund plays an important role as the main component of all structural elements of an econetwork. The analysis of methods of land use of NRF and ecological network of the Chernivtsi region gives the chance to establish optimum combinations of key, connecting, buffer and renewal territories in interests of society and environment, and also to predict econetwork development. It allows supervising a condition of changes in ecosystems in comparison with other territories, and also their degree and an orientation – a basis for establishment of a so-called ecological threshold, changes outside which become irreversible in ecosystems.

Practice confirms that reasonable activity of the human in branch of environmental protection turned off threat of disappearance of many representatives of fauna and flora.

When the number of any kind of animals decreases to the catastrophic sizes, the actions directed on its protection and a reconstruction under natural conditions with the following reacclimatization in places of the former dwelling are undertaken. So it happened to population of a bison European. In particular, there are 38 individuals of a bison European only in the wildlife area "Zubrovitsya" on the Bukovina, here bisons lives and breeds in free conditions (fig. 4).

Influence of anthropogenous and natural factors on ecosystems is studied On lands of forest and reserve fund – econetwork components,, special researches according to the program of environmental monitoring that aim are conducted: supervision over changeability of environmental conditions, first of all biovariety, with allocation of the changes, which caused by anthropogenous factors; the forecast of changes of the environment as a result of economic human activity; assessment of environmental state and anthropogenous factors which influence on it. It gives the chance to keep and increase valuable types of fauna and flora. So in recent years population of a noble deer in the territory of the state forest fund reached optimum number – 740 individuals.



Fig. 4. Family of bisons (*Bison bonasus* L.) on Gilchansky forest district the state enterprise "Storozhinetske Forestry" (the wildlife area "Zubrovitsya" – the key territory of an econetwork)

The Chernivtsi region has a difficult geological structure. In its territory are 58 geological and karstic-speleological reserved objects. In particular, in the Bukovina Carpathians is allocated a number of reserved territories with exits outside of Precambrian crystal breeds, and also flaking of rocks.

Geological protected areas and objects Bukovina Carpathian clearly illustrate the geological structure of the crust and natural which occurred during which occurred during the process, the whole history of its development process, the whole history of its development (fig. 5).

The forests and reserve compound of econetworks also play a significant role as basic objects of ecological-educational work. Implementation of ecological education and nature protection education in turn assists in branch of preservation of the forests, a genofund of a plant and animal life, standards of natural ecosystems to development of nature and reserve fund and formation of an econetwork of the Chernivtsi region.



Fig. 5. Flaking of rocks – geological sight of the nature – Ploskivska a forest district the state enterprise "Putylske Forestry" (Grinyavska mid-mountain and forest connecting territory of econetwork)

CONCLUSIONS

Development of the forests and reserve territories as compound structural elements of an econetwork of Chernivtsi region promotes multi-purpose forest exploitation with increase ecologization production, to growth of part of nature protection fund in forest resources, in particular:

- formation of the sustainable development principles of the region in a context of introduction of the principles of the Framework convention on protection and a sustainable development of the Carpathians;

- increase in woodiness of the territory;
- preservation of biological variety of forest ecosystems;
- increase of firmness of forest ecosystems to negative factors of the environment;
- rational, not wearisome forest exploitation;

The forests of the Chernivtsi region, behind the appointment and an arrangement carry out mainly ecological functions and have limited operational value. It is necessary to develop for optimization of forest exploitation at the state level the National Program of ecological safety of the Bukovina Carpathians and Precarpathians (Carpathian region), where to consider implementation of a complex of nature protection actions, first of all expansion of territories and objects of nature and reserve fund and econetwork formation. Formation of an econetwork is one of transition factors to the water-collecting and landscape principles of forestry, harmonization of systems of maintaining forestry on the zone and typological principles.

- to improve an ecological situation in the region by control of requirements of the environmental protection legislation by subjects of activity;

- to provide the balanced development of productive forces of the region taking into account ecological components, intersector harmonization of the plans of action, achievement of the integrated regulation of development of mountain and foothill areas;

– to improve environmental protection by introduction of ecological standards of anthropogenous loads regulation of ecosystems, decrease in economic influence on development of environmental risks.

Thus formation of an econetwork of the Ukrainian Carpathians on the basis of the principles of the Carpathian convention gives the chance effectively to realize resource and nature protection strategy of the balanced environmental management.

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