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## Geoecological approach to organization of naturalized anthropogenically-modified territory

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Received: 31.01.2020 Received in revised form: 03.03.2020 Accepted: 14.03.2020 **Abstract.** The problem today is to ensure a harmonious relationship between anthropogenic activity and natural processes in order to preserve the dynamic integrity of the environment. The best specimen of the territorial compatibility of the natural and cultural component is a rather specific category in the list of objects of the nature reserve fund (PFP) - "parks and

gardens". The article deals with the formation, operation and development of the Alexander Park, located in the Tomashpil district of Vinnytsia region. It, like the vast majority of areas of existing and designated nature reserves and sites of Vinnytsia region, has a complex origin, caused by long (about 150 years) and multi-stage human impact. The purpose of this study is to combine ecological and geographical approaches in determining the features of organization of the park and park territory at the present stage of their functioning. Alexander Park, which is of great environmental, historical and cultural importance for the whole Vinnytsia region, is characterized and symbolized by the indivisibility of natural and cultural heritage, and thus provides the fulfillment of several interrelated functions: environmental, recreational and economic. The use of both traditional and modern methods, such as geo-ecological analysis and synthesis, comparative-geographical, key areas, etc. made it possible to study the features of the territorial organization of nature management, relations and relationships between their most characteristic forms, the "cultural morphology" of the forest park type. The development of the Benetto-Alexander Surprises Nature Trail demonstrates the results of conservation and efficient use of biotic and landscape diversity, combined with the sustainable use of natural resources, which is one of the main tasks of modern environmental management and conservation. In addition, it is also a basic condition for balanced development of the region. The practical value of the proposed methodology is to use them, especially in Vinnytsia region, as a reference and scientific and practical basis in the assessment of cultivated landscapes in scientific and practical activities in the development and improvement of planning nature conservation and recreational and tourist activities of the region.

Key words: territorial organization, park, ecological trail, cultural landscape, nature management, biodiversity.

# Геоекологічний підхід в організації природокористування антропогенно-модифікованої території

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Анотація. Проблемою сьогодення є забезпечення гармонійних взаємозв'язків між антропогенною діяльністю та природними процесами з метою збереження динамічної цілісності навколишнього середовища. Найкращим зразком територіальної сумісності природної й культурної компоненти слугує досить специфічна категорія в переліку об'єктів природно-заповідного фонду (ПЗФ) — «парки-пам'ятки садово-паркового мистецтва». У статті розглянуті питання формування, функціонування й розвитку Олександрівського парку, розташованого в Томашпільському районі Вінницької області. Він, як і переважна більшість площ сучасних і проектованих природно-заповідних територій та об'єктів Вінниччини, має складне походження, зумовлене тривалим (близько 150 років) і багатоетапним впливом людини. Метою цього дослідження є поєднання екологічного й географічного підходів у визначенні особливостей організації паркової й припаркової території на сучасному етапі їх функціонування. Олександрівський парк, відіграє велике природоохоронне та історико-культурне значення для усієї Вінницької області та символізує неподільність природної й культурної спадщини, а відтак забезпечує виконання декількох взаємопов'язаних функцій: природоохоронної, рекреаційної та господарської. Використання як традиційних, так і сучасних методів, зокрема геоекологічного аналізу і синтезу, порівняльно-географічного, ключових ділянок уможливило вивчення особливостей територіальної організації прикової хаперивових ділянок уможливило вивчення особливостей територіального, ключових ділянок уможливило вивчення особливостей територіального, ключових ділянок уможливило вивчення особливостей територіального, ключових ділянок уможливило вивчення особливостей територіальної організації природокористування, на найхарактернішими формами, «культурної морфології» лісопаркового типу. Упорядкована природо-пізнавальна екологічна стежка «Бенетто-Олександрівські сюрпризи» наочно

демонструє результати збереження та ефективного використання біотичного й ландшафтного різноманіття у поєднанні з невиснажливим використанням природних ресурсів, що є одним з головних завдань сучасного природокористування, екобезпеки та охорони природи. Окрім того, – це є також основною умовою збалансованого розвитку регіону. Практична цінність пропонованої методики полягає у використанні їх, передусім у Вінницькій області, як довідкової й науково-практичної основи в оцінюванні окультурених ландшафтів у науково-практичній діяльності при розробці та удосконаленні планувальної природоохоронної й рекреаційно-туристичної діяльності регіону.

Ключові слова: територіальна організація, парк, екологічна стежина, культурний ландшафт, природокористування, біорізноманіття

Introduction. The UN has announced 2021-2030 the decade of ecosystem restoration. Moreover, for the first time in the half-a-century history of the Economic Forum in Davos, five greatest global risks were determined to be ecological. These risks are climatic catastrophes, losses of biodiversity and destruction of terrestrial and aquatic ecosystems (Diamond, Carvajal., 2020). In such conditions, the acute problem is determining scientifically-substantiated priorities and directions of nature use within cultural landscapes which, at the level with the natural landscapes, perform the role of ecological centers and corridors, supporting the integrity of the biosphere at the local and regional level. Among these landscapes, a special group comprises parks or cultural phytocenoses. The founder of theory of phytocultural landscapes Y. P. Byallovich (Byallovich, 1936) has determined culturephytocenosis as a certain complex characterized by certain relations of plants between each other, with the environment affected by the reactions of landscape and complexes of purposeful planting measures by humans. Such complex includes both shrub-tree (field-protecting windbreaks, plantations in recreation zones, sanitary zones of industrial enterprises, forest-parks, urban parks and gardens, boulevards and garden squares) and herbaceous plant groups (lawns, flower gardens, pastures, etc), which are formed, controlled and regulated by humans at all stages of their development.

Such landscapes, formed as a result of complex interaction of natural and socio-historical factors, are at the cutting-edge of European approaches, selfcontained and significant territories or fragments of biotic- and landscape diversities. The best example of territorial compatibility of their natural and cultural components is a quite specific category, included in the list of the object of the nature-reserve fund (NRF) - "parks-monuments of garden design" (Dubrovskiy, 2008). They belong to the group of artificially created objects, subjected both to protection and use for esthetic, educational, scientific, nature-protection and health-improving purposes. It should be noted that particularly nature-protected territories of such type are given a special mission - formation of knowledge among the population about ecologically practical nature use, understanding the necessity of preservation of diversity of life forms, promotion of nature-protection and ecological cultures (Hudzevych, 2012). Thus, parks along with their immediate surroundings create favourable capabilities for organization-educational trails (ecological trail) and scientific-research and recreation activities of representatives of different layers of the local population.

The objective of this article was combining ecological and geographic approaches in determining the peculiarities of organization of park and pre-park territories at the current stage of their formation. The specific purpose of this article was to create the image of a park and its surroundings which would really reflect the valuable features of cultural landscape and thus attract the local population, guests and also interested structures to the need of preservation and rational use of park territories.

**Material and methods of the research.** Anthropogenic activity underlies the effect which causes disturbance or modification (or transformation) of the structure of the natural complex and causes formation of numerous classes of anthropogenic landscapes. The directions of territories` development or nature-use are determined taking into consideration the special differentiation of natural conditions and pattern of division of natural-resource potential. The practical aspect of contemporary concepts of nature-use is the organization of territories when a region of the planet in general functions as an integral stable system where the economic subsystem is correlated with natural one according to the principle of compatibility of the components of natural landscape, providing:

- rational (careful, economical) exploitation of natural resources and effective preservation and restoration of them taking into account potential interests of the development of economic activity of human;

- preservation of high-quality environment, health of the population and environment of recreational capability of the territorial economy (Hudzevych, 2012).

Overlapping (interference) of the elements of anthropogenic-cultural and natural environments, which determines and provides the structural integrity of parks-monuments of garden design, is the subject of discussions among specialists concerning this category in the system of the NRF. Their positions range from unconditionally or cautiously positive (Ena, 1989; Krasnitskiy, 1983; Stoiko, Hadach, Shymon, Mykhalyk, 1991) to sharply negative, including suggestions to exclude them from the NRF. At the same time, supporters of the most radical actions, understanding that without cultivation and care the old historical parks will become abandoned and degraded, do not reject the provision of a protective regime for parks (Dubrovskiy, 2008), nor do they reject active regulation.

At the same time, the issues of optimization of nature use taking into account the status of polyfunctional territories are being insufficiently studied from the perspectives of the geoecological approach. This leads to contradictions and conflicts between the nature users of different spheres and makes impossible the monopolized use of natural resources. Such situation requires development of a national, regional and local strategy of ecologically-balanced use of nature-resource potential, fulfillment of requirements of resource-ecological safety by all the subjects of economic activity and therefore creation of conditions for improvement of the environment on this basis.

Problems of projecting and organizing an ecological trail is described in a number of studies by domestic and foreign scientists, including methodological developments of the group of authors led by Y. P. Didukn (Didukh, Ermolenko, Kryzhanivska, Popovych, Serebriakov, 2000) and proposals on use of walking trails within nature-protection territories for educational purposes in the works by V. Strasdas, P. Chizhova, Y. Eylart, 1996 (Strasdas, 2002; Chizhova, Dobrov, Zahlebnyiy, 1989; Eylart, 1996), S. Trapp with co-authors (Trapp, Gross, Zimmerman, 1994) and others. Until recently, there have been solid theoretical developments regarding the problem of using ecological trails in tourism (Dmytruk Iu., Dmytruk, S., 2009). However, the issue of organizing ecotrails in Vinnytsia Oblast, taking into account the specifics of those trails and reasons for their existence, despite some practical steps (Hudzevych, 2014; Hudzevych, 2002), require more substantiated research.

The methodological basis of our research comprised both traditional and contemporary methods used in complex geoecological studies, including geoecological analysis and synthesis, the morphometric method, geoinformational cartography and modeling, the comparative-geographical, key-plots method, techniques and methods of ecological optimization of territorial structure of landscapes.

**Results and their analysis.** Geoecological analysis of nature use involves study on the correspondence

of the structure of use of a territory to its natural capabilities. Among well-known directions of the structure of nature use in the sphere of nature-protection (strict preservation, regulated, compensational directions) the monuments of garden design are regulated localized territories. They have distinct borders, and their activity is determined by legislative acts. According to Articles 6 and 7 of the Law of Ukraine "On the Nnature-protection Fund of Ukraine" (Zakon Ukrainy, 1992), they are subjected to complex protection and belong to lands of nature-protection and historical-cultural purposes, because they have special ecological, scientific, esthetic, economic, and historical-cultural values. The recommended regime is temporary rejection of economic use, though recreational use with minimum effect on nature is allowed (Reymers, 1990).

The object of our studies was the territory of Oleksandrivsky Park. It is located on the south border of a small village Blahodatne, 5 km from Oleksandrivka village of Tomashpil district of Vinnytsia Oblast. Oleksandrivsky Park was founded in the late XIX century around the manor house of Gräfin Hanna Benett. As the records tell, in the territory of the park, there was built a palace and houses for servants. During the Revolutionary events of 1917, the palace was destroyed Two small houses which remained from that time were restored and designated as a hotel.

The park has been built in regular-landscape style (Hudzevych, 2002). This allowed maximum use of flat interfluves and erosion-valley elements of the relief. The water-divide surface contained decorative compositions of biogroups of trees and shrubs, isolated sculptures, wooden log-benches, flower gardens. Slope areas were covered chiefly by trees and shrubs typical of broad-leaved forests. The bed of the ravine was transformed into cascade of interrelated water bodies. All these parts of the park are connected by the Gräfin's Alley of horse-chestnuts (Aesculus hippocastanum) and small-leaved limes (Tilia cordata Mill.), and also northern white-cedars (Thuya occidentalis L.), forming an integrated and harmonious composition (Fig. 1). Since the foundation, the Gräfin's Park had 80 species of broad-leaved and coniferous species. During the USSR no one was interested in the fate of the Park. It was the property of the Sovkhoz and silrada. Then, according to the decision of the executive committee № 441 from 30.07.1969, this territory of 11.0 ha was included in the Nature-Reserve Fund of Vinnytsia Oblast as park monument of garden design (Hudzevych, 2002). The restoration works began only in 2009. The Park's pond was restored (Fig. 1). New alleys were planted, particularly of *Thuya* genera. Since then, the nurseries at the place of old garden (Fig. 2, 3) have been in operation. An apiary and a well were also constructed.



Fig. 1. Gräfin's Alleys of horse-chestnuts and the Park's pond

Among the park biotopes, two groups of forest phytocenoses were distinguished according to current ecological condition of the tree stand (proportion of tree species, condition of growth gain and natural restoration, species diversity of herbaceous vegetation, anthropogenic impact): cultural or anthropogenic, actual culturephytocenosis (constantly taken care of by humans) and natural-anthropogenic (natural course of the development practically is not disturbed). The first group is a complex of biogroups, mostly of introduced species concentrated in the west side, the other group occupies the largest part of the park which is remote from the outbuildings and occupied mainly by local trees and shrubs. beech (*Fagus sylvatica L.*), Kentucky coffeetree (*Gymnocladus dioicus L.*), pin oak (*Quercus palustris Munchh.*), sweet chestnut (*Castanea sativa Mill.*), Japanese pagoda tree (*Sophora japonica L.*). Ev-



ergreen species are successfully supplemented by *Rhododendron*, European larch (*Larix decidua Mill.*) and Siberian larch (*L. sibirica L.*), black pine (*Pinus nigra Arn.*), Norway spruce (Picea abies *L.*) and blue spruce (*Picea pungens Engelm.*)), European silver fir (*Abies alba Mill.*), savin juniper (*Juniperus sabina L.*), common juniper (*J. Communis L.*) and Irish juniper (*J. Hibernica L.*).

Nearby, lianas are planted — Italian woodbine (Lonicera× caprifolium L.), dogwoods (Cornus) -Lukyanovsky dogwood (Cornus mas «Lukyanovsky») and Cornelian cherry dogwood (Cornus mas 'Elegant') and shrubs of Paeonia × suffruticosa (Paeonia suffruticosa Andrews). Twelve quite mature speci-



Fig. 2. Husbandry of forest plants and the ravine in the outskirts of the park

The rationally organized part of the park territory is presented by scattered one- and multi-trunk trees and biogroups which reach various height (15-30 m) and diameter (27-52 cm), including European

mens of *Cornus mas «Lukyanovsky»* aged 112 years continue to bear fruit.

Among the old-timer plants of the phytocenosis which are distinctive by compact form and decora-



**Fig. 3.** Scheme of ecological trail Benetto-Alexander Surprises within the objects of the Oleksandrivsky Park and Polishchukove Agroforestry of Vinnytsia Oblast Municipal Specialized Forestry Vinoblahrolis

#### A. Territory of Polishchukove Agroforestry of Vinnytsia Oblast Municipal Specialized Forestry (AVOMSF) Vinoblahrolis

- 1. Outbuildings
- 2. Genetic-mother plantation of grafted trees
- 3. Cold frames and greenhouse
- 4. Apiary
- 5. Nursery of exotes
- 6. Polishchukove Educational Center
- 7. Nursery of forest species

#### B. Park

- 9. Maple alley
- 10. Zoo corner
- 11. Children's playground
- 12. Organized cultural phytocenosis
- 13. Love gazebo
- 14. Lime tree alley

- Territory of dried water bodies
  Self-regulating forest structure
- 19. Hyzhi Yaruhy Gullies
- 20. Centennial lime trees
- 21. Well
- 22. Springs
- 23. Centennial willow
- 24. Fallen trunk of centennial willow
- 26. Stream
- 27. Overgrowing area of the pond
- 28. Pond
- C. Outskirts

### 17. Ravine

- 18. Shtany Tract (at the distance of 1 km from the south edge
- of the park)
- 24. Wasteground and quarry

tiveness, are the garden form of *Viburnum* – European cranberrybush (*Viburnum Roseum L.*) and weigela (*Weigela hortensis Thunb*).

In the past, the Park's system of landscape views was composed of picturesque alleys with early-blossoming shrubs of lilac and winter jasmine (*Jasminum nudiflorum*). Among them, as fruit-bearing accompanying species, planted varieties of Persian walnut (*Juglans regia L*) are distinctive mainly for their ballshaped and branchy crown.

Apart from the introduced species, the tree stand is to a high degree formed by local species of broadleaved trees: common oak (Quercus robur L.), limes (common lime Tilia europaea L., large-leaved - T. Platyphyllos Scop and small-leaved lime T. cordata Mill.), European ash (Fraxinus excelsior L.), maples (Norway maple Acer platanoides L., field maple A. campestre L., box elder A. negundo L.). The conditions of all of them are satisfactory. Growth gain occurs in scattered cases, represented chiefly by common lime Tilia europaea L., common hornbeam (*Carpinus betulus L*) or common oak (*Quercus robur* L.), though ecotonically, that is at the border with the self-regulated part of the park. Projective cover of herbaceous plants is 60-80%. In different areas the dominants are asarabacca (Asarum europaeum L.), yellow archangel (Lamium galeobdolon L.) and ground elder (Aegopodium podagraria L.). One of the lawns is made into a children's playground. Undeveloped areas are provided with recreational zone comprising tables and benches, and the road-trail network was expanded. Sporadically, small architectural forms, gazebos, are constructed. They are scattered around the water body. In the center of the culturalphytocosis, these structures are rather higher – gazebo with harmonious name Love Gazebo. It is the only one restored, standing in the place of a pre-Revolution small architectural form.

On the old park's territory free of trees and shrubs, near the maple alley, aviaries with protective grids are constructed for ostriches (*Struthio camelusL*.) and emus (*Dromaius novaehollandiae L*.) exotic in our country. According to the workers of Vinoblahrolis AVOMSF, the park's zoocorner will in the nearest future be supplemented by species from the of local ornihtofauna, and also interesting mammals (*Mammalia*). The zoocorner should become some sort of a window into the world of animals, enabling study on their behaviour and contributing to the complicated and extremely necessary work on preservation and breeding of rare species.

In general, the scattered trees and shrubs, the park's zoocorner and children's playground are well

fitted into the landscape, having a strong esthetic effect on the visitors.

Apart from the recreational, and currently managed part of the park, an important environmentforming function is performed by self-regulating forest area of the park. It is located on well-manifested slopes of north-east, east and south-east expositions.

The broad-leaved forest aged over 100 years is represented by quite dense (0.7-0.9) tree stand of 24-26 m and diameter of trees measuring 23–45 cm. In the first stratum there, the dominant species are common oak (*Quercus roburL*.), common hornbeam (*Carpinus betulus L*.) and common ash (*Fraxinus excelsior L*.)

The second stratum of the forest part of the park is composed of Norway maple (*Acer platanoides L.*) and box elder (*A. negundo L.*), wild cherry (*Cerasus avium L.*), small-leaved lime (*Tilia cordata Mill.*), and also common hornbeam (*Carpinus betulus L.*) and common ash (*Fraxinus excelsior L.*). Common in the understory of these park phytoconoses are common hazel (*Corylus avellana L.*), cornus (*Swida sanguinea L.*), black elder (*Sambucus nigra L.*), euonymus – european (*Euonymus europaea L.*) and verrucosus (*E. verrucosus Scop.*), and field maple (*Acer campestre L.*).

Apart from the indicated plants, there are scattered silver birch (*Betula pendula Roth.*), common aspen (*Populus tremula L.*), black poplar (*Populus nigra L.*), silver poplar (*Populus alba L.*). Under trees and shrubs, species of plants which are genetically related to broad-leaved forests are represented: asarabacca (*Asarum europaeum L.*), yellow archangel (*Galeobdolon luteum Hudls.*), unspotted lungwort (*Pulmonaria obscura Dum.*), ground elder (*Aegopodium podagraria L.*), greater stitchwort (*Stellaria holostea L.*).

Against the background of conditionally optimum life conditions for the tree stands, however a critical ecological situation is seen. It is manifested in a large amount of drying and weakened trees damaged by pests, diseases; inhibition of growth by taller specimens with better developed crowns. Thus, there are dry tree stands and coarse woody debris (recent and of past years). The decrease in the intensity of forestry measures for forming park's plantation (thinning) in the previous decades has contributed to the concentration of these unhealthy signs. One of the main reasons of abandonment of sanitary cuttings in the park is the absence of the need of the local population in wood, first of all the trees in the age of the main-use felling. Natural intensity of self-thinning typical for wild forests has not been reached so far in these plantations. According to the types of growing conditions, the largest share of trees is seen in humid forest parts of the tract of the ravine's bed.

The natural function of separation of the two different park areas is performed by the pond in the central part of the park. From pre-Revolutionary system of interrelated water bodies (cascade of ponds), only one is still remaining. The pond bed belongs to the valley-streambed type. The water level in the pond, compared with stream one, as at the beginning of its formation, remains 1.5-2 m higher. The banks are asymmetric in their structure: the right bank is low, while the left is steep. Current average depth of the pond is 0.80-1.20 m, whereas maximum depth is 1.8 m.

The deterioration of the sanitary condition of the water body is indicated by natural eutrophication of the pond through shoaling and overgrowing by aquatic vegetation. The latter factor reflects the specific terrestrial-aquatic stratification composed of plants of the shore part and the water body. The shore stratum is represented by water-whorl grass (CatabrosaaguaticaL.), shortawn foxtail (Alopecurus aequalis Sobol.), floating sweet-grass (Glyceria fluitans L.) and great manna grass (G. maxima (C.Hartm) Holmb.), true sedges (Carex cespitosa L., C.Hirta L. and others.), purple loosestrife (Lythrum salicaria L.), jointleaf rush (Juncus articulatus L.), arrowhead (Sagittaria sagittifolia L.), flowering rush (Butomus umbellatus L.), European water-plantain (Alisma plantago-aguaticaL.). Behind them there is a wall (up to 3-4 m) of wood clubrush (Scirpus sylvaticus L.), common reed (Phragmites australis Cav.), lesser bulrush (Typha angustifolia L.) and broadleaf cattail (T. Latifolia L.). Somewhat deeper, or right behind them, the free areas are occupied by aquatic plants with leaves that float on the water surface: longroot smartweed (Persicaria amphibia L.), common frogbit (Hydrocharis morsusranae L.), broad-leaved pondweed (Potamogeton natans L.), yellow water-lily (Nuphar lutea L.).

The park is home to a large diversity of ornithofauna. Nesting forest-park birds include great spotted woodpecker (*Dendrocopos major L.*), great tit (*Parus major*), Eurasian jay (*Garrulus glandarius L.*), common cuckoo (*Cuculus canorus L.*), thrushes (common blackbird – *Turdus merula L.*, song thrush – *Turdus philomelos L.*), greenish warbler (*Phylloscopus trochiloides Sundevall*), European robin (*Erithacus rubecula L.*), nightingale (*Luscinia F.* – up to 20 individuals), common linnet (*Acanthis cannabina L.*), common starling (*Sturnus vulgaris L.*), European turtle dove (*Streptopelia turtur L.*), rock dove (Columba livia L.), rook (*Corvus frugilegus L.*), western jackdaw (*Corvus monedula L.*), woodlark (Lullula arborea L.), black kite (Milvus migrans B.), Eurasian wren (Troglodytes troglodytes L.), spotted flycatcher (Muscicapa striata P.), bluethroat (Luscinia svecica L.) and others. From the settlement (Blahodatne village), sparrows (house sparrow Passer domesticus L. and Eurasian tree sparrow P. montanus L.) and barn swallow (Hirundo Rustica L.) often fly into the park.

The territory of the park is surrounded by various agricultural lands. Not so long ago, large fields of the stepped ravine in the outskirts of Oleksandrivsky Park were used for grazing local cattle. Now, because the locals have massively abandoned maintaining of cattle, the ravine has lost its importance as pasture. The decision of the silrada gave the forbs meadow-steppe ravine the status of "land in reserve", and now it is developing according to the natural ecoevolutional laws in unison with latitudinal-caused peculiarities of self-development. We may say that the place restores naturally. At the same time, shrub vegetation tends to drive out herbaceous meadow-steppe species. As a result, rich forbs (marsh-mallow Althaea officinalis L., Valerian Valeriano officinalis Kreuer., meadowsweet Filipendula ulmaria L. Maxim., orchard grass Dactylis glomerata L., common comfrey Symphytum officinale L., meadow fescue Festuca pratensis Huds., common bent Agrostis tenuis Sibth., peppermint Mentha piperita L., common agrimony Agrimonia eupatoria L., white cinquefoil Potentilla alba L., couch grass Elymus repens L., Timothy grass Phleum pratense L., Kentucky bluegrass Poa pratensis L., common chicory Cichorium intybus L., tufted hairgrass Deschampsia cespitosa and other) have been supplemented by dog rose (Rosa canina L.), hawthorn Crataegus ucrainica *Pojark.*, forest (known commonly as "wild") pears - European pear (Pyrus communis L.) and European crab apple (Malus sylvestris Mill.), and silver birch (Betula pendula Roth).

Near the cultural part of the park there is the agroforestry Polishchukove of Vinoblahrolis AVOMSF. Based on this forestry of 1.8 ha and the territory of the park the forestry took control and care of the "foothold" of Vinoblahrolis AVOMSF was created with the area of 12.8 ha. Experienced foresters have created the selection breeding base. Cold frames with polyethylene covers have been built to grow grafter plants with closed root systems [root system of container-grown plants – *Translator's note*]. On the area of 0.4 ha, Vinnytsia Oblast's first mother plantation has been laid out, collecting the offspring of several dozens of plus trees. Out of propagules prepared in it, the genetic mother plantation of grafted trees has been created. The work of agroforestry resulted in creating a collection of 15 thousand established species (shrubs, trees) using the cutting method. They include thujas (first of all northern white-cedar *Thuja occidentalis L*.), common box (*Buxus sempervirens L*.), terry-flowered varieties of lilac (*Syringa*–Bohdan Khmel-nytsky, Iliver Deser, Taras Bulba) and mock-orange (*Philadélphus L*.). In the future, the collection will ensure that the park is in continuous bloom – from March to November. Most trees and shrubs are arranged in plantations of 3x3 m.

Agroforestry measures of the workers of Polishchukove are oriented towards protection and restoration of biodiversity in the nature-protected territories and outside them. Their actions demonstrate preservation and efficiency of use of biotic and landscape diversities combined with non-exhausting use of natural resources which is one of the main goals of contemporary nature-use, ecosafety and nature protection and the main condition of balanced development of the region.

In spite of relevance of the concept of formation of econetwork, it is important that the monument of garden design Oleksandrivsky Park plays the important role of natural center of regional importance and is included in the system of Halytsko-Slobozhansky latitudal eco-corridor. It is given a special place of border between three regional landscape parks of Vinnytsia Oblast which were established during the first decade of XXI century: Murafa (2008, area of 3452.7 ha), Serednie Pobuzhia (2009, area of 2618.2 ha), Dnister (2009, area of 5049.03 ha). At the same time, Oleksandrivsky Park is a component of the Buzko-Dnistrovsky water-divide regional eco-corridor which connects it with the Oblast's only National Nature Park Karmeliukove Podillia.

The main tasks include improvement of effective use of the park. In the immediate future, it will be necessary to develop the territory, carry out inventory checking and reconstruction of the green plantations, first of all the self-regulated part (clearing thickets and removing self-seeding plants, planting new forms of shrubs around the pond and strengthening of the banks). In some places, the old tree stand of the phytocenosis needs new plants. Since they will develop in the conditions different from those in which they were growing during the creation of the park, they will require constant control measures for their protection by foresters responsible for the condition of the park monument.

Currently the dominating forms of nature-use within the park territory and its outskirts are: 1) recreational nature-protection; 2) forest- and agro-parkeconomy; 3) water management system; 4) settlement (village) and transport or road forms. These , apart from the territorial structure, reflect the functional and organization capabilities of the territory (functional and organizational structure). Each of the types of nature-use has specific features and requires separate study approaches. In our opinion, in the contextual aspect, it is most important to, analyze as logically as possible, the territorial groups of certain types and forms of nature use using the educational ecological trail (ecotrail), the creation of which is due to its high scientific substantiality and objectivity which is combined with simplicity and practicability.

An ecological trail is defined as a path of travel, journey, recreational-health improving walks, ecological-educational excursions, etc which is geographically determined, associated with a certain locality and characteristic (specific) objects and is described with a certain amount of detail (Didukh, Ermolenko, Kryzhanivska, Popovych, Serebriakov, 2000). The advantages of nature protection and ecological education in ecopaths are: year-round use, high informativeness, involuntary learning of information and rules of behaviour directly in nature. In spite of the fact that such itineraries are developed first of all for school pupils and students, they are located near settlements or directly within their borders. Important roles in selecting the path are played by accessibility for visiting, attractiveness and esthetic expressiveness of the landscape, informational capacity of the itinerary (Hudzevych, 2012). According to purpose, ecological paths are divided into problem-educational, educational-touristic and educational-informative.

The itinerary we developed in the conditions of monument of garden design Oleksandrivsky Park of Blahodatne village has logically received its name, that is Benetto-Oleksandrivsky Surprises and may be used for any of the abovementioned purposes. Obviously it is developed to provide better perception of components, laws, phenomena and processes of the environment, help give a complex understanding of the results of impact of human communities on the environment, broaden world-view positions concerning nature use, rational organization of territory and its protection. According to the purpose, the path is poly-functional, but one of its most important tasks is to transform passive observers of nature in to conscious nature users. It is also important that it is organized within the specialized research forestry, where the guide may be an experienced specialist in forestry.

Depending on the goal of visit, various educational forms could be used: lessons, elective classes,

lessons of study circles, and of course different-topic excursions. The total length of the itinerary is about 4 km. If necessary it could be shortened to 1-2 km.

To enable visitors to stay long (combining recreation and education) the park territory has all the necessary conditions. There is a functioning hotel and dining hall. As educational premises, the buildings of the Educational-Production Zone of Vinoblahrolis AVOMSF could be used. This allows the territory of the park and its surrounding to be used throughout the year.

Trekking, ski treks and sleigh rides, sport games would contribute to general health improvement and recreation of fans of places remote from settlements.

The viewing scheme of Oleksandrivky Park and its outskirts (Fig. 3) focuses on the main objects which may be used for observations and studies. Apart from the main scheme, the landmarks in the itinerary of the natural-educational trail are indicators and information boards with brief characteristics of the stopping place and view. It should be noted that most of the proposed objects are within the Park's territory, i.e. the object of nature-reserve fund which requires the visitors to meet the nature-protection demands. The rules of behaviour in the itinerary are presented on the board near the main information stand. Moreover, they are set as separate signs along the entire educational route.

Finally, it should be noted that Oleksandrivsky Park has important nature-protection and historicalcultural significance for the entire Tomashpilsky district and is characterized by the following peculiarities: 1) it is located near the Southern Bug-Dnister water-divide and the interfluves of two rivers of the Transnistria – the Rusava and Murafa; 2) it is a territorial integrity of regional natural and historical-cultural peculiarities of park landscape; 3) is the place of the formation of the gene fund of the flora and fauna of forest-park habitat, first of all ornithofauna; 4) provides performance of several interrelated functions: nature-protection, recreational and economic; 5) belongs to a small number of parks living through their renaissance.

**Conclusions.** On the basis of the geoecological approach, we determined the peculiarities of organization of the nature-protection park, and adjacent territories at the current stage of functioning. Functional and organizational structures of nature use in the territory of the park reflect the most characteristic forms: a) anthropogenic nature-protection and recreational areas as the environment-forming: restoration of biodiversity with the elements of landscape design of the territory for more comfortable recreation of visitors of the park; oriented at creating

and restoring the recreational potential of the park and infrastructure (organizing walking areas and recreation zones, further construction of hotels, etc); b) ecological: adaptiveness of park, and additional ecotone environments to the local nature conditions by self-sustaining processes in the context of multi-year succession changes; c) social: creating conditions for accommodation and rational nature-use; establishing the basics of new recreational and educational spaces using the ecotrail with increase in the capabilities for observation of wildlife and geoecological phenomena in system of propagandistic-educational, the excursion, research activities at different level of formal (pre-school, school, specialized secondary and higher education) and informal education of the population.

The environment of the territory of Oleksandrivsky Park (green and open areas, hydrographic network) and its surrounding require further scientific researches as an integral system according to the territorial level of planning and organization of regional econetwork. It is practical to combined the key territory with other territories which now belong to other administrative units, as a whole, including pastures, hayfields, artificial forests and other plantations, windbreaks, of the roadsides, agricultural lands, etc.

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