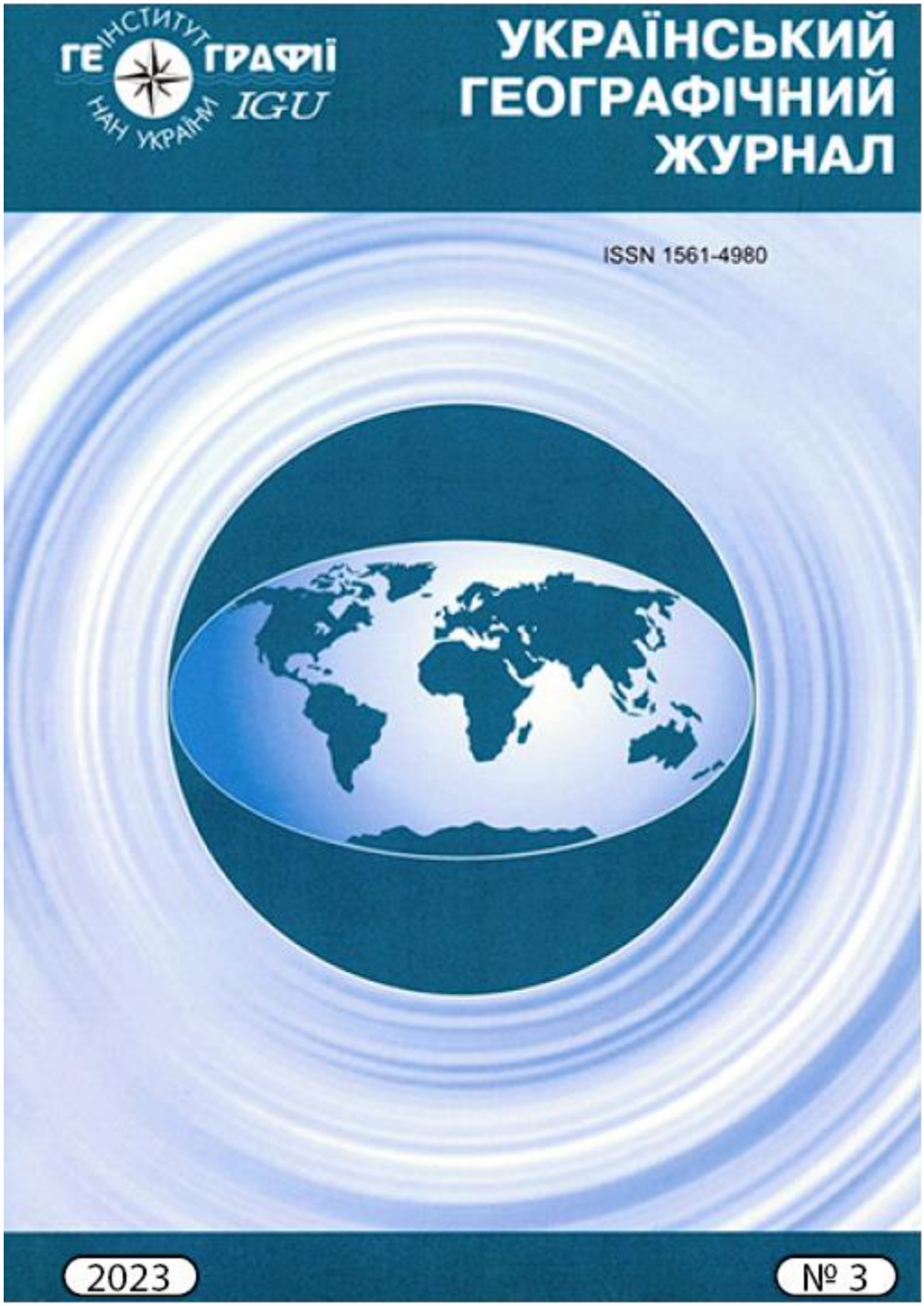


ISSN 1561-4980

https://doi.org/10.15407/ugz

ELSEVIER
Scopus

Index Copernicus

Crossref doi

ULRICHSWEB™ GLOBAL SERIALS DIRECTORY

Google Scholar

Денисик Г. І., Чиж О. П., Ситник О. І., Война І. М., Атаман Л. В.

СЕРЕДИННИЙ ЛАНДШАФТНИЙ ПОЯС СХІДНОЄВРОПЕЙСЬКОЇ ФІЗИКО-ГЕОГРАФІЧНОЇ КРАЇНИ: ВИОКРЕМЛЕННЯ, СТРУКТУРА, РАЦІОНАЛЬНЕ ПРИРОДОКОРИСТУВАННЯ

Серединний ландшафтний пояс східноєвропейської фізико-географічної країни: виокремлення, структура, раціональне природокористування На початку XXI ст. завершено обґрунтування наявності у межах Східноєвропейської фізико-географічної країни своєрідного за природними умовами — Серединного ландшафтного поясу. Мета — здійснити аналіз його виокремлення, структури, особливостей сучасного ландшафту для цілей раціонального використання природних ресурсів. Показано, що структура Серединного ландшафтного поясу складна і своєрідна. З півночі на південь тут прослідковуються три ландшафтних стрічки: Ополле-Поліська, Головного ландшафтного рубежу і Лісостепових Полісь; із заходу на схід — три ЗАПРОШУЄМО ДО ДИСКУСІЇ • INVITATION TO DISCUSSION ISSN 1561-4980 UKRAÏNS'KIJ GEOGRAFÌČNIJ ŽURNAL • UKRAINIAN GEOGRAPHICAL JOURNAL 2022, 4(120) 64 Denysyk, H. I., Chyzh, O. P., Sytnyk, O. I., Voyna, I. M., & Ataman, L. V. Invitation to discussion сектори: західний (Український), центральний і східний. Активне використання природних ресурсів Серединного ландшафтного поясу призвело до суттєвих змін структури його ландшафту, що потребує подальших детальних досліджень. Зокрема це стосується й перегляду схеми районування Східноєвропейської фізико-географічної країни, результатів необґрунтованого господарського освоєння, розробки заходів раціонального природокористування з врахуванням унікальності природи Серединного ландшафтного поясу. Ці заходи необхідно здійснювати з урахуванням структури й стану сучасних, переважно, антропогенних ландшафтів: польових, лучно-пасовищних і лісових, як фонових майбутньої екомережі Серединного ландшафтного поясу. Відповідні наукові дослідження мають стосуватися: подальшого детального вивчення природних та антропогенних ландшафтів у межах Серединного ландшафтного поясу; розробки окремих проєктів раціонального природокористування для кожної його структури; перегляд схем господарського використання польових, лісових та пасовищних ландшафтів; розвиток існуючих та створення нових природоохоронних об'єктів і територій як основи майбутньої екомережі Серединного ландшафтного

поясу. Ключові слова: Серединний ландшафтний пояс, виокремлення, структура, ландшафтні стрічки, сектори, районування, природокористування.

Research relevance Despite the fact that the distinct nature of the Middle Landscape Belt within the East European physical-geographical country has been of scientific interest for more than two centuries, its very existence was substantiated only in the late 20th and early 21st centuries [1, 2]. The structure of the Middle Landscape Belt is complex and unique. Nevertheless, it is understudied as of the early 21st century. This is due to its rather recent distinction as well as its spatial location within the boundaries of three countries— Ukraine, Belarus, and Russia. The disregard for the unique nature of the Middle Landscape Belt has led to the total anthropogenization of its natural landscape and the formation of a complex natural and economic structure, the study of which started in the second half of the 20th century and is still going on. At the beginning of the 21st century, the issues of the more profound coverage of the Middle Landscape Belt distinction process, the substantiation of its boundaries, the study of its structure and place within the framework of physical-geographical zoning, the development of ways of sustainable management, particularly within the territory of Ukraine, are becoming increasingly relevant. The problem statement, literature review Numerous fundamental monographic publications are dedicated to the natural conditions and resources of the East European physical-geographical country. The analysis of the above research works is a matter of a separate study. The list of names of outstanding home and foreign scientists who undertook investigations into the given problem, particularly the physical-geographical zoning of the region and the use of its resources, demonstrates sheer scientific interest in resolving respective issues. The Ukrainian geographers P. A. Tutkovskyi, B. L. Lichkov, K. H. Voblyi, O. M. Marynych, K. I. Herenchuk, P. H. Shyshchenko, as well as their foreign colleagues V. V. Dokuchaiev, H. I. Tanfiliev, L. S. Berg, M. A. Solntsev, F. M. Milkov, A. H. Isachenko, contributed to the research of the problem under consideration. The analysis of their research findings can be found in comprehensive monographs and textbooks. Relatively recent publications on the given subject include those by A. H. Isachenko [3], O. M. Marynych, and P. H. Shyshchenko [4], Nature of the Ukrainian SSR. Landscapes and physical-geographical zoning [5], H. I. Denysyk [1]. The analytical review of carried out comprehensive physical and geographical studies of the East European physical-geographical country makes it possible to reveal some understudied aspects of the issue of zoning. One of them is the lack of a detailed analysis of the boundaries of natural structures found in the territory of the East European physical-geographical country. F. M. Milkov was the first to take note of the above problem. His research paper on the given subject [7] was further worked on and published as part of the monograph Physical Geography. Landscape Studies and Geographical Zoning [7]. Afterward, geographers paid more attention to the boundaries of natural areas [1, 3, 5, 2]. F. M. Milkov himself focused on researching the Main Landscape Frontier of the East European physical-geographical country, which he singled out [7]. Another problem is that published works do not pay due attention to the existing regional structures within the East European physical-geographical ЗАПРОШУЄМО ДО ДИСКУСІЇ Middle Landscape Belt of the East European Physical-Geographical Country: Distinction, Structure, and Rational Environmental Management ISSN 1561-4980 УКРАЇНСЬКИЙ ГЕОГРАФІЧНИЙ ЖУРНАЛ 2022, 4(120) 65 country as well as the prospects of distinguishing new ones. The research goal is to carry out the analysis of the process of singling out and substantiating the existence of the Middle Landscape Belt within the East European physical-geographical country as well as its structure and significance for solving problems of rational environmental management, particularly in the territory of Ukraine. Research methodology Basic principles of landscape studies were implemented in the course of studying the Middle Landscape Belt. They include those of emergence, which is the feature of landscapes as a whole; cause-effect relations between separate geocomponents; historicity and plurality. General scientific methods of analysis, synthesis, comparison, abstraction, formalization, etc., as well as methods of GIS technology based on AreGis 10.2 and QGIS 3.4 software and the use of publicly available satellite images of the Earth on Google Earth, were used along with field landscape study methods. Presentation of the main research material Singling out the Middle Landscape Belt. The physical-geographical country is made up of numerous natural structures of various taxonomic ranks. Each of them is spatially outlined by landscape boundaries of different origins. F. M. Milkov distinguished the following landscape boundaries of the East European physical-geographical country: zonal climatic ones at the edge of a landscape zone; the meridional

boundary that divides nature of the country from west to east into two areas; orographic ones that outline the country bounds; geological and geomorphological boundaries that embrace natural areas [8, p. 123]. According to F. M. Milkov [8], a landscape boundary represents fundamental qualitative changes of a landscape observed at a relatively short distance. Such boundaries distinguish and separate from each other landscape complexes of various taxonomic ranks. The ability to tell between landscape boundaries in the field facilitates the solution of practical and theoretical problems, particularly those of physical-geographical zoning and rational environmental management. Substantiating boundaries of each natural structure calls for detailed landscape studies and, as a rule, considerable time. Singling out the Middle Landscape Belt within the East European physical-geographical country is not an exception either. It was caused by the active exploitation of natural resources of the East European physical-geographical country in the 19th–20th centuries as well as promoting comprehensive geographic studies, including physical-geographical zoning of the territory of the country. The Industrial Map of European Russia (1851) is of great interest in terms of tracing the first attempts to single out the Middle Landscape Belt within the East European physical-geographical country. The map under consideration as well as the atlas it was presented in was charted based on results of verbal questioning and written surveys of the population of central parts of European Russia, reports by officials of different ranks, merchants, and even travelers. The obtained data were generalized by the Ministry of Finance of Russia and charted on maps. In the background of The Industrial Map of European Russia, one can see four natural and economic strips: forest, industrial, black earth (agricultural), and pasturable ones. Outlines of the agricultural strip mainly coincide with the present-day forest steppe. In particular, the northern boundary of the black earth agricultural strip fully coincides with the northern forest-steppe boundary [1]. V. V. Dokuchaiev made a significant contribution to the comprehension of the structure of the Middle Landscape Belt within the East European physical-geographical country by researching its black soils and singling out natural areas within it. In his book Ruskyi Chornozem (Russian Black Soil), V. V. Dokuchaiev first demonstrated that the northern and southern parts of the East European Plain are divided not by a line but a strip (Fig. 1, p. 68). “There is no doubt, a significant finding as to the northern boundary of black soils is that generally speaking, such a boundary does not exist: one can just imagine it as a more or less wide (sometimes up to 100 versts1 or more breadthways) strip, where northern humus poor turf soils gradually and almost imperceptibly turn into black soils…” [9, p. 166]. 1 Verst is the old Russian measure of length. The distance of 100 versts was approximately 66 miles (107 km). ISSN 1561-4980 UKRAÏNS’KIJ GEOGRAFÌČNIJ ŽURNAL • UKRAINIAN GEOGRAPHICAL JOURNAL 2022, 4(120) Moreover, V. V. Dokuchaiev identified main characteristics of this transition strip, such as: “(a) gradual transition of black soils to northern ones; (b) gradual decreasing of the steppe-characteristic flora (gradual flora depletion in terms of steppe species); (c) the sporadic heterogeneity of the boundary and the existence of a deep depression along it that is rich in sands and bogs; (d) drastic, though the gradual, change of slide-rocks; (e) finally, the coincidence of the northern black soil boundary with the established isotherm patterns—all the above being in close genetic ties…” [9, p. 183]. In the late 19th century, H. I. Tanfiliev developed V. V. Dokuchaiev’s ideas of zoning and made the northern forest-steppe boundary more exact drawing the line through Lutsk—Zhytomyr— Kyiv, then Riazan—Novhorod and Kazan (Fig. 1). “There is a country that stretches to the south of coniferous woods in European Russia, the northern third of which is covered in broadleaf woods spread among treeless black soil areas, and which is entirely woodless in the south…” [10, p. 234]. L. S. Berg grounded the existence of the distinctive boundary between the northern woody area and the southern steppe area of the East European Plain. While defining the woody area he pointed out that its southern boundary roughly coincided with the southern margin of spruce areal. “In terms of landscape geography, it would be more correct to consider the southern boundary of spruce woods or the areal of spruce as a woodland species as the southern boundary of woodlands. Unfortunately, the above distinction is not common, except for Belarus and the Volga Region. Thus, one should focus their attention on the southern boundary of the spruce areal” [11, p. 81]. L. S. Berg drew the line between the woody area and the forest-steppe (lesostepie according to L. S. Berg) from Puławy (former Nowa Aleksandria on the Vistula)—Lutsk—Zhytomyr—Kyiv—Karachev—Kaluha along the Oka River to Riazan— Horkyi—Kazan—Mamadysh, to the north of Sarapul and Birsk…” [11, p. 81]. The correlation between the boundary drawn by L. S. Berg and the southern edge of present-day natural

spruce forests of the East European physical-geographical country is shown in Fig. 1 on p. 68. The Middle Landscape Belt structure. In 1949, F. M. Milkov named the boundary between the forest zone and the steppe zone, which was distinguished in the research works of his predecessors, the Main Landscape Frontier of the East European Plain [6]. The above boundary is spatially heterogeneous: "…borders of landscape zones on the Ruska Plain (the Russian Plain / the East European Plain) can be ambiguous—either indistinct, 'blurred,' in the form of more or less wide transition strips, or distinct and sharp, approaching linear borders» [6, p. 106]. It is worth noting that the Main Landscape Frontier distinguished by F. M. Milkov was not immediately recognized by all scientists. There were critical reviews as to its very existence, particularly those by M. V. Dylis, Ye. M. Lavrenko, H. D. Rikhter, and V. B. Sochava. Much later, in the year 1981, F. M. Milkov substantiated the existence of the OpilliaPolissyan landscape strip to the north of the Main Landscape Frontier. According to F. M. Milkov, the above strip, being a regional structure, is an interzonal landscape complex. Its distinctive features include structure complexity, mixed character, and contrast of landscape complexes. "In this respect, three landscape subtypes are closely interconnected: southern mixed coniferous-broad-leaved forests (the western part of the strip), the southern taiga (the east of the strip), and the northern forest-steppe" [8, p. 290]. Recent field research findings along with the recognition of the existence of four, instead of three, natural zones in Ukraine as well as some other groundwork, made it possible to modify the structural organization of the territories adjacent to the Main Landscape Frontier of the territories. In 2001, H. I. Denysyk singled out a strip of forest-steppe Polissya to the south of the Main Landscape Frontier of the East European physical-geographical country [1]. Unlike the OpilliaPolissyan strip, Polissya landscapes within the forest-steppe Polissya strip are found only as separate areas that have to do with ancient river drains and contemporary river valleys. The above entities include lower Polissia, Podilia Polissia, the Polissia of the Dnipro and its tributary pine terraces, the Upper Udai Polissia as well as other Polissias in the territory of Ukraine, the Tsna Polissia, pine terraces of the Don River, the Oka River in Russia and their tributaries, etc. The above Polissia areas are found on the southern edge of their area of distribution. The peculiar Polissia nature and the unique landscape structure make them distinct from the background of the forest-steppe landscapes. With regard to their unified genesis, specific features and landscape structure, the Opillia-Polissyan strip, and the Forest-steppe Polissya strip can be considered distinctive counterpart landscapes developed to the north and south of the Main Landscape Frontier of the East European physical-geographical country, including those within Ukraine. Spatially, they included landscapes of the southern ЗАПРОШУЄМО ДО ДИСКУСІЇ Middle Landscape Belt of the East European Physical-Geographical Country: Distinction, Structure, and Rational Environmental Management ISSN 1561-4980 УКРАЇНСЬКИЙ ГЕОГРАФІЧНИЙ ЖУРНАЛ 2022, 4(120) 67 outskirts of the zone of mixed coniferous-broadleaf forests, the northern outskirts of the zone of broadleaf forests and forest-steppe; nowadays they are located within the northern and southern borders of woodlands [1, 2]. Overall, it represents a natural (the Main Landscape Frontier, the Opillia-Polissyan landscape strip, and the forest-steppe Polissya strip) formation, which is nothing else but the Middle Landscape Belt within the East European physical-geographical country (Fig. 2, p. 68). Unlike the Main Landscape Frontier, it provides evidence of landscape changes within the country not at short distances, but rather a gradual transition of the northern forest landscape into the southern steppe one. The northern boundary of Opillia location and the southern boundary of the forest-steppe Polissya distribution represent the respective boundaries of the Middle Landscape Belt. The strip under consideration divides the East European physical-geographical country into two parts: the northern forest zone and the southern steppe one (Fig. 2, p. 68). The Middle Landscape Belt appears to be heterogeneous not just in terms of its spatial distribution from north to south but also the one from west to east. The above heterogeneity is due to changes in natural conditions and landscapes caused by the increased climate continentality from west to east, accompanied by respective changes in ground and vegetation cover. According to it, three sectors, distinct in terms of their respective natural conditions and landscape structure were singled out within the East European Middle Landscape Belt (Fig. 2, p. 68). The western sector—is mainly located within the borders of Ukraine and characterised in terms of structural complexity, and diversity of landscape complexes. Its further descriptions can be found in the monograph Forest-steppe Polissia and some scientific publications [2, 12, 19]; the central sector—comprises headwaters of the Don River, the Meshchera and Tsna Polissia making up "the great arc" of the East European Middle Landscape Belt stretched from Briansk through Moscow region to Nyzhnii

Novhorod. The east sector has to do with the Volga areas as well as those of its tributaries of the Oka and the Ufa between the cities of Nyzhnii Novhorod and Ufa with distinct and fragmentally researched woodlands within the river valleys. The high-altitude differentiation of the Middle Landscape Belt nature is traced [12]. The Middle Landscape Belt appears to be a kind of ecotone within the East European physical-geographical country representing a transitional natural structure that divides the country into two distinctive parts: forests in the north and steppes in the south. Obviously, they should be given a special status in the hierarchy of zoning structures in the East European physical-geographical country. A possible name of the given structures could be a physical-geographical (natural) belt. It suggests singling out distinct belts within the East European physical-geographical country first, and then—natural zones within the belts. So far, three major physical-geographical belts have been singled out (Fig. 3, p. 68). In the course of further studies of the East European physical-geographical country, their number can increase. Spatially, the Middle Landscape Belt does not coincide with the forest-steppe zone of the East European physical-geographical country. This issue requires further investigation. In researching the Middle Landscape Belt, the focus has traditionally been on its uniqueness, diversity and structure rather than on environmental management and protection issues. The economic management that lacked scientific substantiation along with the increased instability of the unique landscape of the Middle Landscape Belt in the face of extensive anthropogenic pressure resulted in unsustainable transformation of its structure, partial loss of its uniqueness, and the need for developing ways of rational environmental management. Considering that the Middle Landscape Belt is a unique natural and economic entity characteristic of only the East European physical-geographical country, the rational landscape arrangement, and its optimum use take on added significance. The above measures must be taken in scientifically based directions: • Further detailed study of both natural and anthropogenized nature of the Middle Landscape Belt. It should be noted that researching remnants of natural landscapes that have long been a basis of anthropogenic landscape formation are still relevant. The above issue is elaborated in a number of published scientific works dedicated to the nature of some parts of the Middle Landscape Belt. In particular, such studies focus on the significance of orography and microclimate [15, 16, 19], hydrological features [17–19], and the lithological composition of rocks [19– 21] in the course of formation and functioning of both past (natural) [22] and modern (anthropogenic) [23] landscape complexes. • Working out special programs, projects, and plans of environmental management for each structure of the Middle Landscape Belt. Landscapes within the Opillia-Polissyan landscape strip ISSN 1561-4980 UKRAÏNS'KIJ GEOGRAFÌČNIJ ŽURNAL • UKRAINIAN GEOGRAPHICAL JOURNAL 2022, 4(120) 68 Denysyk, H. I., Chyzh, O. P., Sytnyk, O. I., Voyna, I. M., & Ataman, L. V. Invitation to discussion Figure 1. Boundaries that make for distinguishing the Middle Landscape Belt (1) boundary on The Industrial Map of European Russia; (2) V. V. Dokuchaiev transition strip; (3) forest-steppe edge according to H. I. Tanfiliev; (4) L. S. Berg edge; (5) southern edge of modern coniferous forests; (6) edge of the East European physical-geographical country; (7) state boundaries. Figure 2. Nature differentiation of the Middle Landscape Belt (1) the Main Landscape Frontier; (2) the Opillia-Polissyan landscape strip; (3) the Forest-steppe Polissia strip; (4) sector boundaries; (5) edge of the East European physical-geographical country; (6) state boundaries. Figure 3. New natural structures-belts in the layout of physical-geographical zoning of the East European Plain Natural belts: (1) northern forest; (2) middle transitional; (3) southern steppe; Boundaries of: (4) physical-geographical countries; (5) belts; (6) states. ЗАПРОШУЄМО ДО ДИСКУСІЇ Middle Landscape Belt of the East European Physical-Geographical Country: Distinction, Structure, and Rational Environmental Management ISSN 1561-4980 УКРАЇНСЬКИЙ ГЕОГРАФІЧНИЙ ЖУРНАЛ 2022, 4(120) 69 and the strip of the Forest-Steppe Polissya differ significantly from one another. The Middle Landscape Belt also has its own distinctive features. The above fact calls for giving full consideration to specific (regional and local) landscape features in the course of developing the basics of sustainable use of their natural resources. • The revision of the structure and peculiarities of economic use of background for the Middle Landscape Belt field, grassland, and forest anthropogenic landscapes. In relation to the structure of the natural landscape of the Middle Landscape Belt in the past, the present-day structure of the anthropogenic landscape is not well-grounded, hence irrational. In particular, field landscapes prevail in terms of their area and significance in the functioning of the modern landscape of all structures of the Middle Landscape Belt not just within the territory of Opillias, but also on flat terrains of Polissya that once were overwatered wetlands. • The dominance of resource-saving and

environmentally friendly technologies in the economic use of natural resources within the Middle Landscape Belt. Typical economic development of the Middle Landscape Belt that followed patterns of developing forest-field landscapes resulted in the mainly inefficient transformation of the landscape structure of Opillias and Polissyas. In the late 20th century, it became obvious that along with modern management technologies, it was urgent to revive and promote traditional technologies, which quite often were belt-specific ones, especially in the forestry and agricultural sectors [18, 20, 21]. • Developing existing and creating new protected areas as a basis of the future ecological network of the Middle Landscape Belt. New protected structures of anthropogenic origin must enrich the existing system of protected objects of the Middle Landscape Belt. Quite often, they are as unique as naturally protected objects. It goes about anthropogenic reservoirs, developed in abandoned granite and sand quarries, peat fields, reclamation systems, individual canals, polders, numerous reafforestation areas, model farms, and recreation objects, etc. The modern ecological network should include abandoned farms, villages, and industrial facilities that are gradually becoming distinctive ecological niches for local zoo complexes. Conclusion Researching, singling out and substantiating the existence of the Middle Landscape Belt of the East European physical-geographical country have been carried out for nearly two centuries. During this time, the structure of its landscape underwent significant changes due to unreasonable economic development. In the early 21st century, new issues are arising in the course of studying the structure and the present state of this unique natural-economic entity, including those of environmental management within the Middle Landscape Belt. The prospective tasks include of revising the zoning scheme of the East European physical-geographical country. The landscape differentiation of the given country appears to be much more complex than it is revealed in available charts of its physical geographic zoning. Singling out and substantiating the Middle Landscape Belt makes it possible to include a new taxon, that of the physical-geographical (natural) belt (the name is disputable), in the hierarchical zoning structures between the taxa of “country” and “zone” in the system of hierarchical structures of zoning the East European physical-geographical country. Such an approach to zoning of the East European physical-geographical country makes the difference not just in terms of theory and general geography but practical regional implications. Due execution of the rational environmental management within the Middle Landscape Belt calls for taking into account: the unique nature of the given structure while working out programs of developing background forest, grassland, and field landscapes; the increased role of industrial and residential town areas, anthropogenic water and recreation landscapes; renewing traditional for the Middle Landscape Belt forms of economic management that differ much from present-day ones; gradual formation of the rational landscape structure based on conservation facilities and territories. The solution of the above tasks is, undoubtedly, a long and expensive process. Nevertheless, the more active reconstruction of separate parts (from north to south) or individual sectors (from west to east) seems to be reasonable. In this respect, there are all prerequisites to reconstructing the western sector of the Middle Landscape Belt, which almost completely lies in the territory of Ukraine. It should be noted that the Middle Landscape Belt must be transformed into a regional natural-economic structure having a special status and an operating mode similar to those of conservation areas.