

## CURRENT STATE OF THE NATURE AND LANDSCAPES OF THE TRUBIZH RIVER BASIN (UKRAINE)

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The article analyzes the specifics of the nature of the Trubizh river basin, characterizes the geological structure of the study area and notes that its forming elements are sedimentary rocks of the Mesozoic and Cenozoic, which lie on the Precambrian crystalline basement, and geomorphological features of the study area form ancient floodplains of the Dnieper river (most of the territory is located within the second floodplain terrace) and the floodplain and floodplain terrace of Trubizh. The boundaries of the floodplain and the floodplain terrace of the Trubizh River have been clarified and reflected on the map. Analysis of the geological and geomorphological structure and originality of climatic conditions of the territory made it possible to establish patterns of formation and distribution of genetic types of soils, most of which were formed on forests and forest-like loams. It has been found that the most common in the study area are light grey and grey podzolic soils. The regularities of vegetation distribution have been characterized and it has been noted that today most of the territory is plowed and is under agrocenoses, which, accordingly, has a negative impact on faunal diversity. It has been established that the reason for this is the irrational use of nature due to drainage reclamation works.

**Key words:** geological structure, relief, geomorphological structure, flora, fauna, aquifer, water management landscape-technical system, rational nature management.

## СЪСТОЯНИЕ НА ПРИРОДАТА И ЛАНДШАФТИТЕ В БАСЕЙНА НА РЕКА ТРУБИЖ (УКРАИНА)

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В статията се анализира природата на басейна на река Трубиж, характеризира се геоложката му структура с основните мезозойски и кайнозойски седиментни скали, лежащи върху докамбрийска кристалинна основа, и се отбелязват геоморфоложките

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особености, които формират древните заливни низини на р. Днепър (по-голямата част от изследваната територия се намира в рамките на втората заливна тераса) и заливната тераса на Трубиж. Границите на тези тераси са изяснени и отразени върху картата. Анализът на геоложката и геоморфоложката структура и естеството на климатичните условия на територията позволява да се установят закономерностите във формирането и разпространението на генетични типове почви, повечето от които са горски и глинести. Установено е, че най-разпространени в района на изследването са светлосивите и сивите подзолисти почви. Характеризирани са закономерностите в разпределението на растителността и е отбелязано, че днес по-голямата част от територията е разорана и е заета с агроценози, което се отразява негативно на фаунистичното разнообразие. Установено е, че причината за това е нерационалното природоползване поради отводнителни рекултивационни работи.

**Ключови думи:** геоложки строеж, релеф, геоморфоложка структура, флора, фауна, водоносен хоризонт, водностопанска ландшафтно-техническа система, рационално управление на природата.

## INTRODUCTION

The current state of development of society is marked by a significant human pressures on the environment. This is especially true of small and medium-sized rivers of the Dnieper Left Bank, among which the river Trubizh should be singled out. Under the influence of excessive anthropogenization in the 50-60s of the twentieth century natural landscape complexes of the river basin were transformed into anthropogenic. The natural river Trubizh was straightened, deepened and rebuilt into a main canal, and the floodplain was turned into a drainage network. As a result, there was a change in water, temperature and air regimes and natural biocenoses.

The study of the nature of the Trubizh basin and its specific features is the basis for further understanding of all processes that occur both within the Trubizh water management landscape and technical system, and in its interaction with adjacent landscape complexes. The relevance of this study is due to the lack of researches that would give a comprehensive description of the specific nature of the Trubizh basin.

**Analysis of previous research and publications.** Analyzing the works of foreign and local scientists, it was found that most of them are devoted to knowledge of the nature of Ukraine as a whole, as well as the Middle Dnieper or Western Ukraine. In their works, they investigated and analyzed vegetation and paleoclimate in the Miocene in Ukraine and found that the main changes in vegetation occurred due to global climate evolution complicated by regional tectonic processes (Syabryaj et al., 2007); climate change in the late Eneolithic in Ukraine, but in a regional archaeological context (Harper, 2019); Middle Pleistocene climate within the Middle Dnieper basin and found that the formation of the valley of the study area occurred during the interstadial phases at the end of the last glacier, and the Holocene transition was characterized by the transformation of large late glaciers into small Holocene meanders (Panin et al., 2017); sequence of forest soils of the last two glacial-interglacial cycles, variability of vegetation and shifts of landscape-vegetation boundaries in accordance with climatic fluctuations (Gozhik et al., 2014); three domains of the Ukrainian Shield, separated by the main suture zones and characterized the relief of the Middle Dnieper domain (Claesson et al., 2019).

Only a few scientists focus on on studying the nature of the nature of the Upper Dnieper, especially in the Kyiv region. They studied the soil formation in the last glacial Eastern European forest and found that in northern Ukraine (Kyiv region) in the past there was rapid climate variability ores and several thin, germinal soils (Veres et al., 2018); the impact of glacial lakes and their runoff on the reorganization of drainage systems during the last two glacial-interglacial cycles and determined that drainage systems were formed as result of excess water of glacial lakes in the late Saalian glacier (Panin et al., 2020). The territory of the Trubizh river basin was only partially studied.

Among domestic scientists, many researches have been devoted to the study of the forest-steppe zone of Ukraine and the Kyiv region (Marinich, 1972; Udovychenko, 2017), but the specifics of the nature of the Trubizh basin is analyzed in the works indirectly. Only some of the scientists focused on the study of the Trubizh river basin: the state of wetlands of the Trubizh river basin, which underwent transformations as a result of the 50-60s of the twentieth century. drainage reclamation (Ladyka, 2017); the flora of the Trubizh floodplain, identifying five species of peat in its stratigraphy (Sidorenko, 2011); the impact of anthropogenization on the groundwater level within the basin of the Trubizh River (Zapolskyi, 1991); changes in the properties of peat soils after long-term drainage and use (Berezhniak, 2011); herpetocomplexes of wetlands of the Trubizh floodplain (Nekrasova & Kuybida, 2014). However, analyzing the works of domestic scientists, it was found that scientists have analyzed the territory of the Trubizh basin, only from a hydrological, floristic and faunal point of view. A comprehensive analysis of the nature of the Trubizh river basin has not been carried out.

**The aim** is to consider the specific features of recent nature and landscapes of the Trubizh River basin on the basis of the analysis of available literary and cartographic sources and own role researches.

**Materials and methods of research.** In the process of analyzing the specifics of the nature of the Trubizh basin, the following methods were used: structural and logical generalization (used to highlight the general features and properties of the study area), system analysis (establishing structural relationships between elements of the study area), comparative geographical temporal differences between geographical processes and phenomena in the study area), retrospective (involved in the study of historical and geographical features of nature), cartographic (in processing information and mapping) and GIS-method for analyzing changes in natural and anthropogenic landscape complexes.

The data presented in this article have been obtained from field and analytical studies, as well as from mapping the geological and geomorphological structure, soils and vegetation of the study area. For cartographic modeling and analysis of the nature of the Trubizh basin, the GlobalMapper20 program was used, which analyzed the features of the terrain, hydrographic network and identified patterns of vegetation distribution in the study area, GIS package SAS.Planet.Release, whose database included information on natural landscape the studied area and their transformation into anthropogenic ones. The study was also carried out by analyzing cartographic materials in the GoogleEarthPro software environment, which was used to analyze satellite images of the study area over time, which made it possible to establish the human pressures on the floristic diversity of the Trubizh basin.

The territory of the Trubizh river basin is located in the north-western part of the Dnieper lowland and covers parts of the territory of Kyiv and Chernihiv regions. According to the physical and geographical zonation of Ukraine, the Trubizh basin is located within two zones: the northern (upper) part is located within Chernihiv Polissya, and the middle and lower part – within the North-Dnieper terrace-plain forest-steppe zone (Fig. 1 – appendix).

The specific natural conditions of the studied area are influenced and determined by many factors, among which are the geological structure and the relief. The Trubizh river basin is located within the formation-accumulative plain of the Dnieper geomorphological region. It is a flat plain with average heights of 100–150 m a.s.l.; a large part of the territory is occupied by saucer-shaped depressions.

A peculiar feature of the study area is that it is located at the junction of two main tectonic structures: the Ukrainian Crystal Shield and the Dnieper-Donetsk Mesozoic depression. The crystalline basement consists of various metamorphic and igneous rocks. Sedimentary rocks of the Mesozoic and Cenozoic, which lie on the Precambrian crystalline basement, take part in the geological structure of the Trubizh basin.

In the Trubizh basin, the Mesozoic era is represented by Jurassic deposits (Oxford layer  $J_{3,iv_2}$ , Keloway layer  $J_{2,ic}$ ), which occur only in the southern part of the basin. Widespread Paleogene sediments of the Cenozoic era, which are represented by Eocene (Obukhiv layer  $P_{2,ob}$ , Kyiv layer  $P_{2,kv}$ , Buchach layer  $P_{2,bc}$ , Kaniv layer  $P_{2,kn}$ ) and Paleocene sedimentary rock (Sumy layer  $P_{1,mr}$ ) (Fig. 2 – appendix).

Anthropogenic (Quaternary) deposits in the Trubizh basin are represented by forests and forest-like rocks on alluvial deposits. In most parts of the study area, Quaternary deposits occur on the rocks of the Kyiv formation (marls and glauconite sands), in the south – on the deposits of the Buchach and Kaniv formation (fine-grained and glauconite sands), and in the northeast – on the sands and siltstones of the Kharkiv formation). The thickness of Quaternary sediments within the river basin varies between 40 and 60 m a.s.l. They are represented by alluvial deposits of the first, second, third and fourth floodplain terraces of the Dnieper and alluvial deposits of low (90–100 m a.s.l.) and high floodplain (95–105 m a.s.l.), as well as a low floodplain terrace (buried) (100–105 m a.s.l.), a high floodplain terrace (buried) (100–110 m a.s.l.) and a pine terrace of Trubizh (Fig. 3 – appendix).

Trubizh is characterized by a wide valley with a depth of up to 25 m. In the upper reaches it connects with the valley of the Oster River by a passable valley. According to the decipherment of satellite images and own field research in the geomorphological structure of the valley, the author highlighted high and low floodplains, high (buried) and low (buried) floodplain terraces and pine forest. Trubizh floodplain, formerly swampy, now drained, has an average width of 500 m up to 3 km, and in some areas is 6–7 km, the difference between low and high floodplain is 3–5 m. The height above the river level varies between 1 and 5 m. The high floodplain has a significant distribution within the central part of the river. The low floodplain terrace (buried) of Trubizh has an average width between 2 and 4 km and more, and the height above the river is 7–8 m. The low floodplain terrace has a wide development in the western part of the lower course of the river. The high floodplain terrace (buried) can be traced in the central and lower reaches of the river and has an average width of 4–6 km, the

height above the riverbed varies from 10 to 15 m. The surface is represented by light loess-like loams. The pine terrace is widespread in the central and lower reaches of the Trubizh, the height above the riverbed is 20–25 m, and the surface is composed of fine-grained sands.

Trubizh is characterized by a wide valley with a depth of up to 25 m. At the top it connects with the valley of the Oster River by a passable valley. In the geomorphological structure of the valley there is a floodplain and the first floodplain terrace. The Trubizh floodplain, formerly swampy, now drained, has an average width of 500 m to 3 km, and in some areas is 6–7 km. The height above the river level varies from 0,7 to 1–2 m. The first floodplain terrace of Trubizh has an average width of 2 to 4 km and more, and the height above the river is 7–8 m, the surface is composed of sand. The floodplain terrace is widely developed in the eastern part of the Trubizh basin, especially in the area of Hlanshev, Kozlov, Berezani and Baryshivka (Marinich, 1972).

#### HYDROLOGICAL AND CLIMATOLOGICAL FEATURES

According to the hydrological zoning of Ukraine, the Trubizh basin belongs to the Left-Bank Dnieper hydrological region of sufficient water content, namely Trubizh-Supiya hearth subregion of low water content. In hydrogeological terms, the Trubizh basin is located within the Dnieper artesian basin. Aquifers are found in the sediments of the Kyiv, Buchach-Kaniv, Obukhiv worlds, as well as the Quaternary system (Zapolskyi, 1991). Quaternary sediments (anthropogenic alluvial and middle anthropogenic fluvio-glacial) form a single aquifer, the thickness of which varies from 20 to 55 m. The depth of the aquifer varies from west to east. In the south-west, west and most of the study area the depth is from 0 to 10 m, and in the northeast and east is from 5 to 10 m.

The main forming rocks of the aquifer are sands, in the lower part of water-bearing rocks there are coarse-grained sands with gravel and pebbles; the middle part is formed by medium-grained sands with layers of sands, loams and clays; in the upper part aquifers are forests and forest-like loams (alluvial deposits of floodplain terraces of the Dnieper). However, within the Trubizh floodplain, groundwater is deposited in peat deposits. Only in the north-west and east of the study area there is an increase in relief, where in some places there is a peak, characterized by shallow deposits (2–2,5 m) and a small thickness of water-bearing rocks (up to 0,5 m) (Sakhatskyi, 2009).

The territory of the Trubizh basin is located within the North Atlantic-continental climate region, namely: the upper part of the basin belongs to the Eastern climatic region of the zone of mixed coniferous-deciduous forests, the middle and lower part of the basin – to the Western climatic region of the forest and steppe zone. Circulation of air masses in the study area depends on the season: winter (January) is dominated by southwestern, southern and southeastern winds, with an average speed in the north, 4–4,5 m/s, in the south, 3–3,5 m/s; summer (July) is dominated by northeast and east winds, the average speed of which is 2 m/s and more.

According to the agro-climatic zoning of Ukraine, the territory of the basin is within two zones: the Polissya part is in the zone of sufficient heat supply and humidification (SCC – 1,3–1,4); forest and steppe part – in the zone of sufficient heat supply, unstable moisture (SCC – 1,0–1,1).

The total solar radiation per year in the Trubizh basin increases from north to south and ranges from 4,000 to 4,300 MJ/m<sup>2</sup>. The radiation balance also increases from north to south from 1600 to 1800 MJ/m<sup>2</sup>. The thermal regime of the basin is characterized by a temperature difference in the same direction: the average monthly temperature in January in the north is -7 °C, and in July – +19 °C; in the south, respectively -5,8 °C and +20 °C. The sum of active temperatures ranges from 2400°C in the north to 2700°C in the south. The pattern of precipitation distribution is also traced in the direction from north to south and is 550 mm/year and 467 mm/year, respectively (Polupan, 2007).

#### FEATURES OF SOIL SPREAD

The formation and distribution of genetic soil types in the Trubizh basin is related to the geological and geomorphological structure and climatic conditions of the territory. The main factors of soil formation are relief and soil-forming rocks, which are specific in the study area. According to the relief and surface deposits, the territory of the Trubizh basin can be divided into two zones:

Zone I is the upper part of the basin, which is located within Chernihiv Polissya. It is dominated by wavy and hilly mesorelief, which causes variegated soils, but small fluctuations in height and close occurrence of the surface of groundwater leads to their glaciation and wetlands. Carbonate-free glacial rocks of light mechanical composition are widespread in this area. As a result, soils get wet, bases are leached and, as a result, the podzolic process of soil formation develops (Marinich, 1972).

Zone II – the middle and lower parts of the Trubizh basin, which are located within the North-Dnieper terrace-plain forest and steppe zone. The territory of the basin is characterized by a flat drain-free relief, numerous saucer-shaped depressions and a high occurrence of groundwater from the surface. All this contributes to the development of waterlogging processes, and the content of sodium bicarbonate in groundwater contributes to soil salinity. Forests and loess-like loams, which contain from 7 to 15% of carbon dioxide, are widespread here. Gray forest and chernozem soils were formed on forest rocks. Also on the territory of the study are partially distributed water-glacial and ancient alluvial deposits of river terraces on which, under the conditions of the washing regime, sod-podzolic soils are formed (Marinich, 1972). In general, most of the soils in the Trubizh basin were formed on forests and forest-like loams (Fig. 4 – appendix). The territory is dominated by forest and steppe podzolic soils, among which the most common are gray and light gray podzolic light loamy and sandy. Dark gray podzolic are found in fragments in the upper and middle reaches of the Trubizh. Typical low-humus chernozems are less common. The study area is characterized by the spread of swamp and meadow-swamp soils on alluvial deposits.

In terms of humus content in the arable layer of soils (up to 30 cm deep) are productive: meadow-chernozem – fragmented only in the middle reaches of the Trubizh under saline meadows, humus content is over 4,0 %; meadow and meadow-swamp – common in the middle and lower reaches of the Trubizh and in the upper reaches of the floodplain of the Nedra River under steppe meadows, humus content more than 4,0 %; typical chernozems formed on forest floodplain terraces under steppe and meadow-steppe vegetation, distributed in the south-west and east of the study area,

humus content is 3,6–4,0 %; podzolic chernozems formed under steppe meadows in the lower reaches and under oak forests in the middle reaches, where they are distributed in fragments, the humus content ranges from 3,6 to 4,0 %. The lowest percentage of humus in the arable layer (up to 1,0 %) is found in sod-slightly podzolic sandy, sandy and clayey-sandy soils on ancient alluvial and water-glacial deposits under pine, oak and pine-oak forests.

In the upper part of the basin, where groundwater is not deep, sod soils are exposed to gleying. Turf gley soils formed on ancient alluvial and water-glacial deposits under grassy, mostly meadow-swamp vegetation. These soils are characterized by accumulation of humus in the upper part of the profile with its gradual decrease with depth and developed gley process. Among the sod gley soils, according to the morphological profile, sod-medium podzolic gley soils stand out. These soils are characterized by a gley-eluvial profile, in which an eluvial horizon is formed at a depth of 25–35 cm, due to the seasonal rise of groundwater (Polupan, 2007).

A feature of the soil cover of the study area is the spread of wetlands and peatlands formed on Holocene alluvial deposits with excessive moisture under meadow-swamp and shrub vegetation. Today, these plant associations have survived in fragments only in the middle and lower reaches of the Trubizh. The rest of the wetland was drained, resulting in the transformation of grass bogs into agrocenoses.

Today, the Trubizh River with its tributaries has importance water management, as it flows in two areas: Kyiv (Brovarsky, Zgurivsky, Baryshivsky and Pereyaslav-Khmelnytsky districts) and Chernihiv (Kozeletsky and Bobrovytsky districts). The length of the main canal is 125 km (it should be noted that the length of the natural riverbed is 113 km), and the area of the catchment basin is 4700 km<sup>2</sup>. The basis of specialization of these districts is agriculture: Bobrovytsia district – the total area of agricultural land – 108,7 thousand hectares, of which arable land – 90,5 thousand hectares; Kozelets district – on its territory (2660,17 km<sup>2</sup>) are concentrated 36 agricultural enterprises, 21 farms, and the area of lands – 144,087 thousand hectares, arable land – 74,775 thousand hectares; Zguriv district – the land fund of the district is 76,308 hectares, of which 63543,7 hectares or 83,3% are agricultural lands (with an average of 69,6% in Ukraine); Pereyaslav-Khmelnytskyi district – the area of agricultural lands is 95628,2 hectares, of which arable land – 80375,4 hectares. According to the decipherment of satellite images and the Public cadastral map of Ukraine, the area of transformation of natural complexes into anthropogenic within the Trubizh basin is 78% (Figs. 5, 6 – appendix).

#### FLORISTIC AND FAUNAL FEATURES

According to the geobotanical zoning of Ukraine, the territory of the Trubizh basin is located within two oblasts (European deciduous and Eurasian steppe) and two provinces (Eastern European (Sarmatian) province of coniferous-deciduous and deciduous forests and Eastern European forest and steppe desert provinces and dune and steppe provinces), the following districts: Livoberezhnopolisky district of oak-pine, oak, pine forests, floodplain meadows and eutrophic swamps and Levoberezhnodniprovsky district of linden-oak, hornbeam-oak, pine (on terraces) forests, meadows, halophytic and swamp vegetation.

The flora of the study area is characterized by a combination of forest, meadow and steppe and wetland groups. During the anthropogenization of the Trubizh river basin, the vegetation cover underwent a significant transformation. As a result, most of the territory is now represented by agrocenoses on the site of forests, meadows and grassy swamps (Fig. 7 – appendix). Therefore, to investigate what changes have occurred in the species composition of the flora of the basin, we conducted a systematic analysis of modern vegetation.

At the beginning of the XXI century the forest cover of the study area is 5–15 %. The most common are deciduous and deciduous-coniferous forests, which have formed on grey forest and sod-podzolic soils. Deciduous forests are common in the middle and upper parts of the Trubizh basin and are represented by formations of common oak with an admixture of other deciduous species. Deciduous conifers are common in the lower and upper parts of the basin and are represented by oak-pine and pine formations.

Most of the territory of the Trubizh basin was occupied in the past by meadow steppes and steppe meadows, which were represented by *Poa angustifolia* L., *Festuca valesiaca*, *Koeleria delavignei*, *Agolisis vinealis*, *Bromus inermis* (Marinich, 1972). The result of excessive economic development is the transformation of these plant communities into agrocenoses.

As a result of drainage reclamation, the Trubizh floodplain is now represented by agrocenoses (oats, millet and winter wheat). However, in the middle and lower reaches of the river in the floodplain fragments of meadow vegetation have been preserved in fragments, among the groups of which cenoses with a predominance of *Poa pratensis* with accompanying species occupy a prominent place: *Veronica arvensis* and *V. chamaedrys* L., *Ranunculus repens*, *Potentilla anserina* L., *Rumex confertus*, *Phalaris arundinacea*, *Carex hirta* and *Galika aparine* (Ladyka, 2017). Less common are areas of onion dominated by *Dactylis glomerata* and *Bromus inermis* with admixtures of synanthropic species: *Veronica polita*, *Echinocystis lobata*, *Myconeotis alica sparsiflora*.

Reclamation works have significantly affected the vegetation composition of sedge-hypnotic bogs. The dominant plant associations in these swamps were *Carex inflata*, *C. lasiocarpa*, *C. diandra*, *C. dioica*, *Carex limosa*, less common *Acorus calamus* and *Scirpus sylvaticus*. As a result of anthropogenization, *Agrostis stolonifera* spreads with its subsequent dominance (Chorna, 2009).

Medicinal plants were found in the Trubizh basin: *Acorus calamus*, *Urtica dioica* L., *Convallaria majalis*, *Rhamnus cathartica* L., *Lycopodium clavatum* L., *Hypericum perforatum* L., *Adonis vernalis* and *Achillea millefolium*.

Species listed in the Red Data Book of Ukraine were found on the territory of the study: *Orchis coriophora*, *Platanthera bifolia*, *Iris pineticola* – endemics; *Daphne cneorum* L. – relict. The specificity of the physical and geographical conditions of the territory contributed to the preservation of endemics and relict plants, which determine the uniqueness of the flora of the Trubizh basin.

In zoogeographical terms, the study area is located within the Paleoarctic region of the Boreal European-Siberian subregion of the Eastern European district of the mixed forest and forest and steppe region, where two areas are distinguished: Eastern (Chernihiv) Polissya and the Left-Bank Dnieper Forest.

As a result of the predominance of agrocenoses, the faunal diversity of the Trubizh basin is significantly impoverished. Common among mammals are common *Microtus ex grex arvalis*, *Mus musculus*, *Apodemus agrarius*, *Cricetus cricetus* L.; among birds there is *Passer montanus*, *Perdix perdix*, *Calandrella rufescens*; reptiles are represented by the *Lacerta agilis*.

Forest fauna also does not differ in species diversity. Typical representatives are *Capreolus capreolus*, *Sus scrofa*, *Lepus europaeus*, *Alces alces*, *Cervus elaphus* (found only in the northwest of the basin), and species listed in the Red Data Book of Ukraine are *Meles meles*, *Bubo bubo*, *Circaetus Gallicus*. The fauna of onions and floodplains is represented by the *Ondatra zibethicus*, *Arvicola amphibius*, *Micromys minutus*, *Ardea cinerea*, *Pelophylax* and the common *Natrix natrix*. Species such as *Lutra lutra*, *Grus grus* and *Haematopus ostralegus* are listed in the Red Data Book of Ukraine. The ichthyofauna of the Trubizh River is represented by 34 species: *Esox*, *Abramis brama*, *Blicca bjoerkna*, *Alburnus alburnus*, *Scardinius erythrophthalmus*, *Cyprinus carpio*, *Carassius gibelio*, *Cobitis taenia*, etc.

## CONCLUSIONS

The basin of the Trubizh River is characterized by specific natural conditions due to a number of natural settings and anthropogenic impact. According to the physical and geographical zonation, the river basin is located within Chernihiv Polissya (northern (upper) part) and the North-Dnieper terrace-plain forest-steppe zone (middle and lower part). From the geological point of view, the study area is within the two main tectonic structures (Ukrainian Crystal Shield and Dnieper-Donetsk Mesozoic Depression), which affected the originality of the relief and geomorphological structure. Sedimentary rocks of the Mesozoic (Jurassic sediments) and Cenozoic (Eocene and Paleocene sediments), which lie on the Precambrian crystalline basement, are widespread within the Trubizh basin. Quaternary deposits are represented by forests and forest-like rocks on alluvial deposits. According to the decipherment of satellite images and own field research, the author highlighted that the geomorphological structure of the river valley has high (95–105 m) and low (90–100 m) floodplain, high (buried) (100–110 m) and low (buried) (100–105 m) floodplain terraces and pine terrace (110–115 m).

According to the hydrological zonation of Ukraine, the Trubizh river basin belongs to the Left-Bank Dnieper hydrological region of sufficient water content, namely: Trubizh-Supiy hearth subregion of low water content. In hydrogeological terms, the Trubizh basin is located within the Dnieper artesian basin. The study area is characterized by high deposits from the surface of aquifers (found in the sediments of Kyiv, Buchach-Kaniy, Obukhiv, Sumy, Ivanytsia and Ichnia formation), which causes waterlogging and development of swamps and peat bogs. This is also facilitated by the flatness of the territory, numerous saucer-shaped depressions and the presence in the geological section of a thick layer of sand and sandy rocks. This is what led to the drainage of reclamation works, which later had a negative impact on the nature of the river basin.

Depending on the geological and geomorphological structure and climatic conditions of the Trubizh basin, two zones of distribution of genetic soil types have been

formed: Zone I – the upper part of the basin (Chernihiv Polissya) is characterized by motley, gleyed, in places swampy, podzolic soils; Zone II – the middle and lower parts of the basin (North-Dnieper terrace-plain forest-steppe zone) is characterized by bottom depressions and the spread of forest and forest-like loams.

At the beginning of the XXI century, the territory of the Trubizh basin is characterized by a high transformation (78 %) of natural landscape complexes into anthropogenic ones. According to the decoding of satellite images and the Public Cadastral Map of Ukraine, the author concluded a schematic map of land use of the study area, according to which arable land is 63 % (with an average plowed land in Ukraine 56 %), forests and other wooded areas – 9,7 %, uncultivated land – 11,9 %, water bodies – 0,9 %, wetlands – 2,9 %, settlements – 11,6 %. Irrational land and water use has gradually led to changes in vegetation (most of the territory are agrocenoses) and, consequently, the impoverishment of fauna, and, in some cases, partial degradation of soil cover (a phenomenon common in the construction of drainage network), as well as partial leveling of surface forms of territory. This requires the continuation of the study of the now almost abandoned Trubizh water management landscape-technical system for the use of results in the development of regional schemes of rational nature management and nature protection.

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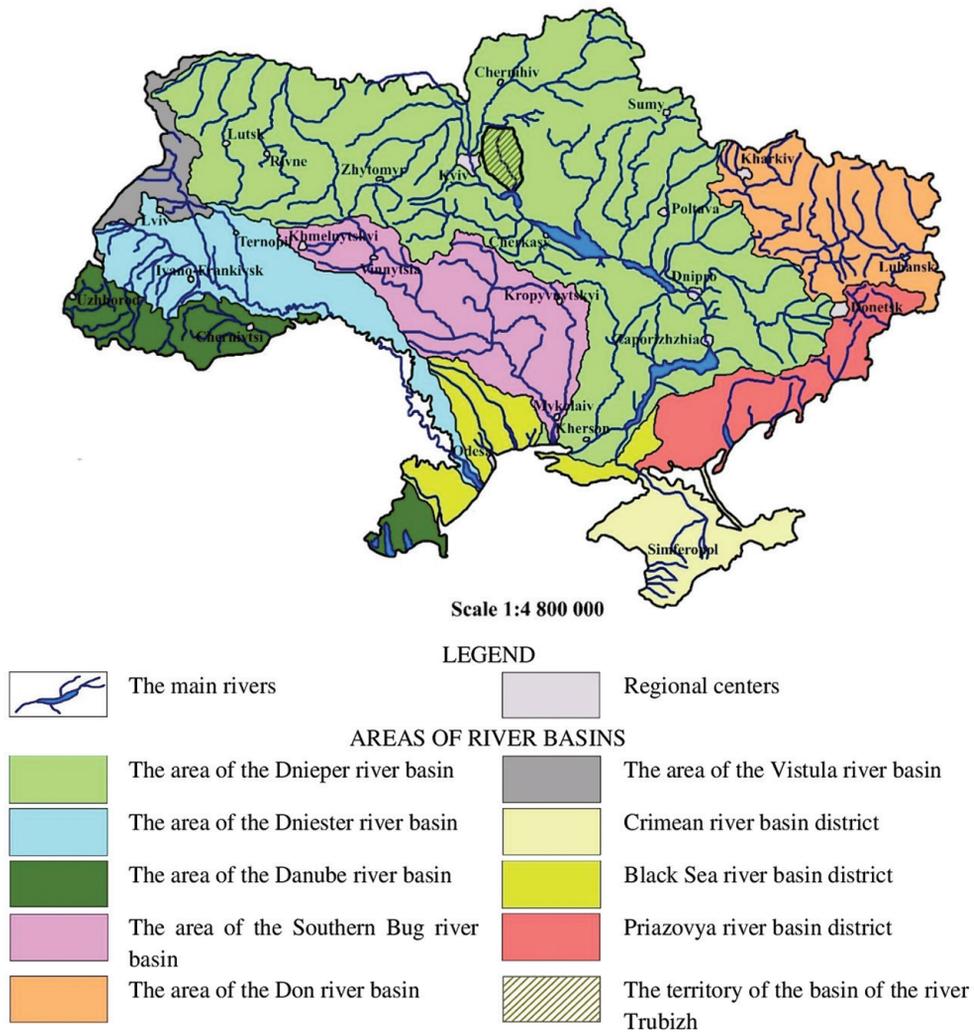


Fig. 1. Schematic map of hydrographic zoning of the territory of Ukraine (compiled by the author on the basis of (Velyka ukrainska entsykloptdia, 2016))

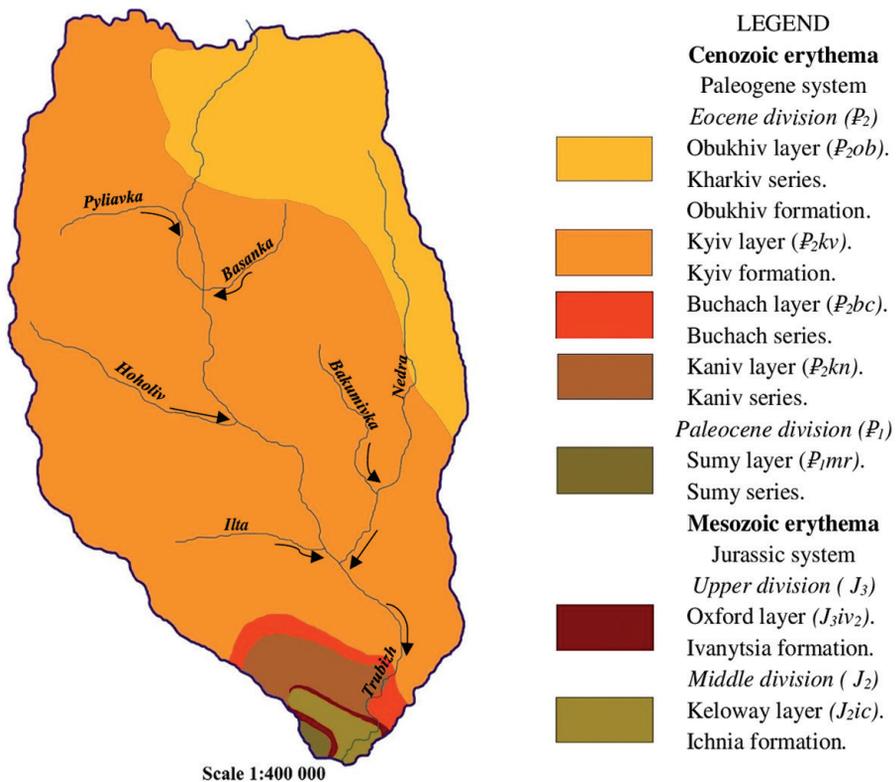


Fig. 2. Schematic map of the geological structure of the territory of the Trubizh basin (compiled by the author on the basis of (Marinich, 1972))

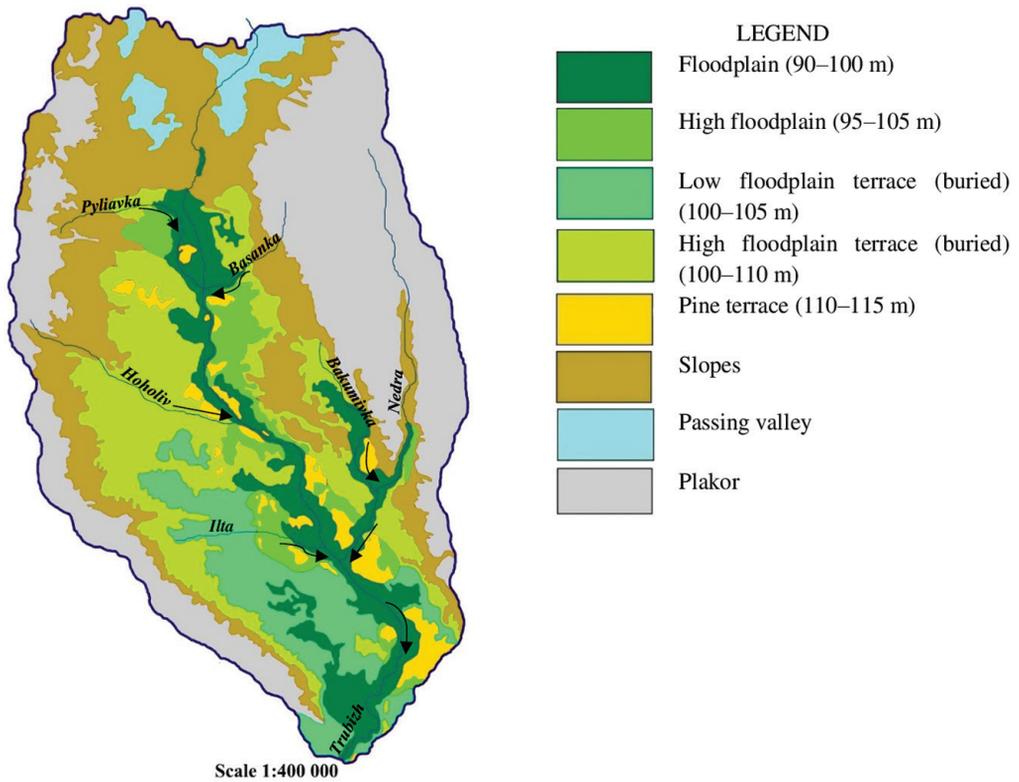


Fig. 3. Schematic map of geomorphological structure of the territory of the Trubizh basin (compiled by the author)

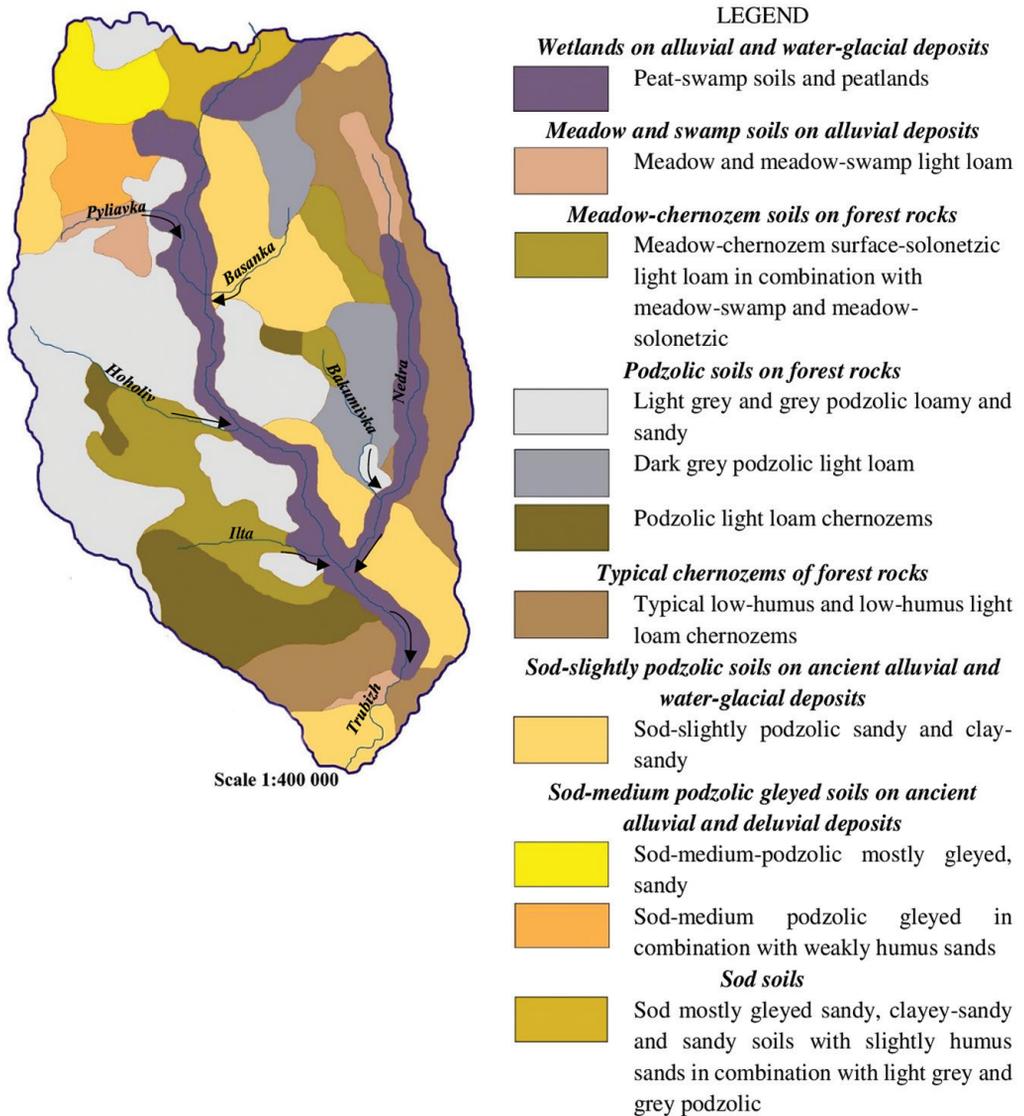


Fig. 4. Schematic map of soil distribution of the Trubizh basin (compiled by the author on the basis of (Institute of Geography of the National Academy of Sciences of Ukraine, 2007))

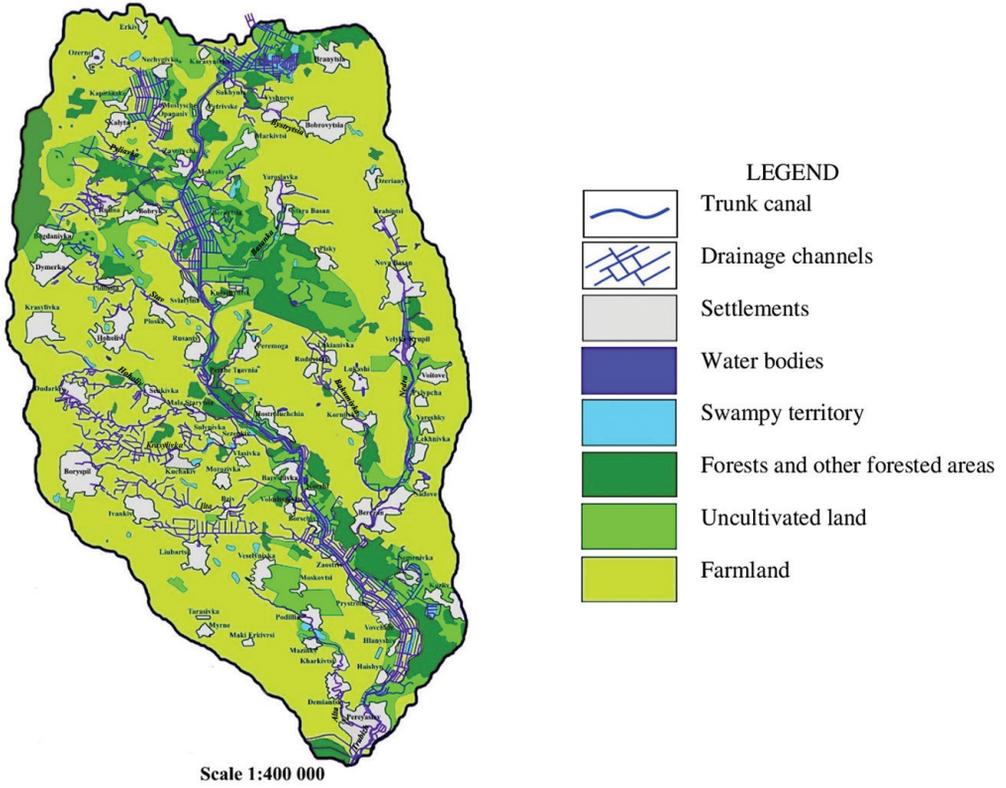


Fig. 5. Schematic map of land use within the Trubizh river basin (compiled by the author)

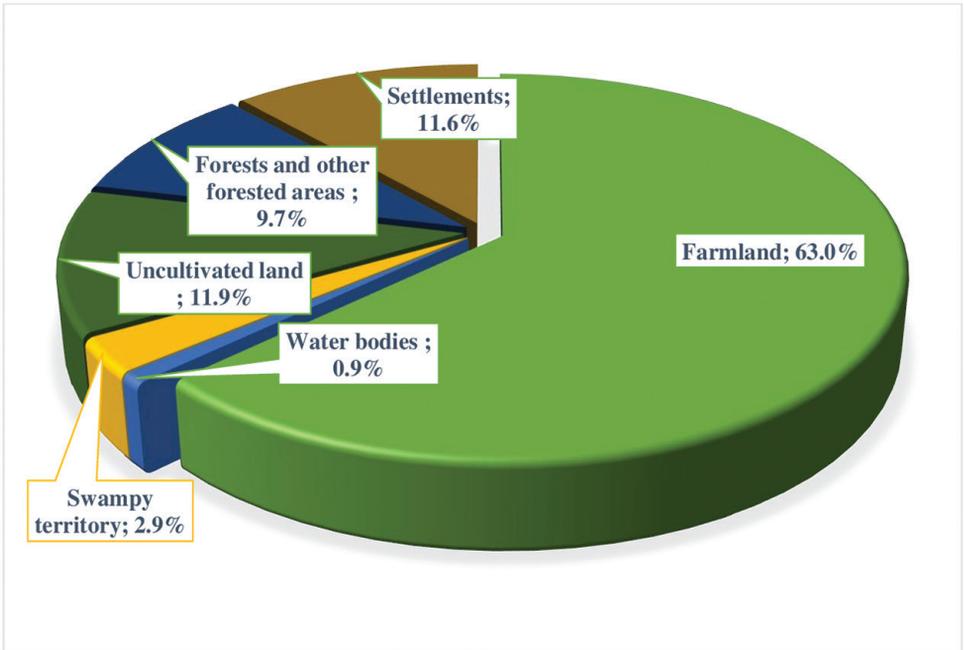


Fig. 6. Main characteristics of land resources in the Trubizh river basin (compiled by the author)

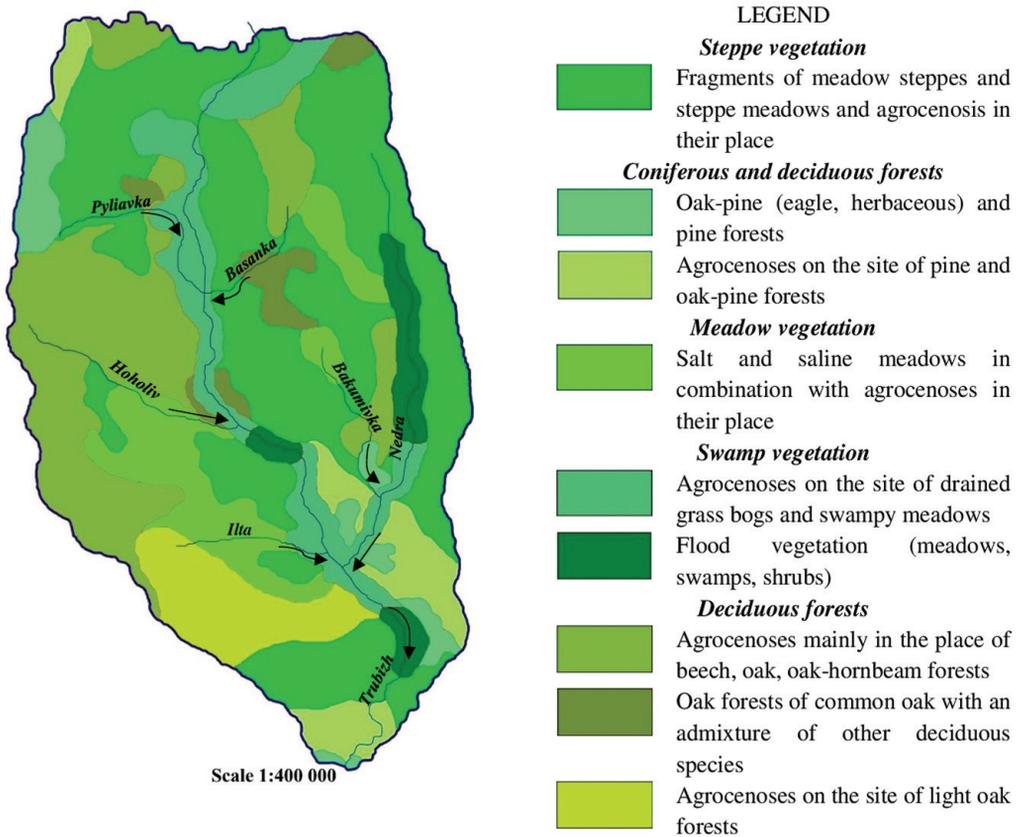


Fig. 7. Schematic map of vegetation distribution of the Trubizh basin (compiled by the author on the basis of (Institute of Geography of the National Academy of Sciences of Ukraine, 2007)