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Landscape research and education about nature based on the example of the National Park Skole Beskids (Ukraine)

Abstract: The present article shows the importance of landscape studies, and in particular, landscape mapping for education about nature. It also discusses the relevance of developing landscape educational trails in national parks. The functions of educational paths and their educational roles are outlined. The design and characterization of the landscape trail through the National Park "Skole Beskids" in order to show the diversity of the landscapes both in the Park, and in the general area of the Skole Beskids.

Keywords: landscape research, education on nature, natural territorial complex (NTC), landscape micro-district, educational landscape trail

1. Introduction

Science-based knowledge of the nature of the Earth's surface is very important for its rational use and protection, and for solving resource-related and environmental problems of humankind. This idea is reflected in the strategy of sustainable development (http://www.un-documents.net/ares64-236) and the European Landscape Convention (http://www.coe.int/en/web/landscape/home). At the same time, it is no less important for the education of students and the general public. In accordance with the scientific disciplines that study the nature of the Earth's surface, it is necessary to distinguish between geological, biological (botanical, zoological, ecological), geographic (geomorphological, hydrological, meteorological and climatic) soil-science and complex landscaping, and landscape-ecological, education. Different types of natural trails can be developed: botanical, ecological, geological, geomorphological, hydrological, landscape-oriented and others. In our opinion, the most complete and comprehensive exploration can be realized using landscape-oriented routes and paths.

Education about nature is one of the important functions of protected areas, such as national parks. For this purpose, special trails and routes that are called ecological or educational trails are developed, arranged and described in the areas of national parks both in Ukraine (http://nnph.if.ua/, http://skole.org.ua/skole-majdan.html) and in Poland (http://www.magurskipn.pl/index.php). The objects studied on such trails are, as a rule, components of nature – certain species of plants, less often their groupings (ecosystems), geomorphological, geological and hydrological objects, so-called monuments of animate and inanimate nature. Unfortunately, there is a paucity of information on the natural, territorial, or landscape complexes developed by national parks on environmental paths. Therefore, in practice, exploration is limited to the study of natural components (rocks, bodies of water, types of plants and soils and their properties – relief, climate, etc.), while complex natural landscapes remain unnoticed.

The purposes of this work include showing the value of landscape research in education, revealing the significance of landscape educational trails, outlining their functions and tasks, proposing a method for creating and editing a landscape map, and designing (creating a car-

tographic basis and description) of the landscape-educational trail on Mount Parashka (the National Park "Skole Beskids" in the Ukrainian Carpathians).

2. Methodology and methods. Literature review

Landscape trails are means of forming holistic complex perceptions of nature in students. Unlike the protected areas of the European Union, where emphasis is put on objects of living and inanimate nature that are typical of a particular territory (components of natural territorial complexes), landscape trails focus on separate components (rocks, vegetation, soils and others), as well as natural territorial complexes of different hierarchical levels – landscapes, streams, tracts and facies.

The diagnostic features for selection and mapping of natural territorial complexes (NTC) are limited to certain forms of relief. According to Miller (1974) landscape facies are natural territorial complexes, which maintain uniform relief, surface rocks of the same lithology, the same moisture mode, climate, soil and biotic community. In a landscape tract, the NTC is composed of naturally combined facies and is associated with terrain mezoforms; in a landscape stretch – the NTC consists of a number of lithologically homogeneous tracts within a single high altitude. An altitude area is a combination of genetically related tracts within a high-rise complex mezoform relief developing under the influence of one of the leading factors of morphogenesis with some local hydroclimatic regime, soil, and vegetation. A mountain landscape neighborhood – is clearly isolated in the geological foundation and terrain of a mountainous area with numerous natural territorial macrocomplexes, positive or negative in form, consisting of a number of high-altitude areas (Miller, 1974).

A landscape trail should be a marked route, which passes through the natural and territorial complexes typical of and unique to a given landscape area. Its main purpose is conducting educational work with students and the general public. A landscape trail as an educational tool for students ensures conditions for the formation of key subject competences in geography. For students of geographic specializations, a landscape trail is a means of forming professional competences, and for the general public – a means of enhancing complex perception of the environment, promoting the study of landscape as the basis of rational and nature management and conservation – i.e. the basis of sustainable development.

The following tasks can be implemented on landscape paths in national parks: familiarizing the visitors with natural territorial complexes and their structural components – natural components, physical and geographical processes and phenomena, economic use of landscape complexes and their current state; conducting classes and field studies at points of interest; familiarization with the available objects on the route which are subject to protection (types of plants and animals, geological, hydrological and other natural monuments); familiarization with the natural potential of natural territorial complexes (their resources, recreation opportunities, aesthetics, ecology); promotion of environmental protection measures.

A necessary prerequisite for developing and improving a landscape trail is the creation of a large-scale (1:25 000) landscape map showing the natural territorial complexes of various ranges – landscape tracts, strata and terrain. We conducted landscape mapping for the natural sciences within the NPP "Skole Beskids" according to the method of Miller (1996). The initial cartographic basis was provided by topographic maps on the scale of 1: 25 000. In compiling the landscape map, satellite images with resolutions of 5*5 and 20*20 m were used, geological, geomorphological maps and maps of the Quaternary sediments (Fondovi materialy…, 1960), as well as forest plantations (Plan lisonasadzhen…, 2003). Field studies were carried out by means of route surveys and work at the points of integrated facies research. The processing of materials and the preparation of a landscape map was carried out using ArcGIS software.

Landscape research for the purpose of education about nature in Ukraine is at an early stage of development. Here we can note the experience of the scientists of the Faculty of

Geography of the Ivan Franko National University of Lviv, who developed several landscape routes in the western region of Ukraine for purposes of regional studies, recreation and tourism, representing the natural territorial complexes of different physical and geographical regions. In particular, several landscape routes have been developed which pass through the territory of the national park "Dermansko-Ostrozky" within the East European Physical Geographic country through the landscape areas of the Rivne Plateau (physical and geographical area of the Volyn Upland), the Ostroh Passage Valley (the Maly Region Polissya), the Kremenets Mountains (the area of the Western Podilia) (Lavruk et. al., 2013). In addition, several landscape and tourist routes have been developed in the Carpathian National Nature Park within the landscape area of Chornogora (High-mountain-Polonian region of the Carpathian Physical Geographical Country), which are used during the educational practices of geography students from different universities of Ukraine and Poland, and during educational trips for students of secondary schools (Melnyk, 2009).

An important prerequisite for the development of the landscape educational trail on the territory of the NPP "Skole Beskids" was conducting landscape research and preparation of a landscape map, as well as maps of the physical and geographical zoning of the Skole Beskids landscape area (the Middle-Skibov region of the Carpathian Physical and Geographic Region) (Burianyk and Melnyk, 2015, 2016)

3. The area of research

The National Park (NPP) "Skole Beskids" (with an area of 35684 hectares) was created on February 11, 1999 (Fig. 1) (Proekt orhanizatsii…, 2008). It is located in the Ukrainian Carpathians in the territory of the Lviv region within the three administrative districts – Skole, Drohobych and Turka. According to the Ukrainian Law "On the Nature Reserve Fund of Ukraine" one of the most important functions of the NPP is protection of valuable natural systems (Zakon Ukrainy…, 1992).

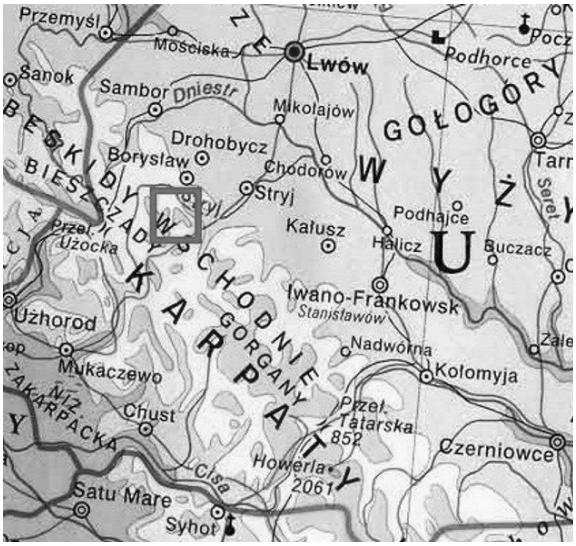

Figure 1. Physical-geographical location of the NPP "Skole Beskids"

Within the territory of NPP "Skole Beskids", the employees of the park and the Department of Recreation and Tourism Development of the Skole District State Administration developed and marketed six ecological-educational trails (short routes, one-day routes created for the purpose of environmental education of the population) and two ecological-educational routes (much longer than trails, designed for two or more days), one bicycle route and three motor routes.

4. Results

One of the most interesting and popular routes in the territory of the national park "Skole Beskids" is the ecological-educational route "Skole – Parashka – Maidan" (http://skole.org.ua/skole-majdan.html). The section of this route from the city of Skole to Parashka, characterized by considerable landscape variety, deserves particular attention. We selected it for the development of the landscape educational trail "On Mount Parashka". Traditionally, the ecological-educational trails appear on topographic maps and satellite maps, and descriptions of ecological- educational routes contain only information about the course of the route, its orientation, the elements of relief and objects of human activity, which is not sufficient for education about nature. Based on our field surveys, a landscape map was prepared, showing the trail with points of interest and a legend containing characteristics of the landscape complexes, as well as a table listing the points of interest. The landscape map, prepared on a topographic basis, shows the boundaries of the landscape complexes and their properties, which facilitates navigation and reveals the features of the relief and hydrographic grid (Fig. 2). The landscape map, based on satellite imaging, in addition to the spatial arrangement of the NTC, provides an idea of the vegetation and the nature of anthropogenic loads (Fig. 3). The table shows the abbreviated names of natural territorial complexes (landscape terrain, strias and tracts), including the stops and the names of the stops with their elevation above the sea level (Table 1).

Table 1. Landscape Educational Trail "On Mount Parashka"

Stop No.	Name of natural boundary*	Stop name	Height m a.s.l.
Landscape locality: the terraced bottom of the valleys of the Opir River Landscape strip: the surfaces of the low terraces are composed of loamy sandy-pebble alluvium			
1	Flat surface of the first terrace (39)	Railway station "Skole"	450
2	Flat surface of the second terrace (38)	Outflow of alluvial deposits	460
3	Flat surface of the second terrace (38)	Terrain boundary	470
Landscape locality: the steep slopes of erosion-denudation forest middle mountains Landscape stripe: the steep and very steep slopes composed of limestone sandstone thick-layer flysch			
4	Weathered crest of the ridge (25)	Linear erosion	490
5	Weathered crest of the ridge (25)	The boundary between facies and tracts	530
6	Weathered crest of the ridge (25)	Botanical object No. 1 (age-old fir)	590
7	Weathered crest of the ridge (25)	Botanical object No. 2 (birch)	650
8	Aligned area of the crest of the spine of the ridge (23a)	Botanical object No. 3 (exotic beech)	790
9	Weathered crest of the ridge (25)	Deadfall	810
10	Water reservoirs of the southeastern exposition (29)	Source	880
11	The area of the crest of the spine of the ridge is convex (23)	Inspection point No. 1	920
Landscape stria: the steep and very steep slopes and crest of the spine of the ridges, composed of limestone sandstone-clay-marl thin-rhythmic flysch			
12	The comb of a steep crest of the ridge (15)	Inspection point No. 2	1030
13	Water reservoirs of the eastern exposition (20)	Inspection point No. 3	1120
Landscape stripe: ridges of ridges, drainage funnels and steep and very steep slopes of crests of ridges are composed of limestone sandstone coarse-rhythmic flysch			
14	Domed peak (1)	Inspection point No. 4 / m. Obroslyi Verkh	1177
15	Domed peak (1)	Inspection point No. 5 / m. Zelena	1217
16	Domed peak (1)	Inspection point No. 6 / m. Tymkin Verkh	1227
17	Domed peak (1)	Inspection point No. 7 / m. Parashka	1268

* Abbreviated names of landscape complexes are given (full of names in the legend to the landscape editing map (Fig. 2).

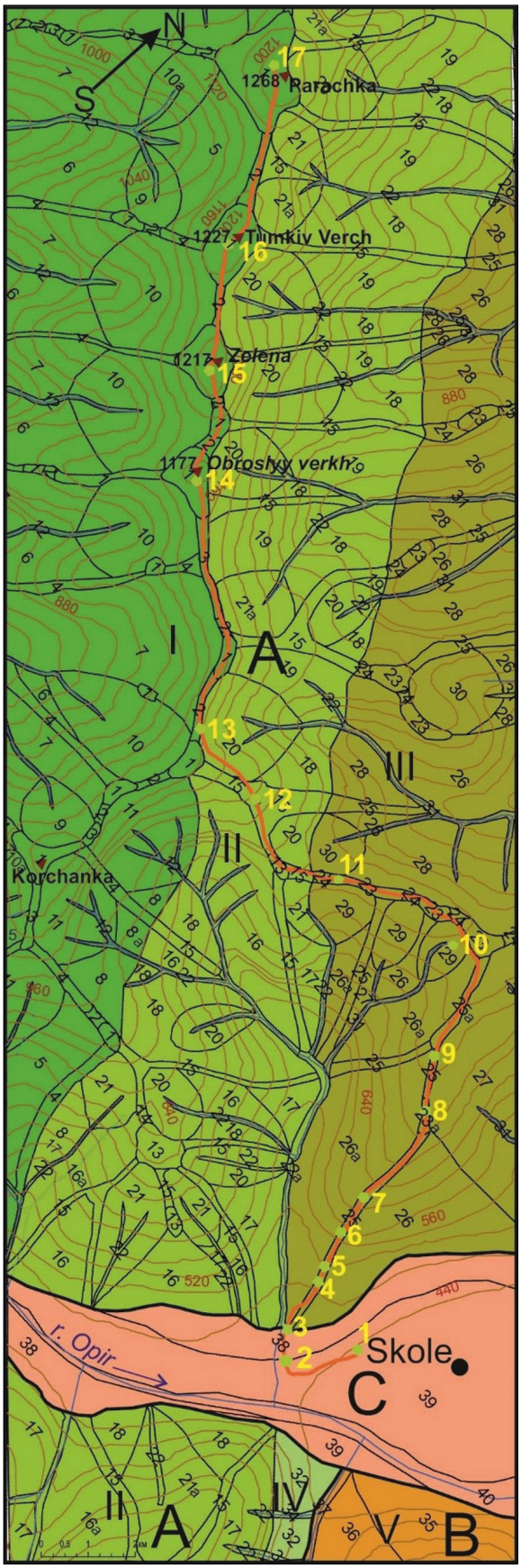

Figure 2. Landscape educational map of the educational parachute landing ground on a topographic basis

Legend: A. Altitude: Steep slope erosion and denudation; moderately cold to cold (January - 8.5°C; July +13°C), moist (900-1200 mm) medium-height forest with oaks, beeches, firs and spruce trees on brown mountain forest soils.

Stria I: crests of ridges, drainage basins and slopes composed of limestone, sandstone, thick-layer flysch on damp sites covered by spruce and sycamore forests on light-brown mountain forest soils.

Natural boundaries: 1 Dome-shaped tops with secondary black-billed bilberry and white bows on sod-brown soils. 2. Saddles with secondary buckwheat and whitewoods on sod-brown soils. 3 Steep convex parts of ridges with secondary black-billed bilberry, white bow and buckwheat meadows on sod and brown soils. 4 Combs of steep ridges of the southwestern exposition with moist ferns of spruce-fir forest on brown mountain forest soils. 5. Steep, weakly demarcated slopes of the southwestern exposition with wet gabled spruce-fir forest on light brown mountain forest soils. 6. **Steep** weakly separated slopes of the northwestern exposition with wet blueberries and spruce forest on dark brown mountain forest soils. 7. Steep slopes of the southeastern exposition of spruce-fir forest with moist ferns on brown mountain forest soils. 8. Steep slopes of the southern exposition with moist mixed beech-spruce forest on brown mountain forest soils. 8a Steep slopes of the northern exposition with ferns of spruce-fir forest on brown mountain forest soils. 9. **Water reservoirs** of the northwestern exposition with wet blueberries and luscious forest on dark-brown mountain forest soils. 10. Water reservoirs of the southwestern exposition with wet blueberries spruce forest on brown mountain forest soils. 10a Water **reservoirs** of the eastern exposition with wet blue-and-lime spruce forest on brown mountain forest soils. 11. **Water reservoirs** of the eastern exposition with wet blueberries and spruce forest on brown mountain forest soils. 12. Narrow steep valleys (windmills) with wet grey alders and mixed beech-fir forest the fragmentary brown mountain forest soils.

Stria II: steep and very steep slopes and crests of ridges, composed of limestone sandstone-clay-marl, thin-layer flysch with damp sites covered by spruce-sycamore-beech forests on light-brown mountain forest soils.

Natural boundaries: 13. Peaks with secondary meadows, wet blueberries, and lime spruce forest on turf-brown-brown and dark-brown mountain forest soils. 14. Saddles of spruce, oak and beech with moist ferns on brown mountain forest soils. 15. Crests of steep ridge slopes with spruce, fir, and beech forests with moist ferns on brown mountain forest soils. 16. Steep slopes of the southern and southeastern expositions with moist ferns of spruce-fir-beech forests on brown mountain forest soils. 16a. Steep slopes of the southwestern exposition by the gabled beech spruce forests on brown mountain forest soils. 17. Steep slopes of the northeastern exposition with wet gabled beech-spruce

forests on brown mountain forest soils. 18. Steep slopes of the northwestern exposition of spruce-fir-beech forests with moist ferns on brown mountain forest soils. 19. Steep slopes of the southeastern exposition with wet gabled sycamore-beech forests on light brown mountain forest soils. 20. **Water reservoirs** of the northeastern and eastern expositions with spruce-oak-beech forests with moist ferns on the brown mountain forest soils. 21. Water reservoirs of the southeastern exposition with the wet gabled beech-spruce forests on brown mountain forest soils. 21a. Water reservoirs of the northwestern and northern expositions with wet gabled beech-spruce forests on brown mountain forest soils. 22. Narrow steep valleys (plinths) with wet grey alders and gabled beech-fir-spruce forests on fragmentary brown mountain forest soils. 22a. The bottom streams with the wet grey alders and gabled beech-fir-brooms on the brown mountain forest soils.

Stria III: Steep and very steep slopes composed of limestone sandstone coarse-rhythmic flysch with wet spruce forests and damp sycamore and beech forests on light-brown mountain forest soils.

Natural boundaries: 23. The peaks with secondary pike-and-biloba meadows and wet beech forests on the turf-brown-brown and brown mountain forest soils. 23a. The aligned parts of the crests of ridges with wet beech forests on brown mountain forest soils. 24. Saddles with secondary pike-and-biloba meadows and wet blueberries and spruce forests on the turf-brown-brown and dark-brown mountain forest soils. 25. Steep crests of ridges with moist ferns of spruce- beech and fir-beech forests on brown mountain forest soils. 25a. The strong-winged crests of ridges with damp spruce-fir-beech forests on brown mountain forest soils. 26. Steep slopes of the southeastern exposition with wet gabled sycamore sub-woods on light-brown mountain forest soils. 26a. Steep slopes of the southwest gabled sycamore-beech forests on light brown mountain forest soils. 27. Steep slopes of the eastern exposition with wet gabled sycamore-beech forests on the light brown mountain forest soils. 28. Steep slopes of the northeastern exposition with wet gabled sycamore-beech forests on light-brown mountain forest soils. 29. Water reservoirs of the southeastern exposition with wet gabled beech-spruce forests on dark brown mountain forest soils. 30. Water reservoirs of the northeastern exposition with spruce-oak-beech forests and moist ferns on brown mountain forest soils. 31. The narrow steep valleys (windmills) with the wet grey alders and fir-spruce forest on fragmentary brown mountain forest soils.

Stria IV: Steep and very steep slopes are composed of limestone sandstone-clay medium-layer flysch with damp spruce forests and damp sycamore-beech forests on light-brown mountain-forest mid-skeletal soils.

Natural boundaries: 32. Steep slopes of the northeastern exposition with spruce-fir-beech forests with moist ferns on brown mountain forest soils. 34. The narrow steep valleys (windmills) with wet grey alders and beech-fir-spruce forests on fragmentary brown mountain forest soils.

B. Altitude: Hilly erosive-denudative; cold (january - 6.6 ° C, july +15.2 ° C), wet (800-1000 mm) woodland lowland with sycamore, fir-spruce-beech and fir forests on brown mountain forest soils.

Stria V: Strong-flowing and steep slopes and crests of ridges, composed of a non-wavy, thin-layer argillite flysch with damp fir and beech-fir forest on brown mountain forest medium to high-class soils.

Natural boundaries: 35. Strong-fledged slopes of the northeastern exposition with the wet gabled-bellied alder shrubs on the light-brown mountain forest soils.

36. The strong-fading slopes of the western exposition with the damp alder and beech forest on light-brown mountain forest soils. 37. Bottom streams with wet alders and gabled beech and fir trees on the brown mountain forest soils.

C. Altitude: the terraced bottom of river valleys with moderate (January -4.4 ° C, July -17.9 ° C), raw (800-900 mm) climates, with the formations of grey alder and beech-fir-spruce forests on the brown mountain forest soils.

Stria VI: the surface of the low terraces is composed of loamy-sandy-pebble alluvium with raw grey alders and beech-fir-brooms on the brown mountain forest soils.

Natural boundaries: 38. The surfaces and ledges of the second terrace are composed of loamy-sandy-pebble alluvium with secondary meadows on sod-brown soils. 39. The surfaces of the first terrace are composed of sand-pebble alluvium with bows and raw grey alders on alluvial meadow soils (mostly built up). 40. Surfaces of the floodplain and river mouths, river beds of sandy-pebble alluvium with fragments of meadow vegetation and grey alders.

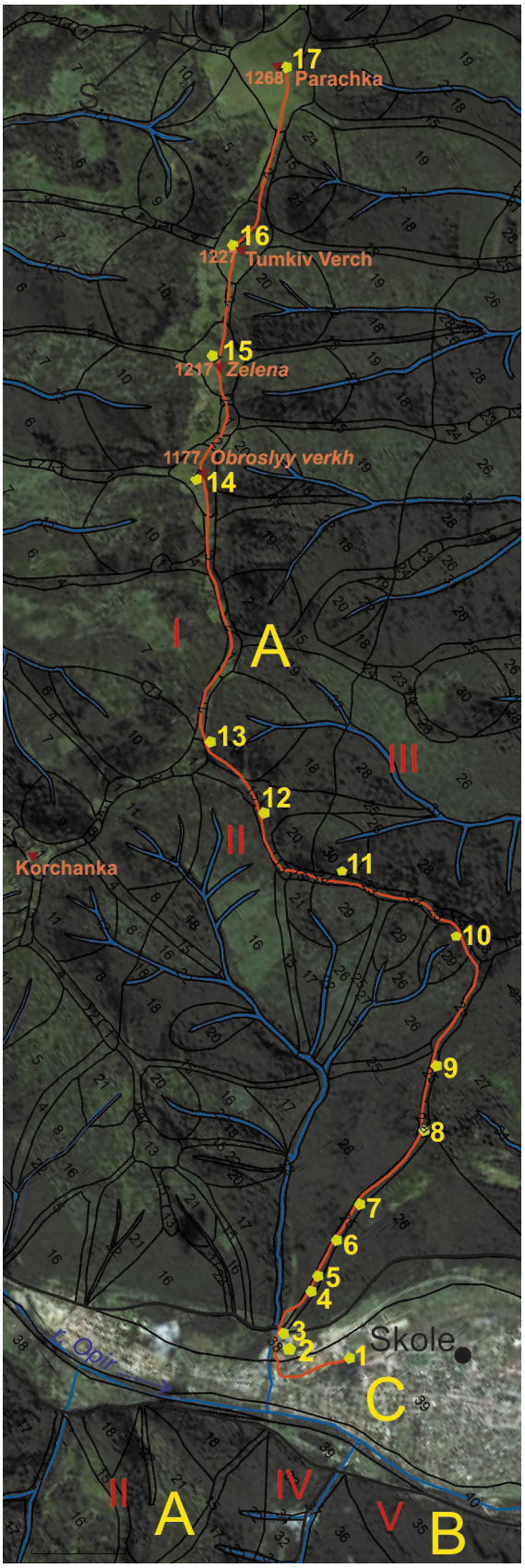

Figure 3. Landscape educational map of the educational parachute landing ground „Parashka," based on a satellite image (5x5 m, 2016)

The route is approx. 10 km long and takes 6-7 hours. It includes 17 stops where one can clearly see the interdependence between the natural components that cause the formation of various natural territorial complexes, boundaries of natural complexes, and factors that determine them. The causes of the occurrence and consequences of natural processes and phenomena, as well as unique natural components become evident. This also facilitate appreciating the attractivene perceptual qualities of the landscape complexes.

5. The main features of the landscape educational trail "On Mount Parashka"

The trail can be divided into four different landscapes, confined to different landscape terrains. It begins in Skole, in the area of the terraced bottom of the Opir River. The landscape line the low terraces is composed of loamy-sandy-pebble alluvium with raw soils and beech and fir trees on brown mountain forest soils. To familiarize with the landscape tracts of this stage, three stops are provided. The first stop, which is the starting point of the trail, gives an idea of the tract of the first terrace and its economic use (Fig. 4), the second – on the geolog-

Figure 4. Economic use of the tract of the first terrace (photo http://mapio.net/)

ical and geomorphological basis of the tract of the second terrace and its border with the tract of the first terrace (Fig. 5), the third – related to the economic use of the tract of the second terrace and the boundary between the landscape terraces of the shaded bottom of the Opir

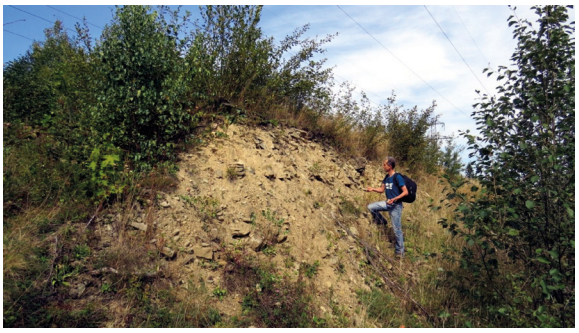

Figure 5. Outflow of loamy-sandy-pebble alluvium in the tract of the second terrace (photo by M. Lavruk)

Figure 6. Commercial use of the tract of the second terrace (photo by M. Lavruk)

River and the steep hills of the medium-height mountains (Fig. 6).

The outcrop of loamy-sand-pebble alluvium (stop 2) in the tract of the second terrace gives an idea of the powerful erosive-accumulative activity of the river Opir, which in fact caused the formation of the terraced bottom of the river, suitable for settlement and economic activity. In the above tracts, accumulative processes dominate, which, together with the flat relief, affect the processes of soil formation, and determine the vegetation. The area of the terraced bottom of the river has the character of an intercessional basin, due to the lithology of the rocks, so the microclimate is favorable for the growth of fruit crops. The anthropogenic load of this locality is mostly residential and transport-related.

The educational trail runs in the area of steep-eroded and denudated forested medium-height mountains, composed of three landscape streams and 37 kinds of landscape tracts (Fig. 2, 3 and Table 1). The second section of the route and the next eight stops (4–11) are confined to the landscape line of steep and very steep slopes of limestone, sandstone, and thick-layer flysch with wet spruce forest and wet sycamore and beech forest on light-brown mountain-forest low-class soils. Stop 4 is devoted to linear erosion, which intensively develops in tracts of steep slopes and steep ridges in places where paths were marked out (Fig. 7). At stop 5, attention should be paid to the clear boundary between the landscape tracts and facies (Fig. 8).

Figure 7. Linear erosion on a tourist path (photo by M. Lavruk)

Figure 8. The boundary between the tract of the steep crest of the ridge and the tract of the steep slope of the southeast exposition (photo by M. Lavruk)

Figure 9. An old fir tree (photo by M. Lavruk)

Figure 10. Birch forest (photo by M. Lavruk)

At stop 5 conclusions can be drawn about determining the influence on the formation

of natural territorial complexes of rocks and relief.

Stops 6 to 8 are associated with interesting botanical objects in the tract of the steep slope: a giant fir (*Picea abies*) about 200 years old and 2.5 meters in diameter (Fig. 9), not typical for the wooded middle hill of the Ukrainian Carpathians with birch forest (confined to a strip of massive thick-layer sandstone within the stria) (Fig. 10) and an exotic beech (its exotic character is also associated with the massive sandstones that provide generally poor conditions for vegetation) (Fig. 11).

Figure 11. Exotic Beech (photo by M. Lavruk)

At stop 9 it is possible to observe in the tract of the western windward slope drillroots in the secondary spruce forest, and in the tract of the leeward slope of the eastern exposition indigenous virgin fir-beech forests (Fig. 12). The vulnerability of the forest on the windward slopes is due not only to the circulation of air, but also due to anthropogenic change in the species composition of the forest: monodominant spruce forests are planted instead of mixed fir-beech forests.

Stop 10 is confined to the only spring along the route of the Parashka, in the tract of the drainage funnel of the southwestern exposition (Fig. 13), and stop 11 – to the glade in the tract of the ridge crest. This is the first point of interest on the route from which the city of Parashka is visible (Fig. 14).

The route between the 4th and 11th stops passes through the tracts covered by forest, and throughout its entire length observers can appreciate the attractiveness of natural forest complexes. Perception, as a complex active cognitive process, consists in perceiving space by sensory organs and forming sensory impressions, reception of signals, which together build the experience of landscape complexes.

When perceiving a forest landscape complex (facies or tracts), people estimate it primarily because of the complexity and mystery of its image. Together, these features determine the assessment of the attractiveness of the landscape (Grodzynska, 2013). The forest tracts of the Parashka landscape, can be attributed to the complex, to the extent they have meadows, the average density of standing trees, the spread of trees of various shape, color, and height. The streaks are characterized by good illumination, a rich palette of colors, a play of light-colored, and characteristic scents of fallen leaf. The mysterious forest tract features winding trails, a mosaic background which consists of roots of trees, rock debris, leaf and coniferous fallout, also the age-old beeches with bizarre forms and twisted roots.

Figure 12. Deadfall (photo by M. Lavruk)

Figure 13. Source in the drainage funnel tract (photo by M. Lavruk)

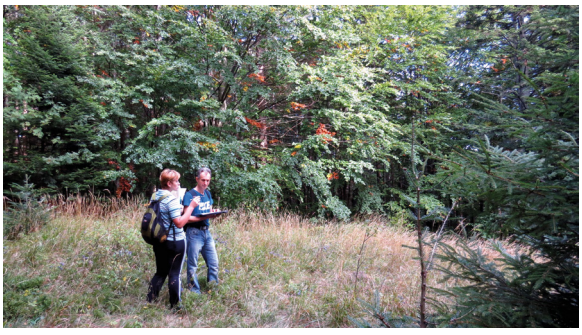

Figure 14. Gland in the tract of the convex part of the crest of the spine of the ridge (photo by M. Lavruk)

Figure 15. Lawn in the tract of the crest of the steep spit of the spine (photo by M. Lavruk)

Figure 16. View of the northeastern macro-landscape of the landscape microdistrict Parashka (photo by M. Lavruk)

In the third section, the route goes through a landscape of steep and very steep slopes and steep ridges, composed of limestone sandstone-clay-marl thin-layer flysch with damp spruce forest and damp sycamore and beech forest, and light brown mountain-forest growing on high-class soils. At stop 12, which is a point of reference on the secondary meadow, a view of the lower located tracts (Fig. 15).

Figure 17. Mountain Obroslyi Verkh (photo by M. Lavruk)

Figure 18. Mountain Zelena (photo by O. Burianyk)

Stop 13 is located within the limits of the secondary valleys in the spine part of Mount Parashka in the tract of the drainage basin of the eastern exposition. It has a significant visual potential: from this open space one can observe the landscape structure of the northeastern macro slope of the Parashka landscape micro-district (Fig. 16).

In the perceptual plan at stop 13 there are new opportunities for aesthetic assessment of the landscape: four planes open up to the horizon, the first of which is dominated by bilberries, with individual fir trees. The second, third and fourth – loose ridges, covered mostly by beech forest, and on the horizon there are barely noticeable contours of the city of Stryi. At this stop, and at the other stops to the end of the route up to the peak of Parashka, observers are struck by the aesthetic harmony of the mountain landscape.

Figure 19. Mountain Timkin Verkh (photo https://mnogomest.info)

Figure 20. Mountain Parashka (photo https://www.google.com.ua/imgres)

The fourth section of the route is connected with the crest of the ridge of Parashka, the catchment lines and steep slopes of the ridge composed of limestone sandstone thick-layer

flysch with damp spruce forests and damp sycamore and beech forest on light brown mountain-forest low-class soils. From stops 14-17, which are observation points (Fig. 17, 18, 19 and 20) associated with the tracts of dome-shaped vertices, in particular, with the facies of the convex surfaces of the peaks, one can observe not only the stretching landscape of the steep hills of forest-covered medium-height mountains, but also the area of the terraced bottoms of the valleys of Opir and Stryi, as well as neighboring landscaped micro-districts bordered by the landscape neighborhood of Parashka – Velikokeverk, Zelemyansky, Dobzhansky and others.

6. Summary

Education about nature should be based on a holistic understanding of the earth's surface, which is associated with a landscape approach. Landscape studies aimed at understanding the interaction between its various components – rocks, relief, climate, water, vegetation, animals, and soils, and ending with the making of landscape maps, which show the natural territorial complexes of various ranks with a detailed description of their components in the legends of maps are essential for the organization of education on nature in the national parks.

The information offered by educational landscape trails is more complete and comprehensive than on environmental paths. It provides a holistic view of nature on the earth's surface and its spatial differentiation, providing school students with possibilities of forming key subject competences in geography, including professional competences for university students of geography. The general public may enjoy comprehensive landscape perception of the environment, which helps promote the landscape-based approach to the goals of sustainable development.

The landscape-educational trail gives an idea of the specific natural territorial complexes of the landscape structure of the territory and its landscape diversity in general on the one hand, and on the properties of all components (rocks and relief, surface waters, atmospheric air, vegetation, fauna and soils) on the other. In addition, it allows analyzing the processes occurring in the landscape and assessing the current state of natural territorial complexes.

An instrument of natural landscape editing is the educational landscape map. It is created on the basis of field landscaping studies using satellite imaging and modern geoinformation technologies, and it includes the legend with a description of the routes and the educational points of interest.

The proposed landscaping trail to Mount Parashka within the national park "Skole Beskids" provides an opportunity to get a detailed overview of the landscape diversity of the Parashka landscape, which, according to the legend of the landscape-educational trail, is represented by a number of landscape complexes of various ranks – two types of high-altitude terrain, four types of strias and forty kinds of tracts.

Following the route, and at the 17 proposed stops, one can see and understand first-hand the various pockets of landscape, the boundaries between them, their structure (the components that form them) and properties, some unique and valuable objects – outcroppings of rocks, springs, plants, etc., geographical processes (manifestations of linear erosion, wind-felled trees, and others), the types and consequences of human economic activities in landscape complexes, to feel and experience the esthetic impressions from the perception of a harmonious natural landscape.

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