



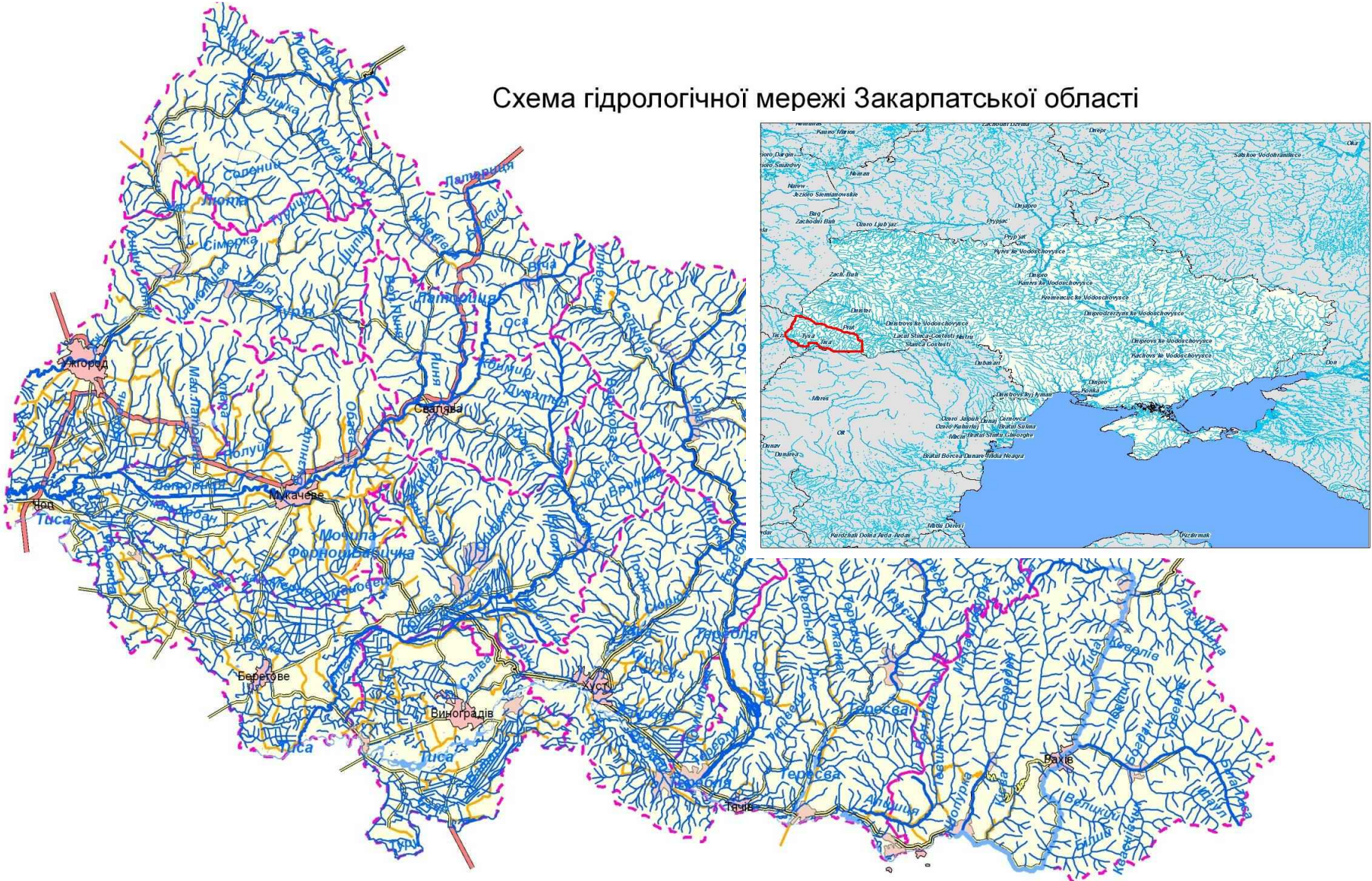
Transcarpathian Swamplands and Fluvial Concept of the Regional Environmental Protection

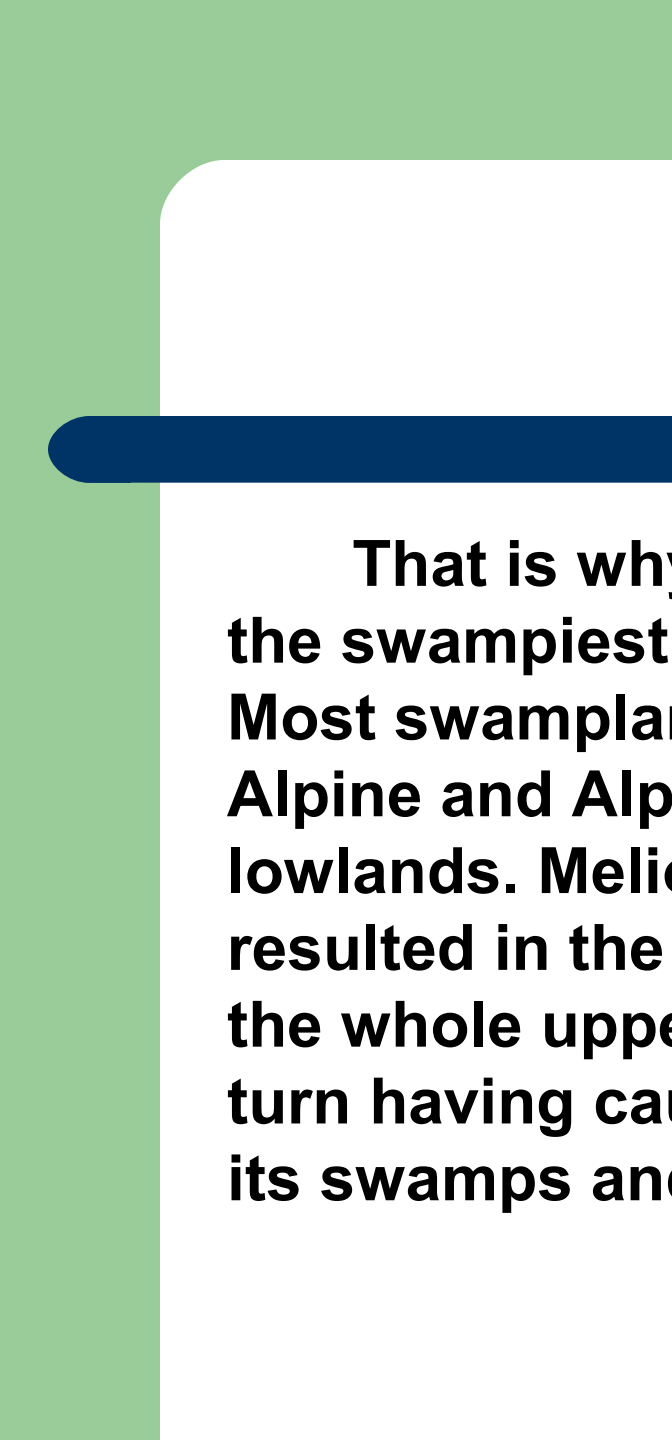
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It is within Transcarpathia that 62% of the Tysa river's flow is formed, with the average river density of 1.7 km/km² (cf. the average river density in Ukraine – approx. 0.3 – 0.5 km/km²).

Схема гідрологічної мережі Закарпатської області

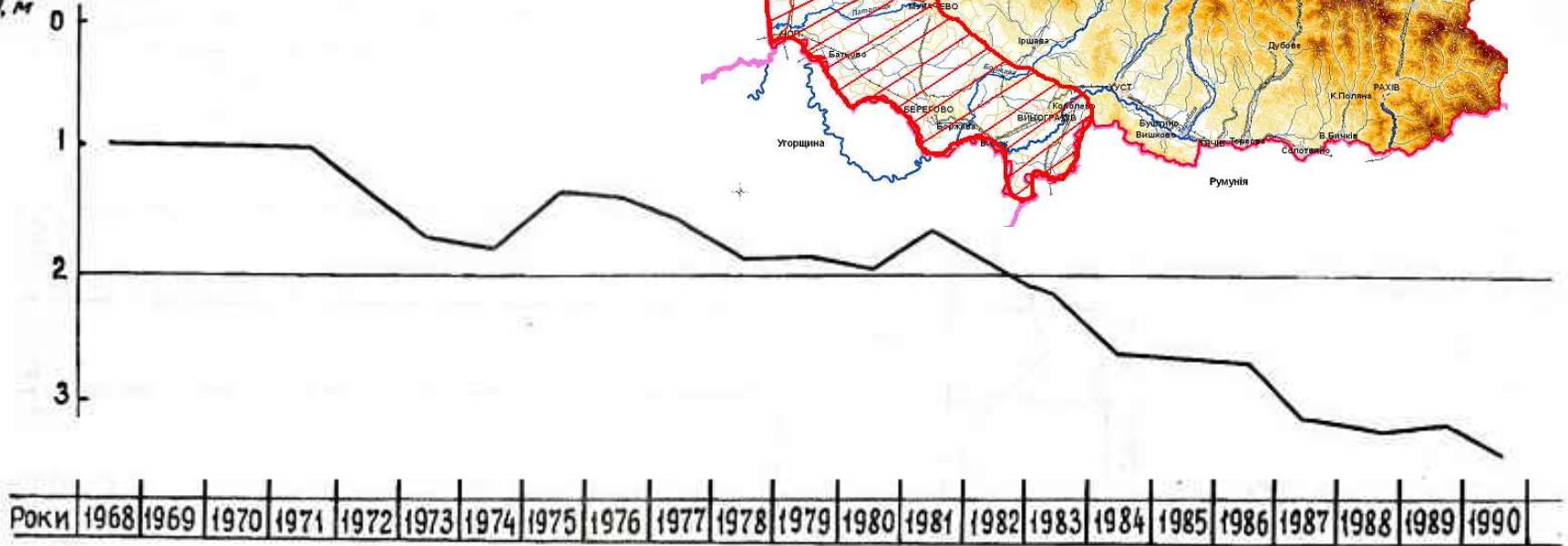




That is why, in the past it used to be one of the swampiest parts of the Ukrainian Carpathians. Most swamplands would be found in the sub-Alpine and Alpine layers, and, naturally, in the lowlands. Melioration and deforestation have resulted in the breakage of the aquatic balance of the whole upper Tisa basin ecosystem, that in its turn having caused disappearance of a number of its swamps and depaupering its floristic diversity.

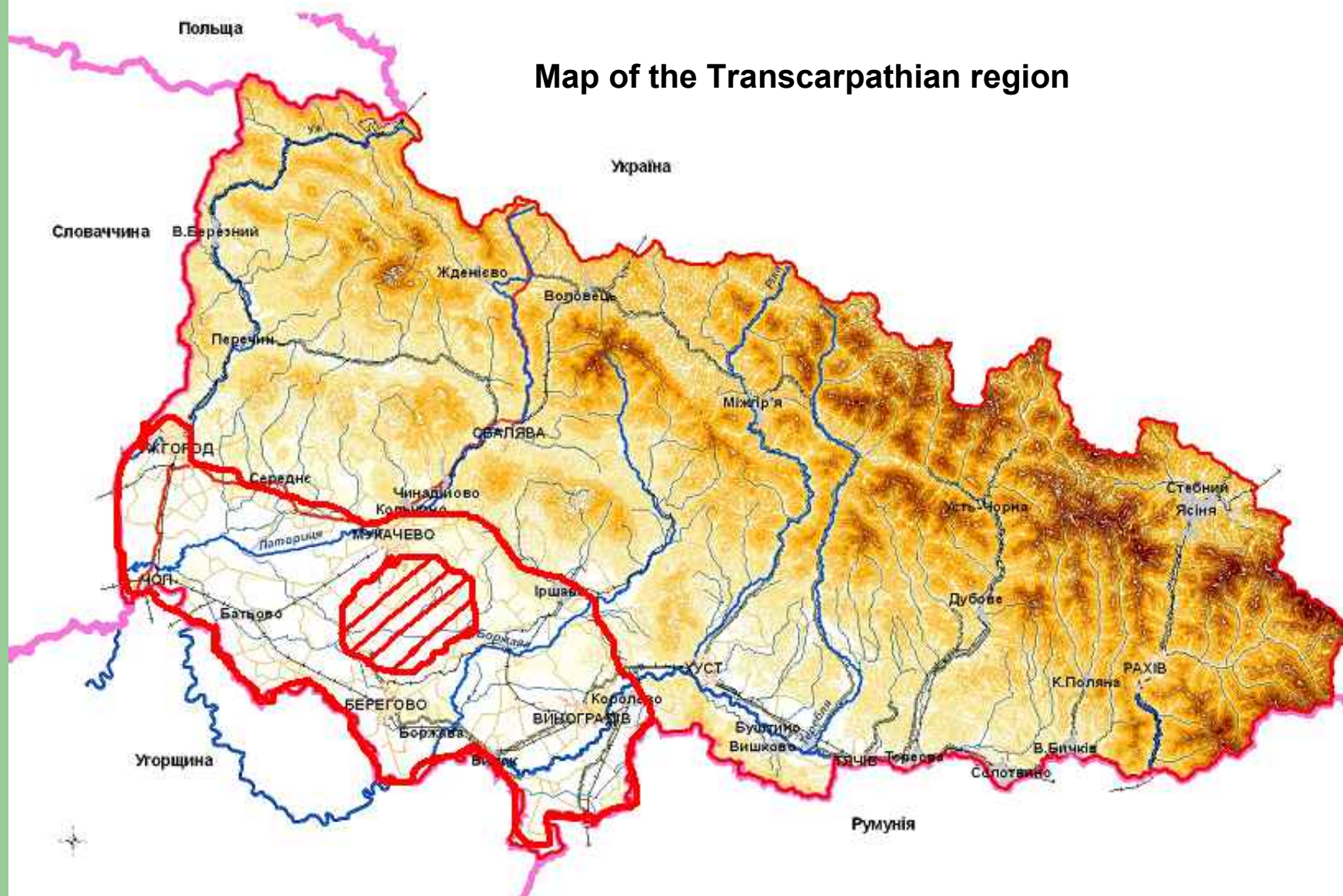
Map of the Transcarpathian region

Рівень ґрунтових вод, м



Subterranean waters level changes in the Transcarpathian lowland, 1968 – 1990

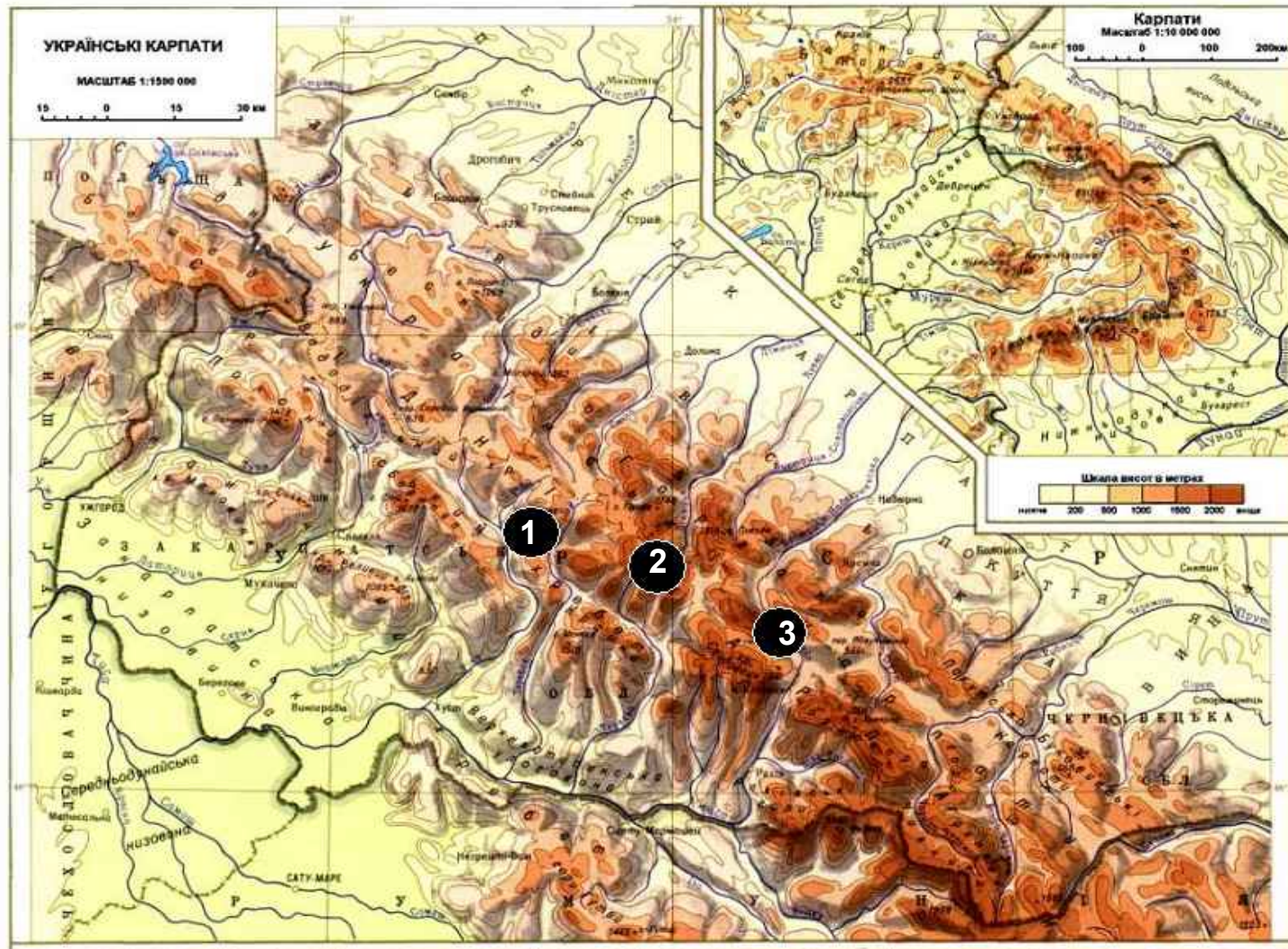
Map of the Transcarpathian region



The Chorny Mochar swampland in the Transcarpathian lowland in the past (16000 ha).

The list of the plant species referred to in the literature as growing in the Transcarpathian lowland, but not registered there minimum for 50 years (Boros 1926; Margittaj 1934; Simon 1954; Fodor 1974):

Trichophorum alpinum, Drosera rotundifolia, Parnassia palustris, Pinquicula vulgaris, Polygonum bistorta, Eriophorum vaginatum, Oxycoccus microcarpus, O. palustris, Comarum palustre, Rhynchospora alba, Menyanthes trifoliata, Hydrocotyle vulgaris, Calluna vulgaris, Ludwigia palustris, Buschia lateriflora (Ranunculus lateriflors), Typha shuttleworthii, Scirpus triqueter, Schoenus ferrugineus.



Location of the oligotrophic swamps in Transcarpathia

1 – Bagno (The Vulkan Carpathian, 854 m). 2.- Hluchanja (The Gorgany, 650 m). 3. – Chorne Bagno (The Gorgany, 720 m).

When comparing the floristic and geobotanic data of our research with those obtained approx. 50 years ago, we have observed the following phenomena: 1) divergence of the plant communities of all the swamps under review (domination of *Eriophorum vaginatum*, *Sphagnum capillifolium*); 2) destruction of the specific diversity of the bryoflora of oligotrophic bog mosses and appearance of mesotrophic ones, and depauperation of the flora of angiosperms (higher plants); 3) spread of meadow species (*Molinia caerulea*, *Nardus stricta*, *Poa pratensis*), and of mire species of broad ecological amplitude (*Juncus effusus*, *J. conglomeratus*); 4) invasion of ligneous species with broad ecological amplitude, in particular, *Betula pubescens*, *Picea abies* and *Salix cinerea* ; 5) reduction of the coenotic role of oligotrophic species and increase of that of mesotrophic species; 6) insularisation and fragmentation of the vegetation cover (for the oligotrophic plants grow only in separate fragments between the brushes of *Molinia caerulea*).



Photo of Felbaba-Klushyna, 2006



Bahno: since 2000, the following species have not been observed: *Sphagnum fuscum*.



Photo of Felbaba-Klushyna, 2006

Hlukhania swamp: since 2000, not found: *Sphagnum fuscum*, *S. rubellum*, *Lycopodiella inundata*. *Carex pauciflora* has moved from the dominant into a rare species.



Photo of Felbaba-Klushyna, 2006

**Chorne Bahno: since
the end of the 1980's,
not found: *Ledum
palustre*.**



Photo of Felbaba-Klushyna, 2006



Photo of Felbaba-Klushyna, 2006

Mesotrophic swamps of the Chornohora mountain range.

The most widely spread association in the sub-Alpine and Alpine layers is *Caricetum rostratae* Rubel 1912, of sub-association *Sphagnetosum riparii*.

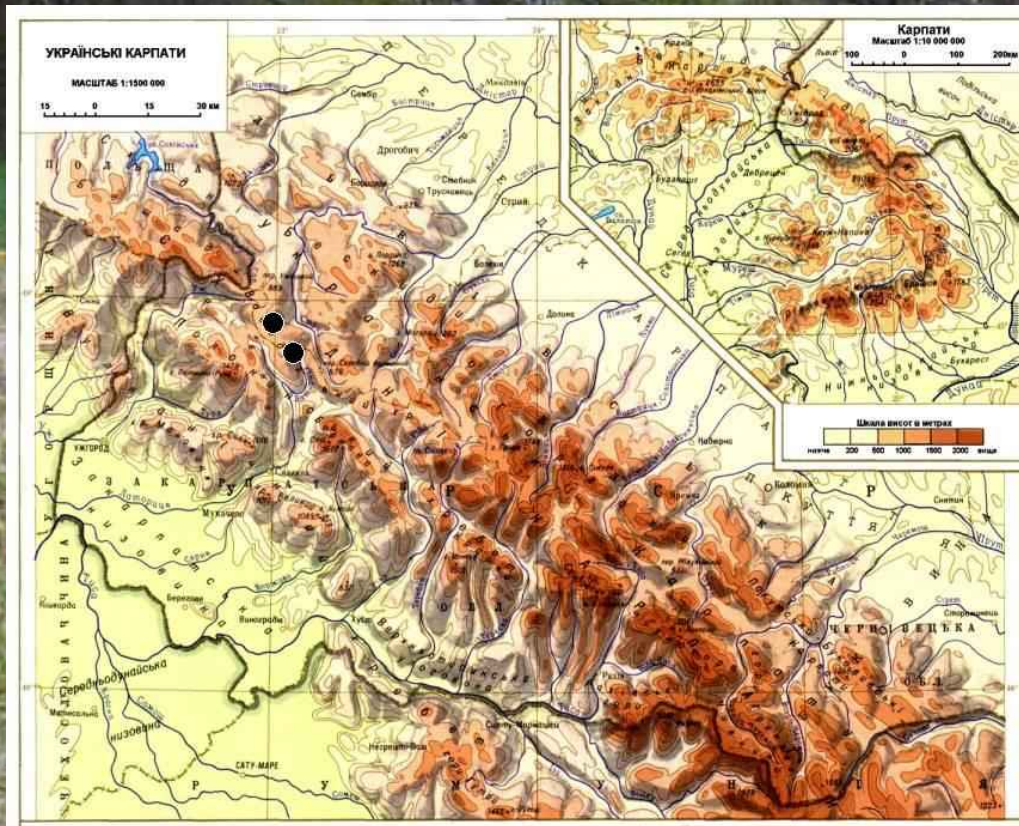


Photo of Felbaba-Klushyna, 2007

The carbonate swamps with *Carex davalliana*

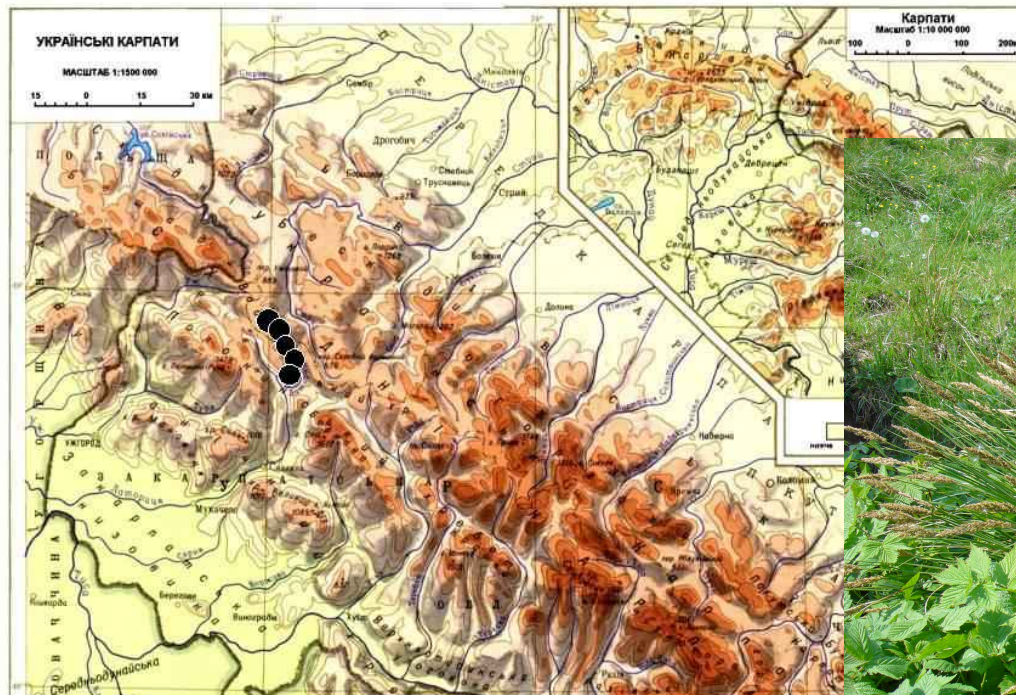


Photo of Felbaba Klushyna, 2009



Photo of Felbaba Klushyna, 2009

**The carbonate
swamps with *Carex
paniculata***

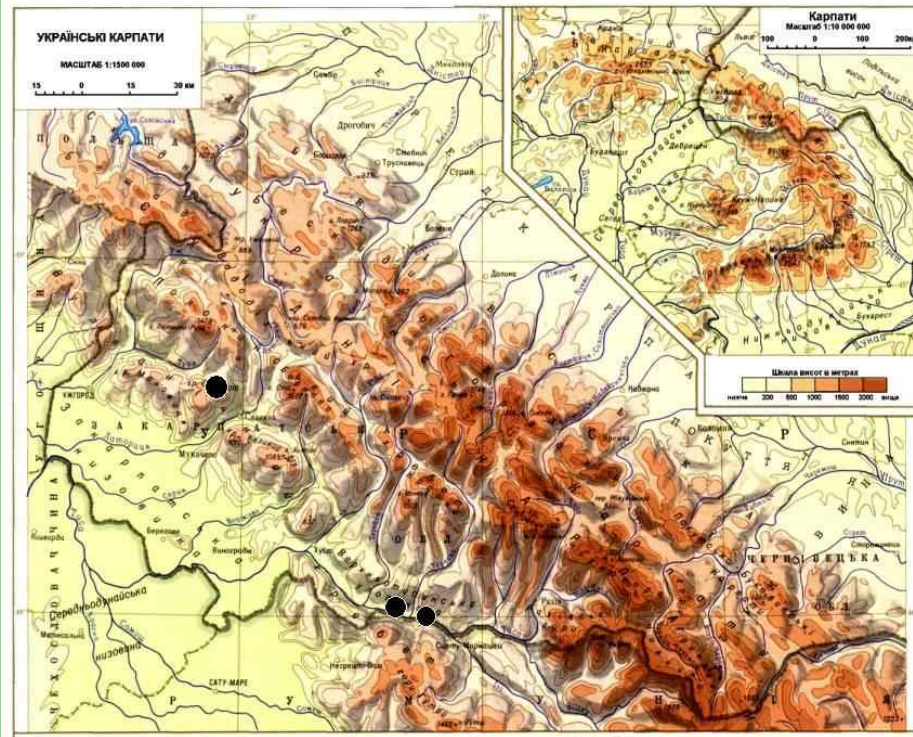
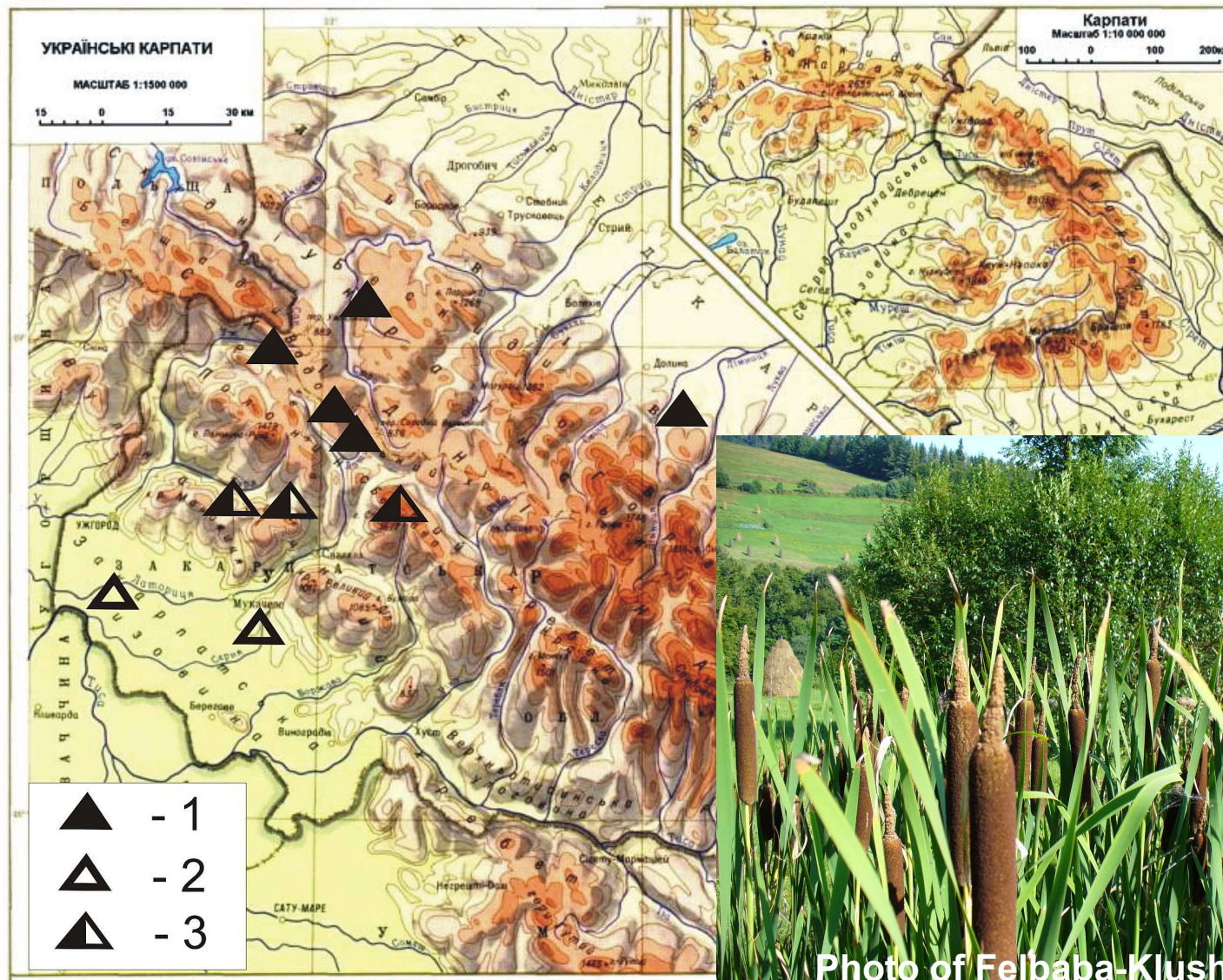


Photo of Felbaba-Klushyna, 2005

The swamps with *Carex distans*



Distribution of *Typha Suttleworthii* within the Ukrainian Carpathians (1- existing, 2- extinct, 3- failed to be confirmed)

How are the Transcarpathian swamplands protected?

Oligotrophic Swamps

In the last quarter of the 20th century, protection of all the three major oligotrophic swamps began: of *Hlukhania* – in 1980, of *Bahno* – in 1975, and of *Chorne Bahno* – in 1990. However, the established environmental regime has failed to be duly adherent to, so the swamps' vegetation has been degrading.



Mesotrophic Swamps

The biggest area-wise mesotrophic swamps found in the *Gorgany*, are located in the National Natural Park *Synevyr*, while the swamplands of the sub-Alpine and Alpine layers, particularly those of the *Chornohora* and *Svydovets*, are located in the Carpathian Biosphere Reserve. Successive changes of these groupings are more affected by geological phenomena taking place at the mountain slopes than by the anthropogenic factor.


Eutrophic swamps

Until recently, there functioned only one hydrological preserve, *Tovar*, encompassing the following three water- and swamplands: *Tovar*, *Mits* and *Stav*, with the area of 145 hectares. The preserve is located in the lower course of the Borzhava river, in the lowland.

We have suggested to found a network of botanical preserves with the purpose of protection of the Transcarpathian rarest swamplands with domination of *Carex davalliana* (2) and *Carex paniculata* (4).



The local protection level provides for the protection of the swamp ecosystem against direct impacts able to upset the natural process of phytocoenotic development (ploughing-up, drainage, or burning-out of the tall herbage). Though, due to the swamplands' small area and big distances between one another, it is very hard to organize their protection. That is why, a regional approach is required here to provide for reproduction of all types of the regional vegetation, including of the swamplands, and, what is most important, for the regeneration of the processes of swamping.

A light green L-shaped graphic element is positioned in the top-left corner of the slide. A dark blue horizontal bar with rounded ends spans across the upper middle section of the slide.

We offer the fluvial concept of protection of the highlands' nature that provides for the rehabilitation of the upper courses of major rivers as the most hydrologically important part of their basins.

The main provisions of the fluvial concept of the Transcarpathian nature protection are as follows:

1. The basin of each medium-size (by its basin area) Tisa's tributary (the Uzh, Latoritsa, Rika, Borzava, Tereblya) must be afforested no less than by 70%. Such an area of the forestlands within the river basins would provide for the fulfillment of water-regulating and water-protection functions of the mountainous forests (Pasternak 1972, 1980, Oliynyk 2008).

The main provisions of the fluvial concept of the Transcarpathian nature protection are as follows:

2. As far as young forests cannot fully fulfill the water-regulating function, it is necessary to have the basins of every mountain river covered with middle-age and mature forests.

3. The Watershed Ridge where all the Tysa's tributaries have their heads will have to obtain the status of a nature conservation zone. Currently, the only protected areas remain the riverheads of the Uzh (the National Nature Park *Uzhansky*), the Tereblia (the National Natural Park *Synevyr*), and the Black and White Tysas (the Carpathian Biosphere Reserve). The riverheads of Latoritsa, Rica and Borzhava are not protected.

The main provisions of the fluvial concept of the Transcarpathian nature protection are as follows:

4. The accumulation function of the landscapes of the Transcarpathian lowland has been to a great extent lost due to the degradation of the floodable holm complexes. As the Slovak scholars (DAPHNE) have already proved by an example of the Morava holm, it is economically more beneficial to renew the natural functions of the river holms if compared to traditional management. Therefore, following the system of melioration canals, it will become necessary to renew the vegetation of the floodable holms, viz.:

a) to partially renew the *Chorny Mochar* swampland that used to be a mighty regulator of the level of subterranean waters of the whole Transcarpathian lowland;

b) in the lower courses of the Borzhava, Latorytsia and Tysa itself, to found the landscape re-naturalization zones with the aim of renewal of the holm complexes. The first step towards this would be opening of the Regional Landscape Park *Prytysiansky*.

c) to do artificial afforestation with the use of fast-growing trees – *Populus tremula*, *Populus nigra*, that will accelerate the process of restoration of the biotic medium, at the pastures with highly degraded vegetation and soils;

d) to protect and try to increase the afforested areas in the Transcarpathian lowland.

e) to realize the idea of formation of transborder system of Ramsar sites (400 km long), which was proposed by the group of scientists from Ukraine, Slovakia, Hungary, and Romania, and expounded in monography “The Upper Tisa Valley”(Szeged, 1999).

The main provisions of the fluvial concept of the Transcarpathian nature protection are as follows:

5. Taking into account:

- that the administrative boundaries of Zakarpatska Oblast coincide with the natural boundaries of the natural landscape complex 'mountains/lowlands' that tentatively may be considered an exclusive and closed ecosystem of the Tysa basin;
- presence of the upper course of the catchment area of the Tisa, the Danube's main tributary, and of very significant high-quality water resources in its territory;
- presence of the ancient forestland ecosystems, considered the key ones in Europe, in its territory;
- a high level of biodiversity;
- significant deposits of recreation resources, including the most valuable ones – balneological, i.e. mineral waters (625 mineral springs!);
- the geographical (Europe's geographical centre) and geopolitical (trans-border) location of Transcarpathia.

Zakarpatska Oblast as an ecological donor has to be awarded a special status of the Territory of Special Ecological Regime to benefit from special investment advantages. In the prospect, the territory with the special status would have to include the Slovak, Romanian and partially Hungarian parts of the Tysa's upper course.

A photograph of a person standing in a lush green field with a dense forest in the background. The person is wearing a blue jacket, an orange shirt, light-colored pants, and a black bandana with white polka dots. They are holding a small object in their right hand and a piece of paper in their left. Overlaid on the image is a large, bold, blue text message.

**Dear ladies and gentlemen,
esteemed colleagues, thank you for
your kind attention, and welcome to
Transcarpathia!**