

NATURE-BASED SUBURBAN LEISURE OPPORTUNITIES WITHIN THE ORADEA METROPOLITAN AREA

Corina-Florina TĂTAR*

University of Oradea, Department of Geography, Tourism and Teritorial Planning,
University St., 410087, Oradea, Romania, e-mail: corina_criste_78@yahoo.com

Ribana LINC

University of Oradea, Department of Geography, Tourism and Teritorial Planning,
University St., 410087, Oradea, Romania e-mail: ribanalinc@yahoo.com

Iulian DINCĂ

University of Oradea, Department of Geography, Tourism and Teritorial Planning,
University St., 410087, Oradea, Romania, e-mail: iulian_dinca@yahoo.co.uk

Marius I. STUPARIU

University of Oradea, Department of Geography, Tourism and Teritorial Planning,
University St., 410087, Oradea, Romania e-mail: marius_stupariu@yahoo.co.uk

Liviu BUCUR

University of Oradea, Department of Geography, Tourism and Teritorial Planning,
University St., 410087, Oradea, Romania, e-mail: liviu Bucur@yahoo.com

Marcu Simion STAȘAC

University of Oradea, Department of Geography, Tourism and Teritorial Planning,
University St., 410087, Oradea, Romania, e-mail: marcu_stasac@yahoo.com

Stelian NISTOR

University of Oradea, Department of Geography, Tourism and Teritorial Planning,
University St., 410087, Oradea, Romania e-mail: snistor@uoradea.ro

Abstract: Over the past 15 years, the periurban area in the proximity of Oradea has been accredited as a place of great attraction for the urbanites eager to move to the countryside, taking advantage of the natural resources, numerically generous and possessing an ecological quality. On such a background, these urbanites or tourists have come into contact and continue to discover these natural resources from the point of view of their new qualities, namely people motivated to do thematic tourism. This study seeks to know in detail the potential of the 11 communes and their related villages in the Oradea Metropolitan Area (OMA) and what they provide for weekend-type activities or forms of tourism based on discovery and leisure. The researched area has various natural resources, but diversity is configured according to the environment and morpho-hydrography specific for the hilly, plain and hilly-plain contact area relief. The inventory of local resources (8 categories) prone to nature-based tourism is dominated by protected areas, rivers and lakes for fishing, deciduous forests and associated hay fields as well as the hilly relief in the eastern part of the area. The

* Corresponding Author

expression of the attractiveness of local nature for leisure tourism is given by the attractiveness index, which at the OMA level is 87.47 points, with an encouraging maximum of 11.67 points (out of a maximum of 25 points). The detail of the distribution and the natural resources attraction weight can be found in the four thematic maps.

Key words: nature, natural resources, attractiveness, leisure activities, rural, Oradea Metropolitan Area

* * * * *

INTRODUCTION

Green spaces can play a vital role for providing leisure opportunities of urban population and trigger environmental, social and economic benefits (Papageorgiou and Gemenetzi, 2018). Tourism can capitalize these benefits in favor of the local communities from the neighboring localities surrounding big cities as well as in the favor of urban tourists who need to escape the agitation and pollution of big cities. Metropolitan areas turned out to be drivers for the development of rural tourism, agritourism, food tourism and nature tourism (Sznajder, 2017).

This research paper aim is to settle a current inventory of the natural resources of the Oradea metropolitan belt and make an assessment of these resources so as to highlight which of the communes of the Oradea Metropolitan Area (OMA) has a higher potential for nature-based tourism. Along with an over agglomeration in the city people need the urge to search for leisure in nature and the suburbs provide such a comfort. Their related green spaces encourage social interaction, stimulate people to practice sports and thus enhance the population public health and fitness (Zaręba et al., 2016). Metropolitan areas are veritable repositories of biodiversity and meanwhile a place for leisure and relaxation with a high socioecological function (Junior and Santos, 2017). Along with urbanisation the quality of life has decreased therefore many urban residents move to nearby rural areas to enhance their quality of life (Holderna-Mielcarek, 2017), nonetheless the more mobile residents become the higher the traffic congestion (Ewing et al., 2018).

The main motivations of a tourist who chooses nature-tourism should be: the return to nature, active rest, air and fruit cure, the consumption of fresh food from hosts' homes, sports, fishing and hiking. However, sometimes there are impediments that trigger potential tourists not to choose a particular tourist destination.

Many western countries witnessed in the '60s a widespread outward expansion with new settlements emerging in the suburbs (Cheng et al., 2017) which were later on integrated as metropolitan areas. A regional economic development is targeted through the merging of nearby neighboring rural areas to the cities, which are no longer treated distinctively, but in the light of a territorial cohesion (Tarta et al., 2007), some of these surrounding communes converting later on from a monocentric to polycentric functions (Huang et al., 2017).

Oradea City from the western part of Romania was set up as the Oradea Metropolitan Association on the 9th of May 2005 whose main objective was the economic development of the metropolitan area and its specific aim the alignment of the Oradea Metropolitan Area to the Euro-Atlantic economic and social standards in accordance with the national ones.¹ The Oradea Metropolitan area currently includes 11 communes, but initially it only included eight communes, i.e. Biharia, Borș, Cetariu, Nojorid, Oșorhei, Paleu, Sîntandrei and Sînmartin to which Girișu de Criș added up in 2007; Toboliu added up in 2008 and in 2010 Ineu commune was intergrated too (Ilieș et al., 2013; Stașac and Bucur, 2010). All the communes feature good premises for a nature-based and villegiatura tourism (Dincă, 2009).

From June 2nd 2010 the Oradea Metropolitan Area counts 12 members, of which 11 rural localities along with the municipality of Oradea city too. Its stated aim is to stimulate and support

¹ www.zmo.ro

the growth and prosperity of the area, enhance the wellbeing of its citizens and the quality of life in general (Strategia de Dezvoltare a Zonei Metropolitane Oradea, 2015). The current paper is exclusively related to the rural area of OMA and its natural tourist resources supply.

The Oradea Metropolitan Area has been inhabited for a long time, namely the 11th century, the thermal waters of Sanmartin being mentioned in documents since 1214-1215 and Ineu commune even earlier in the year 1014.

MATERIALS AND METHODS

The research consisted of a natural resources territorial survey within the radius of the 11 communes of the rural Oradea Metropolitan Area, the research team approaching more than 34 tourist sites, *de visu* and *in situ* from which photos were taken as well as an assessment of their status was conceived. The raw data were processed through the ArcGIS program which allowed the natural resources mapping, thus generating more theme maps such as the attractiveness index of the natural potential of the OMA map, the time-distance map, a physical-geographical map, an original material meant to stimulate potential urbanites (overburdened by air pollution and agglomeration in the city) to undertake quality nature-based leisure time in the proximity of their residential area, as well as to stimulate short-distance leisure travel which implies lower travel costs. The nature-based resources included in the study are avens, forests, monuments of nature, natural reserves, leisure lakes as well as rivers and streams that cross the area. The authors included also in the natural resources' category the man-made lakes which got a leisure function across time given that their primary natural source which led to the development of leisure activities is water. The attractiveness index of the natural tourist attractions was calculated according to the national methodology of the tourist potential assessment in the basic administrative-territorial units in Romania. The scores for each category were given as a result of consultations with specialists from the field of economy of tourism, territorial planning, geography, sociology, architecture, geology, operators in tourism in the public and private field, local or central public authorities, etc so that a final 100 points' score was granted after assessing the 4 items referring to the natural tourist resources for which 25 points were granted; the man-made tourist resources - 25 points; the tourist specific infrastructure - 20 points and the technical infrastructure - 30 points. For the current paper only the first part of the assessment was taken into consideration with a maximum score of the attractiveness index of up to 25 points referring to the rural OMA natural resources.

RESULTS

The natural touristic assets of the rural OMA

The paper starts from the consideration that one of the basic pillars of rural development in the OMA is its natural capital. Meantime, we have to admit that there is a certain delay in the touristic capitalization of this potential, even though urbanites have shown a real interest to move to OMA villages for over a decade, due to the quality of natural resources, especially the landscapes (Dincă and Teodorescu, 2015). Starting from these considerations our analysis focuses on natural tourist resources, possibly becoming tourist micro-destinations, resources that include: relief, climate, hydrographic and bio-geographical resources and landscapes as a synthetic expression of all local natural elements. Here, the tourist can come in direct contact with nature, can resort to an active rest in an unpolluted natural environment that typologically, structurally and functionally fits the subnatural and low-average anthropomorphic landscapes (Dincă, 2008).

The OMA lays over a lowland plain and low hills area. The relief is set in light steps and consists of the low plain of Crișuri, the Depressionary Corridor of Crișul Repede river (Oradea - Bratca Depression), Oradea Hills in the north-east and Tășad Hills in the south-east area.

The Oradea Hills are part of the western border of Crișana Hills, which delineates the Carpathian mountain range. The southern part of these hills form the right slope of the Crișul Repede Valley (in the Oradea - Bratca Depression). In terms of altitude, in the OMA area, these

hills range from 150 to 350 m (figure 1). The administrative-territorial units located in Oradea Hills are Ineu commune (i.e. the villages of Botean and partly Husasau de Criș), a part of Oradea city, the villages of Paleu and Cetariu (figure 1). The interfluves in these hills are rounded and above the general level, in some places, a peak that sets itself apart into a belvedere spot stands up. The contact with the plain is made directly or by means of some more or less tilting glacises. The Tășad Hills are more discrete in the rural metropolitan area, being present in the south-east area. But, from the tourist point of view, the Șomleu Hill (346 m altitude) from Sînmartin commune sets itself apart, due to the unique existence of a form of endocarstic relief: Betfia / Hud (r) of Bradi. Genetically, this hill is a prominent limestone spur prolonged from the Padurea Craiului Mountains. The administrative-territorial units of the Tășad Hills are the communes of Nojorid (i.e. the villages of Apateu and Sauaieu), Sînmartin (i.e. the villages of Cordău and Befia) and Oșorhei (i.e. Felcheriu village).

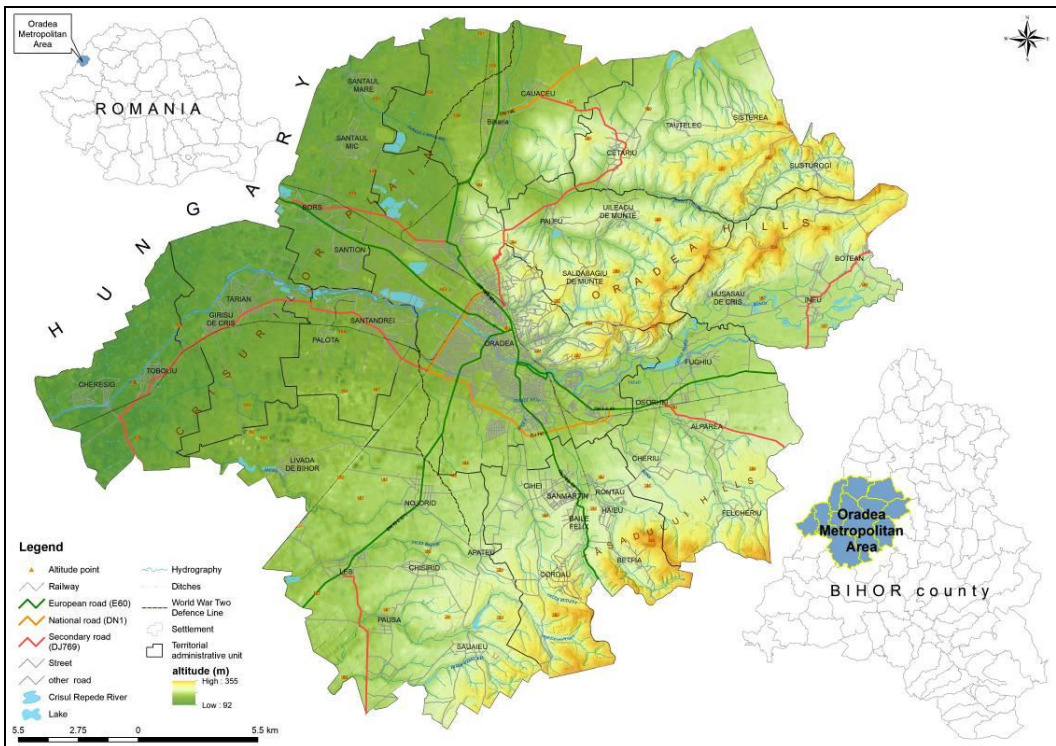


Figure 1. Physical-geographical map of the Oradea Metropolitan Area

The Depressionary Corridor of Crișul Repede River, a golf-type depression specific to western Romania, is represented by the Oradea - Bratca Depression, widely considered to be the main morphological axis in the specialized literature, as well as a road and railway link of Bihor County. The administrative-territorial units in this corridor are the Ineu commune (i.e. its homonymous village and partly Husasau de Criș), partly Oradea, Bors commune (i.e. the villages of Bors, Santău Mare, Santău Mic and Sântion). The relations between the rural OMA are enhanced by the "blue blood connection" represented by the Crișul Repede valley (Filimon, 2014). In this corridor, the lower terraces of Crișul Repede are revealed, capitalized by agriculture, and the vineyards and orchards appear at the contact with the hills.

The third step of the OMA is given by the Crișuri Plain, which is the central part of the Western Plain of the country. There is an upper plain section (over 100 m altitude: Biharia Plain,

Miersig Plain) and a lower alluvial section below 100 m altitude (Borș Plain). In the upper plain we find the communes of Biharia, Sînmartin (partially), Nojorid (partly), part of Girișu de Criș commune (i.e. the homonymous), part of Paleu commune (i.e. the homonymous village), and in the lower plain there are the communes of Toboliu, Sintandrei, Borș, partly Oșorhei and partly Ineu.

Climate, from a tourist point of view, is an intangible resource, but it strongly influences the development of tourist activities in nature. In the OMA, the temperate continental climate with oceanic influences is defined on the basis of the continuous flow measurements carried out at the Oradea weather station since 1961. These climatic data have been processed and interpreted in several scientific articles, as well as two published doctoral theses (Dumiter, 2007, Șerban, 2010). The climate elements with reverberation in tourism are: air temperature, duration of sunshine/nebulosity, rainfall, wind and some climatic risk phenomena (hail and storms). Overall, their values do not present restrictive thresholds for tourism activities. The average annual temperature is 10.3 °C (20.8 °C in July and -1.7 °C in January), the amount of rainfall reaches 615 mm per year, the relative humidity is below 80%, the wind speed is low (below 3 m/s), with a maximum frequency from the south or south-east direction. We draw attention to the fact that the highest rainfall amounts fall in the warm semester of the year (April to September, with a peak in June), but without diminishing the quality of the tourist activity, apart from exceptional cases. We mention the emergence of climatic risk phenomena. It seems that June hosts the maximum number of hail cases in the Crișuri Plain, but also that of storm occurrence. Storms are fast-paced phenomena that cannot be predicted early, and the Crișuri Plain is included in the high vulnerability class (1-4 days). Regarding the spa resorts of Băile Felix and 1 Mai, correlating the climate elements with the sanogenesis effect, the authors Teodoreanu and Gaceu (2013) indicate a sedative bioclimate with excitation nuances.

The OMA hydrography (figure 1) is represented by surface waters in the form of man-made lacustrine water storage and anthropogenic channels, but also by groundwater (ground and deep). The central part of the OMA is crossed by the Crișul Repede River (its lower sector) over 42.5 km, representing its main hydrographic artery. Its main tributary is the Peța brook, with under thermal waters (Ilieș et al., 2015). In the north of the study area, the streams are tributary to the Barcău River, and in the south to the Crișul Negru river. The average hydrographic density is 1.27 km/sqkm, the highest values being in the Sintandrei commune (i.e. 1.91 km/sqkm), and lower in the commune of Biharia (i.e. 0.9 km/sqkm).

A major component of hydrography is given by lake accumulations. From the category of the natural ones, we mention Lake Peța, the thermal lake (on the territory of Sînmartin commune) (Șoldea, 2003). In the last five years, it seems to be losing its thermal character due to the drying out of the sub-lacustrine spring that should fuel it. To it are added several eutrophic lakes from the Crișul Repede meadow, formed in the abandoned river meanders after massive hydro improvement work interventions. There are also several man-made lakes in the OMA, as well as many ponds for fishing. Although their cuvette/basin is anthropogenic, by its very natural water body attribute, and because they have turned into genuine natural ecosystems (some of them included in Natura 2000 sites), we will assimilate them into the natural capital. Thus, on the Crișul Repede River, on the territory of Oșorhei (at Fughiu), there is a man-made water storage lake (reservoir) with a flow control role, as well as meant to fuel with water the municipality of Oradea, and in its meadow, as a result of the gravel and sand diggings numerous man-made lakes were formed. Besides these, we can also find some reservoirs with a defensive role against floods and with a leisure purpose, such as the reservoirs of: Alceu, Leș, Săuaieu, Popii, Vișilor, Steluța, Paleu (ABA Crișuri, 2016) or just with a leisure function, such as the lakes of: Camelot, King's Land, Saldabagiu, Biharia, Merita.

Until the middle of the 20th century, the low Crișuri plain was known for its marshy features, because the rivers that drain it (the three Criș rivers, Barcău) had barely sketched river beds and at any water level rise they yielded floods. After 1950, large-scale hydro-technical (through the construction of dams and reservoirs) and hydro-improvement works (dams, drains,

channeling, etc.) started in the Crișului basin. For OMA, the construction of the Collector Channel (Criș Channel) with a total length of 61 km in north-south direction between Tămașda and Tărian should be mentioned. It is a belt channel with the role of regulating the flows between Crișul Repede and Crișul Negru rivers, but also for water supply and irrigation.

Ground waters play an important role, especially in the meadow sectors, because it supplies the gravel-quarry dug generated lakes (which have become real poles of attraction for local or migratory ornithofauna but also for fishing enthusiasts). Of particular importance are the deep waters due to their thermal feature, known as geothermal or thermomineral waters. The OMA sits on a thermal aquifer of Triassic age, lower Cretaceous, at different depths (2000-3000 m in Oradea - Borș and 50-350 m at Băile Felix) and higher Pannonian with depths exceeding 1000 m (Biharia - Săcuieni - Marghita aquifer) (Țenu, 1981; Cohut, 1986; Paál, 2013).² These waters are known and used for a long time in Băile Felix and 1 Mai for balneology and leisure, and more recently in Oradea (home heating), Livada (Nojorid commune) for leisure. There are also thermal drillings on the territories of the communes of Toboliu, Sintandrei and Borș but they are not currently used, the water flowing freely but it can be collected and used for heating and balneary purposes.

The Oradea Metropolitan Area vegetation belongs to the forest steppe and oak forest floor, with a strongly modified structure by the anthropogenic intervention (Herman, 2012). In the OMA, in the rural area, especially in the hills of Oradea and Tashad, forest bodies are preserved forming some massive forest bodies, made of oak (*Quercus robur*), the Turkey oak (*Quercus cerris*), sessile oak (*Quercus petraea*), common hornbeam (*Carpinus betulus*). There are also to a lesser extent the wild cherry (*Prunus avium*), the silver linden (*Tilia tomentosa*), the tatarian maple (*Acer tataricum*), etc (Burescu and Herman, 2010; Herman, 2010a, b; 2012; Herman and Herman, 2011).

Within the land fund structure, forests cover 16.1% of the metropolitan area (figure 2). Large areas of forests belong to Sînmartin (2,021 ha, 32.7% of the commune's surface), Nojorid (2,369 ha, 18.9%), Ineu (1,660 ha, 33.5%), Cetariu (1,345 ha, 20.6%), Paleu (1,281 ha, 26.8%), Oșorhei (1,242 ha, 19.1%). The presence of these forests at the outskirts of the metropolitan belt contributes to the air cleaning of dust particles and the improvement of topoclimate, but also gives some degree of physical and mental comfort. Within these forests there are some interesting cenoethical and tourist elements from the forest. Thus, in the commune of Cetariu (in the eastern village of Cetariu), the presence of a linden tree near the Peștea hamlet and the edible plated chestnut forests (*Castanea sativa*) must be mentioned in order to keep small boars and cervids away from cereal crops (Dincă et al., 2012). In the Peța Brook Nature Reserve there is a secular oak (over 300 years old), and in some forests (1 Mai spa, Cordău, Sișterea, Paleu, Botean) grow the butcher's-broom (*Ruscus aculeatus*), a species protected as a monument of nature (Herman, 2012). In the vegetation that develops on the ground floor of the forest, it is necessary to mention the edible mushrooms (*Boletus mushrooms*, *chanterelle mushroom*, *Blancaccio*, *Russula mushroom*), and at the edge of forests, the shrub layer consists of rose bushes (*Rosa canina*), hawthorn (*Crataegus monogyna*), common hawthorn (*Crataegus monogyna*), blackthorn (*Prunus spinosa*), blackberry (*Rubus fruticosus*). These products are sometimes found in the local cuisine or medicinal supply.

Along the watercourses there is an azonal vegetation, represented by willow (*Salix alba*), alder (*Alnus glutinosa*), poplar (*Populus tremula*), and on some lacustrine surfaces such as King's Land and Ineu the white lily (*Nymphaea alba*) and yellow lily (*Nuphar lutea*). In 1 Mai spa, in a subtropical ecosystem (Peța thermal lake), until recently we could find an endemic plant, unique in the world, surviving the glacial periods: the thermal water lily (*Nymphaea lotus var. Thermalis*), along with two other endemic fauna species: the thermal snail (*Melanopsis parreyssi*) and thermal ray-finned fish (*Scardinius racovitzai*). As a consequence of the chaotic real estate development, possibly due to the decrease in the amount of precipitation in the last years with consequences in the supply of the thermal reservoir, the sub-lacustrine thermal spring that fuelled the lake has dried out and the species are extinct in situ.

² <http://biwaterm.hu/wp-content/uploads/2013/05/Stud-for-geoterm-an-geochim-an-partea-romana-cluster.pdf>

The primary herbaceous vegetation was degraded by intensive pasture and replaced by secondary meadows where a xerophilous and xeromezophilous vegetation develops, represented by hays (*Festuca sulcata*, *F. pseudovina*, *F. valesiaca*), Kentucky bluegrass (*Poa pratensis*, *P. bulbosa*), feather grass (*Stipa joannis*), crested wheat grass (*Agropyron cristatum*), smooth brome (*Bromus inermis*) with a varied color, adapted to conditions of dryness and intense sunshine, accompanied by bush formations. However, they cover smaller areas because most of the land is covered by agricultural crops or forests. Carrying out of the hydro-improvement works from the Criș low plain along with the drying out of extensive marshy areas, led to a considerable water decrease of the areas with hydrophilic vegetation, which is only found along valleys and reduced spaces where the elimination of the water surplus is difficult. This vegetation is represented by the common cattail (*Typha latifolia*), *Scirpus radicans*, Greater Pond Sedge superplugs (*Carex riparia*), reed (*Phragmites communis*) (Pop, 2005).



Forests and secondary pastures in Cetariu and Ineu communes



Shrubs at the edge of the forest

Vineyards and orchards in Cetariu commune

Figure 2. Vegetal formations specific for the OMA

We also mention the presence of vineyards and orchards, but on small surfaces. We integrate them into the category of natural tourist resources, even if they are due to typical anthropogenic lucrative processes. The vineyards and orchards can be attractive and stand out as a natural distinct tourist resource and the experience of discovery, through fruit varieties and its associated products as a result of their processing, by the possibility of maintaining a beneficial trade for the farmer and the tourist. Paleu and Cetariu communes (figure 2) hold about 40% of the metropolitan vineyards and some 29% of the orchards ³ can be found in Nojorid commune.

³ <https://zmo.ro/strategie>

The present fauna of the metropolitan area is characterized by species that have adapted to the physico-geographic conditions of the lowland plain and hills. Among these are rodents such as *Citellus citellus*, *Cricetus cricetus*, *Spalax hungaricum*, *Lepus europaeus*, *Sciurus vulgaris*, different bird species such as *Coturnix coturnix*, *Perdix perdix*, *Sturnus vulgaris*, *Falco tinnunculus*, *Alauda arvensis* - the only singing bird in flight, etc. There are also various insects and reptiles. The amphibian class has enjoyed increased attention from researchers, some species being protected or threatened with extinction. It is the *Bombina bombina* (the fire-belly toad), *Bombina variegata* (yellow belly toad), *Triturus cristatus* (great crested newt), *Lissotriton vulgaris* (smooth newt), *Rana ridibunda* (marsh frog), *Rana dalmatina* (agile frog), all protected species. Among mammals, the European roe deer (*Capreolus capreolus*) can be found frequently in large metropolitan areas fields, and the wild boar (*Sus scrofa*) abounds in metropolitan forests. Other faunistic elements with a more discrete presence are the wild cat (*Felis silvestris*), fox (*Vulpes vulpes*) and even wolf (*Canis lupus*) (Dincă et al., 2012). Of the birds, the common pheasant (*Phasianus colchicus*) found particularly favorable reproduction conditions in areas cultivated with cereals. In the streams of the metropolitan area, species of fishing interest (the *Prussian carp*, the *European chub*, ray finned fish) can be found, and the reservoirs and gravel quarry dug lakes are familiar to Cypriots (*Prussian carp*, *carp*), perch, catfish, etc.

Forest or field wildlife is of particular interest for hunting and fishing, and there are several hunting stocks in the metropolitan area: Giriş hunting stock, Bors hunting stock, Biharia hunting stock, Paleu hunting stock, Salard hunting stock, Ineu hunting stock, Livada hunting stock, Păușa hunting stock, Alparea hunting stock, Boboștea hunting stock.⁴

The natural leisure attractions analysis from the OMA

The tourist natural resources of Oradea Metropolitan Area relate to avens, forests, monuments of nature, reserves, leisure lakes as well as many rivers and streams that cross the area. From the natural resources analysis it comes out that most of natural attractions are found within the Sînmartin and Cetariu communes with a share of 23% each, followed by Borș commune (18%), Ineu, Paleu and Nojorid with 10% each, Biharia (4%), Oșorhei and Toboliu with 3% each (figure 3).

Borș, Biharea, Nojorid and Toboliu communes stand out exclusively with the leisure lakes-related potential. Their in-built leisure lakes are the lakes of Borș and Sîntion (Bors commune), the swamp of Biharea (Biharea commune), the lakes of Leș and Șauaieu (Nojorid commune) and the Merita pond of Cheresig (Toboliu commune). Osorhei commune is naturally attractive by its daffodil forest of Alparea and the leisure lake of Fughiu, as well as the Crișul Repede stream. Instead the bulk of the remaining communes feature mixed natural attractions such as butcher's-broom (*Ruscus Aculeatus*) - monument of nature of Cetariu Forest; the forest of Cetariu; the linden forest of Pește; butcher's-broom (*Ruscus Aculeatus*) - monument of nature of Șișterea Forest; the leisure lakes of Vițeilor, Popilor and Steluța (Cetariu commune), butcher's-broom (*Ruscus Aculeatus*) - monument of nature of Cordau Forest; the aven of Betfia; the Natural Reserve Dealul Șomleu; the secular oak tree of the Natural Reserve Peța Brook the water lily - monument of nature from the Peța stream (*Nymphaea Lotus var. Thermalis*) (Sînmartin commune), butcher's-broom *Ruscus Aculeatus* - monument of nature of Botean; Cordău, Șișterea, Băile 1 Mai forests; the leisure lake King's Land of Ineu; the leisure lake Balta Ursului of Husasău de Criș; the leisure lake Camelot of Husasău de Criș (Ineu commune) and the Natural Reserve Fâneța Valea Roșie; the leisure lake of Paleu (Paleu commune).

In order for the tourist to reach and estimate the time allocated to the movement to these attractions a distance-time (driving) map was created as the short-distance leisure travel to the suburbs implies lower costs and less time allocated to traveling. The time-distance map shows how near the potential tourists are to a certain attraction.

⁴ http://oradea.gardaforestiera.ro/files/552_Harta%20fonduri%20Bihor.jpg

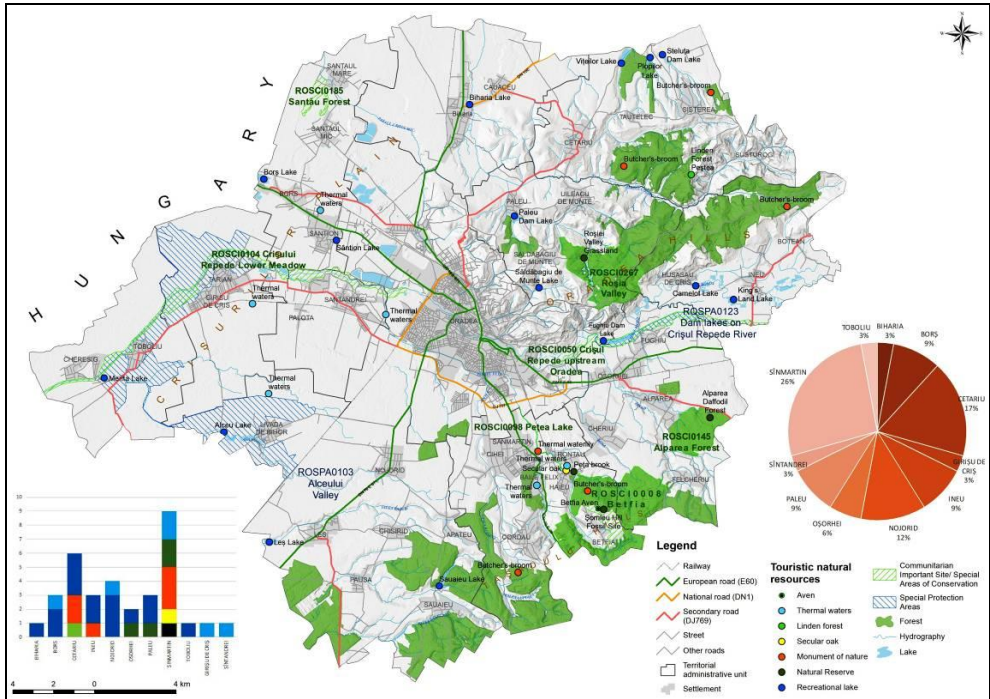


Figure 3. Natural tourist resources within the rural Oradea Metropolitan Area and their percentage (right side) and numerical (left side) distribution per commune

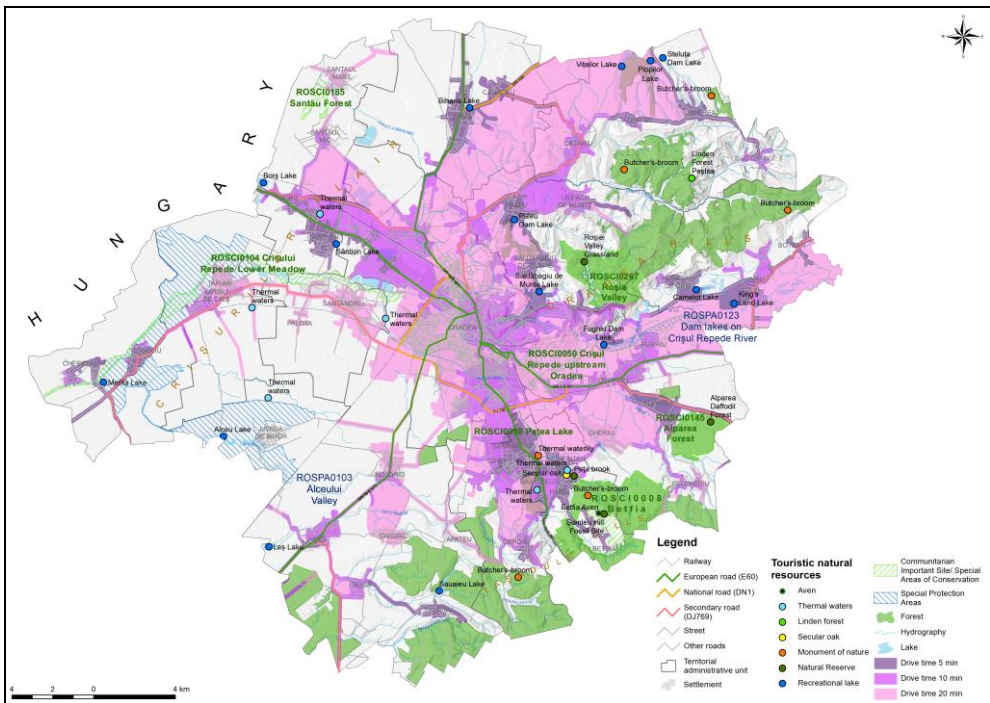


Figure 4. Necessary allocated driving time to reach the natural tourist attractions within the rural Oradea Metropolitan Area

For instance taking into consideration the attraction A the dark purple ring around it indicates that tourists are within a five minutes driving time to the attraction A and the light purple ring indicates that tourists are within a twenty minutes driving time to the attraction A (figure 4).

The arterial transportation easy access to the suburbs enables the urbanites to reach faster and more conveniently these favorite leisure nature attractions. The demand for weekend and holidays to the periphery encouraged the development of many scenic locations and recreational spots as well as its adjacent transportation facilities (Wu and Cai, 2006). By the generated map it is highlighted that most of these scenic natural attractions can be reached easily from the central part of the Oradea city. Within the specialized literature there is the concept of distance-decay which applies to tourism too in which the gravity model of distance-decay suggests that tourist flows decrease with distance from the origin (Hinch and Higham, 2004). Therefore the attractions which are further away from the residential place of tourists are less prone for visitation as they imply higher costs and time for travel.

The attractiveness index of the tourist natural resources

For this research paper only the scores related to the natural tourist resources were taken into account for the analysis so that only a maximum of 25 points could be given. Nonetheless as the natural tourist resources analysis will later on show in the analyzed area of the OMA the scores did not go above 12 points which indicates an average tourist potential when compared to the national territory. The class values for the analysis were divided between 2.1 - 4; 4.1 - 6; 6.1 - 8; 8.1 - 10; 10.1 - 12 (figure 5).

In order to carry out the natural tourist attractions' analysis for the current study of the rural OMA more items were calculated such as the position on relief steps for which a maximum of 14 points were given, geomorphology for which maximum 1 point was given, vegetation for which a maximum of 1.5 points were given, fauna (maximum 1.5 points), hydrography (maximum 3 points), bioclimates (maximum 0.66 points), protected areas (maximum 5 points), landscape (maximum 3 points).

At the subcategory referring to the position on relief steps more items were taken into consideration such as field, hills, mountains; the geomorphology subcategory includes gorges, karst relief; vegetation includes a coverage of over 30% or below 30% (coverage with bushes, vineyards and orchards, pastures); at the fauna subcategory of high or average hunting interest (herbivores – little cervids, wild boar; carnivorous mammals – fox, wolf; wild birds – pheasants and birds of the wet environment; reptile and batraciens; fishes) were taken into consideration; the hydrography subcategory includes the presence of lakes, ponds, mineral springs, waterfalls; the landscape category was assessed according to the high or average interest for the identity of the places (villages or communes). The natural protected areas subcategory was assessed according to their representativeness degree, their conservation status and the possibility to practice a form of tourism (Herman et al., 2016; Ilieș et al., 2017a, b).

The influence of the OMA nature on people interested in leisure tourism in one of its belonging communes results from the analysis of the attractiveness of natural resources. The total score for the 11 OMA's belonging communes is 87.47, resulting in an average of 7.95 points. Compared to the maximum of 25 points that a commune could score according to the methodology, there is an encouraging average mean with reference to its attractiveness.

Compared to the average, there are notable territorial differentiations for the natural resources attractiveness index, which can determine the potential tourists interested in nature to choose a commune, a village, a natural site or more natural attractions for discovery, relaxation and leisure.

The analysis of the attractiveness degree showed that the most attractive from the natural tourist resources perspective within the rural OMA is Sanmartin commune which scored very well at position on relief steps, hydrography and protected areas and totally it reached 11.67 points (figure 5, table 1).

In its content, the work emphasizes decisively not only the favorable situation of the happy combination between the potential for the representation of the hilly relief developed on limestone (with detailed forms for the endo and exokarst relief - the karst microforms complex (lapiez) and

avens at Betfia), the deciduous forests and the thermal waters, but also the advantageous geographic position to have Băile Felix and 1 Mai spas in the commune. This is a spur for attraction and less time spent traveling for leisure (tourists, locals and urbanites) to relax and spend their free time in the local natural environment. At the opposite end, the least attractive came out to be Biharia commune with a score of merely 3.97 points (figure 5). It is an important space for the suburban leisure and entertainment opportunities, only the landscape generated by the largely undulated hills and the deciduous woods can attract the potential tourists for walks not far from the communes' villages.

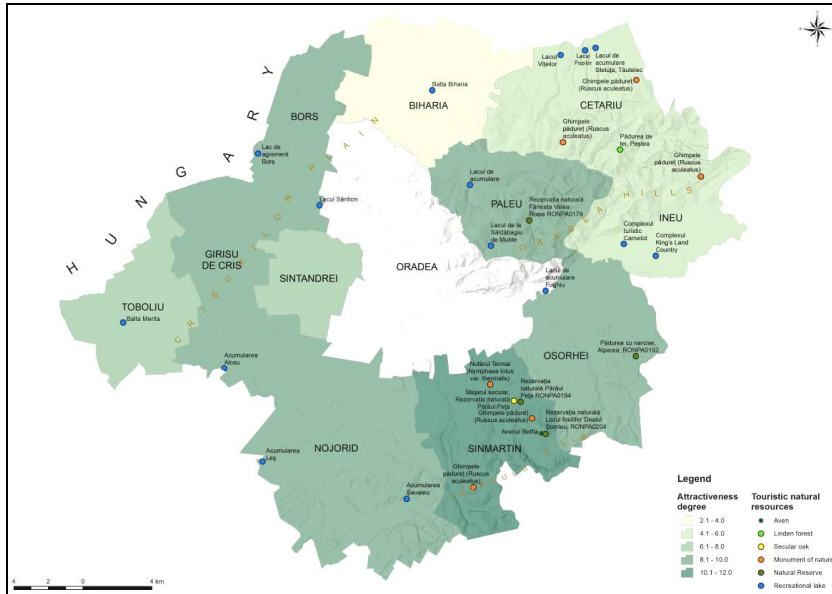


Figure 5. Attractiveness index of the natural tourist resources from the rural Metropolitan Area of Oradea

Table 1. Indexing of natural resources meant to reveal the attractiveness index of rural OMA

Name of commune	Position on relief steps (max. 14 pts)	Geomorphology (max. 1 pts)	Vegetation (max 1.5 pts)	Fauna (max 1.5 pts)	Hydrography (max 3 pts)	Bioclimates (max. 0.66 pts)	Protected areas (max. 5 pts)	Landscape (max. 3 pts)	Total (max 25 pts/every commune)
Biharia	1	0	1	0.5	0.25	0.22	0	1	3.97
Bořș	1	0	1	0.5	1.5	0.22	3	1	8.22
Cetariu	2	0.1	1	0.75	1.5	0.22	1	1.25	7.82
Giriřu de Criř	1	0	1	0.5	1.5	0.22	3	1	8.22
Îneu	2	0	1	0.5	1	0.22	0	1	5.72
Nojorid	2	0	1	0.5	1.5	0.22	3.3	1	9.52
Ořorhei	2	0.1	1	0.5	1	0.22	3	1.25	9.07
Paleu	2	0	1	0.5	1	0.22	3	1	8.72
Sînmartin	2	0.2	1	0.5	3	0.22	3.5	1.25	11.67
Sîntandrei	1	0	1	0.5	2	0.22	1.8	1	7.52
Toboliu	1	0	1	0.5	1	0.22	2.3	1	7.02
Total	17	0.4	11	5.75	15.25	2.42	23.9	11.75	87.47

In fact, from examining the information in table 1 and figure 5, a certain type of attractiveness for the OMA natural tourist resources stands out. It may be wrong to conclude that in the OMA the hilly relief and the logical association of landscapes customized by a network of streams, forests, meadows, wildlife, protected areas with rare flora or fauna are certainly linked to a maximum attractiveness index. The reality partially confirms this assertion. The communes on the northern side of the OMA are the least attractive for leisure tourism, being deficient in hosting

protected areas. The eastern side of the OMA is, however, well-equipped with natural elements (protected areas, lakes for fishing, deciduous forests, shrubs, hay meadows and barbecue areas, rare flora, vineyards and orchards), as well as a good road network that allows easy car travel and spending leisure time. The western part of OMA, although set dominantly in the plain, has significant attractiveness values ranging from 7.02 to 9.52 (table 1). The explanation is related to the favorable nature of many lacustrine environments that encourage fishing (e.g. the Sântion, Borș, Merita, Leș lakes) and some protected areas that can be the purpose of weekly thematic visits (e.g. The Forest of Santău with its species adapted to the humid environment of the willows, black alder, ash, water soldiers, the red belly toad).

CONCLUSIONS

The rural OMA, although in the shadow of Oradea city, abounds in natural elements, despite the risk of its anthropization in the form of a permanent assault by real estate developers, few attempts of small industry and investment in infrastructure. These natural elements configure a pattern of leisure and recreation activities in the OMA space. The activities are oriented according to the number of sites (local nature resources), their importance (especially in the case of protected areas and natural monuments), ease of access (including travelling time to the site) and physical and emotional benefits of the activities. According to the number and density of the sites, local leisure tourism relies on the dominant grouping of natural sites on the eastern and western sectors. The east of the metropolitan area is well-capitalized and the tourists are attracted by a sum of resources given by the undulated hills, deciduous forests, protected areas and natural monuments (from the butcher's thorn, daffodil meadows to avens, etc.), reservoirs on the Crișul Repede river from northern OMA with flowing and still water fish.

All these fit perfectly for discovery activities, light walks, hiking, fishing, barbecue, etc. South-eastern and southern metropolitan areas are dominated by discovery and leisure activities that capitalize on the protected areas of the plain, as well as complex physico-kinetic recovery and relaxation (in the case of thermal waters) and leisure in the waters of the lakes and Crișul Repede (fishing). When it comes to the traveling time, it can be concluded that weekend or leisure tourists follow routes mainly whose attractions are located on the central axis of the OMA (fishing on lakes, forests and meadows, aven, rare flora) for whose reach, between 10-15 minutes can be allocated. There is also a secondary section between the center and the east of OMA, where fishing is eminently enjoyable. Concrete leisure activities dictated by the local natural potential are used in building the attractiveness index. In spite of a significant natural background, the fact that there are no mountain ranges and mountain relief details generates modest results, including an average of 11.67 points (out of 25 possible) of the 11 analyzed communes.

REFERENCES

- Bucur, L. (2012). *Studiu geografic al Zonei Metropolitane Oradea prin Sisteme Informaționale Geografice*, Editura Muzeului Țării Crișurilor, Oradea.
- Burescu, P., & Lacatoș, L. (2010). Contributions to the knowledge of hornbeam and beech forests, from Lăzăreni Hills (NW Romania). *Analele Universitatii din Oradea - Fascicula Biologie*, 17(1), 55-61.
- Carrière, J. P., Filimon, L., Guitel, S., Savourey, C., ...& Irincu, E. (2018). Urban Sprawl within the Metropolitan Area of Oradea. *disP-The Planning Review*, 54(3): 36-51.
- Cheng, H., Liu, Y., He, S., ...& Shaw, D. (2017). From development zones to edge urban areas in China: A case study of Nansha, Guangzhou City. *Cities*, 71, 110-122.
- Cohut, I. (1986). Sistemul hidrogeotermal Oradea - Felix, *Nymphaea, Muzeul Țării Crișurilor*, 617-628.
- Covaciu-Marcov, S. D., Ghira, I., ...& Venczel, M. (2000). Contribuții la studiul herpetofaunei din zona Oradea. *Nymphaea. Folia Naturae Bihariae, Oradea*, 28, 143-158.
- Dincă, I., & Teodorescu, C. (2015). The Romanian Rural Space And Its Landscapes: Attraction And Motivation For Relocating Townspeople, *Geographia Napocensis*, 19(1):21-36.
- Dincă, I. (2008). The emergence of Oradea-Paleu-Cetariu-Șișterea axis for villeggiatura tourism. Assertion possibilities based on local resources, sight-seeings and initiatives, *Geographical Forum - Geographical studies and environment protection research*, 7(7):167-177.
- Dincă, I., Herman, G.V., ...& Sztankovics, G. (2012). *Descoperire prin ecoturism și prin turism rural în Comuna Cetariu*,

- Editura Universității din Oradea, ISBN 978-606-10-0724-0.
- Dumiter, A.F. (2007). *Clima și topoclimatele orașului Oradea*, Editura Universității din Oradea, Oradea.
- Ewing R., Tian G., ...& Lyons, T. (2018). Does compact development increase or reduce traffic congestion?, *Cities*, 72, 94-101.
- Filimon, C. (2014). *Depresiunea Oradea-Bratca. Studiu de populație și așezări*, Editura Universitară Clujeană, Cluj Napoca.
- Herman M.L. (2012). *Flora și Vegetația Dealurilor Lăzărenilor*, Editura Universității din Oradea, ISBN 978-606-10-0873-5, Oradea.
- Herman M. L., Herman, G. V. (2011). Contributions to the Knowledge of the Association of Festuco Drymejae-Fagetum from Lăzăreni Hills (North-Western Romania). *Analele Universității din Oradea, Seria Geografie*, 21(2): 248-255.
- Herman, G. V., Iliș, D. C., Baias, Ș., Măduța, M. F., Iliș, A., Wendt, J., ... & Josan, I. (2016). The tourist map, scientific tool that supports the exploration of protected areas, Bihor County, Romania. *GeoSport for Society* 4(1): 24-32.
- Herman, M.L. (2012). Spatial Distribution of the Lăzăreni Hills Vegetation. *Analele Universității din Oradea, Seria Geografie*, 22(1): 158-162.
- Herman, M.L. (2010a). Description of *Tilia Tomentosae-Carpinetum Betuli* Association from Lăzăreni Hills (Northwestern Romania). *Analele Universității din Oradea, Fascicula: Protecția Mediului*, 15: 668-674.
- Herman, M.L. (2010b). Description of *Tilia Tomentosae-Carpinetum Betuli* Association from Lăzăreni Hills (Northwestern Romania). *Analele Universității din Oradea, Fascicula: Protecția Mediului*, 15: 675-680.
- Hinch, T., & Higham, J. (2004). *Sport Tourism Development*, Aspects of Tourism 13, Channel View Publications, p. 81.
- Holderna-Mielcarek, B., Basińska-Zych, A., Kaiser, A. (2017). Rural Metropolitan Areas as Sites for Recreational Activity of their Inhabitants. An Example of Poznan Metropolis, *European Journal of Service Management*, 23(3): 21-30.
- Huang, D., Liu, Z., Zhao, X., Zhao, P. (2017). Emerging polycentric megacity in China: An examination of employment subcenters and their influence on population distribution in Beijing. *Cities* (69), 36-45.
- Iliș, D. C., Baias, Ș., Buhaș, R., Iliș, A., Herman, G. V., Gaceu, O., Dumbrava, R., ... & Măduța, F. (2017a). Environmental education in protected areas. Case study from Bihor County, Romania. *GeoJournal of Tourism and Geosites*, (19)1:126-132.
- Iliș, D. C., Herman, G. V., Dehoorne, O., & Măduța, F. (2013). The Role of the Importance of Cyclotourism in the Development of the Oradea Metropolitan Area (Romania). *GeoJournal of Tourism and Geosites*, 12(2): 101-110.
- Iliș, D. C., Herman, G., Iliș, A., Baias, Ș., Dehoorne, O., Buhaș, S., ... & Ungureanu, M. (2017b). Tourism and Biodiversity in Natura 2000 Sites. Case Study: Natura 2000 Valea Roșie (Red Valley) Site, Bihor County, Romania. *Études caribéennes*, (37-38).
- Iliș, D.C., Buhaș, R., Iliș, A., Morar, C., Herman, G.V., (2015), *Nymphaea lotus* var. *Thermalis* (Pârâul Peța nature reserve), brand near extinction of the Băile Felix - Băile 1 Mai (Romania) spa tourism system. *GeoJournal of Tourism and Geosites*, 15(1): 107-117.
- Junior, V.S., Santos, B.A. (2017), Using Environmental Perception and Local Knowledge to Improve the Effectiveness of an Urban Park in Northeast Brazil, *Ethnobiology and Conservation*, 6(2): 1-24.
- Măhăra, G., Josan, N., Bențe, F., Petrea, D., Petrea, R., Iliș A., Linc R., Nistor S., Gaceu O., Pâle, L., Stașac M., Vlaicu, M., (1999). *Potențialul turistic al bazinului hidrografic al Crișului Repede*, Editura Universității din Oradea, Oradea, 153 p.
- Paál, G. (2013). Sinteza particularităților hidrogeologice ale acviferului termal de la Băile Felix - 1 Mai. *Nymphaea Folia nature Biharie*, Muzeul Țării Crișurilor, Oradea, 40: 83-107.
- Papageorgiou, M., Gemenetzi, G. (2018). Setting the grounds for the green infrastructure in the metropolitan areas of Athens and Thessaloniki: The role of green space. *European Journal of Environmental Sciences*, 8 (1):83-92.
- Pop, G. (2005). *Câmpia și Dealurile de Vest*, Editura Universității din Oradea, Oradea.
- Stașac, M., Bucur, L. (2010). Geo-demographical changes in rural space of Oradea Metropolitan Area. *Analele Universității din Oradea, Seria Geografie*, 20(2): 223-323.
- Sznajder, M.J. (2017). *Metropolitan Commuter Belt Tourism*, Taylor and Francis, Elsevier.
- Șerban, E. (2010). *Hazarde climatice generate de precipitații în Câmpia de Vest situată la nord de Mureș*, Editura Universității din Oradea, Oradea, 395 p.
- Șoldea, V. (2003). *Peța și nufărul termal*, Editura Universității din Oradea, Oradea, 98 p.
- Tarța, M., Filip, P., Hotnog, A. (2007), Zona Metropolitană Oradea - Conceptul strategic de dezvoltare durabilă 2007-2026 (Oradea Metropolitan Area- Strategic concept of sustainable development 2007-2026).
- Teodoreanu, E., Gaceu, O. (2013). *Turismul balneoclimatic în România*, Editura Universității din Oradea, Oradea, 218 p.
- Țenu, A. (1981). *Zăcămintele de ape hipertermale din nord-vestul României*, Editura Academiei, București.
- Wu, B., & Cai, L. A. (2006). Spatial modeling: Suburban leisure in Shanghai. *Annals of Tourism Research*, 33(1), 179-198.
- Zareba, A., Krzemińska, A., Widawski, K., Olesniewicz, P. (2016). Green Infrastructure Practices-Strategies how to Sustain Life in Metropolitan Areas, *E3S Web of Conferences*, Volume 10, Article number 00112.
- *** (2013), Studiul forajelor geotermale. Investigații de teren. Analize chimice și izotopice. Analiză cluster, Program de cercetare în Euroregiunea Hajdú-Bihar - Bihor pentru cunoașterea stării hidrogeologice a corpurilor de apă termală transfrontaliere, HURO/0901/044/2.2.2.

www.zmo.ro

<http://biwaterm.hu/wp-content/uploads/2013/05/Stud-for-geoterm-an-geochim-an-partea-romana-cluster.pdf>

<https://zmo.ro/strategie>

http://oradea.gardaforestiera.ro/files/552_Harta%20fonduri%20Bihor.jpg

Submitted:
September 12, 2018

Revised:
October 24, 2018

Accepted and published online
December 14, 2018