

Joanna Adamczyk¹, Piotr Wałdykowski², Agata Cieszewska³

Warsaw University of Life Sciences – SGGW, Institute of Environmental Engineering, Department of Landscape Architecture, Poland

ORCID: ¹<https://orcid.org/0000-0002-8026-2734>, ²<https://orcid.org/0000-0002-7493-6405>, ³<https://orcid.org/0000-0002-3647-1539>

Corresponding author: Joanna Adamczyk, email: joanna_adamczyk@sggw.edu.pl

Tourism attractiveness of the landscape of Mazovia in Poland – an untapped potential for bicycle tourism development

Abstract: The region of Mazovia in Poland helps meet the growing demand for recreational areas, which is related to the existence of large urban centres in the region and the ever-increasing trend towards an active lifestyle. This paper demonstrates the potential of Mazovia in terms of bicycle tourism, discusses the state of the existing bicycle infrastructure and outlines prospects for its development. For that purpose the authors: 1) summarised the spatial distribution of natural values important for cycling and the condition of cycling infrastructure; 2) examined the relation between the values of the Mazovia region and their use for cycling; 3) checked the state of the bicycle routes network in the Mazowieckie voivodeship in relation to other voivodeships. This study shows that Mazovia has a considerable potential for cycling tourism and recreation on both a regional and local scale for short-term and short-distance trips. On a supra-regional scale, the Mazovia area offers excellent conditions for establishing transit routes between regions of the highest tourist attractiveness in Poland. However, the above-mentioned potential is at present partially untapped, the likely reasons for which have been indicated in this paper.

Keywords: bicycle tourism, bicycle route, tourist attraction, natural values, Mazovia

1. Introduction

Tourist attractiveness of a landscape is a matter of perception of the landscape and its development for tourism purposes. That being said, tourist attractions should reflect the diversity of the landscape (Kulczyk, 2013, 2014). They can be considered separately, but also as a diverse whole originating from nature and human activity alike (Sołowiej, 1987). The natural environment resources appreciated by visitors become an asset that can generate tourist traffic, which in turn creates a tourist attraction (Kowalczyk, 2013). In this sense, it can be assumed that newly discovered natural potential may affect the development of tourist attractiveness of a place or region that was not previously perceived as attractive.

The areas of the Mazovia region help meet the growing demand for recreational areas,

which is linked to the existence of the metropolitan area of Warsaw, as well as other urban centres, such as Płock, Radom, Siedlce or Mława. Among the principal drivers of tourism development, including cycling, there are at present such demographic changes as population growth in cities combined with migration from rural areas, increased life expectancy, higher activity of people with disabilities, surge in multiculturalism, as well as emerging social trends for an active lifestyle, IT society and pro-ecological attitudes (Bell et al., 2008; Cieszewska, 2008). The effects of social change are visible through a broader interest in forms of tourism, or rather recreation, that can be practised during daily or weekend holidays.

In Poland, more than 70% of residents declare to cycle for recreation and leisure pur-

poses (GUS, 2017). The cycling skills in Poland are among the most frequently reported physical activities, too (over 93% of respondents – GUS, 2017). Interest in using a bicycle is confirmed by the fact that more than 70% of households own a bike (GUS, 2017), which is a relatively stable occurrence since at least 2013 (GUS, 2013). According to official data, the number of kilometres of routes designated for riding bicycles in Poland increased by 17% between 2010 and 2018 (GUS, 2019 a). In order to face the growing interest in cycling in Poland, international, national, regional and local cycling routes are being developed, which is apparent from reports of tourist organisations (Kozioł, 2019) and confirmed by the observations made by the authors, especially within the Warsaw metropolitan area. The authors' research indicates that a large share of cyclists visit forest areas in general, especially the nature protection ones. Compared to hikers, cyclists constitute a crucial group of

visitors in the Kampinoski National Park, their share being 46% (Cieszewska, 2009), while in the Chojnowski Landscape Park also located in the vicinity of Warsaw, they represent even 52% of visitors (Cieszewska, 2007).

In this study, the authors put forward a thesis that, despite the competition from neighbouring regions, Mazovia has a considerable potential to increase the attractiveness of cycling by providing diverse and appealing cycling routes and many starting points for cycling tourism. This may help satisfy the public needs concerning bicycle tourism and recreation and reduce the need for longer weekend trips for the people living in the region.

The authors also analyse the natural values relevant for cycling tourism as such. Furthermore, it should be emphasised that the cultural potential and services offered to cyclists, which are beyond the scope of this work, constitute an essential aspect as well.

2. Research area in the context the cycling tourism map

Mazovia is not the primary destination for cycling tourism due to the lack of important tourism values. The areas of the Mazowieckie voivodeship are mostly flatlands, with a meagre share of surface waters (mainly rivers) and a relatively lower share of forest areas compared to the rest of the country (23.4% in the voivodeship, 30.9% in Poland – GUS, 2019 b). In addition, when it comes to culture, the importance of the region in question is also not prominent apart from its function of being a place where the capital of Poland and individual tourist attractions of international importance are located (e.g. Żelazowa Wola – F. Chopin's birthplace).

Lower popularity of Mazovia in terms of cycling tourism is largely influenced by the competition of tourist traffic concentration areas in the neighbouring regions, such as Mazury, Świętokrzyski Forest, along with Biebrzański and Narwiański National Parks. However, due to the proximity of other, arguably more attractive regions, the Mazowieckie voivodeship may become a transit area between the key tourist regions, which is considered essential for the development of international and regional routes. Especially as it is located in the axial configuration of the Vistula valley and other large Polish rivers that enter the Vistula in the vicinity of Warsaw.

3. Methods

The authors conducted a study aimed at demonstrating the potential of the Mazovia region in the field of cycling tourism. They also reviewed the state of the existing infrastructure of cycling routes and outlined possible perspectives of its development.

In 2014, the authors conceived the present *Strategy of Development of Cycling Tourism Products in the Mazowieckie Voivodeship* for MROT (Mazovian Regional Tourist Organisation) (Strategia, 2014). In this article, they extend the scope of analyses included in the Strategy concerning the area attractiveness in

terms of natural values, relevant for cycling tourism.

In the first stage of the research, the natural values (Strategia, 2014) playing a substantial role in cycling were summarised. As in the Strategia (2014), the same criteria were taken into consideration, having regard to beginner and intermediate groups of cyclists. The authors also conducted an analysis of the spatial distribution of natural values attractive for cycling, i.e. diversified landform, the presence of forest areas, water bodies and watercourses, the occurrence of complexes of arable lands, meadows, as well as the existence of forms of nature protection. The results are presented as a spatial distribution of these features within their actual ranges. Additionally, they were quantified in the form of indicator values expressed in hexagons, basic units of equal size, enabling comparative analyses of different spatial statistics calculated for one area. This indicator was computed by summing up the area of all features attractive for cycling and dividing it by the area of the statistical unit (15 000 ha). In the interpretation of natural conditions, the authors put an emphasis on the characteristics of the Mazowieckie voivodeship that may contribute to the development of cycling tourism. There is also a reference to the five main principles of bicycle route design provided by CROW (1993), which may be considered as favourable to their convenience and attractiveness.

The second stage of the study was to assess the appropriateness of the development dedicated to bicycle tourism concerning the natural and landscape values of Mazovia. All marked cycling routes in the field were compiled using the database collected by the Cycling Tourism Commission of the Polish Tourist and Sightseeing Society (ZG PTTK, 2018). In addition, the map was supplemented with approximate locations of the proposed routes. To better illustrate the density of the routes, the area of the Mazovian voivodeship was shown using hexagons. The density indicator was calculated by summing up the length of the existing routes within a hexagon, related to the fixed area of the statistical unit (15 000 ha). The density of existing cycling routes in hexagons was presented as compared to natural values for cycling tourism.

In the fourth stage, the authors examined the communication conditions of the Mazowieckie

voivodeship. For this purpose, the network of two means of transport most frequently used by people practising bicycle tourism is presented in Figure 7. Among the examined aspects one can find the arrangement of the railway network, which includes calculated time of travel by suburban trains from Warsaw in all directions. The system of roads with high traffic intensity, i.e. over 1 000 cars per day according to the GDDKiA (2015), is also presented there. The aim of this very visualisation is to characterise road connections and determine the limitations of the cycling route network development.

In the third stage, the relation between the values of the Mazovia and their use for cycling tourism was examined. The whole region was divided into three groups of areas of different attractiveness. The 'most attractive areas' are those that are of index 2 in the summary of natural values for bicycle tourism. Said areas demonstrate almost all attractiveness features – as described in Chapter 2 – within the statistical unit. The 'attractive areas' were found to be those for which the indicator was above 1.7, which corresponds to locations where most of the attractiveness features are met. However, there are no relevant objects, e.g. protected areas, large areas of water bodies, or the landform is of low diversity. Both discussed categories include important areas of open spaces, including agricultural and forest areas; landscape contrasts are also present in them. The third category encompasses areas of an average attractiveness, which are in practice used for daily cycling recreation and located in the vicinity of the place of residence. The results of the study on the density of the bicycle route network were also divided into three groups. The first one constitutes the areas where the density index of the marked bicycle routes in the area is above 50. It indicates very favourable conditions for a route network to be established within the statistical unit (hexagon), which was confirmed by visual interpretation. These areas can be considered well developed in the context of bicycle tourism. The regions with an indicator of 20–50 have no route network, which classifies them as insufficiently developed. The remaining areas (below 20) are lacking routes or include only short sections of them. Such a formulation of the results allows for an assess-

ment of the Mazovia region development level with respect to cycling tourism.

Finally, the route network in Mazovia was examined in relation to other voivodeships. The study was carried out using a database of bicycle routes maintained by PTTK (ZG PTTK, 2018). Although it is the only database of routes that is conducted systematically in Poland, it is in all likelihood not complete. The collected

data were grouped into two categories: 1) international and supra-regional routes, intended mainly for transit purposes within the voivodeship; 2) regional and local routes, mostly forming a route network in given areas. For each voivodeship, the length of routes was compared to the fixed field of 15 000 ha of open spaces. As the information was not spatially referenced, abstract units were used instead of hexagons.

4. Results

4.1. Natural values for cycling tourism

One of the crucial features rendering the area of Mazovia cycle-friendly for both the beginner and intermediate groups of cyclists is the small diversity of terrain elevation and actual lack of elevated hills. It should also be mentioned that in the southern part of the region, on the edge of the uplands of central Poland, there are many areas with varied relief (Richling and Malinowska, 2017), making it a landscape attraction for off-road cyclists as well.

The presence of large forest complexes is an essential element increasing the attractiveness of the area. Moreover, from a cyclist's perspective, forest areas in general protect against heat in warm seasons and reduce wind speed during windy weather. The largest forest areas in Mazovia are located in the valleys of major rivers and on parts of uplands, mainly in the vicinity of Warsaw (Kampinoski National Park, Mazowiecki and Chojnowski Landscape Parks).

A vital feature of Mazovia's land use is its agricultural pattern, formed by the presence of vast areas of arable fields and meadows. In Polish conditions, such a landscape is suitable for bicycle tourism and thus constitutes an attraction compared to urbanised areas. In addition, agricultural areas often form a mosaic with small patches of forest, increasing the number of view plans and creating landscape contrasts that are of high scenic value.

Surface waters can be both a destination for cycling tourists and another aspect enhancing the attractiveness of the landscape along the routes. In Mazovia, the rivers and accompanying old river beds are of greatest importance for this matter as there are only few post-glacial lakes whose main concentration occurs in the

northern parts of the voivodeship (Richling and Malinowska, 2017). On a regional scale, dammed lakes (Włocławskie and Zegrzyńskie Lakes) are considered objects of particular appeal.

Natural protection forms may also become a tourist attraction, provided that they are suitably arranged. In the area of Mazovia, one can come across the Kampinoski National Park and widespread regions with the status of landscape parks, which are known to be bicycle tourism destinations for the residents of the Warsaw agglomeration.

Spatial distribution of natural environment features important for cycling tourism is presented in Figures 1 and 2. These maps indicate that the most beneficial areas for cycling tourism occupy relatively small parts of the region, forming elongated bands. This implies a considerable potential of the Mazovian region to develop transit bicycle routes. One can also notice that said areas are not particularly extensive, which renders them more suitable for weekend excursions, rather than longer trips.

The level of attractiveness of the Mazovia region cannot be compared to other areas commonly known as highly attractive for bicycle tourism, such as the Mazury Lakeland, since there is a lack of comparative research in this respect. However, it is worth noting that the most valuable parts of Mazovia have a similar accumulation of qualities as mentioned above, albeit they cover smaller areas. This feature makes them most suitable for weekend and one-day trips. The exceptions are the stretches of attractive areas along the main watercourses, namely the Vistula and Bug rivers – they are advantageous for locating transit bicycle routes.

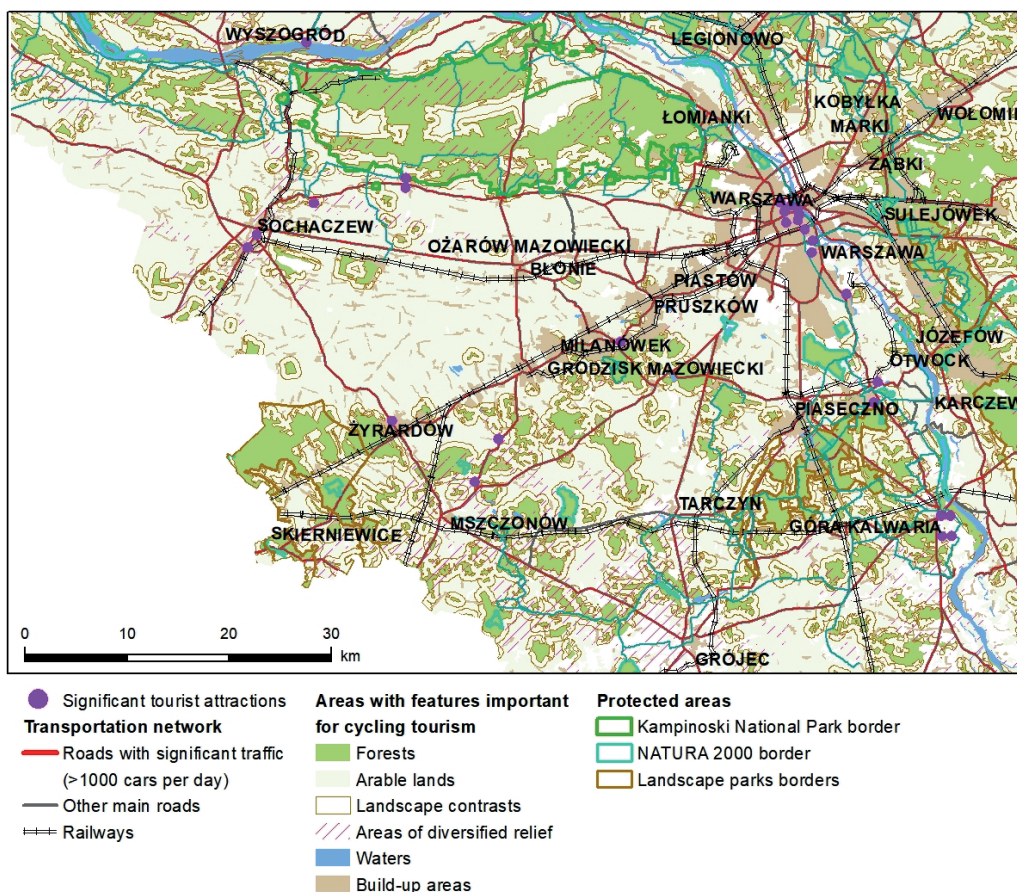


Figure 1. Natural and usefulness values important for cycling tourism in the Mazovia region on the example of the area located west of Warsaw (Source: own elaboration)

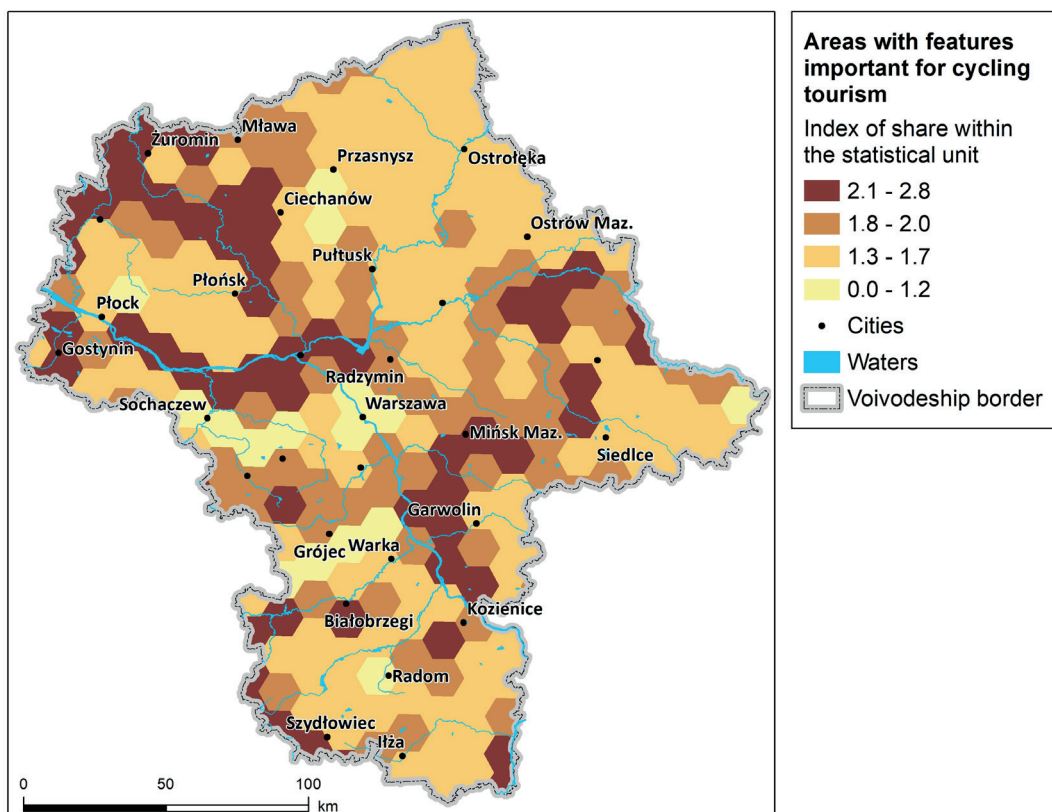


Figure 2. Indicator of the share of natural values significant for bicycle tourism in the Mazowieckie voivodeship within the area of a statistical unit (hexagon) (Source: own elaboration)

4.2. State of bicycle infrastructure in the Mazovia region

A summary of the course of the existing routes and approximate location of the proposed routes in the Mazowieckie voivodeship against the background of open areas is presented in

Figure 3. The indicator of the density of routes in the statistical units (hexagons) is shown in Figure 4. In the Mazowieckie voivodeship, there is about 1 810 km of bicycle routes in

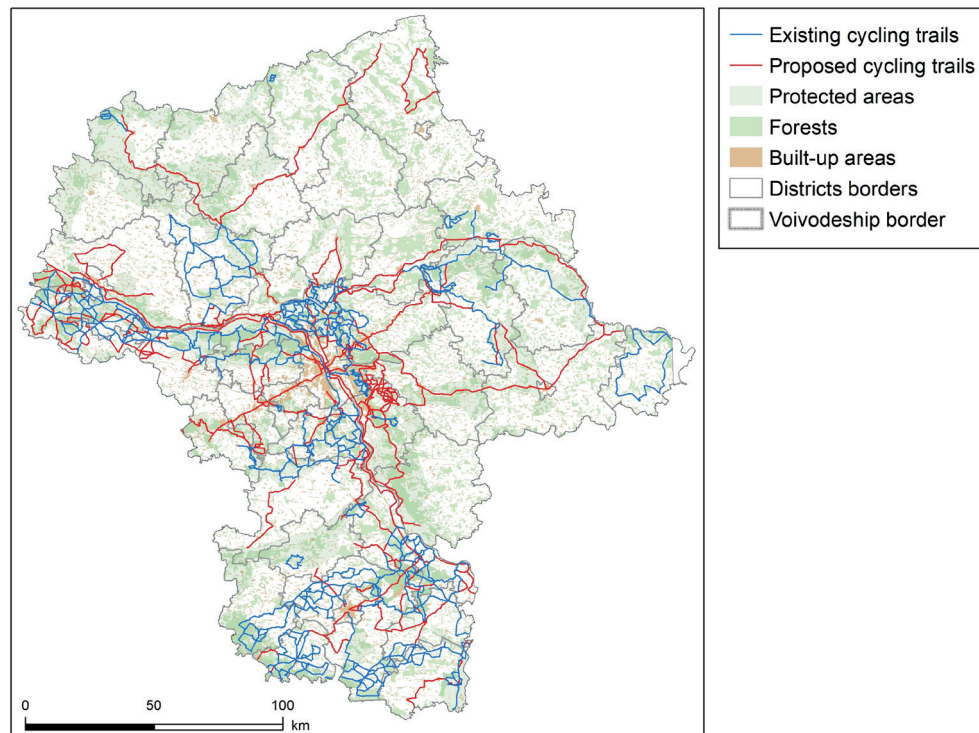


Figure 3. Existing and proposed bicycle routes in the Mazowieckie voivodeship (Source: own elaboration)

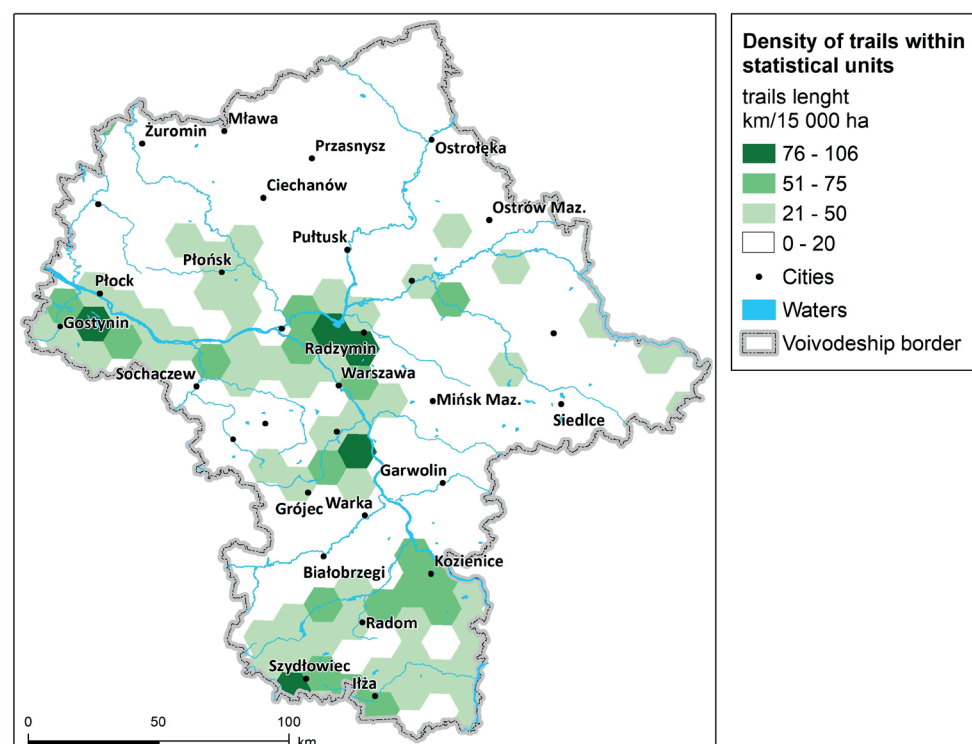


Figure 4. Density of routes in the Mazowieckie voivodeship expressed in kilometres within 15 000 ha, presented in hexagons (Source: own elaboration)

total (ZG PTTK, 2018), most of them being regional and local (about 1 155 km). As for larger densities of such routes, they form a relatively coherent cycling infrastructure and are observed only in a few areas of the region. Said areas are the neighbourhoods of Warsaw and Kampinoski National Park, Gostynińsko-Włocławskie Lakeland, Chojnowski Landscape Park, Kozienicka Forest, as well as a part of the Świętokrzyski Forest within the range of the Mazowieckie voivodeship. One should note that the trails tend to form a system of loops within relatively small areas, which enables one-day trips by car.

International and supra-regional routes exist in Mazovia mainly at the conceptual

stage, and only their fragments are present in the field. These include a section of the EuroVelo R2 international route (61 km) and two parts of supra-regional routes, i.e. Nadbużański Bicycle Route and VeloMazovia No. 20 (292 km). An approximate course of the proposed trails is shown in Figure 3, indicating that, if implemented, they would complement the region with a network of transit routes.

Cycling routes located in the area of the Mazowieckie voivodeship rarely include complementary infrastructure addressed to cyclists, similar to Green Velo routes running through the eastern regions of Poland.

4.3. Use of Mazovia's values for bicycle tourism

In Mazovia, the highly attractive and attractive areas for bicycle tourism only in a few cases overlap closely with the marked bicycle routes (Fig. 5). These are the locations near Płock, Sochaczew (along the Bzura valley), in the surroundings of Zegrzyńskie Lake, near the source of the Utrata river between Żyrardów and Grodzisk Mazowiecki, and also near Kozienice and Szydłowiec. In many places, the most attractive sites do not have a network of cycling routes. The linear continuity of highly attractive areas with a low density of said routes creates a potential to designate new regional and supra-regional ones, specifically along the Vistula valley between Warsaw and Płock (Fig. 6). Local solutions in the form of loops could be developed around these routes, which would make them more suitable for a typical tourist with limited distance expectations. These areas together form a continuity of locations that is conducive to the development of a connection between bicycle routes and other regions. As of now, highly attractive areas covered by a network of bicycle routes are scattered around the region and form isolated centres (e.g. the neighbourhoods of Węgrów, Zwolen, Płońsk).

When trying to determine new routes, one can also take into account attractive areas with a network of bicycle routes. They are located along certain minor river valleys compared to the Vistula river (e.g. Bug, Narew, Pilica, Liwiec, Wkra, Świder). They may be useful in establishing loop links with attractive areas

without a network of cycling routes (e.g. Garwolin, Mińsk Mazowiecki, Sokołów Podlaski or Ciechanów). The presence of highly attractive and attractive places is particularly relevant in the vicinity of large cities (e.g. Płock, Radom, Warsaw, Siedlce), where these networks are most needed.

A potentially crucial driver for the introduction of solutions for bicycle tourism would be the proximity of attractive areas to transport infrastructure in the region (Fig. 7). This factor fits into the principle of direct organisation of cycling connections as per CROW (1993). The freedom of choice concerning the way to reach the most attractive destinations facilitates the establishment of local cycling route networks and their diversification by targeting specific cycling preferences, e.g. routes for mountain bikes, sightseeing tours, families with children. The system of roads in Mazovia is dense enough to allow for quick access to all areas described as attractive.

However, the large proportion of roads with considerable traffic of over 1 000 cars per day (Fig. 6), which results from the transit status of many roads in the region, constitutes one of the reasons behind the difficulty in solving the problem regarding an underdeveloped network of long-distance routes in the Mazowieckie voivodeship. In consequence, the following two of the CROW (1993) requirements may prove to be particularly difficult to comply with: 1) directness of the trail – mostly precluded

due to the high traffic density on many roads, Bicycle routes should not be established along such roads (EURO VELO, GreenVelo rules); 2) safety – can be ensured provided additional investment in road infrastructure. In this situation, it appears that it would be more effective

to create local networks of bicycle routes, including forest and field roads, as well as paved gmina public roads connecting smaller towns with one another.

The arrangement of railway routes (Fig. 6) is conducive to leaving the centre of the voivode-

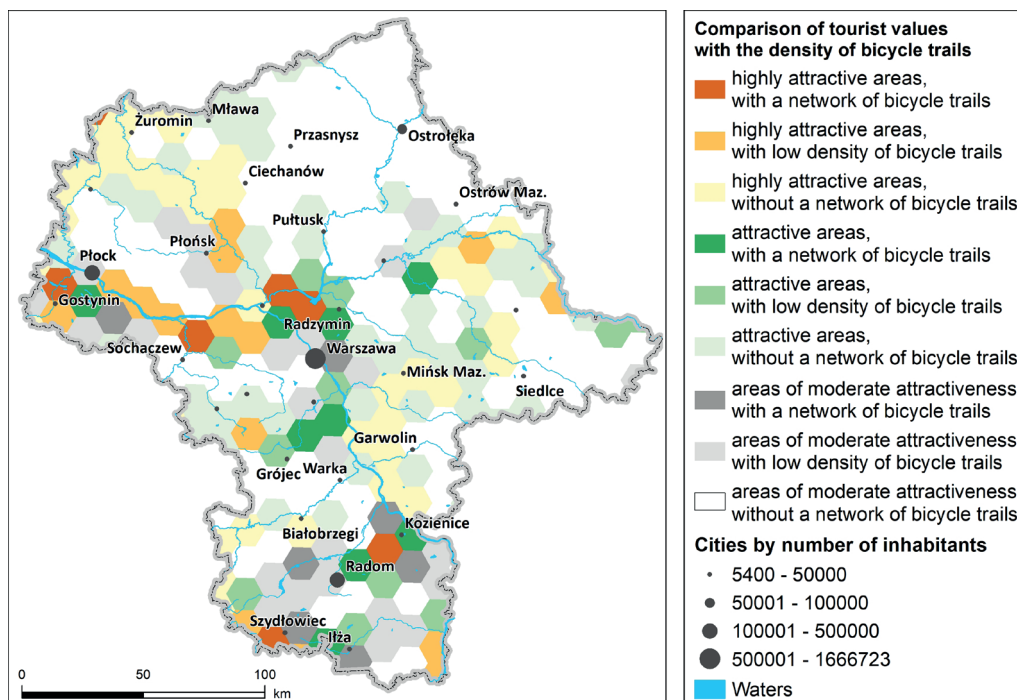


Figure 5. Comparison between the route network location and the occurrence of natural values for cycling tourism (Source: own elaboration)

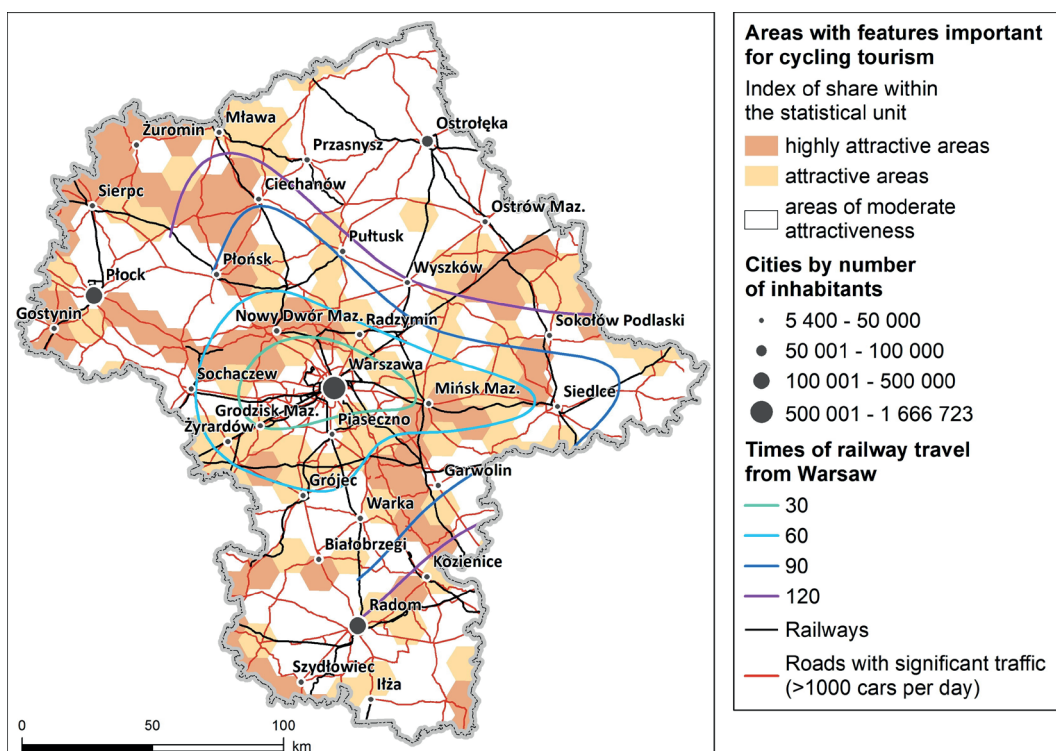


Figure 6. Areas with relevant values for bicycle tourism compared to the transportation network (Source: own elaboration)

ship located in Warsaw in nearly all directions. The travel time to the farthest parts of the voivodeship from the centre is slightly longer than 2 hours. It is possible to reach almost all the main attraction areas in this way, except for the Kozienska Forest region and the Płock area. The highest potential for travel in less than 2 hours is in the eastern, north-eastern and

south-eastern directions, where relatively short travel time facilitates visiting the attractive surroundings of Wyszaków, Mińsk Mazowiecki, Siedlce and Garwolin. The incomplete coverage of attractive areas by the railway network largely limits the opportunity to travel to the omitted areas on a one-day trip or requires using a bus or a car, including finding accommodation.

4.4. Cycling infrastructure in the Mazowieckie voivodeship compared to other regions of Poland

The results of the comparison of bicycle route networks in Polish voivodeships presented in Figure 7 allowed the authors to divide them into five main groups. The first one includes the Łódzkie and Zachodniopomorskie voivodeships, which have the highest density of routes in Poland. Regional and local routes prevail here, showing that these regions are best developed for bicycle tourism. The second group includes voivodeships with a reasonably high overall density of the route network, where nearly half are transit routes, i.e. the Świętokrzyskie and Podlaskie voivodeships (western Poland). What is more, the Kujawsko-Pomorskie region also belongs to this group since it offers the greatest

length of these routes in Poland in general. The third group encompasses voivodeships with a relatively high overall density of trails and a substantial share of local routes forming networks for the areas concerned. In the fourth group, two voivodeships were distinguished: Śląskie and Mazowieckie with the indicator close to 5, which, in the countrywide context, proves to be an inferior result. The lengths of the transit routes are negligible here, but there are a few local routes as well. The fifth group comprises voivodeships with the lowest density of trails of both categories in Poland, namely the Opolskie and, to the authors' surprise, Podkarpackie voivodeships.

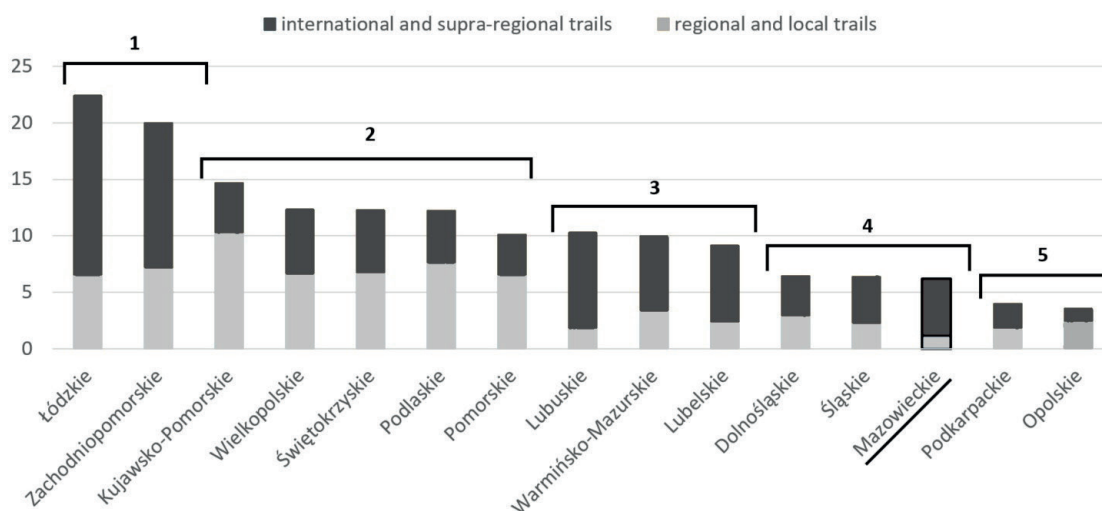


Figure 7. Share of the length of routes per unit of 15 000 ha of open space in Polish voivodeships (Małopolskie voivodeship was omitted due to insufficient data) (Source: own elaboration based on ZG PTTK, 2018)

The expected correlation between the length of cycling routes and the presence of natural values in the individual regions of Poland is not apparent in the results obtained. For example, the Łódzkie voivodeship is among the voivodeships with relatively lower natural attractiveness compared to the Podkarpackie voivodeship. How-

ever, upon closer inspection, it is noteworthy that a large share of regional and local routes in most voivodeships are aimed at the promotion of local tourist attractions. This can be linked to local initiatives, e.g. those undertaken by gminas. The idea of cycling routes of international and supra-regional importance is implemented in a limited

number of voivodeships, which implies that the policy of cycling route development in Poland has not been so far focused on the creation of cycling links between regions. Exceptions are individual cases of voivodeships geared towards the development of long-distance routes, e.g. in the Green Velo or Euro Velo system (e.g. Kujawsko-Pomorskie, Wielkopolskie, Świętokrzyskie, Podlaskie, Pomorskie, Opolskie voivodeships).

5. Summary and discussion

This study shows that Mazovia has a considerable potential for bicycle tourism and recreation on a regional and local scale. The natural values of the region play an essential function in terms of meeting the needs of several hours', one-day and weekend tourism near the place of residence. The rapid development of the Warsaw agglomeration and other urban centres (such as Płock, Radom, Siedlce or Mława) resulted in an enormous need for the development of infrastructure for cycling tourism over the last decades. On the other hand, its accomplishment depends on taking this trend into consideration in both local and regional policies. On a supra-regional scale, the Mazovia region offers excellent conditions for establishing transit routes between areas with the highest tourist attractiveness in Poland. The fact that these routes have only been in the concept phase for many years is partly due to institutional issues related to the following aspects of tourist infrastructure management (Strategia, 2014): 1) the lack of coordination between the institutions responsible for specific territories; 2) the absence of rules governing the designation and documentation of the routes. At present, this is customary practice for PTTK. Still, there is no legal instrument forcing all organisations that undertake initiatives in this field to coordinate their activities and report them to a specific database; 3) the lack of coordinated efforts to raise funds for the designation of bicycle routes and to build a network of trails on a broader scale, which would facilitate, among other things, investments in safe bicycle paths along roads with heavy traffic, as well as building more comprehensive tourist products.

Apart from the natural potential, one should bear in mind that Mazovia has a great cultural

Based on the comparison presented above, the Mazowieckie voivodeship ranks among the last in terms of cycling route network development. It features the least number of transit routes when compared to other voivodeships, which confirms that the area in question does not realise the potential of its transit location in relation to other attractive Polish regions.

potential as well, which has not been addressed in this study. Another concept worth mentioning involves the so-called natural and cultural tourist belts. It was first developed under the Voivodeship Programme for the Care of Monuments for the years 2006–2009 (WPOZ, 2012). The combination of the assessment of Mazovian cultural values included in the concept and the data on natural benefits proposed in this study may be a basis for designing and promotion of new tourism products. These products need to be more comprehensive than just the designation of tourist routes and, what is more, be compiled in an up-to-date database presenting the opportunities for tourism and bicycle recreation in the Mazovia region.

A critical issue to be solved is the shortage of railway connections in many places attractive for tourists, e.g. the area around Płock. Unless it is addressed, tourists will have limited access to newly created tourist products. In terms of public transport, the railway is the most convenient way of reaching the trip destination. Therefore, the lack of railway connections is a large barrier to the development of cycling tourism in these regions. Beyond the tourist aspect, a more extensive railway network may also benefit the target destinations, which is particularly important at the time of promoting public transport as an alternative to cars.

In conclusion, the authors hope that the increase in popularity of cycling that results from the ever-growing interest in an active lifestyle and the demand for weekend destinations will lead to more coordinated actions to create even more attractive cycling tourism products.

References

- Bell S., Simpson M., Tyrväinen L., Sievänen T., Pröbstl U. (Eds), 2008. *European Forest Recreation and Tourism A Handbook*, Taylor & Francis, London.
- Cieszewska A., 2007. Charakterystyka ruchu turystycznego Chojnowskiego Parku Krajobrazowego. [In:] Falkowski M., Jedliński M., Nowicka-Falkowska K. (Eds.), *Chojnowski Park Krajobrazowy monografia przyrodniczo-edukacyjna*. Wydawnictwo Zespół Parków Krajobrazowych Mazowieckiego, Chojnowskiego i Brudzeńskiego, Otwock, 172-176 [In Polish].
- Cieszewska A., 2008. Forest tourism and recreation management in Europe - lesson for Poland. *Turystyka w lasach i na obszarach przyrodniczo cennych*. *Studia i Materiały Centrum Edukacji Przyrodniczo – Leśnej* 10, 3(19), 179-192 [In Polish with English Abstract].
- Cieszewska A., 2009. Ocena ruchu turystycznego w Kampinoskim Parku Narodowym w latach 2005-2006. [In:] Andrzejewska A., Lubański A. (Eds.), *Trwałość i efektywność ochrony przyrody w Polskich Parkach Narodowych*. Kampinoski Park Narodowy, Izabelin, 99-112 [In Polish].
- CROW, 1993. *Sign up for the bike: design manual for a cycle-friendly infrastructure*. Centre for Research and Contract Standardization in Civil and Traffic Engineering, Ede.
- GUS, 2013. *Turystyka i wypoczynek w gospodarstwach domowych w 2013 r.*, GUS, Warszawa [In Polish].
- GUS, 2017. *Uczestnictwo w sporcie i rekreacji ruchowej w 2016 r.* GUS, Warszawa [In Polish].
- GUS, 2019 a. *Sytuacja gospodarstw domowych w 2019 r. w świetle wyników badania budżetów gospodarstw domowych*. GUS, Warszawa [In Polish].
- GUS, 2019 b. *Rocznik Statystyczny Rzeczypospolitej Polskiej (Statistical Yearbook of the Republic of Poland)*, GUS, Warszawa [In Polish and English].
- Kowalczyk A., 2013. Natural resources as cultural attractions: an examples from Lanzarote Island (Spain). *Turystyka Kulturowa* 5, 35-37 [In Polish with English Abstract].
- Kozioł M., 2019. *Analiza Podaży Turystyki Rowerowej w Polsce 2019*. Polska Organizacja Turystyczna, Warszawa [In Polish].
- Kulczyk S., 2013. Landscape and tourism — the mutual relations. *Uniwersytet Warszawski, Wydział Geografii i Studiów Regionalnych*, Warszawa [In Polish with English Abstract].
- Kulczyk S., 2014. Landscape tourist attraction – the examples of system approach. *Turystyka Kulturowa* 4, 6-15 [In Polish with English abstract].
- Richling A., Malinowska E. (Eds.), 2017. *Przyroda województwa mazowieckiego i jej antropogeniczne przekształcenia*. Narodowa Fundacja Ochrony Środowiska, Warszawa [In Polish].
- Sołowiej D., 1987. *Podstawy metodyki oceny środowiska przyrodniczego człowieka*. Uniwersytet im. Adama Mickiewicza, Poznań [In Polish].
- Strategia, 2014. *Strategia Produktów Turystyki Rowerowej w Województwie Mazowieckim 2014*. Mazowiecka regionalna Organizacja Turystyczna, dokumentacja grantu Ministerstwa Sportu i Turystyki (nr projektu 2014.0097/0118/U/DOT/DT). Archiwum Katedry Architektury Krajobrazu SGGW [In Polish].
- WPOZ, 2012. *Wojewódzki program opieki nad zabytkami na lata 2012 – 2015 – część analityczna – uwarunkowania*, Warszawa [In Polish].

Internet sources

- GDDKiA, 2015. *Generalny Pomiar Ruchu - GPR 2015*, Generalna Dyrekcja Dróg Krajowych i Autostrad (GDDKiA); <https://www.gddkia.gov.pl/pl/3959/GPR-2020> (Date of access: 01.05.2020).
- ZG PTTK, 2018. *Marked bicycle trails of the Mazowieckie Voivodeship*, listed in the register of the Cycling Tourism Commission of the Polish Tourist Country-Lovers' Association (ZG PTTK) as per 14.09.2018 r.; <http://tkkol.pl/wp-content/uploads/szlaki/mazowieckie.doc> (Date of access: 01.05.2020).