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Perceptions and Patterns of Use of Blue Spaces in Selected European Cities: Tartu, Tallinn, Barcelona, Warsaw and Plymouth

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Abstract: Urban blue infrastructure is an important component of the urban landscape for ecological, economic, social, and cultural reasons. However, there is a clear research gap in relation to preferences and patterns of use in the context of different blue spaces, considering the citywide context and different cultural and geographical settings. Additionally, when compared to green spaces, the location and morphology of urban blue elements are usually geographically predefined, and it is much less possible to ensure their equitable distribution with respect to population. To fill this gap, we decided to explore the effect of distance from residential areas, the role of water, the level of facilities, and the character of blue spaces in attracting visitors of different demographic characteristics in a sample of different European cities. We used a public participatory geographic information system approach (PPGIS) to collect data about residents' favourite blue spaces in each city and categorize the most popular of these according to whether they were close to or distant from respondents' homes. We also categorized the types of blue spaces and the level of facilities present. The results show that certain key blue spaces, such as the seaside or beaches, attract more distant visitors and that the pattern of the blue spaces within the city also affects visitation. There are many differences among the studied cities due to the morphology determined by geography. The usage of blue spaces is very site-specific and should be studied in more detail at the city and place levels, focusing on the different roles of everyday and destination places.

Keywords: blue spaces; perception; patterns of use

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1. Introduction

For many decades now, urban areas have faced rapid development pressure, often leading to unsustainable and chaotic growth with an impact on both the environmental and social qualities of life. Moreover, with the forecast that 60% of the global population will be living in cities by 2030 and that the number of so-called mega cities will substantially increase [1,2], there is a sharper focus within urban planning research on how to ensure that cities can be designed to promote health and well-being and to ensure a good quality of life for all inhabitants. Within the 17 United Nations Sustainable Development Goals (SDGs) [3], a number are particularly relevant for urban planning and landscape design, especially 11 (sustainable cities and communities), but also 3 (good health and well-being), 5 (gender equality), 6 (clean water and sanitation), and 13 (climate action). The role played by good landscape design in helping to achieve these goals has recently been the focus of the International Federation of Landscape Architects (IFLA), which has published a guide [4], illustrated by good practice examples, on how landscape architects should be professionally responsible in this area. One of the key aspects of the urban landscape that is crucial for achieving many of these goals is green and blue infrastructure, which provides many ecosystem services and acts as a framework for connecting features that help to reduce the urban heat island, deal with urban flooding, and provide important places for recreation and improved physical and mental well-being, among many other social, economic, environmental, and health perspectives. While green infrastructure—such as urban parks, urban forests, green corridors, and gardens—has been the major focus of research, it is only recently that the corresponding blue spaces—the sea, rivers, lakes, and other water areas—have received equivalent attention. In particular, the European Union-funded Horizon 2020 research project "BlueHealth" helped to redress this balance [5].

With 91,000 km of coastline, Europe is inextricably linked to a diverse range of marine environments, including the Atlantic Ocean, the North Sea, the Irish Sea, the Mediterranean Sea, the Black Sea, and the Baltic Sea, as well as numerous rivers and lakes. Around 50% of the European population lives within 50 km of a coastline, and on average, urban dwellers are only 2.5 km from a river, lake, or canal [5]. This means that understanding the values, perceptions, and use of urban blue spaces, which offer similar but also different opportunities, needs further research.

2. Urban Green and Blue Infrastructure

Urban Green Infrastructure (UGI) is the concept of natural and semi-natural green spaces within a strategically planned network that have the capacity to deliver a range of benefits [6]. It consists of different types of spaces, such as forests, parks, squares, brownfields, green walls and roofs, and private gardens [6–9]. Urban water has previously been treated as part of green infrastructure; however, with growing evidence of the unique importance of blue spaces and water in the city, it became clear that it should be treated as a separate system [5,10,11]. As part of the BlueHealth project, the first typology of blue spaces was created, which includes natural spaces such as the sea, lakes, ponds, rivers, and streams but also artificial ones such as reservoirs, canals, docks, and ports [5,12]. Another typology is based more on functions than forms: visible blue spaces (managed and multifunctional) and spaces waiting to be recognised or developed (called in limbo and in_visible) [13]. Besides the importance of blue spaces, what also distinguishes many of them from urban green areas is that they are geographically determined and fixed in space. Urban areas have frequently developed around, on, or next to blue spaces—coastal cities or those on important rivers—while green spaces such as parks, while possibly incorporating existing natural areas, can be created and located more flexibly, according to where planners and designers want them. Blue spaces are also much more difficult to establish artificially, requiring much more engineering and understanding of hydrology, while urban green areas can be cheaply established on a range of site types with relatively little technical input. Thus, access to blue spaces significantly depends on the specific geography of the area, such as demonstrated in Helsinki, where a complex and fractal coastline to the city, together with many lakes, means that the majority of residents live close to blue spaces and these are important landscape elements to be protected or enhanced in terms of accessibility and aesthetic quality [14].

2.1. Human Benefits from Interaction with Blue Spaces

Well-designed blue and green infrastructure is very important for urban environments. It enhances biodiversity [9], ameliorates the urban heat island effect and different forms of air and water pollution [15–17], or mitigates extreme weather events such as flooding or droughts [10,18–21]. Moreover, many studies focus on the connection between the environment and human health and well-being. The need for interaction with the natural environment and its positive influence on health and well-being are based on theories such as biophilia and biophilic design [22]. The positive health and well-being effect of green spaces is achieved through pathways such as physical activity [16,23], social cohesion, with a stronger connection to the quality rather than quantity of green areas [24], or stress reduction and attention restoration processes [25]. These latter, enabling a calming effect [26], are often connected to escape from stressors or appreciation of natural beauty [16,27]. Similarly, there are studies focusing on the relaxing, restorative, recreational, and active lifestyle-promoting aspects of blue spaces [26,28–30]. Additionally, White et al. [30] present a conceptual diagram where planetary and human health and well-being are interconnected and are achieved through exposure and proximity to blue spaces and pathways, such as mitigation, instoration (through, e.g., recreation), and restoration (through, e.g., social interactions, physical activity, and stress reduction [31–33]. Modifiers of these effects might be situational (e.g., water quality) or individual (e.g., personal traits).

While studying the environment in the context of the human-nature relationship, it is important to distinguish different types of open spaces [16]. Systematic reviews of the literature reveal a gap in research into the relevance of specific environmental characteristics and space quality to health and well-being in both green and blue areas [16,31].

2.2. Proximity and Accessibility of Blue Spaces

Some studies suggest that the health and well-being benefits of blue spaces are connected to the proximity of these areas, i.e., how close residents live to them and thus how accessible they are [33–36]; however, others suggest that this effect might be mediated by the frequency of visits [26]. Other aspects, such as perceived water quality, also influence visits to blue spaces [37]. Conversely, some visitors are willing to make a relatively long journey to attractive yet more distant recreational and natural areas (in the case of green spaces), while others, despite their proximity, do not visit them so often, perhaps because of other constraints (time, feeling they do not belong there, or health issues) [38,39]. Some green spaces, such as major urban parks or blue spaces such as beaches, can be considered destination areas that are very attractive despite the longer distance to reach them [40–42]. Differences among conclusions from studies may vary because of different factors and specific local aspects of the environment and society, so a broader recognition of these is needed [43]. Understanding person-based accessibility or preferences towards different types of blue spaces (for example, the seaside might have a greater value for users compared with other, nearer blue spaces as destinations), using bottom-up approaches, may demonstrate different results from those measured using top-down methods [14].

Another important aspect associated with the more frequent use of green space is accessibility. Easier access to large green spaces has been demonstrated to have a positive influence on higher levels of walking [16,43,44], while more easily accessed recreational facilities (in particular open spaces and beaches) were associated with enhanced physical activity among adults in Australia [45]. The presence of good facilities and infrastructure for walking or cycling also plays an important role [46], especially for specific groups that might have difficulties using places with unsurfaced paths, for example [47].

2.3. Preferences, Perceptions, Use and Place-Based Values in Blue and Green Spaces

Preferences for landscapes have been considered from the perspective of evolutionary theory and the possibilities of humans adapting preferred habitats [25]. As health and well-being benefits depend on different pathways, not only proximity or access but also factors such as personal preferences need more research in order to achieve better, more informed, and tailored design and planning solutions that accommodate different needs. In general, people appear to prefer landscapes with water in them compared with those without [48]. Some studies also demonstrate the value people place on the presence of natural elements, such as plants or animals [49,50], while higher perceived naturalness of green spaces influences more activities, as a study in Gothenburg shows [51]. However, different individuals may vary in their preferences, such as the amount of nature they benefit from. For example, for some people, higher perceived biodiversity is also related to higher restorativeness [50]. Moreover, some characteristics of the environment, such as poor levels of maintenance or a lack of lighting, can influence the feeling of safety [52,53]. The level of equipment can be especially attractive (or simply needed) in order to facilitate access and moving around [44,46,47,54,55]. A study from Poland demonstrated place-based values that respondents indicated were important in parks and public gardens, such as spaciousness, cleanliness or maintenance, the existence of buildings or other facilities, such as sports grounds, atmosphere, biodiversity, and a sense of security, while for informal green spaces, views, wilderness, uniqueness, dog friendliness, sounds of nature, and social life featured [56].

While studying patterns of use of blue spaces, it has been suggested to look more into personal factors such as gender, age, or ephemeral environmental factors such as the weather to assess their impact on health and well-being [31,57]. For example, paths can be used more by runners or during colder seasons, while lawns and sandy beaches are more attractive for passive activities such as sunbathing [58]. Gender differences can also be found; for example, women often prefer to focus more on activities such as paddling or sunbathing, while men tend to prefer fishing or water sports [59] while socializing or swimming is important for a majority of people [59,60]. Age also plays a role—small-scale blue-space intervention experiments revealed the importance of sitting places for all ages, access to water being more important for younger respondents, or shelter for older people in Estonia [61] and the UK [62]. Moreover, considering destination and local green places, studies in Germany, the Netherlands, and Denmark revealed that walking, walking with a dog, cycling, and running, as well as relaxing, sunbathing, and nature watching, are connected with local green spaces, but social interaction, picnicking, and walking and cycling are important in distant, destination places at a regional level [41].

There is a clear knowledge gap in research into the impact of blue spaces on human behaviour as well as preferences in the context of different blue spaces, especially considering a citywide context and comparing different cultural and geographical settings. Given the fact that the spatial pattern of blue spaces is often geographically pre-defined and inflexible, with key blue spaces such as rivers and the sea being major structural features defining the layout and character of many cities, there is less control in terms of planning over the ability to ensure blue spaces are, for example, evenly distributed with respect to population. Therefore, we decided to explore the different patterns and preferences for the use of blue spaces, specifically in relation to general well-being, at the city level in a sample of European cities. The sampled cities were, in order from the northeast to southwest, Tallinn and Tartu in Estonia, Warsaw in Poland, Plymouth in the UK, and Barcelona in Spain. These are not geographically directly comparable but represent a range of cities across a geographic and climatic gradient and thus should provide a broad view of how water is used across Europe. In particular, we wished to explore the impact of distance from residential areas, the role of water, the level of facilities, and the character of the spaces in attracting visitors of different demographic characteristics. Our research questions, therefore, are as follows:

1. What are the most popular blue spaces among residents of the different case study cities, and what typifies the range of favourite blue spaces in each of the cases according to blue space and water element type?
2. Does the distance from home affect the choice of blue spaces to visit?
3. What is the role of water, number of facilities, and blue space character in determining the choice of blue spaces?
4. Are there differences in visiting distance and preference among gender and age groups?

3. Materials and Methods

3.1. Research Context—Case Study Areas

In this study, we focused on patterns of use of blue spaces in five different cities. Tallinn, Tartu, Plymouth, and Barcelona were case studies of the BlueHealth Horizon 2022 project, while Warsaw was chosen for a comparative study financed by a separate grant from the Polish National Science Centre. Figure 1a shows the locations of these cities.

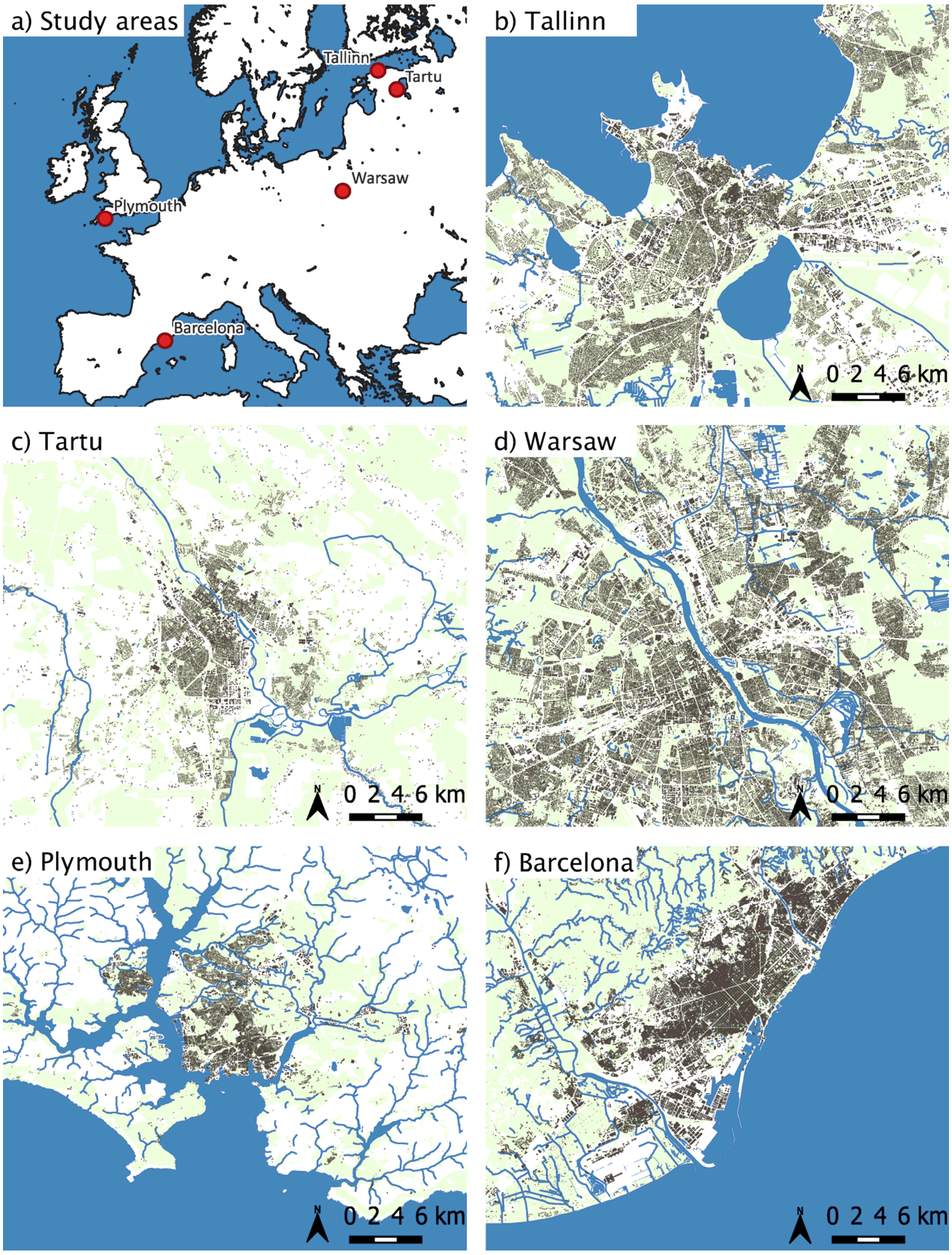

Figure 1. (**a**) shows the location of the case study cities in Europe, with the trend from northeast to southwest (**b**–**f**) are maps of the blue spaces of each case study city (all maps are to the same scale). (**b**) shows the morphology of Tallinn, with several bays and promontories plus the two main lakes. (**c**) depicts Tartu with the river flowing through it. (**d**) shows how Warsaw, the largest of all the cities, is dominated by the river Vistula. (**e**) shows the distinctive RIA coast morphology of Plymouth, and (**f**) depicts Barcelona, the densest city located along the coastline of the Mediterranean (source: © OpenStreetMap CC BY-SA 2.0, openstreetmap.org/copyright).

Tallinn and Tartu are the two main cities of Estonia, a country located in the north-eastern part of Europe. Tallinn, the capital city with a population of around 440,000 and located on the Baltic Sea, is an example of a primarily coastal urban blue space. It has several protected green and blue spaces, of which most heritage areas are parks around the old town and nature-protected areas such as Natura 2000 sites in the surroundings. Along the coastline, there are several beaches, as well as ports and the extensive industrial and post-industrial peninsula in the Kopli area to the north. Apart from the sea, there are two sizeable lakes: Ülemiste Lake (closed to the public to protect Tallinn's water supply) and

Harku Lake [63]. Several rivers have been industrialized and artificially regulated, such as parts of the Pirita River and in one case, completely piped underground (the Härjapea River. Some of the beach areas used to be unmanaged or leftover from the industrial past; however, even with small interventions, they have become more inclusive and accessible [54].

Tartu, with a population of around 100,000, is an important university city. It has numerous green spaces, several large parks, and extensive natural surroundings such as meadows and forests, as well as historical parks. While the city is very green, one of the most dominating elements is the river Emajõgi flowing through the center, gradually changing in character from natural to urbanized, with promenades and several beach areas, and back to more natural as it passes through the city. Another very popular place for swimming (also winter swimming) and other water activities in all seasons is Anne Kanal, an artificial water body initially designed for rowing sport purposes. Both Tartu and Tallinn, since they are located in the northern climate and cultural zone, feature specific uses of blue spaces according to seasons, such as saunas, where people dip into the water through holes cut in the ice when the water is frozen.

Warsaw is the capital of Poland, with a population of around 1.8 million. It is a very green city, with many parks, squares, and natural areas—such as forests—as well as green spaces distributed among multi-family residential areas dating from the 20th century. A recent focus of urban research has been on urban wastelands as very rich and supportive green infrastructure elements [64]. However, the main feature giving identity to the city is the Vistula River, unique among European urban rivers because of its unregulated character along the majority of its length, especially the east or right bank, where beaches and nature trails are located [65–67]. The landscape along the margins of the river is also directly connected to it, with historic parks, a steep escarpment, and oxbow lakes. The west, or left bank, features a promenade with museums, seating, playgrounds, and restaurants [68]. In addition to the river, the city is c by many artificial ponds/small lakes, especially in historic and other parks, fortification moats, flooded clay quarries, as well as streams and canals. The biggest artificial canal, Kanał Żerański, is a waterway, but there are several smaller ones that were constructed to drain wet areas, especially on the eastern side of the river.

Plymouth, with a population of around 260,000, is one of the largest naval ports in the United Kingdom. It is located in Devon on the south coast of England, fronting the English Channel. Geographically, it is part of a river coast where former unglaciated river valleys were drowned through sea level rise to form winding, branching valleys that penetrate far inland [69]. It is characterized by many blue areas, such as beaches, picturesque rocky cliffs, different parks with lakes, and several rivers, of which the Tamar and Plym and their valleys are the main ones. Many surrounding green areas are landscape protection areas; some parks within the city are considered destination areas of historical importance [70]. However, the city is facing a challenge of rising social inequalities, possible unsustainable and unbalanced use of blue and green areas, and a need to create more accessible and interconnected networks of these areas. The natural values of the landscape, environmental protection, and sustainable green/blue space design are important agenda items for the city, as stated by different development projects [70–72].

Barcelona is a coastal city and the capital of Catalonia, with a population of around 1.62 million people. The city boundaries are naturally formed by two main rivers, the Besós and the Llobregat, and mountains rising to the west. Barcelona has a very dense urban structure; however, several blue and green spaces are present in the city landscape. One is the Besós River Park, which covers 115 hectares. This park is divided into two parts: a wetland area of great natural, biological, and scenic value (inaccessible to the public) and a public area of more than 5 km in length, with green areas, paved paths, and a bicycle path [73]. The other, the Llobregat River, is characterized by post-industrial cultural heritage intertwined with green, natural recreation areas (such as forests) [74]. Barcelona also has numerous green areas, including several famous parks, which, together with its architectural heritage, attract many visitors. The main blue space, however, is the Mediterranean Sea, with its sandy beaches and former port areas transformed into recreational marinas, which now serve both incoming visitors and local inhabitants [75]. In recent years, this city has become recognized as developing in an inclusive way, from the bottom up, creating more and more spaces for social interaction and sustainable, health- and well-being-centered urban planning [76].

Figure 1b–f shows the overall distribution of green and blue spaces and the urban pattern of each city.

3.2. Data Collection and Categorization

3.2.1. Geo-Questionnaire and PPGIS Data Collection

In order to obtain data to answer the research questions, we used two different but complementary web-based tools belonging to the family of public participation geographic information systems, or PPGIS. These are methods that use geospatial technology to engage the public in obtaining spatially related data for use in policymaking, planning, and research [77]. PPGIS methods provide user-friendly tools for investigating human behaviour, preferences, or attitudes in a place-specific and context-sensitive way. The localization of specific information and patterns of behaviour connects them to specific physical contexts, connecting the information on human behaviour and experiences provided by respondents to geographical locations. PPGIS can be used to obtain large data sets [78,79]. Thus, the combination of PPGIS data ("soft GIS") with conventional register-based GIS data ("hard GIS") allows for simultaneous GIS-based analysis of human behaviour in relation to the physical environment [77].

In the cases of Tallinn, Tartu, Plymouth, and Barcelona, we used a system called Maptionnaire, which is a proprietary online software product under license from Mapita OY from Finland [80] in order to collect data. In Poland, we used a similar method provided by the Heksagon company [81]. Both studies used an interactive map base obtained from OpenStreetMap (© OpenStreetMap) and—in the case of Warsaw—Bing Maps (www.bing.com), with the possibility for respondents to mark a geographical location (blue space) on the map and to answer questions about that place in a pop-up window. It was possible to leave any of the questions unanswered. The geo-questionnaire versions used the same questions translated into the relevant local languages by native speakers and pilot tested for understandability.

Respondents were asked to:

- Mark up to five favorite blue spaces on the map, located in or close to the city;
- Answer an open-ended question: "Why is this place important to you?"
- Rate the importance of water in the overall experience on a scale of 1–5.
- Mark a location close to, but not directly at, the respondents' home (the closest crossroads or a point within 300 m, so as to avoid the possibility of identifying an individual);
- State their age group (16 years and over) and gender.

The data was collected by volunteer sampling and advertising the geo-questionnaire through social media and the websites of local municipalities and other local organizations. The questionnaire in each country was carried out in the local languages and was also available in an English version. The following number of valid answers (where at least the location of favourite blue spaces was marked on a map) were collected: Tallinn—376; Tartu—336; Warsaw—454; Plymouth—833; and Barcelona—488. The variability in responses was mainly due to the success of the promotion of the survey as well as the available population. The total number of responses where it was possible to calculate distance from home to marked favourite blue spaces was: Tallinn—347; Tartu—326; Warsaw—319; Plymouth—735; Barcelona—482.

3.2.2. Cleaning and Validating the Data

The datasets were downloaded from each platform into a GIS database and checked for duplicates. The quantitative data (results of categorical and continuous variables) were amalgamated into a single database comprising several tabs for analysis. The text from the open-ended questions was coded into a set of common themes. The coding process for open text responses to the question "Why is this place important for you?" was carried out and verified by three researchers into place-based values, where each answer was assigned to a category and categories were added to the list until data saturation was reached. A single answer, depending on what it stated, could be coded as more than one place-based value.

3.2.3. Identification and Description of the Blue Spaces Marked on the Map

In locations where clusters of three or more data points could be identified, we determined the boundaries of the blue spaces by examining maps and aerial photos in detail, and we created polygons for use in further analysis, adapting the method suggested by Wilczyńska et al. [13]. The resulting polygons encompassed the majority of responses given in all cities—82% of all points in Tallinn, 84% in Tartu, 78% in Warsaw, 74% in Plymouth, and 60% in Barcelona. Following this, we also identified a number of site-specific parameters for each blue space polygon:

- Water body type: ornamental pond or fountain; large natural or manmade lake; wetland; canal or moat; stream or river; sea or ocean
- Blue space type by land cover or land use: harbour, marina, dock, jetty, pier; urban street or square; promenade; meadow and farmland; scrub or reeds; park or garden; woodland; beach; cliffs, rocks, shingle
- Facilities level: 0—not equipped—no equipment apart from the access path; 1—moderately equipped—some equipment, e.g., benches or bins, but insufficient to maximize the potential of the space; 2—well equipped—a full range of facilities to maximize the potential of the space and possibilities for recreation
- Water access: 0—no obvious access to the water; 1—good access due to the natural conditions of the site; 2—excellent access improved by purpose-built structures
- Land access: 0—no paths or narrow dirt paths; 1—gravel or macadam-surfaced paths; 2—paved

The assessed parameters were not exclusive—polygons often possessed more than one land cover or waterbody type.

3.3. Data Analysis

All GIS data operations, including analysis, were performed in QGIS software, Version 3.20 (Open Source Geospatial Foundation), and all statistical analysis of quantitative data was performed in SPSS software, Version 19 (IBM). We followed the overall approach of "explore, explain, predict, or model" suggested by other authors [82]. Given the mix of ordinal, dichotomous, and continuous variables, we did not expect the data to be normal. The use of dichotomous variables and chi-square tests can limit the range of analysis and the interpretation of the results. The collected data were combined and analysed by exploring them and spatially and statistically explaining them according to the following steps in the analysis (although no predictive analysis was possible due to the sample sizes):

First, after answers were categorized according to place-based values, the results for each city were compared by the frequencies of answers within each category.

Second, the distribution of favourite places by water body and blue space type was calculated and compared using frequency distribution descriptive statistics.

Third, the distance from home (the approximate home location as recorded on the map) to each favourite blue space was calculated as the Cartesian distance. Next, a dichotomous proximity variable, indicating if the blue space is close to home or another location frequented by the respondent, was coded in the data. The absolute distances were divided into quintiles. The first two were automatically categorized as being "close". In addition, based on the respondents' comments on why they were visiting a particular blue space, it was occasionally possible to identify if the site was close to home or another frequented location for the person. This enabled us to include some of the cases where respondents chose not to reveal their approximate home locations and cases where the site was otherwise far from home but still close to other everyday locations such as school or work.

Fourthly, the correlation between the distance from home to the favourite blue space and a range of other variables was calculated: age, gender of the respondent, the perceived role of water in the overall experience, place-based value categories, as well as the assessed site-specific parameters (facility level; land access level; water access level; water body type; blue space type by land cover or land use).

Fifthly, a distance analysis with the same variables as at step four, but this time using the dichotomous distinction of being close to home or other everyday places (coded as 1) or distant (coded as 0), was carried out. This allowed us to examine the distances in a more generalized way and also to include cases where a blue space was close to another frequented location (such as work) or when respondents did not want to reveal their approximate home locations but gave open-text comments on the matter instead. As the main variable of interest, along with many others, was on a dichotomous scale, a Chi-square analysis with *posthoc* testing for significant results was carried out.

Finally, for areas where responses from three or more people were recorded, we identified the blue spaces primarily serving local residents and those primarily being visited over larger distances and from further afield. The distinction was based on a mean service distance score that was calculated as the average of the numbers in each quintile group for each valid record with a distance value. All points identified as favourite blue spaces within the area were scored for the distance range based on the distribution among quintiles (if the distance from home was within the first quintile, the score was 1, and if the distance from home was within the last quintile, the score was 5). Based on these, an average score ranging between 1 and 5 was calculated for every area. If the score was below 1/3 of the possible range, the area was deemed to be serving nearby residents; if the score was above 2/3 of the possible range, the area was deemed to be serving visitors from a distance; and if the score was between 1/3 and 2/3, the area was considered to serve visitors from both near and far.

Three widely accepted p-values of 0.05, 0.01, and 0.001 were applied as the cutoff for statistical significance.

4. Results

4.1. Exploring Place-Based Values, Blue Spaces and Blue Element Distribution

In order to answer Research Question 1, we examined the favourite places in terms of the place-based values expressed by respondents. The qualitative analysis of the answers to the open-ended questions revealed seven categories of place-based values (Figure 2). **Cultural values and ambience**—comments mentioning memories, ambience, safety and security, and general comfort; **Beauty and views**—comments that identified the aesthetic values of the space itself and/or attractive views from it; **Restorativeness**—comments suggesting relaxing, therapeutic, or contemplative values; **Escapism**—comments mentioning the value of being away, being alone in a quiet and peaceful place with lots of space around; **Nature**—comments connected to natural values, either particular elements such as trees, meadows, or wilderness (fauna and flora), weather, seasonality, or rhythms in nature; **Blue space itself**—comments identifying preferred blue elements or the water itself, **Activities**—comments mentioning different activities associated with favorite blue spaces.

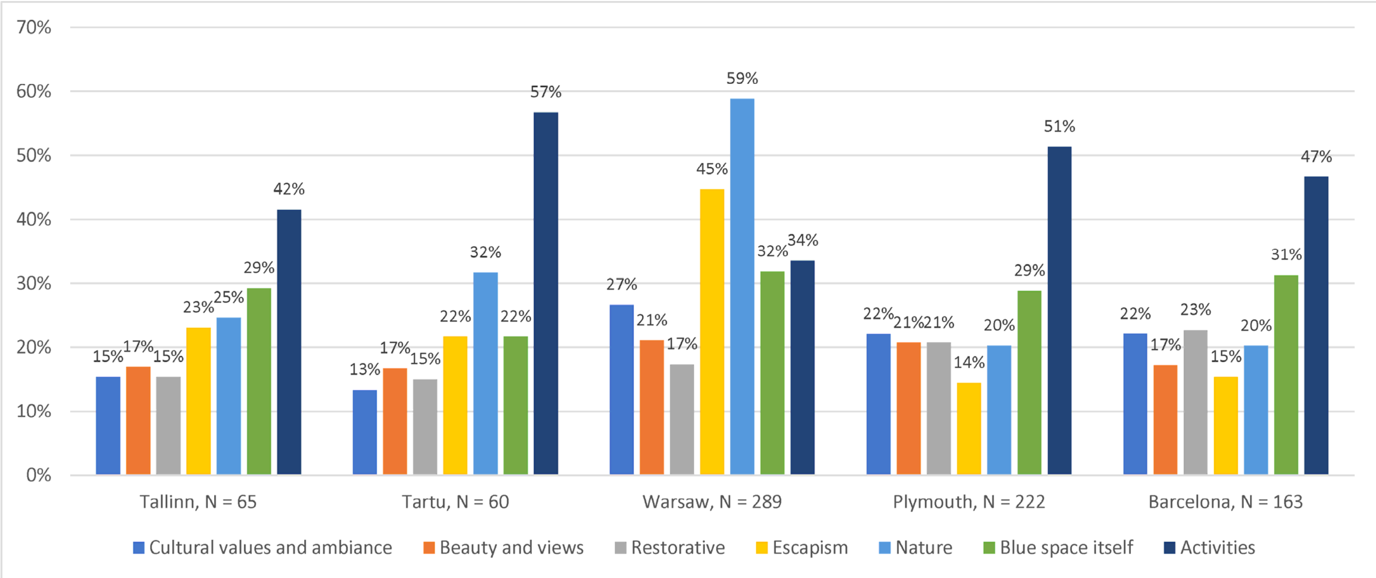

Figure 2. Proportions of categories of place-based values are mentioned in the comments. Percentages do not add up to 100 because multiple themes could be mentioned in each response. The number of comments offered by respondents varied considerably from city to city.

Figure 2 shows the relative proportions of the place-based value categories. It is noticeable that in four cities—Tallinn, Tartu, Plymouth, and Barcelona—the most frequently mentioned aspects of favourite blue spaces were the possibilities for different activities, while in Warsaw it was the natural aspect of the area followed by the chance to escape from the city hassle. Naturalness was also the second most appreciated aspect of the chosen blue spaces in another river city—Tartu. In all cities except Tartu and Warsaw, the blue element, or water itself, was not mentioned as often. Beauty and views were mentioned at a similar level in all cases. Restorative aspects were least mentioned in the Estonian cities and Warsaw. Additionally, cultural aspects were the least mentioned in the Estonian cities compared to the rest.

A notable aspect of the distribution of favourite places is the share of the dominant waterbody (Figure 3a). In three cities by the sea (Tallinn, Plymouth, and Barcelona), 61–76% of all points were at that waterbody, clearly dominating over any other types. However, in the case of the river cities (Tartu and Warsaw), only 45–55% of favourite places were identified as rivers. Other notable observations among blue areas visited by three or more respondents are the lack of lakes in Barcelona, the lack of wetlands in Plymouth and Warsaw, a negligible share of ponds in Plymouth, and a rather large share associated with a canal in Warsaw. This pattern is clearly visible on the more detailed maps available in the Supplementary Materials. In the coastal cities, the majority of points are distributed along the shoreline, while in Tartu they tend to be along the river and associated with smaller blue elements within the urban tissue.

Focusing on land cover and land use types, the pattern of favourite places is more diverse (Figure 3b). In Barcelona, the most frequented blue spaces are dominated by beaches (38%), promenades (32%), and parks (25%), along with cliffs, rocks, and shingle (26%). In the case of Tallinn, three land cover and land use types (park 23%, woodland 20%, and beach 22%) share comparable prominence. In Tartu, parks dominate (33%), and in Warsaw, woodlands (36%). Another notable observation is the rather small share of meadows and scrub among the frequented blue areas across all five sites. The most notable difference is the choice of water integrated into urban streets or squares in Plymouth (7%) and Tartu (1%).

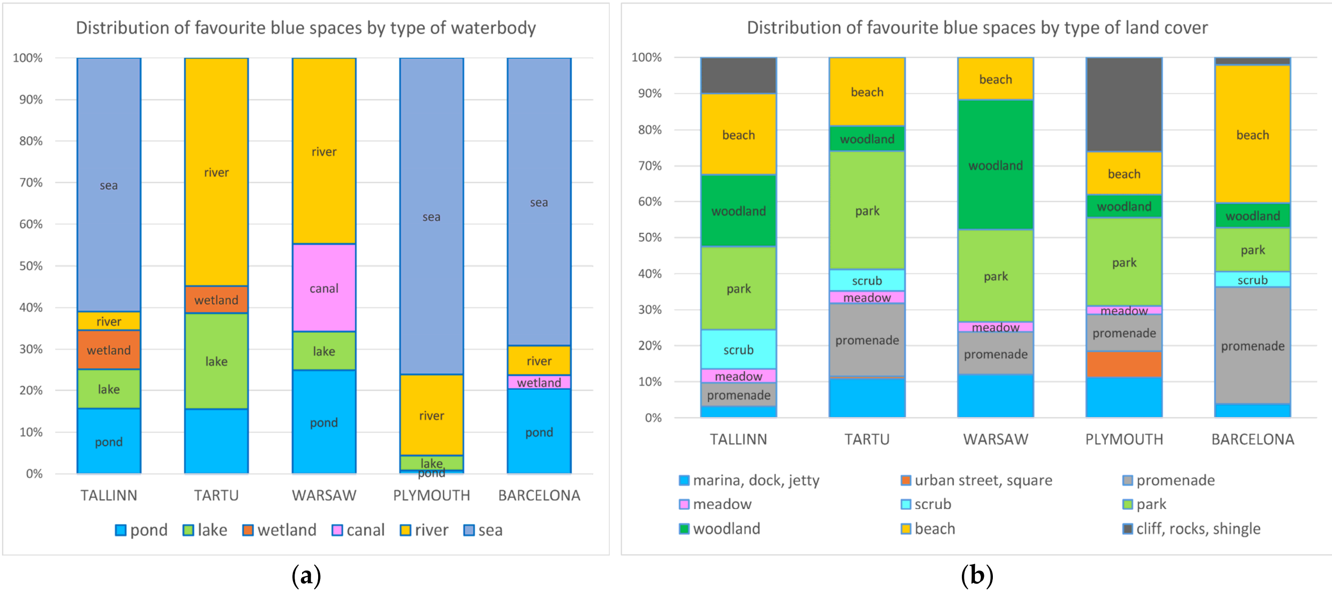

Figure 3. Proportion of favorite blue spaces: (**a**) by the type of water body; (**b**) by the type of land cover and land use.

4.2. Pattern of Distances from Home

To answer Research Question 2, distances between home locations and favourite blue spaces were divided into quintiles for each case. The first two quantiles (nearby locations) are within 1.5 km of the river cities and roughly 3 km of the coastal cities (Table 1 and Figure 4). In the case of Barcelona and Plymouth, what stands out is that distant places are relatively far away, with the 5th quintile starting at roughly 23 km and 10.5 km, respectively, while in Tartu, Tallinn, and Warsaw it is 5 km, 7.8 km, and 6.5 km. In Tartu and Warsaw (river cities), the third quintile ends before it even starts in sea-dominated Barcelona, Plymouth, and Tallinn. Also, median distances are much smaller for Tartu and Warsaw because the rivers flow through the centre, thus halving the distance from the periphery to the main waterbody, compared with coastal cities where the main blue space lies along one edge. The maximum distance (the end of the 5th quintile) is, in the case of Warsaw, 32 km and Tartu, 200 km; for Plymouth, it is 364 km and Barcelona, 1650 km; there are a few selected locations (7) that are either on the other side of Spain or in Italy, Corsica, or the UK (despite respondents being asked to select favourite places in the vicinity of the city). In the case of Tallinn, there is one location marked on the island of Lanzarote in the Canary Islands, plus two locations in Tartu, one in Saaremaa, and three in Haapsalu. In the case of Tartu, it is Muhumaa, Hapsaalu, Parnu, Dirham, and some of the inland areas, such as wetlands or Lake Peipus, which are somewhat far from the city.

Table 1. Overview of distances from home to favourite blue spaces given as quintile ranges, mean, and median values in kilometres. N—total number of valid responses, n—responses where the distance to home calculation was possible.

	Tallinn	Tartu	Warsaw	Plymouth	Barcelona
1st quintile	0.05–1.25	0.09–0.88	0.04–0.59	0.15–1.69	0.06–1.34
2nd quintile	1.25–3.03	0.88–1.53	0.59–1.41	1.69–3.14	1.34–3.09
3rd quintile	3.03–4.66	1.53–2.45	1.41–2.94	3.14–5.68	3.09–5.68
4th quintile	4.66–7.90	2.45–4.98	2.94–6.39	5.68–10.59	5.68–22.7
5th quintile	7.90–4569.53	4.98–207.21	6.39–32.05	10.59–36.45	22.69–1647.91
Mean distance	21.026	9.057	3.868	11.057	27.287
Median distance	3.679	1.882	2.083	4.033	4.486

Table 1. *Cont.*

	Tallinn	Tartu	Warsaw	Plymouth	Barcelona
n	347	326	319	735	482
N	376	336	454	833	488

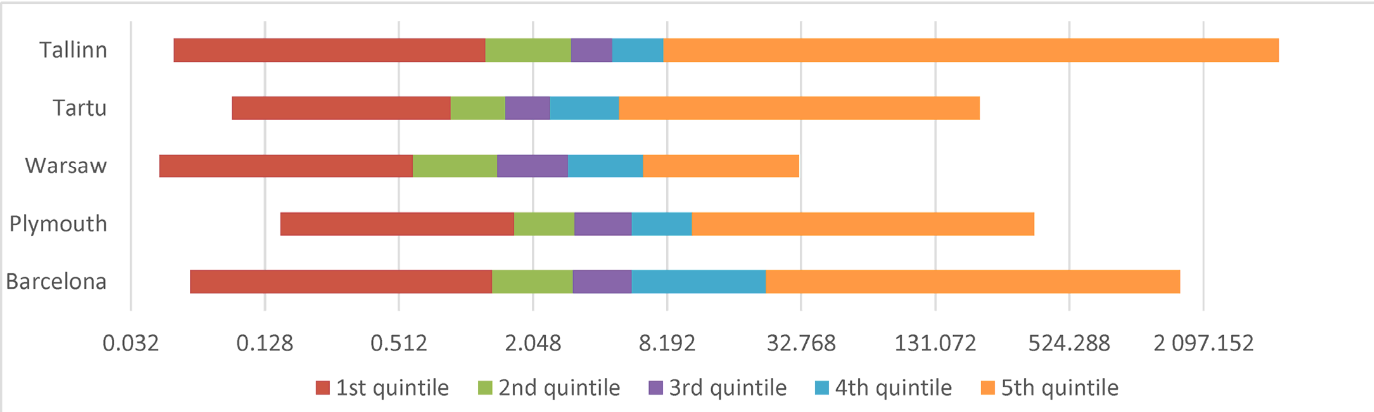

Figure 4. Quintile range graph of distance from home to favourite blue spaces (in kilometres, base-2 logarithmic scale).

4.2.1. General Relationships with Distances from Home

Correlations between gender and distance from home did not reveal any significant results (Table 2). There was no linear relationship between age and distance from home in four of the cases. The age group was correlated positively to distance only in the case of Tallinn. The perceived role of water in the overall experience was positively correlated with distance in Tartu and Barcelona. People there reported a stronger role for water in the more distant blue spaces.

Table 2. Correlations between distances from home to favourite blue spaces and the following analysis variables: gender, age, perceived importance of water in experience, amenity levels, various land cover types, and waterbody types. (r) = Pearson correlation; (τb) = Kendall's tau-b correlation; N = number of valid cases. *** = correlation is significant at the 0.001 level (2-tailed); ** = correlation is significant at the 0.01 level (2-tailed); * = correlation is significant at the 0.05 level (2-tailed). All statistically significant results are also marked in bold.

	Tallinn		Tartu		Warsaw		Plymouth		Barcelona	
	r or τb	N	r or τb	N	r or τb	N	r or τb	N	r or τb	N
Female (r)	0.02	347	0.03	326	−0.04	217	−0.02	735	0.03	476
Age group (τb)	0.12 **	347	0.07	326	−0.04	218	0.05	735	0	476
Role of water in overall experience (τb)	0.09	285	0.11 *	237	0.04	235	0.03	477	0.23 ***	231
Cultural values and ambience (r)	0.23	62	0.09	58	0.15 *	208	0.17 *	199	0.21 **	162
Beauty and views (r)	0.14	62	−0.08	58	0.00	208	−0.07	199	−0.04	162
Restorativeness (r)	−0.07	62	0.21	58	−0.05	208	−0.06	199	0.15	162
Escapism (r)	0.12	62	0.26	58	−0.11	208	0.04	199	−0.05	162
Nature (r)	−0.10	62	0.03	58	−0.17 *	208	0.02	199	−0.05	162
Blue space itself (r)	−0.13	62	−0.16	58	0.01	208	0.02	199	−0.06	162
Activities (r)	−0.14	62	−0.05	58	0.22 **	208	−0.05	199	−0.11	162
Facilities level (τb)	−0.05	289	−0.06	277	**0.27 *****	249	**−0.22 *****	554	0.02	292
Land access level (τb)	**−0.18 *****	289	**−0.16 *****	277	−0.07	249	**−0.22 *****	554	−0.04	292
Water access level (τb)	0.05	289	0.07	277	**0.28 *****	249	**−0.18 *****	554	**−0.10 ***	292

Table 2. *Cont.*

	Tallinn		Tartu		Warsaw		Plymouth		Barcelona	
	r or τb	**N**	**r or τb**	**N**	**r or τb**	**N**	**r or τb**	**N**	**r or τb**	**N**
Marina, dock, jetty (r)	**−0.13** *	289	**0.12** *	277	**−0.21** **	249	−0.04	554	−0.08	292
Urban street, square (r)			−0.05	277			−0.04	554		
Promenade (r)	0	289	−0.06	277	**0.28** ***	249	**−0.09** *	554	**−0.21** ***	292
Meadow (r)	0.05	289	0	277	−0.04	249	0.03	554		
Scrub (r)	−0.06	289	0.02	277					−0.03	292
Park (r)	**−0.18** **	289	**−0.15** *	277	**−0.22** ***	249	−0.03	554	**−0.19** ***	292
Woodland (r)	**0.31** ***	289	**0.18** **	277	−0.04	249	0.07	554	**0.37** ***	292
Beach (r)	**0.19** **	289	0.10	277	**0.28** ***	249	0.04	554	**0.23** ***	292
Cliff, rocks, shingle (r)	−0.04	289					0.04	554	**0.76** ***	292
Pond (r)	**−0.20** ***	289	−0.06	277	**−0.13** *	249	−0.03	554	**−0.18** ***	292
Lake (r)	0.08	289	0.11	277	**0.16** *	249	0.06	554		
Wetland (r)	0.07	289	0.05	277					0.04	292
Canal (r)					**−0.28** ***	249				
River (r)	0.01	289	−0.06	277	**0.26** ***	249	0	554	−0.11	292
Sea (r)	0.09	289					−0.02	554	**0.20** ***	292

Place-based values associated with favourite blue spaces were not generally associated with either larger or smaller distances, with two exceptions. Comments about nature were negatively correlated with distances in Warsaw—fewer such comments were marked for more distant blue spaces. Cultural values and ambience were positively correlated with distances in all cities, and in the cases of Warsaw, Plymouth, and Barcelona, the results were statistically significant. In the case of Warsaw, activities were positively and significantly correlated with distances—more comments were mentioned in more distant locations.

In the case of blue space parameters (facilities level, water access, and land access), the significant correlations were mainly negative except for Warsaw, where a higher level of water access and provision of facilities was associated with larger distances. In Tallinn and Tartu, only the land access level was significantly larger with shorter distances, while in Plymouth, higher levels of provision of all three blue space parameter measures were correlated with smaller distances. Finally, in Barcelona, smaller distances were associated with better levels of water access.

Correlations with distance from home and blue space type by land cover and land use revealed a variety of results. In Plymouth, only one significant negative correlation was found: promenades. In both Barcelona and Warsaw, the majority of land cover types could be associated with larger or smaller distances. In general, distances are negatively correlated with parks, significantly so in four cases (Tallinn, Tartu, Warsaw, and Barcelona), where parks identified as a favourite blue space type tend to be closer to homes. Beaches are always positively correlated with distances, significantly so in three cases (Tallinn, Warsaw, and Barcelona), meaning that beaches, as favourite blue space types, tend to be further away from home. Also, woodlands are often significantly positively correlated with distance. This suggests that respondents are often willing to travel further to reach beaches and woodlands. Other land cover types also have significant correlations, but in different directions, depending on the city. Marinas, docks, and jetties are associated with shorter distances in Tallinn and Warsaw but larger distances in Tartu. Promenades are associated with shorter distances in Plymouth and Barcelona but with larger distances in Warsaw. Cliffs, rocks, and shingles are strongly associated with longer distances, but only in Barcelona. Scrublands, meadows, and urban streets or squares do not show any relationship with distances.

Distance from home was not significantly correlated with any waterbody type in the cases of Tartu and Plymouth, while in Tallinn and Barcelona, some correlations were significant. In Tallinn, ponds were negatively correlated with distances, suggesting more local use. Similarly, in Barcelona, ponds were negatively correlated to distance while the sea was significantly positively correlated, suggesting more distant use scenarios. In Warsaw, all waterbody types correlated significantly to distances, suggesting more local use for canals and ponds and more distant use for lakes and rivers. Looking at the correlations from the perspective of waterbody types, it can be noted that ponds were always negatively correlated to distances from home in our data, and in three cases out of five, significantly so. In the case of lakes, the correlations were always positive, albeit only significant in the case of Warsaw. The most dominant waterbodies in the city do not always stand out in these correlations. In Warsaw, the river was significantly positively correlated to distances, suggesting that among all of the favourite blue spaces, the respondents were indicating the main waterbody was located further away from home. However, this was not the case in Tartu. Similarly, in sea-dominated cities, only Barcelona had the same significant positive correlation.

4.2.2. General Relationships with Closeness to Home and Other Everyday Places

Following the correlation analysis of the previous section, where absolute distances were the focus, we decided to explore the relationships further, but this time dividing locations into two categories: close to home or other frequented places and distant. For brevity, the main results of the Chi-square tests, which only reveal the presence or absence of statistically significant differences between two groups (close vs. distant), are given in Appendix A; hence, Table 3 reports the adjusted residuals for statistically significant results only. Adjusted residuals are z-scores, so anything above absolute 1.96 is significant at the p 0.05 level, and the positive and negative signs can subsequently be interpreted as an abundance or shortage of cases compared to the expected frequency. For ease of comparison with the previous correlations on distances from home, it is helpful to pay attention to the columns entitled "Distant" (as distance on a continuous scale increases, the likelihood of dichotomous classification as distant also increases).

Table 3. The adjusted residuals (z-scores) are shown only for statistically significant results of the Chi-square test (Appendix A). * = significant adjusted residual value, indicating a larger than expected number of cases if positive or a smaller number if negative. (d) = dichotomous variable coded as 0 for absence and 1 for presence in the data; because of the symmetry of residuals and to save space, only the present level is shown.

Variable	**level**	**Tallinn**		**Tartu**		**Warsaw**		**Plymouth**		**Barcelona**	
		Distant	**Close**	**Distant**	**Close**	**Distant**	**Close**	**Distant**	**Close**	**Distant**	**Close**
Female (d)	1			−2.37 *	2.37 *					−2.02 *	2.02 *
Age group	1							−3.05 *	3.05 *	0.40	−0.40
	2							−0.58	0.58	0.14	−0.14
	3							3.26 *	−3.26 *	0.21	−0.21
	4							−0.01	0.01	−2.48 *	2.48 *
	5							−0.71	0.71	2.52 *	−2.52 *
	6							−1.33	1.33	−0.43	0.43
	7							−0.20	0.20		
Role of water in the overall experience	1									−0.86	0.86
	2									−2.68 *	2.68 *
	3									0.94	−0.94
	4									−0.95	0.95
	5									2.48 *	−2.48 *
Cultural values and ambience (d)	1										
Beauty and views (d)	1					2.34 *	−2.34 *				
Restorative (d)	1										
Escapism (d)	1	2.34 *	−2.34 *								
Nature (d)	1					−2.26 *	2.26 *				
Blue space itself (d)	1					2.26 *	−2.26 *				
Activities (d)	1										

Table 3. *Cont.*

Variable	level	Tallinn		Tartu		Warsaw		Plymouth		Barcelona	
		Distant	**Close**	**Distant**	**Close**	**Distant**	**Close**	**Distant**	**Close**	**Distant**	**Close**
Facilities level	0			−1.45	1.45	−2.59 *	2.59 *	4.32 *	−4.32 *		
	1			2.65 *	−2.65 *	−1.01	1.01	2.32 *	−2.32 *		
	2			−1.65	1.65	3.09 *	−3.09 *	−5.00 *	5.00 *		
Land access level	0	1.98 *	−1.98 *					1.94	−1.94		
	1	1.59	−1.59					4.97 *	−4.97 *		
	2	−2.79 *	2.79 *					−5.51 *	5.51 *		
Water access level	0					−1.73	1.73	−0.17	.17	−1.51	1.51
	1					−1.58	1.58	6.45 *	−6.45 *	3.02 *	−3.02 *
	2					3.61 *	−3.61 *	−6.04 *	6.04 *	−2.25 *	2.25 *
Marina, dock, jetty (d)	1	−2.69 *	2.69 *			−3.68 *	3.68 *	−3.73 *	3.73 *		
Urban street, square (d)	1							−2.28 *	2.28 *		
Promenade (d)	1					4.14 *	−4.14 *	−5.35 *	5.35 *		
Meadow (d)	1							3.32 *	−3.32 *		
Scrub (d)	1										
Park (d)	1			−2.84 *	2.84 *	−2.30 *	2.30 *	−3.27 *	3.27 *	−3.38 *	3.38 *
Woodland (d)	1	3.85 *	−3.85 *			−2.04 *	2.04 *	6.42 *	−6.42 *	1.98 *	−1.98 *
Beach (d)	1	2.67	−2.67 *					3.91 *	−3.91 *	3.21 *	−3.21 *
Cliff, rocks, shingle (d)	1									2.74 *	−2.74 *
Pond (d)	1	−3.59 *	3.59 *							−2.91 *	2.91 *
Lake (d)	1							2.12 *	−2.12 *		
Wetland (d)	1	2.41 *	−2.41 *								
Canal (d)	1					−4.54 *	4.54 *				
River (d)	1					4.95 *	−4.95 *	3.25 *	−3.25 *	−2.25 *	2.25 *
Sea (d)	1	2.19 *	−2.19 *					−3.58 *	3.58 *	3.22 *	−3.22 *

Compared to the results with distances on a continuous scale, there are many similarities but also some notable differences. While in the earlier analysis, gender had no significance, it now has significant results in Tartu and Barcelona. In both cities, a larger than expected number of women indicated favourite blue spaces close to home or other everyday locations, and consequently, fewer women were associated with distant locations. In Tallinn, the age groups correlated with distances in the earlier analysis, but now the relationship is not present. Instead, Plymouth and Barcelona had significant results for distinct age groups. In Plymouth, the age group 35–44 was over-represented and the age group 16–24 was under-represented in distant locations, while in Barcelona, the age group 55–64 was over-represented and the age group 45–54 was under-represented. Similar to the previous correlation analysis, the role of water in the overall experience was significantly associated with distances in Tartu and Barcelona. A score of 5 was significantly over-represented, and a score of 2 was significantly under-represented in distant locations in Barcelona.

Categories of place-based values were related to distance in a rather different manner. Cultural values and ambience were not related to close or distant locations in any city, contrary to previous results. Comments relating to escapism had been mentioned more often in distant places in Tallinn. In Warsaw, distant locations had a greater than expected frequency of comments on beauty and views, as well as the blue space itself, while there were fewer comments than expected in relation to nature (in agreement with the distance correlation).

Results for facility levels were very much in agreement with the previous correlation analysis in Tallinn, Warsaw, Plymouth, and Barcelona. In all of these cities, the distant locations had significantly fewer high provision scores if previous correlations were negative and significantly more high provision scores if previous correlations were positive. The only divergence from the previous distance correlation analysis was in Tartu, where land access level scores were not statistically significant anymore. Instead, the facilities provision level of 1 (mid-value) was significantly overrepresented in distant locations.

In the case of land cover types, the results are comparable with the correlation analysis with distances. In Plymouth, the residuals for promenades were in agreement with the previous correlation analysis, but in addition, many other land cover types had significant results this time. In Barcelona, the results were in agreement with the previous results except for promenades, which no longer exhibited a significant relationship. Distant locations had fewer than expected cases of marinas, docks, and jetties; urban streets and squares; promenades; and parks, while meadows, woodlands, and beaches were overrepresented. In Tallinn, beaches and woodlands were more frequently present in distant places, and marinas, docks, and jetties were less frequent, just as in the correlation analysis. The only difference was the fact that parks did not have significant differences between close and distant locations anymore. In Tartu, marinas, docks, and jetties, as well as woodlands, were not significantly different anymore between distant and close locations, while parks were less present in distant places just as previously. Similarly in Warsaw, the results were more or less repeating the previous analysis except for beaches having no significant differences between distant and close locations anymore and woodlands gaining significant results.

Similarly, for waterbody types, there are some differences compared to previous correlations, but none of the results has changed the direction of the relationship. In Tallinn, ponds are less prominent, while wetlands and the sea are more prominent in distant locations. In Tartu, none of the waterbody types can be significantly associated with distant or close locations. In Warsaw, ponds and lakes no longer have statistically significant differences, while the river is still overrepresented in distant locations and canals are underrepresented. In Plymouth, which previously had no significant relationships, lakes and rivers are significantly more prominent in distant locations, while the sea is represented less than expected. In Barcelona, there are fewer cases of ponds and rivers and more cases of the sea in distant locations.

4.2.3. Visitor Catchment and Blue Space Relationships

This subsection explores the distribution of blue spaces in relation to whether visitors are predominantly from nearby, far away, or both. These show a similar variety of favourite blue spaces regardless of visitor travel distance (Figure 5). For the further spatial distribution of these areas, see Appendix B. People are not going only to nearby or distant places but will visit both, suggesting that there may be different motivations for visiting different places.

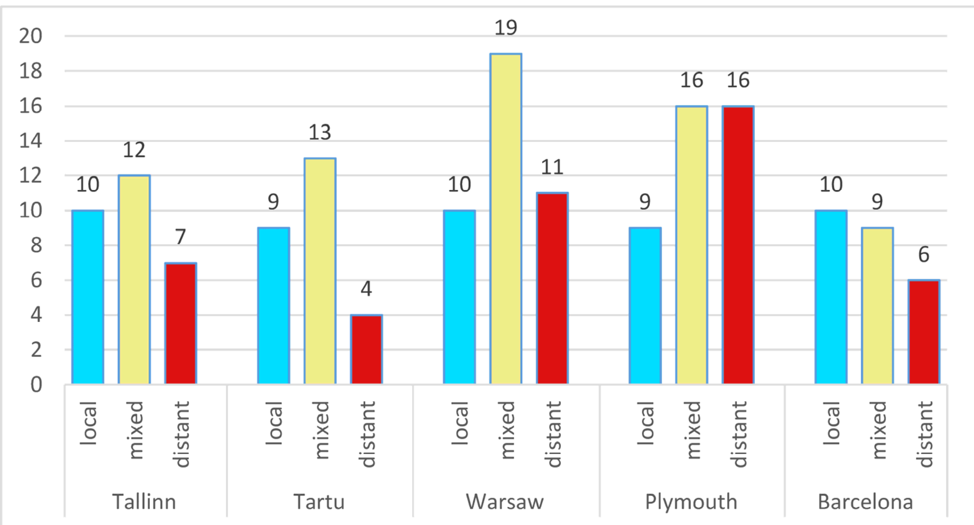

Figure 5. Distribution of local, mixed, and distant blue spaces within case study areas.

As Table 4 shows, there is no relationship between gender and the type of area coded as local, mixed, or distant. Similarly, the age groups do not seem to be linearly correlated. There is a significant result in Plymouth, but the magnitude of 0.09 at a *p-level* of 0.05 is marginal. The role of water in the overall experience is positively correlated with the service distance in Barcelona and Tartu. Areas that are primarily visited from greater distances tend to have higher scores on water experience. The relatively large correlations in Barcelona are in agreement with both of the previous analyses, but the significant result for Tallinn is a new find.

Table 4. Kendall's tau-b correlation of socio-demographics and place-based value categories with distant (coded as 3), mixed (coded as 2), and local places (coded as 1). N = a number of valid cases. *** = correlation is significant at the 0.001 level (2-tailed); ** = correlation is significant at the 0.01 level (2-tailed); * = correlation is significant at the 0.05 level (2-tailed). All statistically significant results are also in bold marking.

	Tallinn		**Tartu**		**Warsaw**		**Plymouth**		**Barcelona**	
	τb	**N**	**τb**	**N**	**τb**	**N**	**τb**	**N**	**τb**	**N**
Female	0.04	310	0.02	282	0.08	222	−0.03	615	0.01	291
Age group	0.04	310	0.03	282	−0.08	223	**0.09** *	615	0.04	291
Role of Water in the overall experience	**0.19** **	245	0.12	204	−0.05	259	0.06	421	**0.38** ***	152
Cultural values and ambience	−0.08	58	−0.18	55	0.08	224	0.05	173	0.10	103
Beauty and views	0.12	58	0.03	55	0.09	224	0.04	173	0.00	103
Restorative	−0.020	58	0.20	55	−0.05	224	−0.05	173	0.17	103
Escapism	**0.36** **	58	0.24	55	−0.11	224	−0.05	173	**0.24** *	103
Nature	0.18	58	0.23	55	**−0.14** *	224	−0.10	173	0.14	103
Blue space itself	−0.01	58	0.03	55	−0.00	224	0.02	173	**0.29** **	103
Activities	−0.01	58	0.02	55	**0.18** **	224	0.07	173	−0.03	103

Looking at the place-based value correlations with the service distance, a larger number of comments on escapism are associated with areas that serve distant visitors, such as Tallinn and Barcelona. In Barcelona, the blue space itself is also mentioned more often, along with areas that are primarily visited from far away. In Warsaw, the significant negative correlation hints that more comments are made about nature in areas that are close to home, and the positive correlation for activities suggests these are associated more with places visited from greater distances.

The following correlations (Table 5) compare various parameters of the areas themselves. Consequently, the number of cases is much smaller, and the correlation results should be interpreted with caution. In the amenities provision, only two results are statistically significant, both in agreement with the previous two versions of the analyses. The facilities level score in Plymouth tends to be higher in areas serving local residents, and the water access level score in Warsaw tends to be higher in areas that serve distant locations.

Promenades are associated with areas that serve local residents in Plymouth. Parks have negative correlation coefficients in all cities, and in three cases, these are statistically significant. A larger number of parks are associated with areas that serve local user groups. On the contrary, areas that are primarily visited from longer distances often tend to have woodlands, beaches, and, in the case of Barcelona, cliffs, rocks, and shingle.

In this version of the analysis, ponds tend to be a local thing. Correlations are all negative and statistically significant in three cases. Results for other waterbody types are less definitive. Rivers are more often associated with areas that serve local residents, and the sea is often associated with areas that have larger distances from home, only in Barcelona.

Table 5. Correlation between service distance score (distance coded as 3, mixed coded as 2, and local places coded as 1) and facility/access level, land cover, and waterbody type. N = number of valid cases. *** = correlation is significant at the 0.001 level (2-tailed); ** = correlation is significant at the 0.01 level (2-tailed); * = correlation is significant at the 0.05 level (2-tailed). All statistically significant results are also in bold marking.

	Tallinn		Tartu		Warsaw		Plymouth		Barcelona	
	τb	N	τb	N	τb	N	τb	N	τb	N
Facilities level	−0.19	29	−0.01	26	0.00	40	**−0.31 ***	41	0.05	25
Land access level	−0.22	29	−0.16	26	−0.03	40	−0.23	41	0.05	25
Water access level	0.18	29	0.30	26	**0.36 ***	40	−0.07	41	0.06	25
Marina, dock, jetty	−0.31	29	0.16	26	−0.01	40	−0.03	41	0.08	25
Urban street, square			−0.24	26			0.15	41		
Promenade	0.06	29	−0.01	26	0.29	40	**−0.42 ****	41	0.15	25
Meadow	0.05	29	−0.06	26	−0.01	40	0.13	41		
Scrub	0.04	29	−0.06	26					−0.22	25
Park	−0.25	29	−0.24	26	**−0.43 ****	40	**−0.35 ***	41	**−0.61 ****	25
Woodland	**0.46 ***	29	**0.38 ***	26	0.23	40	0.27	41	0.10	25
Beach	**0.46 ****	29	0.25	26	**0.33 ***	40	0.28	41	**0.74 *****	25
Cliff, rocks, shingle	0.05	29					0.17	41	**0.49 ***	25
Pond	**−0.40 ***	29	−0.32	26	**−0.31 ***	40	−0.22	41	**−0.57 ****	25
Lake	0.17	29	0.27	26	0.21	40	0.09	41		
Wetland	0.32	29	0.10	26					0.06	25
Canal					−0.21	40				
River	−0.13	29	−0.10	26	0.30	40	0.06	41	**−0.39 ***	25
Sea	0.22	29					−0.03	41	**0.77 *****	25

5. Discussion

We aimed to study different patterns and preferences for the use of blue spaces at the city level in a sample of European cities, in particular the impact of distance from residential areas, the role of water, the level of facilities, and the character of spaces in attracting visitors of different demographic characteristics.

The first research question asked: What are the most popular blue spaces among residents of the different case study cities, and what typifies the range of favourite blue spaces in each, according to blue space and water element type?

We found that the case study areas were very different, but generally, each of them has a dominant blue element. Either they were built on the coast or along the river, and so, unsurprisingly, these tended to be among the most favourite places. However, the importance of the blue element itself was the second-most mentioned place-based value in the coastal cities and only third or fourth in the river cities. In coastal cities, the majority of respondents pointed to the sea as their favourite blue element, while for river cities, the choice of blue elements was more diverse, with a bigger share identifying with ponds, lakes, and canals. It seems that the diversity of blue elements, in general, is greater in Warsaw and Tartu, especially the former, than in coastal cities (Figure 1). What distinguishes Warsaw is its rather large share of canals, connected to the history of the city's development. These areas are very popular among residents, especially if managed and adapted to their needs. This suggests that not only the blue element itself is important, but also the area connected to it, the so-called blue space [13], with different land use and land cover, which is an important step to bridge the gap in existing research and to see the relations among preferences and blue space types and characteristics [31].

It seems that land use and land cover types in blue spaces are very site-specific and unique for each city studied. For example, in Barcelona, by far the most popular area is the beach, promenade, and marina—this might be one of the few blue spaces, relatively close, where one can visit (Figure 1). On the other hand, in Warsaw, woodlands were chosen much more often than in other cities, since there are a lot of overgrown, "wild" places in this city [8,66,67]. In Tallinn, Tartu, Plymouth, and Warsaw, parks with blue elements were chosen more often than in densely built-up Barcelona. In Plymouth, because of its diverse shoreline, cliffs, rocks, and shingle elements are much more commonly chosen by respondents. Therefore, in the planning process, a more specific analysis of each city is recommended.

Although the restorative effects of favourite blue spaces identified by respondents in each city were not mentioned as often as other place-based values, the activities within the areas were highlighted, especially in Tallinn, Tartu, Plymouth, and Barcelona, and as the third most frequent value in Warsaw. These place-based values, especially "activities" and "escapism", might, however, be treated as pathways to positive health and well-being outcomes, as suggested in the literature [16,23,24,26,29–33]. An additional aspect important in mediating positive health and well-being is an appreciation of the naturalness of an area, as identified in Warsaw, that may affect the level of activities, as demonstrated in Gothenburg [51]. It is possible that Warsaw in general has more green and "wild" areas connected to blue spaces, such as the wild Vistula river banks or along canals [13], and so "escaping" is also easier in such an environment.

In order to answer the second research question, does the distance from home affect the choice of blue spaces to visit? We looked at distances from home locations to the selected blue space. River cities, since the river passes through the centre, tend to have a shorter median distance to the water from all parts of the urban area than coastal cities, which on the one hand might be connected with more, different blue spaces spread around the city with the river in its central part (as in Tartu and Warsaw, Figure 1), or the seaside, being clearly a destination place, chosen despite the distance [40,41]. However, looking at distances from the perspective of local, mixed, and distant places, in Plymouth and Warsaw, more mixed and distant places were marked than local ones, while in other cases it was the local and mixed ones. The fractal character of the shoreline in Plymouth also gives shorter median distances to the water than Barcelona, which has a simple, straight coastline. Tallinn is somewhere in between, morphologically speaking.

To explore this topic in more detail, we looked at the relationship of distances with water bodies and blue space types. Tallinn, Warsaw, and Barcelona ponds were significantly related to blue places closer to home, as were canals in Warsaw. These smaller types of blue elements are usually located in parks and other open spaces within the urban tissue and might serve as everyday recreation areas. Similarly, marinas, docks, and jetties (Tallinn and Warsaw) and promenades (Plymouth and Barcelona) are also favourite places closer to home, perhaps because of their central character.

Conversely, the lakes and rivers in Warsaw and the sea in Barcelona were positively correlated to further distances from home (but negatively in Tartu, which is much smaller). What is interesting is that the promenade in Warsaw is positively correlated to distance from home, which might be explained by the recent renovation of that area and the huge popularity of that place among inhabitants, especially during weekends, due to the activities located there. Generally, however, the favourite but more distant places typically have a more natural land cover and are located around the edge of the city—woodlands, beaches, or cliffs and rocks—depending on the case study area. Everyday places are important to fulfil everyday needs, while distant places might therefore have some qualities that make them a special destination, despite the distance. Some studies suggest that proximity to blue spaces is connected to better health and well-being [33,36] but on the other hand, for some, distance is not crucial, and they are willing to travel further to the nearest nature area [38,39]. Therefore, closer recognition of which places serve as either every day or destination places—or both—is valuable for further planning and design decisions.

Additionally, the relationship between distance and place-based values described by respondents was studied. In general, the distance was not very much related to place-based values, except cultural ones and ambience in Warsaw, Plymouth, and Barcelona, for distant areas. However, one test revealed a relationship between distant places and the possibility of escape, but only for Tallinn and Warsaw. It is interesting that in Warsaw, perceptions of values connected to nature were assigned to places closer to home, but since one extraordinary aspect of that city is the extensive, wild green areas in the centre, gives the possibility for escape and restoration closer to home, this is a unique example.

The third research question asked: What is the role of water, number of facilities, and blue space character in determining the choice of blue spaces? Access to green and blue spaces and appropriate facilities has been shown to be important for recreation [16,43,44]. In our study, the role of water in the overall experience was associated with more distant places, such as Tallinn, Tartu, and Barcelona, where places connected to water might be treated as destination places. In the case of Warsaw, distant places also tend to have a higher level of provision of facilities and water access, which is not provided within the city. Conversely, in Plymouth, the number of facilities, water, and land access was related to favourite places closer to home. Similarly, in Tartu and Tallinn, closer spaces were related to a higher level of land access, while in Barcelona, they were associated with places with better water access. There is no specific identifiable pattern here, but it could be worth exploring further than we were able to with the data we collected.

The final and fourth research question asked: What is the relation between gender and age groups and the chosen blue space distance from home? Studies on socio-demographic aspects such as age, gender, and blue spaces have focused mainly on activities [59,60]. In our study, we tried to determine what impact distance from home might have on different ages and gendes. The results of this were not very significant, in the main, except for age in Tallinn and gender in Tartu and Barcelona, where for the latter, women tended to identify places closer to home as their favourites. However, these were limited findings, and we cannot draw much from them.

6. Conclusions

The spatial pattern of blue spaces is often geographically pre-defined and much less flexible than that of green spaces, giving much less control in terms of planning and design, especially in providing blue spaces within easy reach of residential areas. Exploration of the provision of blue spaces in relation to the distance from home, accessibility to these areas, and site-specific characteristics are, therefore, more important for understanding how and what people value about them and why they visit—in some places there are beach areas along the sea shore, in others wild spaces along a river, or cliffs and rocks. From our study, we can see that there is a lot of variety between different cities simply because they have different morphology and urban pattern related to the place of water in the urban landscape. This distinguishes the way in which blue infrastructure can be planned, designed, and incorporated into the urban landscape when compared with green infrastructure, for which, as noted earlier, there is much more flexibility. In addition, as a result of the different climates, the use of blue spaces varies a lot, and it is no surprise that the beach in Barcelona is hugely popular as a destination and that distance does not impact its popularity. Wide variation was to be expected; however, the level of inconsistency in the data points to the fact that usage of blue areas is very specific to the local situation so broad generalizations are often unwarranted and in fact, should be avoided. Every city wanting to assess and improve the usage of blue spaces should therefore do an independent study, focusing on the different roles played by both everyday local places and destination places.

6.1. Limitations

This study was limited by the relatively small number of respondents given the population sizes of each city. Data-gathering exercises using PPGIS can gather far greater numbers of respondents, but recruitment requires a lot of effort in publicizing the survey and activating the population. This is best done at the individual municipality level, but then it is not easy to obtain comparable data. Such limitations are common to any survey undertaken via the Internet when there are potential segments of the target population who cannot be reached and sampling is on a voluntary basis. There are also potential issues with respondents' recall and the truth of self-reported data, which are also common issues with surveys of all kinds. These limitations also affect the possibilities for statistical analysis, especially the use of inferential statistics as part of the "explore, explain, predict" model within PPGIS. When carrying out case study research, it is not possible to be truly comparable or to generalize results, but this is also a well-known aspect of such research.

6.2. Further Research

Given the fact that urban blue space morphology defines many cities around the world in ways that are significant for many aspects of urban planning, further examination of this would be relevant, especially in terms of ensuring more equitable access. If you cannot bring the blue spaces to the people, then it is necessary to bring the people to the blue spaces.

Supplementary Materials: The following supporting information can be downloaded at: https://www.mdpi.com/article/10.3390/su15097392/s1.

Author Contributions: conceptualization: G.N., A.W. and S.B.; methodology: G.N., A.W., S.B. and P.V.; software: A.W. and G.N.; writing—original draught preparation: A.W., S.B., I.M. and P.V.; writing—review and editing: A.W., S.B. and P.V.; project administration: S.B., G.N., A.W. and I.M.; funding acquisition: S.B. and A.W. All authors have read and agreed to the published version of the manuscript.

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Institutional Review Board Statement: As the study did not include direct contact with anyone, did not collect personal information, and did not engage with vulnerable people, it was deemed not to require ethical approval. The data was collected in accordance with the European GDPR rules.

Informed Consent Statement: At the start of the survey, respondents were given details of the purpose of the project and were given the option to leave it at any time. By entering the survey, they gave informed consent.

Data Availability Statement: Since there are more analyses we wish to undertake, we are withholding the database at the moment.

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Conflicts of Interest: The authors declare no conflict of interest.

Appendix A

Table A1. Chi-square tests between closeness to everyday places and other variables. f = Fisher's exact test; here the *p* value is reported instead of the Chi-square. [a] = Chi-square test assumptions not met; (df) = number of degrees of freedom; b = 6 degrees of freedom. *** = Test is significant at the 0.001 level (2-tailed); ** = Test is significant at the 0.01 level (2-tailed); * = Test is significant at the 0.05 level (2-tailed). All statistically significant results are also in bold marking.

	Tallinn		Tartu		Warsaw		Plymouth		Barcelona	
	χ^2	N	χ^2	N	χ^2	N	χ^2	N	χ^2	N
Female (df1)	1.98	350	**5.63 ***	328	0.17	291	0.14	758	**4.06 ***	477
Age group (df5)	7.93 b	350	7.18	328	4.30	293	**18.96 ** b**	758	**11.40 ***	477
Role of water in overall experience (df4)	3.64 [a]	288	**10.67 * [a]**	239	1.37 [a]	323	1.16 [a]	491	**11.75 ***	231

Table A1. *Cont.*

	Tallinn		Tartu		Warsaw		Plymouth		Barcelona	
	χ^2	N	χ^2	N	χ^2	N	χ^2	N	χ^2	N
Cultural values and ambience (df1)	f p = 0.461	65	f p = 1.000	60	0.755	289	0.95	222	2.81	163
Beauty and views (df1)	f p = 0.067	65	f p = 0.250	60	**5.492** *	289	1.05	222	0.33	163
Restorative (df1)	f p = 1.000	65	f p = 1.000	60	3.236	289	2.95	222	0.55	163
Escapism (df1)	**f *p* = 0.027** *	65	f p = 0.070	60	0.252	289	0.22	222	1.24	163
Nature (df1)	f p = 0.205	65	f p = 0.202	60	**5.112** *	289	0.05	222	0.97	163
Blue space itself (df1)	0.87	65	f p = 0.485	60	**5.102** *	289	1.79	222	1.57	163
Activities (df1)	0.00	65	0.09	60	0.187	289	0.10	222	0.89	163
Facilities level (df2)	4.84	291	**7.81** *	279	**10.11** **	353	**29.50** ***	571	1.81	293
Land access level (df2)	**7.90** *	291	5.83	279	0.54	353	**30.70** ***	571	0.13	293
Water access level (df2)	5.35	291	2.56	279	**13.17** **	353	**44.01** ***	571	**9.23** **	293
Marina, dock, jetty (df1)	**7.22** **	291	3.18	279	**13.51** ***	353	**13.90** ***	571	0.07	293
Urban street, square (df1)			0.42	279			**5.22** *	571		
Promenade (df1)	0.72	291	3.02	279	**17.18** ***	353	**28.64** ***	571	0.22	293
Meadow (df1)	0.16	291	0.41	279	0.51	353	**11.04** ***	571		
Scrub (df1)	0.04	291	0.64	279					0.19	293
Park (df1)	3.72	291	**8.06** **	279	**5.28** *	353	**10.70** **	571	**11.43** ***	293
Woodland (df1)	**14.81** ***	291	3.48	279	**4.15** *	353	**41.22** ***	571	**3.91** *	293
Beach (df1)	**7.12** **	291	2.75	279	3.16	353	**15.30** ***	571	**10.30** **	293
Cliff, rocks, shingle (df1)	0.02	291					2.88	571	**7.52** ** [a]	293
Pond (df1)	**12.88** ***	291	0.87	279	2.66	353	f p = 0.124	571	**8.49** **	293
Lake (df1)	0.90	291	1.1	279	0.11	353	**4.51** *	571		
Wetland (df1)	**5.82** **	291	2.51	279					f p = 0.201	293
Canal (df1)					**20.65** ***	353				
River (df1)	0.02	291	0.09	279	**24.47** ***	353	**10.54** **	571	**5.07** *	293
Sea (df1)	**4.79** *	291					**12.78** ***	571	**10.37** **	293

Appendix B. Maps Showing the Distribution of Local, Mixed, and Distant Blue Spaces within Case Study Areas

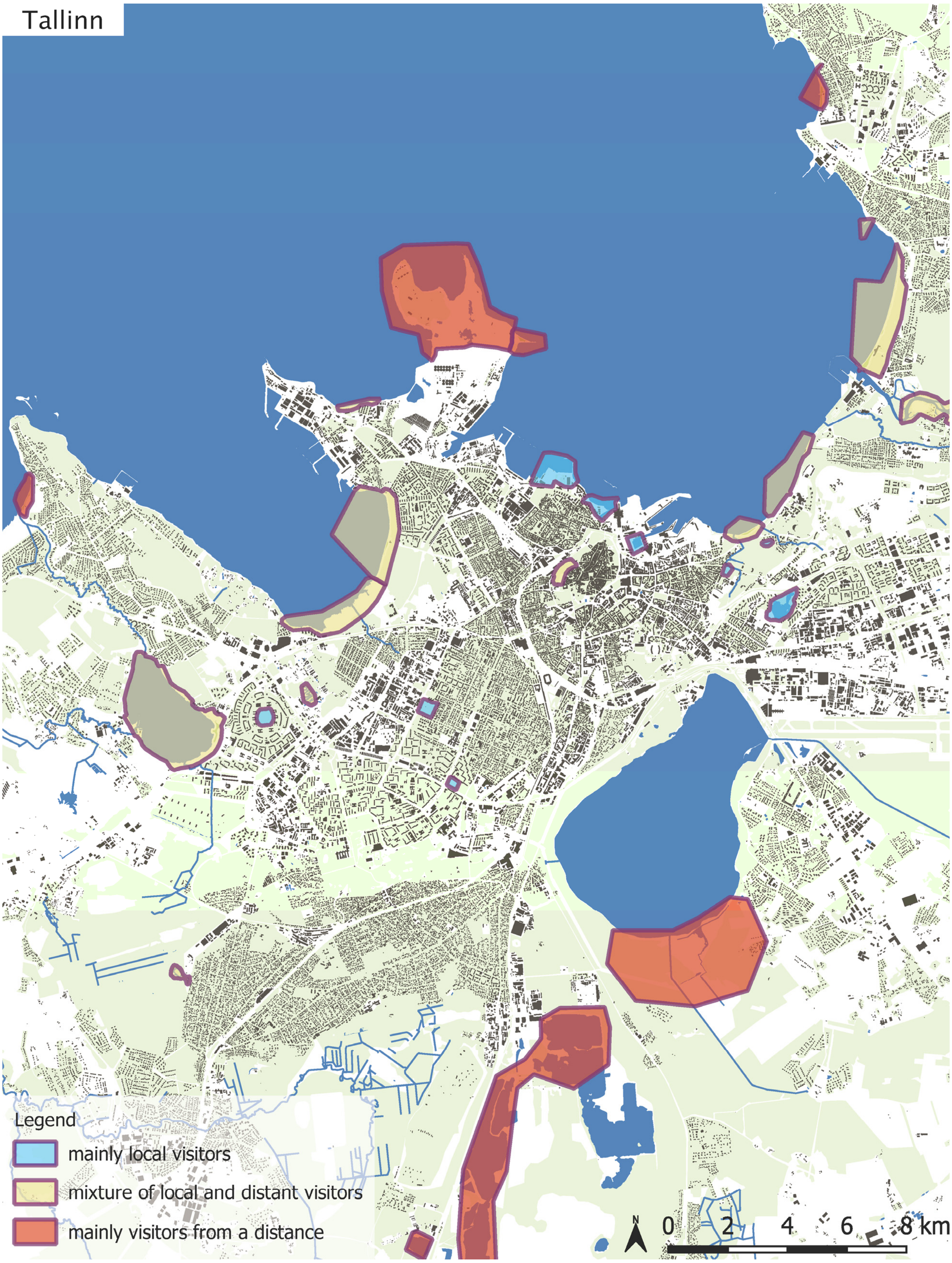

Figure A1. Distribution of local, mixed, and distant blue spaces in Tallinn (source: © OpenStreetMap CC BY-SA 2.0, openstreetmap.org/copyright).

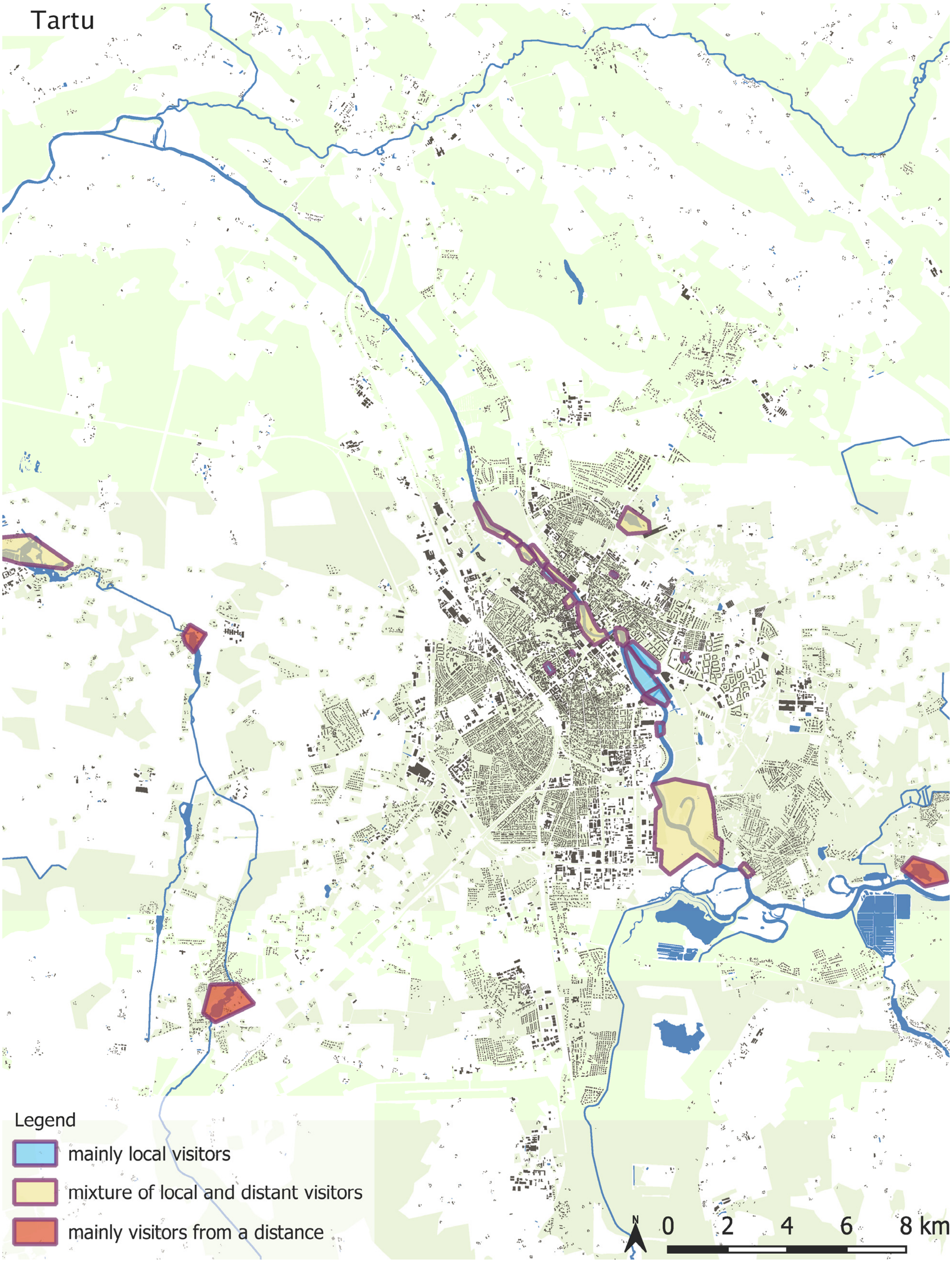

Figure A2. Distribution of local, mixed, and distant blue spaces in Tartu (source: © OpenStreetMap CC BY-SA 2.0, openstreetmap.org/copyright).

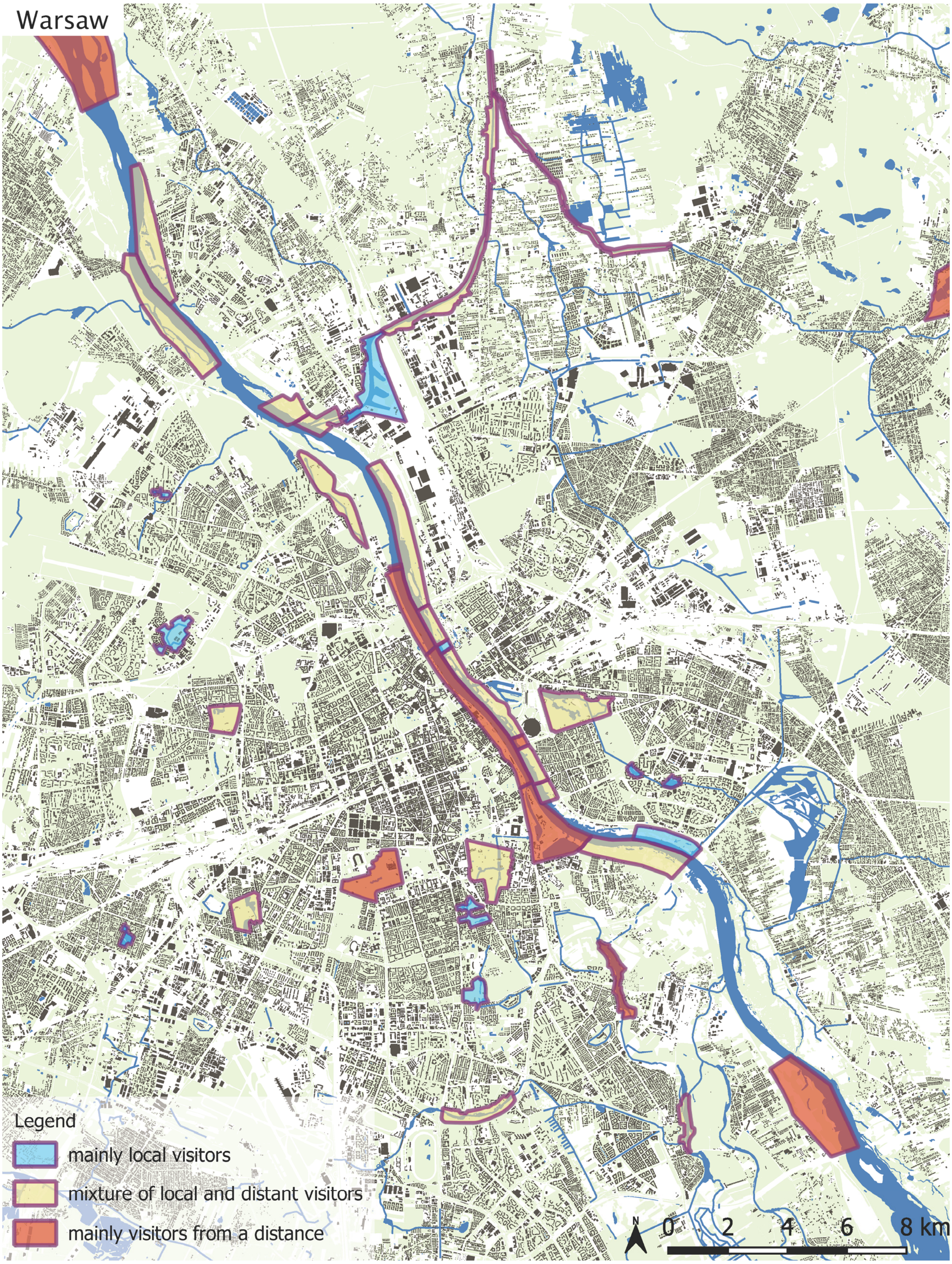

Figure A3. Distribution of local, mixed, and distant blue spaces in Warsaw (source: © OpenStreetMap CC BY-SA 2.0, openstreetmap.org/copyright).

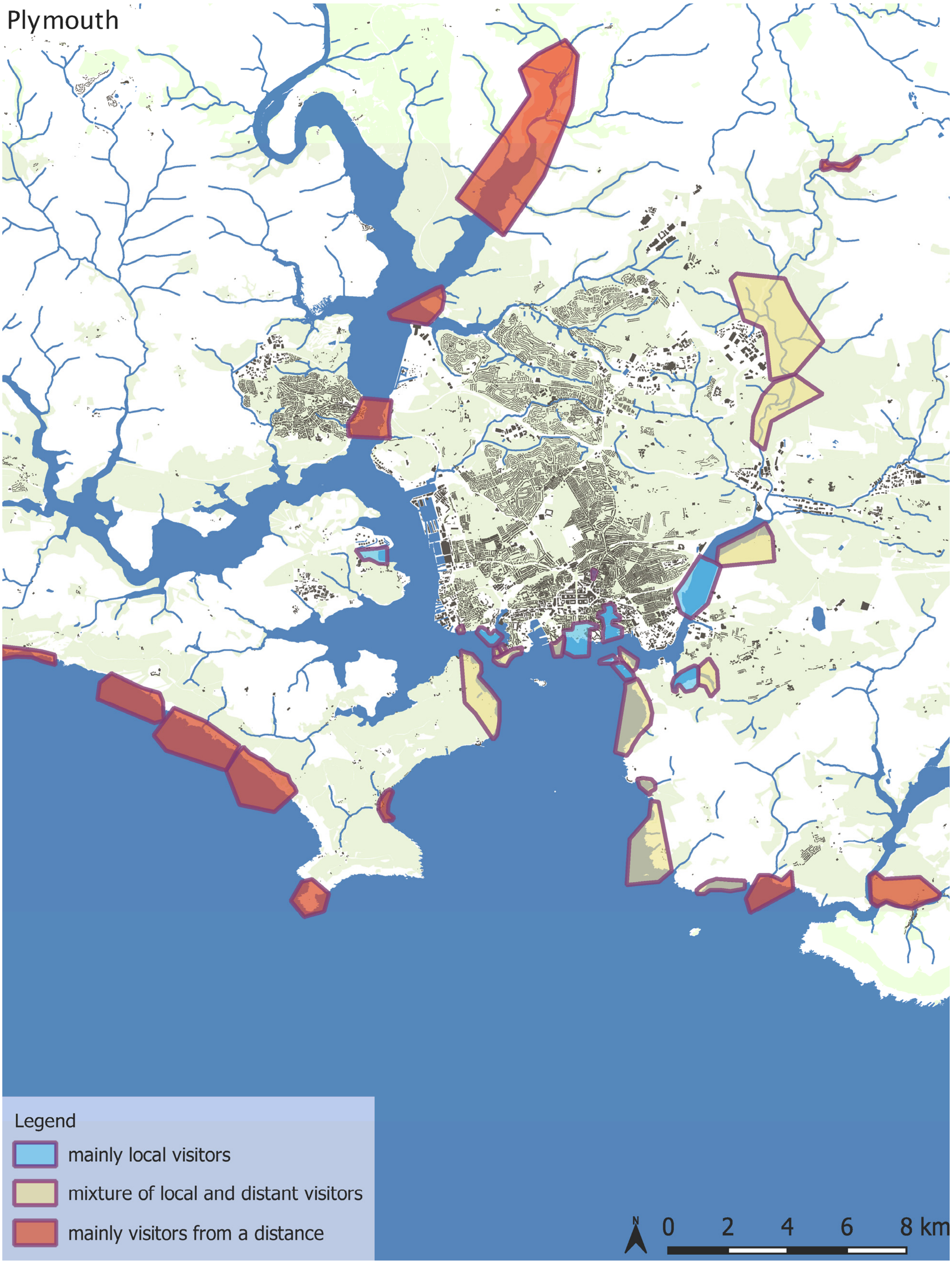

Figure A4. Distribution of local, mixed, and distant blue spaces in Plymouth (source: © OpenStreetMap CC BY-SA 2.0, openstreetmap.org/copyright).

Figure A5. Distribution of local, mixed, and distant blue spaces in Barcelona (source: © OpenStreetMap CC BY-SA 2.0, openstreetmap.org/copyright).

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