

Article

A Method for the Appraisal of Natural Values Serving the Preparation of a Landscape Audit: A Case Study from Poland

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Abstract: The article focuses on the development of a universal method for the appraisal of values of a natural landscape in administrative division units. The Dobrze Miasto municipality serves as a case study. The municipality lies in the heart of Warmia, a region with centuries-long historical tradition. This paper also mentions solutions adopted in Poland in the consequence of the ratification of the European Landscape Convention. Following many years of research, changes in the natural landscape and directions in the measures taken to protect it were traced. In the face of current transformations in space, efforts to protect and conserve natural wealth are difficult. Compromises are unavoidable for the sake of saving the region's valuable natural assets while allowing its development. The aim of this study was to identify the natural values in the chosen research area, and to develop a method for their appraisal. The identification of the natural elements deserving protection substantiated rational location decisions in space. This is particularly important in the case of a natural landscape, which is difficult to evaluate and whose estimated value is often a result of a subjective assessment. The valorisation of the natural landscape in the chosen municipality allowed us to identify new areas, which at present are outside the boundaries of legally protected areas but which deserve protection owing to their highly valuable natural properties. The proposed method for the appraisal of natural values can be used in shaping a spatial policy, in spatial planning and development, and, above all, in the preparation of landscape audits. The proposed method fills the gap in the legal regulations adopted in Poland in the field of strengthening the protection of natural and cultural values since no comprehensive guidelines for the evaluation of landscape attributes for the purposes of landscape protection and development have been elaborated thus far.

Keywords: natural landscape; landscape protection; landscape assessment; spatial planning; landscape audit



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1. Introduction

The term ‘landscape’ has for years been used in various scientific texts; it lacks one, universal definition, and hence scholars use it in their own way [1]. Landscape is a holistic entity [2], and yet three basic types of landscapes are distinguished in the evolutionary approach: primordial, natural, and cultural ones [3]. Primordial landscape bears no signs of human touch, natural landscape is somewhat influenced by people, and cultural landscape is created by humans, so that it reflects all civilisation and cultural changes through which the human race on the Earth has passed [4]. Most controversy is stirred up by definitions of natural landscape and the ambiguity of the word ‘natural’. Natural landscape is sometimes equated with ‘primordial’, which raises doubt whether at this stage of the development of our civilisation there are such untouched landscapes to be found anywhere because even the highest mountains or the impenetrable depths of tropical forests are influenced by our civilisation, albeit indirectly, through contaminants imported due to the global

circulation of the atmosphere. The word ‘natural’ is also understood as related to nature, which is shaped under the influence of natural processes. This approach is marred by the uncertainty as to when during its evolution a given landscape loses its natural character due to human activities and becomes a cultural landscape; i.e., it is transformed by people [3]. There is also a view that there is only one, indivisible landscape [5], which does not need any other definitions because it is an outcome of simultaneous interactions between nature and culture [6]. Both the definitions of a landscape and the landscape as such are constantly evolving and both are the subject of debates among scholars. The term ‘landscape’ first appeared in the Old German language in the form that is still used, i.e., ‘Landschaft’, and it referred to a unit of space in the political, natural, and geographical meaning [7]. However, the conceptualisation of landscape as an element of nature can be traced back to the 19th century, when Humboldt defined landscape as a comprehensive and complete set of characteristics of an area on Earth [8]. In Poland, a broader description of landscape occurred in the Act of 16 April 2004 on the Protection of Nature (Dz. U. 92/2004, item 880) [9], which contains the provision that landscape values are to be understood as ‘ecological, aesthetic or cultural values of an area as well as the associated land relief, forms and elements of nature shaped by the forces of nature or by man’ (Act on the Protection of Nature passed in 2004) [9]. Noteworthy is the definition of landscape proposed in the European Landscape Convention, which says that ‘the landscape is part of the land, as perceived by local people or visitors, which evolves through time as a result of being acted upon by natural forces and human beings’ [10].

The key moment in the history of nature conservation in Poland was the country’s accession to the European Union in 2004. As a result, Poland ratified the European Landscape Convention (ELC) [11], which became the fundamental document for any measures implemented for the sake of landscape protection. In the following years, the Polish government passed amendments to the nature conservation legal regulations in order to meet the EU requirements [12].

Ultimately, these adjustments led to the passing of the Landscape Act in 2015 [13]. It provided the legal basis for landscape audits. The Landscape Act was supplemented by amendments to the Act of 27 March 2003 on Spatial Management Planning [12] and executive provision, that is, the Regulation of the Council of Ministers of 11 January 2019 on the Preparation of Landscape Audits [14].

Far more often than urban areas, rural ones are perceived as being harmonious, ensuring the sense of safety and familiarity owing to their low population density, scattered buildings, and a large share of green areas [15]. However, the dynamic spatial changes in landscapes in rural areas over the past few decades have given rise to considerable concerns [16] because quite many of these landscapes are exposed to an uncontrollable impact of economic and civilisational processes. An aftereffect is the progressing degradation, which leaves a permanent mark on landscape, in extreme cases leading to a complete loss of landscape assets [17]. In particular, all historic green areas, such as parks, gardens, tree alleys, green squares, cemeteries, and other green areas and plant assemblages, which are important for cultural heritage, deserve constant protection and conservation activities. Historic green areas are protected by law, and their maintenance, trimming, and possible restoration work must be carried out in accordance with the guidelines set for the preservation of historic monuments so as to retain their original character and historical values. Although objects listed as historic ones are legally protected in accordance with the Act of 23 July 2003 on the Protection and the Care of Monuments [18], cases of tree felling or the destruction of natural landscape are reported time and again [19]. Therefore, in order to prevent any chaotic development of these areas, the way they are used must be amended while preserving the spatial order, which is one of the principal goals of spatial development plans and development strategies designed by administrative units [20,21]. For a positive change to become notable, the pursuit of nature conservation actions alone is insufficient; it is equally crucial to alter the way of thinking about environmental management [22,23].

In view of the above, any measures undertaken in space should be rational and adjusted to local conditions, and above all they should take into account and protect valuable elements of natural and cultural environment. In Poland, in compliance with the binding legal regulations, spatial planning, especially implemented locally but regionally, plays the most important role in this respect [24].

A landscape audit, as a mandatory document prepared by voivodeships at least once every 20 years, is an instrument of landscape protection. Its purpose is to identify landscapes on a regional scale, to assess their value, and to determine priority landscapes, that is, landscapes particularly valuable because of their natural, cultural, historic, architectural, urbanistic, rural, or aesthetic and visual assets. Paradoxically, the time allocated for the preparation of landscape audits was just 3 years since the entry into force of the said obligation. As of mid-2024, however, only three of the sixteen Polish voivodeships, that is, the kujawsko-pomorskie, wielkopolskie, and mazowieckie voivodeships, had completed landscape audits [25,26].

Despite the lack of completely objectivised, formalised methods for the evaluation of landscape and its condition, an adequately insightful observation enables drawing many valid conclusions about the transformations occurring in the environment, which are beyond doubt strongly influenced by humans [27]. Difficulties encountered while making an objective valorisation of landscape explain why a landscape value assessment is often achieved with the help of valuation methods, which by definition are subjective. However, Barkowski maintains that no evaluation of the geographical environment can ensure full objectivity, and a score valuation method is “the only rational way to a landscape value assessment of complex natural sites” [28]. This method was applied for the first time during the interwar years by Leszczycki [29], and it later gained more popularity among researchers [30–36] in studies focused on a whole country, a region, or any local space, for example, with reference to maps at different scales, displaying administrative divisions, physio-geographical units, etc. [37]. The score valuation method consists of assigning a certain numerical value (a score) on a given scale to particular quality features (e.g., natural assets) present within the unit of space submitted to an analysis, and then reducing values of different features present in the environment to a common denominator. This procedure enables comparisons [28,38]. A summarised assessment is the information on a determined value of a given landscape. A map of landscape values can serve as a background map for landscape zoning into areas with similar properties. For the areas identified as the above, it is then possible to propose an optimal direction in their development and protection in order to create spatial order, understood as such shaping of space that creates a harmonious entirety while acknowledging all conditions and functional, socio-economic, environmental, cultural, and composition-related and aesthetic requirements (Article 2 of the Act on spatial planning and development) [12], and to endow the whole area with an aesthetically valuable form [39]. In recent years, access to geospatial data has been increasingly widespread. Of importance is the progress in the GIS technology and the application of artificial intelligence (AI) [40], including solutions dedicated to landscape studies [41,42]. The geographic information systems (GISs) and artificial intelligence (AI) are powerful tools, which can be used to support landscape protection. By combining spatial data and the functionality and universality of GIS with the identification of patterns and predictive capability of artificial intelligence, it is possible to build a decision-making model that is more effective and efficient. The combination of GIS and AI offers many potential benefits in the process of making decisions, including greater precision, efficiency, and speed [43].

The spatial planning system as an element of spatial management is a decision-making system fed with the information about the area, as required by decision makers (planners) [44]. Spatial data are gathered in their registers by central government institutions and local government units at all levels of the state’s administrative division. The legal base for all these registers is composed of the binding legal regulations, which—apart from mandating specific authorities to maintain registers—also oblige the register-keeping

institutions to make the collected data accessible [45]. In recent years, geospatial data have become more easily accessible. Progress in the development of artificial intelligence (AI) has made an unquestionable contribution [40]. It creates opportunities for making increasingly advanced analyses of landscape in line with its various definitions (e.g., natural, cultural, rural landscape, etc.) [46–48]. The automation of the analytical process owing to GIS tools plays an important role. Simensen et al. [46], for example, made a review of 54 contemporary approaches to landscape description originating from all parts of the world, with the aim of identifying the prevalent methodological strategies. The cited authors concluded that with time, there is a tendency to allow the observer more independence. Thus, this article seems to correspond well to the currently pursued trend in landscape research, and more specifically—in studies on natural landscape.

This issue is particularly important in Poland, where so far no comprehensive rules for the assessment of landscape values have been elaborated on subsequent to the entry into force of the legal regulations in 2015.

The European Landscape Convention obligates the EU member states to promote landscape protection, management, and planning, and to raise social awareness. The exchange of experiences and good practises among the European countries allows for the development of shared solutions and more effective measures.

It is therefore necessary to create stronger bonds between the protection, management, and planning of landscapes and, on the other hand, to raise social awareness in this field. The latter stems from the belief that it is only through the understanding and appreciating of the value of landscape that can we ensure its sustainability for future generations. This article focuses on the development of a universal method for the appraisal of values of natural landscapes to be used by administrative bodies. A case study comprised the Dobre Miasto municipality, situated in the heart of Warmia, a region shaped historically over several centuries and endowed with picturesque landscapes.

The purpose of the study was to identify natural assets in the chosen research area, and to develop a method for their evaluation. This objective is particularly important in the case of natural landscapes, which are difficult to evaluate, and more often than not the value of such a landscape is estimated by subjective evaluation.

2. Materials and Methods

2.1. Characteristics of the Research Area

The municipality of Dobre Miasto, situated in the heart of a historical region called Warmia, was chosen for our case study. This municipality, with its 258.7 km² of area, comprises the town of Dobre Miasto and 23 villages. The largest share of this municipality is covered with forests and farmlands. Forests and woodlands cover 9021 ha (35%) of the Dobre Miasto municipality, and the whole municipality lies within three forest districts: Wichrowo, Kudypy, and Wipsowo [49]. The municipality is moderately industrialised. Its main functions are industries and services, while agriculture plays a complementary function, even though it is the main source of income for most of the rural population [49]. What is unique about this municipality is its location—Dobre Miasto lies in the heart of historic Warmia. The shape of Warmia's territory resembles a triangle with one of the vertices touching the Vistula Lagoon. The area submitted to our study and its location are illustrated below (Figure 1).

The area of this municipality is characterised by high cultural values and by picturesque landscapes and valuable nature. Another distinguishing characteristic of this area is that very little of it has valid planning studies (local spatial development plans), which are a tool for environmental protection, including landscape protection. The elements of the natural landscape that contribute to its value are described in more detail in Section 3 (Results).



Figure 1. Location of research area.

2.2. Sources and Scope of Data

A wide range of information from monographic studies and field inventories and from an analysis of landscape values and transformations was gathered. Cartographic materials were also employed. Another significant source of data consisted of spatial data acquired from state institutions and local government units. Cultural and natural landscapes were studied, and an appraisal of specific tourist values in the Dobre Miasto municipality was made.

For the purpose of this study, data stored in different formats (both analogue and digital ones) were used. The GIS applications have functions enabling connecting data to the WMSs (Web Map Services) and WFSs (Web Feature Services). Owing to these functions, it is possible, for example, to draw on resources of the Polish Geoportal and show protected areas or other elements of the natural landscape against this background. The proposed method requires supplementing and expanding the scope of information by supplying missing source data (often stored in a descriptive form). The GIS tools, including geocoding in the case of new objects identified during field trips or iconographic analyses, were employed for spatial analyses.

2.3. Research Methodology

The research was carried out for many years (from 2014 to June 2024) and in many stages.

Because of the wide scope of collected data, the results of our assessment of the landscape values found in the research area were divided into several subjects. The first article dealt with the transformations of cultural landscapes [50]. This is the second article in the series, where the focus is on the analysis of natural landscape and on the elaboration of a method for the appraisal of natural assets, which could be useful for making landscape audits.

Considering the main research aim, which was to identify a landscape's natural values and to make an attempt to evaluate this landscape, the following research steps were distinguished:

(1) Definitions and their theoretical background regarding the natural landscape and landscape elements, which shape its value, were given (using the relevant literature and the authors' own thoughts and observations, using the previous research and applicable legal regulations as a starting point).

(2) A method for an appraisal of natural values of landscapes different in worth as nature objects, using the ATPOL grid coordinates [51,52]. For the purpose of more detailed investigations, the grid was densified and divided into smaller squares. A big advantage of using such geometric fields is their equal surface area, which makes them easily comparable [53], and the results can be processed smoothly in different software programmes. The method takes into account both spatial and point forms in a landscape as well as the cases of their overlapping:

- An inventory of elements of the natural landscape was made.
- The environmental valorisation of the landscape was carried out, including an analysis of the legal regulations pertaining to landscape protection, which let us work out

criteria and a scale for the evaluation of natural values. Score-based valuation was developed on the basis of previous research performed by other authors, modified using the knowledge of experts with practice in spatial planning and environmental protection as well as the authors' own professional experience (described in more detail in Section 3.1). In order to elaborate the score-based valuation for the appraisal of landscape natural values, a case study was carried out with the experimental method developed by the authors. The study was part of a doctoral dissertation by one of the authors (A. Mazur) on the transformations of natural and cultural landscapes [54].

(3) The proposed method of the assessment of natural values was verified on the chosen research object (Dobre Miasto municipality, olsztyński powiat, warmińsko-mazurskie voivodeship), which led to the elaboration of a map. The map was developed using AutoCAD 2023, Autodesk, Inc. US, which works with different spatial data formats and many types of databases. The data imported to the software are presented in the form of layers composed of a map and a table of attributes. This enables the integration of data, for example, from Microsoft Excel or Access files, or from open access servers providing databases, with the map, and subsequently data visualisation according to the set criteria.

(4) The potential of the proposed method for an appraisal of landscape natural values was demonstrated, as well as its usefulness and applicability at various levels of spatial planning, and especially as a useful tool for the purpose of preparing landscape audits.

3. Results

3.1. A Proposed Method for the Appraisal of Natural Values

The method for the appraisal of landscape natural assets proposed in this paper is an approach composed of two steps: inventory making and valorisation. The application of this method enabled us to divide the study area into groups with different values of natural elements.

Step I—making an inventory of natural assets is a complex process of collecting, analysing, and documenting information about the condition of the natural environment in a given area. The purpose is to distinguish areas with different landscape natural values, which served as a basis for identifying criteria for the landscape assessment. Cataloguing natural assets can be achieved directly or indirectly. Although the indirect method is more time-consuming, it ensures that the collected data are up to date and reliable.

Making an inventory progresses through two stages. The first one consists of collecting all available data concerning the area submitted to the analysis, chamber studies to verify the data, and an evaluation and selection of the information that can be used for making the inventory. The second stage is supplementary work, most often performed in the field or based on available reference sources. The main part of the inventory-making process is the field research, which deals with both animate nature and selected elements of inanimate nature. The elementary recognition of entire ecosystems in the field, in conjunction with the previously collated data concerning the study area, is the starting point for further steps, which most often involve valorisation.

Making an inventory in the field was an essential part of the research process in our case, too, as it helped us to identify the actual state of the natural environment in the study area. Most of this work was purposefully carried out during the plant-growing season, when better access to all parts of the analysed area was ensured.

Step II—the valorisation of natural elements largely corresponds to the classification of an area, i.e., the determination of its usefulness for a specific purpose; in our case, it was to identify areas with different natural values. An evaluation of a given area is carried out within primary fields. The valorisation of natural assets can be accomplished with the help of one of the two ways of dividing the whole area into primary fields:

- It is assumed that a primary field is the smallest area distinguished in the country's territorial division, which is a cadastral plot in Poland;
- It is assumed that a primary field is a geometric figure (e.g., a square with a fixed side length), obtained by the artificial division of the whole area into smaller parts.

The choice of primary fields for natural valorisation depends mainly on what purpose the valorisation is to serve and what cartographic maps are available. For landscape audits encompassing a whole voivodeship in Poland, it is recommended to use 1:50,000-scale maps, while the 1:2000 scale is recommended for priority landscapes. The area submitted to valorisation can be varied; it can comprise a cadastral district (a village), a cadastral unit (a municipality), or even several municipalities. It can refer to the whole area of a voivodeship or another region (e.g., a geographical region).

During the valorisation of natural elements, the authors introduced certain modifications' scale into the methods developed by other researchers pertaining to the choice of criteria and the valuation. In regards to the plant cover, the valorisation followed a modified method and criteria originally proposed by Gacka-Grzesikiewicz et al. [55], where the degree of naturalness of the plant cover was the main criterion, while the auxiliary criteria consisted of diversity and mosaic-like patterns of plant cover, and the landscape-related value of plants. The method developed by Dubel was also modified [31], and the method elaborated by Adamiec served as an inspiration [56]. The size of the area covered by forests and surface water bodies was taken into consideration. Additional points were scored by the fields where nature valuable areas and objects were located [57]. The last criterion taken into account referred to the impression generated by landscape. In order to develop a point-based valuation approach to the appraisal of landscape natural values, the authors carried out a study using an experimental method based on a survey. This study was part of a doctoral dissertation on natural and cultural landscape transformations [54]. At present, landscape value evaluation methods need to take into account new elements of infrastructure, especially ones related to renewable energy (wind turbines and photovoltaic panels, which appear in various forms in landscapes). In the proposed method, such objects were classified as degrading the value of natural landscapes, particularly depreciating the aesthetic perception of landscape.

3.1.1. Making an Inventory of Natural Elements of Landscape in the Dobre Miasto Municipality

The outcome of the inventory-making process was the identification of all natural environment elements, which affected its values. A visual display of the most important natural landscape elements is given in the maps below (Figure 2).

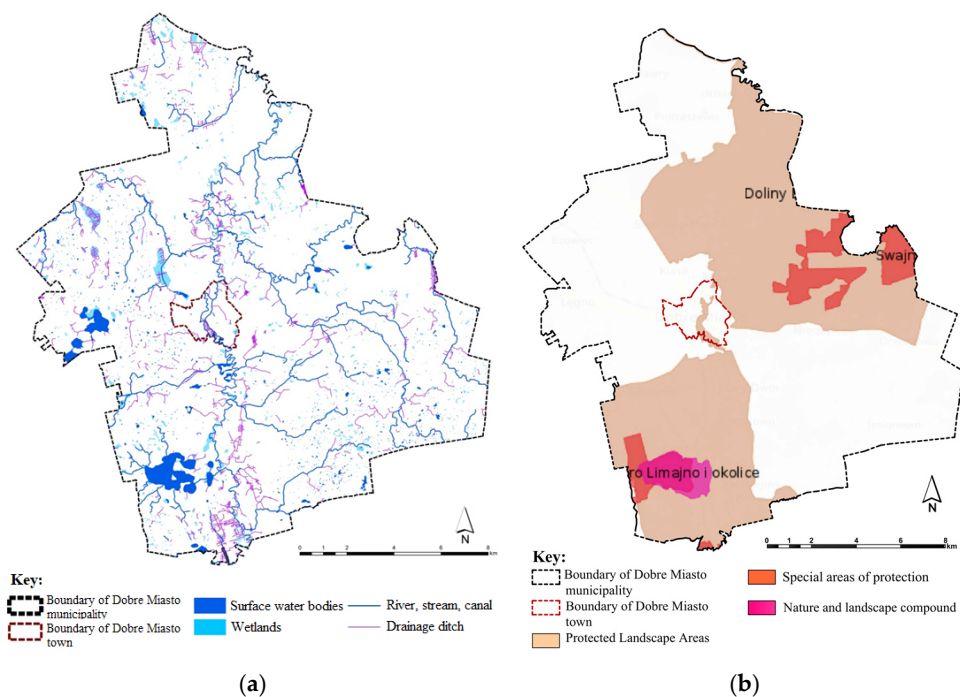


Figure 2. Cont.

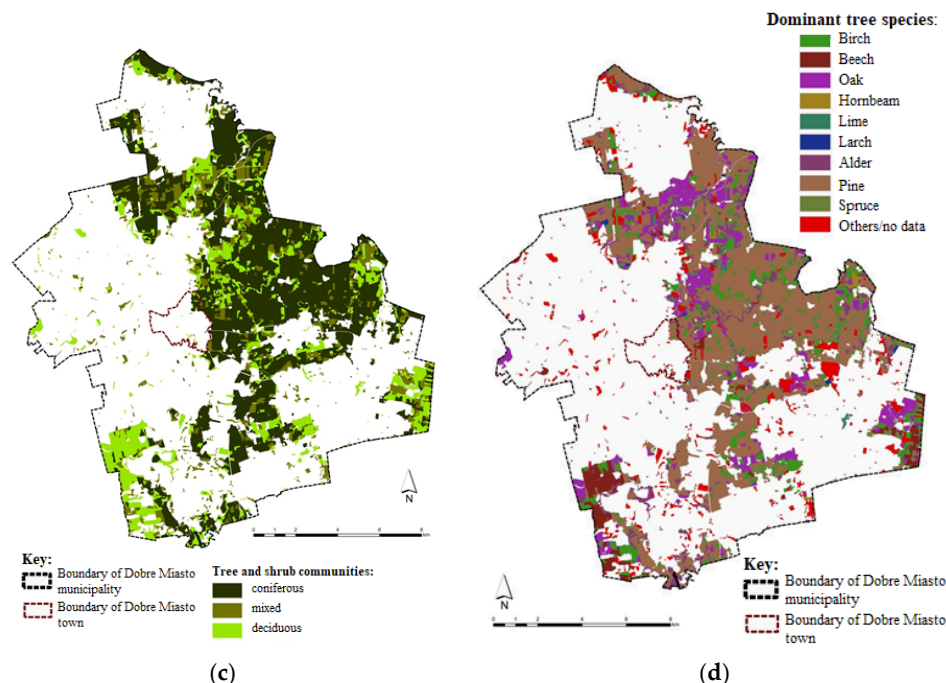


Figure 2. (a). Surface water bodies in the area submitted to the study [58]. (b). Areas submitted to legal nature conservation in Dobrze Miasto municipality [58]. (c). Trees and shrubs in the area submitted to the study [58]. (d). Dominant species of trees in the Dobrze Miasto municipality [58].

The study area does not include any national parks, landscape parks, or nature reserves (Figure 2b), which are the most valuable forms of nature conservation in Poland.

Warmia's landscape was shaped under the impact of the last Baltic Glaciation. As the climate was warming, the glacier was slowly retreating from this territory, and wherever the glacier front stopped for a longer time, chains of terminal moraines formed. This is how six moraine embankments appeared in Warmia [59]. High diversity of the land relief can be observed in the Dobrze Miasto municipality, which lies in the valley of the Łyna River. The municipality's territory encompasses uplands of bottom and terminal moraines, sander, and a few river valleys, like ones carved by the Łyna River and its tributaries: the Kwielka and the Kisna. The northern part of the municipality features undulating hills, clearly rising southwards (Figure 3a,b) [60].



Figure 3. Values of the land relief (source: own photographs). (a) Near Łęgno village; (b) Near Jesionowo village.

The area submitted to our study lies mostly in the catchment of the Łyna River, which flows from the south to the north, cutting through the centre of the municipality and creating one of the most picturesque canoeing trails in Warmia. The banks of the Łyna, to a width of 100–200 m, are under another form of environmental conservation; namely, they

are designated as a site of the European Network Natura 2000, which has both national and European reach. It is prohibited to build any facilities in this ecological corridor along the Łyna, except ones serving water tourism and technical facilities for water protection [61].

Near the village Swobodna, in the Protected Landscape Area of the Middle Łyna River and in the nature and landscape complex called Limajno Lake and its Surroundings, lies the municipality's largest lake, called Limajno (Figure 4a). Limajno, known as the Warmia's Pearl, has an area of 232.9 ha and its maximum depth is 40 m. Other lakes with an area of over 10 ha include Pupla Duża (Figure 4b), Pupla Mała, and Kominek (Figure 4c).

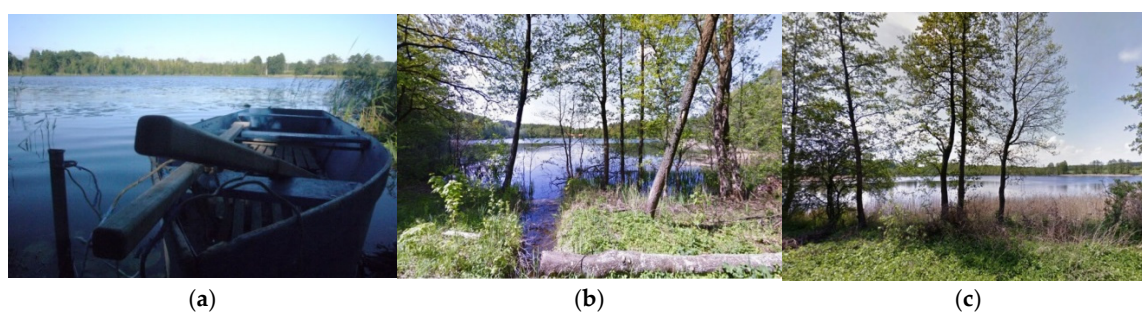


Figure 4. Examples of lakes in the Dobre Miasto municipality (source: own photographs). (a) Limajno Lake; (b) Pupla Duża Lake; (c) Kominek Lake.

The Wichrowskie Forest, stretching to the eastern side of Dobre Miasto, is the largest forest compound comprising an ecological system of protected areas. The total area of this forest in the municipality is 8372.50 ha. The dominant type of forest is fresh mixed deciduous forest, followed by mixed deciduous forest and fresh mixed coniferous forest [62]. Most tree stands in the municipality are composed of coniferous trees, Scots pine (*Pinus sylvestris*) and larch (*Larix decidua*)—63% and Norway spruce (*Picea abies*) and fir (*Abies alba*)—17%, while the most common deciduous species are silver birch (*Betula pendula*)—12%, pedunculate oak (*Quercus robur*)—12%, black alder (*Alnus glutinosa*)—7%, and others—3% [49]. There are several urban green areas within the town's boundaries, for example, walking paths along the Łyna River and the Friends of Culture Park with an area of 1.98 ha, where 95% of trees belong to deciduous species [61]. The rural areas of the municipality have two historic manor parks. One is the park designed in 17th–18th c. at the palace in Smolajny, a summer residence of the bishops of Warmia. A large number of old trees have survived there, mostly small-leaved limes (*Tilia cordata*), broad-leaved limes (*Tilia platyphyllos*), and ash-leaved maples (*Acer negundo*) (Figure 5a). The other manor park, within the former land estate in Urbanowo, was one of the largest parks in Warmia. The layout of paths in the park as well as its historic boundaries have been preserved, in addition to several old trees, such as specimens of European beech (*Fagus sylvatica*) [62]. There are also numerous groups of trees growing among fields (Figure 5b) and roadside tree alleys, which are one of Warmia's landmarks (Figure 5c). In the past, they delineated roads, guided hikers, gave shade, protected against wind or rain, and were a source of aesthetic pleasure.

There are also other historic green areas, most often found near sacral buildings and sites, for example, in cemeteries. Nine graveyards with greenery shaped in the past have been listed as historic objects (one each in Cerkiewnik, Jesionowo, and Międzylesie, and two each in Głotowo, Orzechowo, and Piotraszewo). It is actually the trees and shrubs in such places that are the most important element, creating a frame for a graveyard's space. Furthermore, there are also monuments of nature in the municipality, which are guaranteed protected exposure so that constructing any buildings at a distance of less than 20 m is prohibited. According to the list of monuments available on the webpage of the Regional Directorate for Environmental Protection, there were eleven such natural monuments in Dobre Miasto as of year 2023 [63].

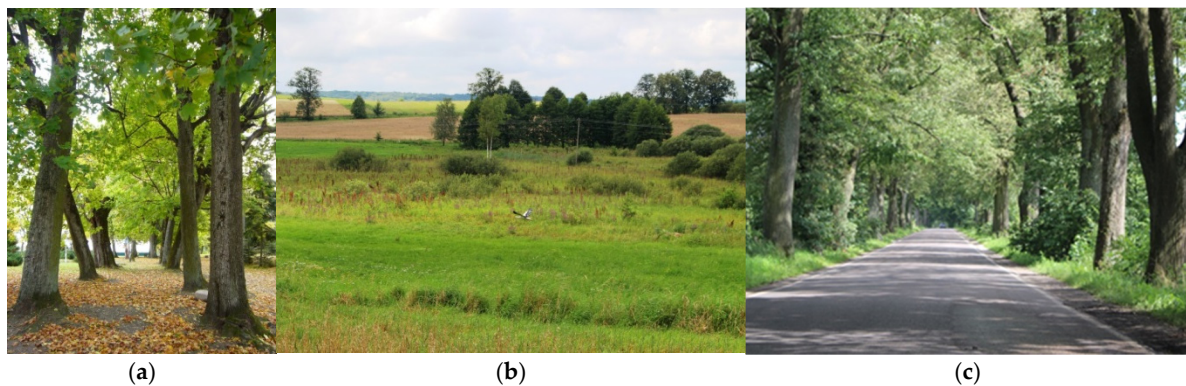


Figure 5. Examples of greeneries typical for Warmia (source: own photographs). (a) Preserved old trees in the Park in Smolajny; (b) In-field trees in the Dobre Miasto municipality; (c) A roadside tree alley—lime trees—between Nowa Wieś and Dobre Miasto.

The presence of five protected species listed in Annex II of the Second Habitats Directive has been detected in the area covered by the Middle Łyna Valley Protected Landscape, such as the beaver (*Castor fiber*), otter (*Lutra lutra*), fire-bellied toad (*Bombina orientalis*), bullhead (*Cottus gobio*), and large copper (*Lycaena dispar*). Among the moraine hills of the Łyna River Valley, there are also many bird species, such as the grey heron (*Ardea cinerea*) and cormorant (*Phalacrocoracidae*), as well as many aquatic animal species [64].

Five species listed as protected ones in the Annex to the First Birds Directive are present in this area. They are the marsh harrier (*Circus aeruginosus*), black woodpecker (*Dryocopus martius*), common kingfisher (*Alcedo atthis*), red-backed shrike (*Lanius collurio*), and corncrake (*Crex crex*). Another natural attraction is Łęgowskie Lake, in the village of Łęgno, which was drained around 100 years ago and which now turns into a vast flooded wetland, creating a nesting habitat for swans (*Cygnus*) [65].

3.1.2. Natural Valorisation of Landscape

When considering the main criterion, the property of very high naturalness of the plant cover was assigned to areas dominated by plant assemblages with natural and semi-natural character. Quite a high score was awarded to areas with visible but not really numerous anthropogenic elements. Only one point for naturalness was scored by areas with the prevalence of anthropogenic elements or infrastructural facilities, or else to fields for growing crops. Very high diversity and mosaic-like patterns of plant assemblages, assessed in the second criterion, were identified in areas where several types of plant communities appeared (e.g., forest, meadows, and fields). High diversity was assigned to areas with only two types of communities, and low diversity if there was only one type of a plant community. The third criterion refers to the landscape value of the plant cover. The highest score was given to areas that featured such elements as varied land relief, with forests, lakes, or rivers. Quite a high value was assigned to the sites where the aforementioned elements were present but not numerous, while areas covered with only fields or grassland scored the lowest. The two other criteria related to the total area covered with forests and surface waters, and the highest share of forests was considered to be over 20% of the whole area submitted to valorisation, average for 10 to 20% of woodlands, and low if that percentage fell below 10%.

An area covered with surface waters was considered to be large if there was a lake in the valuation field, moderate if there was a river, and small if in-field ponds, small watercourses, or waterlogged areas were identified. According to the sixth criterion, points were awarded for the presence of specific, valuable natural areas or objects. The fields that possessed a natural monument or a Natura 2000 area were given five points, areas of protected landscape and ecological corridors—three points, and a natural and landscape complex—one point. Should a few valuable natural areas or objects occur in the same

primary field, the points were added up. The last criterion referred to quite a subjective evaluation of sensations aroused by the landscape. Wherever the viewer felt a large number of positive emotions, that field scored five points, whereas a small number of such emotions corresponded to one point. Negative emotions, however, yielded a negative score (−3 points). This score was given to areas with elements degrading the natural landscape (Table 1).

Table 1. Criteria and valuation scale applied to natural assets.

	Criteria	Valuation Scale	
		Descriptive Value	Score
I	Degree of naturalness of plant cover	very high	5
		quite high	3
		low	1
II	Diversity and mosaic-like patten of plant cover	very high	5
		quite high	3
		low	1
III	Landscape value of plant cover	very high	5
		quite high	3
		low	1
IV	Size of area covered by forests	very large	5
		moderate	3
		small	1
V	Size of area covered by surface waters	very large	5
		moderate	3
		small	1
VI	Presence of valuable natural areas and natural monuments *	natural monument	5
		Natura 2000 area	5
		area of protected landscape	3
		ecological corridor	3
VII	Impressions generated by landscape	nature and landscape compound	1
		Many positive impressions	5
		Few positive impressions	1
		Negative impressions (elements degrading natural landscape)	−3

* Points are summed up when more than one valuable area or natural monument are present in the same primary field.

Based on the valuation results, five types of areas with different values of natural elements were distinguished (Table 2).

Table 2. Groups of natural values to which every research field was assigned to based on the sum of points scored.

Groups of Values	Description of Groups of Values	Total Score of Valuation Points
A	Areas with exceptionally high natural values	>30
B	Areas with very high natural values	23–30
C	Areas with high natural values	15–22
D	Areas with moderate natural values	7–14
E	Areas with low natural values	<7

3.2. The Verification of the Method Using the Chosen Research Object

3.2.1. Division into Primary Fields

The Dobre Miasto municipality's area is comprised within eight squares with a side of 10 × 10 km, assigned the letter–digit codes EB 11, EB 12, EB 21, EB 22, EB 23, EB 31, EB 32, and EB 33. In order to localise the grid in the field, the centrally located square EB 22 was chosen, and its coordinates were plotted on a map with a scale of 1:25,000.

Following the division of the studied area into primary fields, 307 squares were obtained, with 103 squares situated on the border of the municipality, having the area of less than 1 km² ([50] (Figure 7)). The valorisation scores were assigned to all distinguished research units of the municipality, developed graphically, and evaluated.

3.2.2. Results of the Assessment of Natural Assets

The results of the assessment of natural values enabled us to identify as many as 42 fields with exceptionally high values, 52 with very high values, 79 with high values, 63 with moderate values, and 71 fields with low natural values, and the spatial distribution of these results is illustrated in the figures below (Figures 6 and 7). Detailed information on the results of the score valorisation is included in the Supplementary Materials (Table S1).

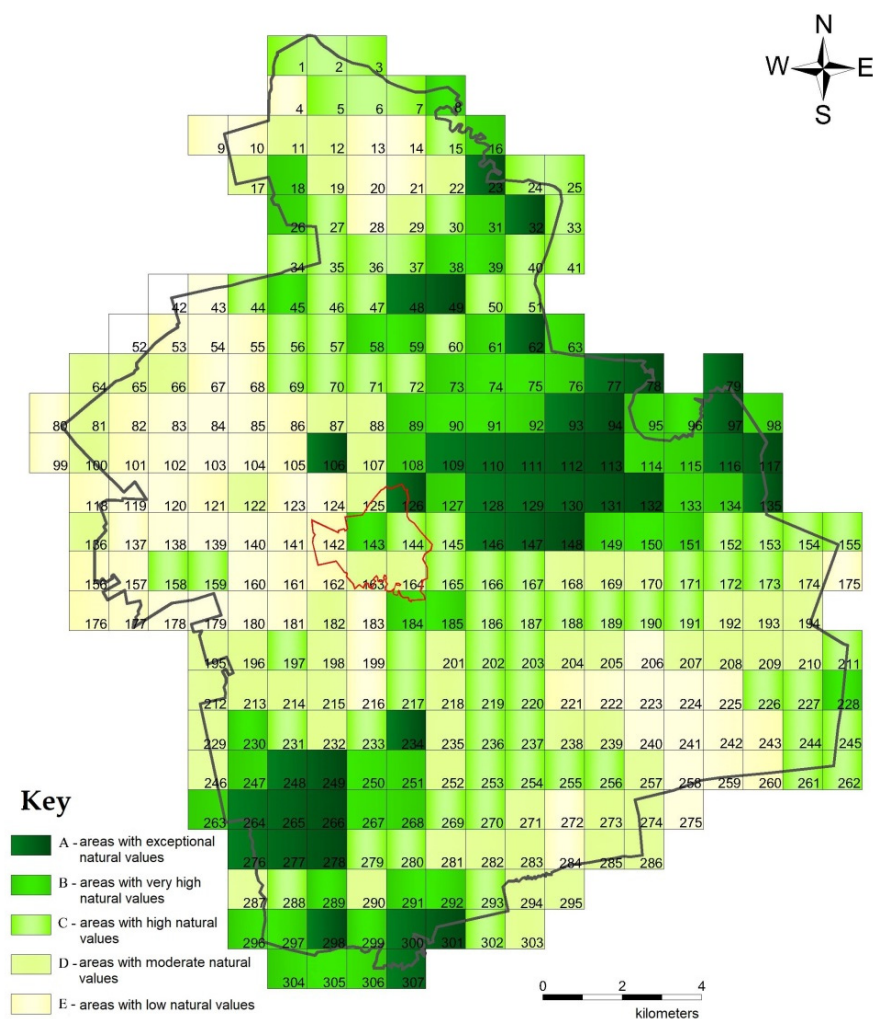


Figure 6. Results of the appraisal of natural values (source: developed by the authors).

The areas with exceptionally high natural values, which make up 13.7% of primary fields, cover the territories where the naturalness of the vegetation cover is very high, and it is also diverse, growing in mosaic-like patterns, presenting a high landscape value. These are areas in compact forests inclusive of surface water bodies and valuable natural sites and objects. In this case, they are situated in the areas of protected landscape of the Lower Łyna Valley and the Middle Łyna Valley, while some are also habitat sites within the NATURA 2000 network: Swajnie (fields: 77–79, 93, 94, 97, 111–113, 116, 117, 128–132, 135, 147, 148) and Warmińskie Buczyny (fields: 248, 249, 264–266, 276–278, 298, 300, 307); eight fields (248, 249, 264, 265, 266, 276, 277, 278) coincide with the location of the nature and landscape complex Limajno Lake and Surroundings and in four fields, there are natural monuments

(fields: 32, 62, 106, 126). For example, there are as many as seven trees listed as monuments of nature in primary field 206. The areas classified as a valuation group scored additional points for the aesthetic impressions generated by the local landscape.

There is a notable concentration of areas with exceptionally high (group A), very high (group B), and high natural values (group C) within the boundaries of the areas of protected landscape of the Lower Łyna River Valley and the Middle Łyna River Valley. These areas occupy 173 fields, which corresponds to 56.4% of the total number, and their spatial distribution nearly completely coincides with the current distribution of dense forest complexes (Figure 7). One of the outcomes of the valorisation was the identification of three fields classified as group B (fields: 18, 26, and 228) and as many as thirty-seven group C fields, which are not covered by legal protection although they deserve it. Fields 18 and 26 were awarded an additional high score because of the forest and Gronowskie Lake present there, while field 228 scored higher for the dense mixed forest located in it, with the pine and beech as dominant tree species, as well as a fragment of the Krisna River. The areas mentioned above and located on thirty-seven fields classified as group C—with high natural values (25.7%)—are most often areas with harmonious woodland or agricultural and woodland landscapes, composed of a mosaic of small forests mixed with fields and meadows, waterlogged areas, small watercourses, numerous in-field ponds, natural groups of shrubs, and scattered houses.

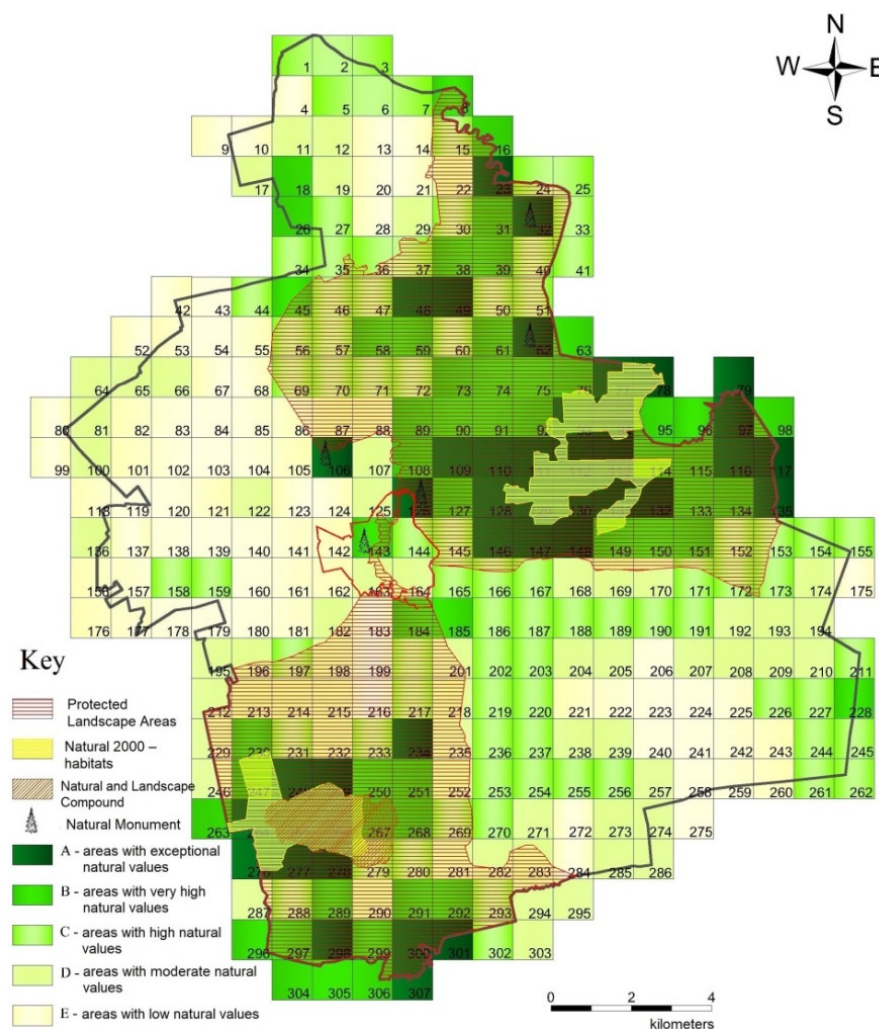


Figure 7. Results of the appraisal of natural values related to the area forms of environmental protection (source: developed by the authors).

Areas classified as group C—63 (20.5%) fields (with moderate natural values)—are most often agricultural areas with a small share of forests and with small in-field ponds. They are also areas with scattered buildings, single farmsteads away from a village, or fragments of a village with meadow and rush vegetation as well as groups of trees growing in fields or along roads.

Areas with low natural values (group E) determined in 71 (23.1%) primary fields are the areas with no forests but with the highest intensity of development. The most common landscape is composed of cropped fields with meadows and waterlogged areas including visible remnants of drained in-field ponds. Some of these areas were given a negative score for the negative visual impact created by their landscape. This happened when elements degrading the natural landscape were detected.

3.3. Identification of Factors Deteriorating Attractiveness of Natural Values

A detailed analysis of the state of natural landscape preservation in the context of the presence of degrading elements, having a negative impact on the perception of landscape in the analysed area, revealed the recurrent presence of the same elements. The perception of the natural landscape was distorted when such objects were present in its proximity: a grid of paved roads, especially ones with road noise barriers (Figure 8a), photovoltaic installations to power road signs [57,66], railway tracks and often their immediate surroundings, various pieces of the power grid (e.g., power poles, high-voltage lines) (Figure 8b), or illegal landfills, most often found near villages, along roads, in ditches, or on lake shores.



Figure 8. Examples of elements with negative influence on the perception of the natural landscape (source: own photographs). (a). Noise barriers along National Road 51; (b). Electricity grid infrastructure on the outskirts of Dobre Miasto.

A negative effect on the perception of natural landscape was also produced by the presence of compact built-up areas, agricultural fields, and the increasing problem of maintaining green spaces in good condition. Examples of bad practice can be noted, for example, topping of trees, planting plants that do not suit a given site, or foregoing any action at all.

In recent years, new elements in natural landscapes have been spreading, such as wind farms and photovoltaic farms [67]. Wind turbines in particular are a dominant and conspicuous element in the natural landscape [68]. There are no wind farms in the Dobre Miasto municipality. However, there are photovoltaic farms. An example of a photovoltaic farm in the village of Podleśna shows integration into the natural landscape and new technical infrastructure (Figure 9).



Figure 9. Example of an industrial photovoltaic farm in the Dobre Miasto municipality (source: own photographs). (a) photovoltaic farm; (b) new technical infrastructure.

In many highly developed countries, in which renewable energy was introduced much earlier, there are now debates about the degradation of natural landscapes with photovoltaic farms [69] and wind farms [70]. In particular, these developments are contested by local communities, which translates into actions undertaken by local and regional authorities, also in the context of natural landscape protection.

4. Discussion

4.1. Natural Landscape Protection—Polish and European Experiences

The deteriorating condition of one's surrounding space has an influence on the quality of life, which leads to mental and physical discomfort spreading in society. This is the reason why more and more attention is paid to adverse landscape transformations caused by the development of our civilisation, as well as an inadequate management of our living space [71]. Unfortunately, we have been unable to stop many developments or prevent consequences of the growth of automotive transport, which resulted in the construction of dense road grids or the felling of roadside trees [72]. Questions of the conservation and protection of landscape should be reflected in local spatial development plans, which are currently optional and cover only a small area of the country. For this reason, the landscape heritage in Poland is very poorly protected [73].

The European Landscape Convention of the Council of Europe, of 16 July 2000 [10], which was ratified by Poland on 24 June 2004 and entered into force on 1 February 2005, unquestionably plays an important role in landscape protection. It applies to all landscapes, that is, both areas with exceptional values and ordinary or degraded landscapes, which nevertheless can also comprise monuments of nature [11]. The convention is a set of guidelines and legal standards regulating the landscape policy in the countries that have endorsed it. It is an instrument dedicated solely to the protection, management, and planning of landscapes in Europe. For the purposes of this convention, definitions of landscape, landscape protection, and landscape management were developed [74]. The definition of landscape protection given in the European Landscape Convention suggests that it should include “actions to conserve and maintain the significant or characteristic features of a landscape [...], so as to guide and harmonise changes which are brought about by social, economic and environmental processes” [10], which implicates three major types of landscape predisposed to being protected, which include significant properties of landscape, characteristic features of landscape, and landscape with high aesthetic value and harmonious character [75]. According to Kistowski [75], the recommendations of the Convention in Poland ‘are clearly breached, and cooperation between ministries (especially the Ministry of the Environment, and the Ministry of Culture) which should act together towards the introduction of provisions into Polish law that would facilitate the implementation of the Convention—if there is any—is feigned’. Kistowski emphasises that there is no reliable inventory of landscape resources in Poland, which in reality makes it

impossible to decide which territories particularly deserve protection. He also notes that the mere knowledge of which landscapes should be protected is not enough for protective measures to be implemented properly [72]. Many scholars endorse this opinion, adding that in Poland, landscape assets sometimes need to be protected from their owner [76]. Similar opinions are shared in international circles. Landscape studies are very popular in the European geographical research, but are not fully taken into account by institutions responsible for preparing planning studies [21,45,77].

Currently, the Polish society has high expectations regarding the strengthening of the protection of natural and cultural values, roused by the reform of the spatial planning system [78,79]. Of key importance is to find out preferences concerning the natural landscape so as to create attractive green spaces, which will multiply the benefits for humans being in touch with nature [80]. There is scientific evidence that the more urbanised the place of residence of a given individual, the higher that person's preference for natural landscapes. Moreover, young people show a greater preference for natural landscapes [81].

In Poland, as well as in other countries, laws are being passed for the sake of protecting natural values. In the years 2016–2023, the binding law regulating the distance from a wind turbine to areas under strict nature protection forms was the 10H rule. Later, this law was relaxed and now the minimum distance is 500 m [82,83]. In order to preserve the heritage worth passing onto the future generations, it is necessary to promote cooperation between various professionals engaged in landscape protection, because the absence of such collaboration will result in an irretrievable loss of the majority of the most valuable native landscapes within the next few decades [79,84].

4.2. Applicability of the Proposed Method for an Appraisal of Natural Values of the Landscape

The question of landscape appraisal is raised by many researchers, who propose different approaches to this problem and ways in which the landscape value can be assessed. However, we still lack sufficiently objective, universal, and structured methods of the evaluation of a landscape and its condition, and therefore any assessment is a subjective relation between the subject making the assessment and the object being assessed. Difficulties in making an objective appraisal of natural landscape mean that valuation methods are often employed for this purpose. A valuation method consists of assigning a numerical value (an appropriate number of points) on an adopted scale to individual value attributes present within the studied spatial unit, and then reducing them to a common denominator. This procedure enables making comparisons. The summarising assessment indicates the value of a given landscape. Areas delineated according to this procedure can then be designated the optimal direction of their spatial development and protection in order to create spatial order and endow them with an aesthetic form. The landscape audit is a relatively new concept in the Polish legal system, which until now has not been employed broadly. The scope of this study was to be the whole territory of one Polish voivodeship. In order to conduct our study properly, we needed a document that would describe clearly and precisely what requirements should be met and what steps should be followed when making a landscape audit. These guidelines are contained in the Regulation of the Council of Ministers on the preparation of landscape audits, passed in 2019, which asserts that the procedure of making a landscape audit consists of specific, mutually related stages. The first step is to identify the landscapes that occur in the territory of a given voivodeship, which is achieved according to the regulation's guidelines. Next, each of the identified landscapes needs to be characterised, so as to subsequently determine the so-called priority landscapes. In the following two stages, threats to the preservation of most valuable properties of each of the identified landscapes are determined, and consequently recommendations and conclusions are formulated for better and more effective management of landscapes. The last step consists of the determination of local architectural forms of the buildings in priority landscapes [24].

However, as emphasised by Wieczorek [25], a landscape audit is a multiplication of entities. Its preparation in the form stipulated by Polish law largely consists of copying and

compiling information from other documents. When this new landscape protection tool entered into force, none of the instruments already existing at that time were repealed. In the spatial development of voivodeships, in the studies of spatial development conditions and directions of municipalities (which are to be replaced by General Plans of municipalities from 1 January 2026 on), and consequently in the local plans, it is still mandatory to identify areas protected under the provisions of the legal regulations pertaining to the protection of the natural environment, historic monuments, and health resorts, to which the obligation to include conclusions from landscape audits was added in 2015.

The excessively detailed rules governing the preparation of landscape audits makes the whole process unnecessarily complicated. This is proven by the research results presented in the literature report pertaining to traditions, identity, and familiarity of the landscapes in the mazowieckie voivodeship [85].

In the justification of the draft of landscape law, it was asserted that ‘the social perception of any form of nature conservation is very bad’. The main reason is potential infringement of legal interests of a given property’s owner. From the point of view of location, living in the neighbourhood of a protected area is highly desirable because it can be seen as a guarantee of predictable changes in spatial development, but in reality, no such assurance is possible. Conflicts concerning landscape protection are instigated primarily by the absence of unambiguous, understandable criteria for the determination of landscape protection measures and of the appraisal of natural values, which are an inextricable element of natural landscape. By being a source of law, a local spatial development plan is the best landscape protection tool, unlike a landscape audit [25]. The proposed method for the appraisal of natural values of a landscape is a universal, multi-purpose tool. It takes into account the binding legal regulations in the field of preparing landscape audits (an area that should be protected), or elements detrimental to the perception of a natural landscape. Thus, the suggested approach complements the complex provisions of the regulations for preparing landscape audits; at the same time, it can also be employed when making other spatial planning documents and be useful for drawing up other planning studies in municipalities or whole voivodeships.

5. Conclusions

The overall assessment of natural values is the result of the complex influence of various variables, with the most important being naturalness, diversity, and landscape value. The Dobre Miasto urban–rural municipality is characterised by the accumulation of valuable natural resources, which are constantly undergoing visible transformations. Unfortunately, negative transformations driven by civilisation progress are noticeable, causing the uniqueness of Warmia’s landscape to blur. Examples are the disappearance of green areas once composed in a way specific for this region; felling roadside tree alleys, which used to be a region landmark; or blocking access to lakes. Contemporary housing development pressure and the desire to improve living conditions lead to irreversible changes in naturally valuable areas. The results of the natural valorisation reported in this paper show a notable concentration of areas with exceptional, very high, and high natural values, within boundaries of area nature conservation forms (the Protected Landscape Areas of the Lower and the Middle Łyna River Valley, NATURA 2000 habitats, the nature and landscape complex). In total, they make up as much as 56.4% of the total number of primary fields. Three fields with very high and as many as thirty-seven fields with high natural values located outside the mentioned legally protected areas but deserving protection were also identified. The conclusions drawn from our analysis of the transformations of the natural environment in the Dobre Miasto municipality indicate the necessity of launching coordinated actions in order to preserve the natural values of this area while ensuring the sustainable socio-economic development, which will take into account the need to protect nature. The research results also form a solid basis for further studies, and can be helpful in future planning initiatives. They have the potential to serve as a support tool in shaping the landscapes deeply rooted in history, and in designing any development

around lakes. With such research data, we are able to strive towards creating spaces that will be in harmony with the surrounding nature, while providing the local community with attractive living conditions.

The European Landscape Convention ratified in Poland lay the foundation for the management of the country's landscape resources. The purpose of the European Landscape Convention is to promote landscape protection, management, and planning, and to foster cooperation in this scope across Europe, based on exchange of know-how, experts, and the creation of good landscape practice. An attempt has been undertaken in Poland to develop the principles for landscape evaluation and protection. In accordance with the legal regulations applicable in Poland, the landscape audit, which entered into force a few years ago as a mandatory document aiming to strengthen the protection of natural and cultural landscapes, receives much criticism from both practitioners and researchers. The fact that the adopted legal framework for a landscape audit is imperfect is manifested by only 3 out of 16 Polish voivodeships so far, having been able to develop landscape audits as required by law. Despite the passing of detailed regulations (regulation of 2019) [26], there are still many unknowns about how to interpret and evaluate particular elements of natural landscape. The proposed method for the evaluation of natural assets not only identifies areas already under protection but more importantly it indicates which areas, owing to their high natural values, should be protected or at least recognised in planning documents (orders, bans, restrictions, and permits in the development and use of space) in order to preserve this unique natural landscape.

The proposed method differs from other existing methods in that it comprehensively evaluates the values of a landscape. This method is universal and can be used for different areas. The primary evaluation fields can be appropriately adjusted to the user's needs. Moreover, in the era of the development and use of GIS technologies, the most important thing is to acquire data and elaborate on an attribute table. The range of data needed for an appraisal in this method was determined, and this is one of the major achievements of this study. Another important aspect of the manuscript is that it contains modified criteria for the scoring of the value of a landscape, determined with the help of expert knowledge, earlier publications, and the authors' own experience, taking into account all landscape appraisal criteria (both positive and negative ones).

The proposed method for assessing the natural values of landscapes, based on point valuation, is innovative and useful in the Polish legal and spatial context, as confirmed by the study results in the Dobre Miasto municipality, located in the Warmia region. The generalisation of the proposed method is possible due to its flexibility and adaptability to different spatial and cultural contexts. However, adjustments must account for local legal conditions, data availability, and landscape specifics. Implementing the method in other countries could contribute to sustainable landscape management at the international level, which is in line with the guidelines of the European Landscape Convention.

Supplementary Materials: The following supporting information can be downloaded at: <https://www.mdpi.com/article/10.3390/resources13120173/s1>, Table S1: Results of the appraisal of natural values.

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