Can visitors visually distinguish successive coastal landscapes? A case study from the Curonian Spit (Lithuania)

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ABSTRACT

Visual distinctiveness of the series of successive coastal landscapes featuring the Curonian Spit, a UNESCO World Heritage site, has been investigated using black and white landscape photos as visual stimuli. Based on the results of the chi-square test it was confirmed with strong statistical evidence that lay visitors indeed are capable of visual distinguishing different coastal landscapes and habitats which occur in the succession series from the shifting dunes to the mature forest. In all investigated 45 different cases of coastal landscapes the 'null hypothesis' was rejected with p < 0.00001. If the photographs representing the landscapes are carefully selected by a dedicated group of professionals, then lay visitors can correctly distinguish the landscapes and/or habitats even in the case when black and white photographs are applied as visual stimuli.

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1. Introduction

1.1. Problem description

Scenery plays a crucial role in attracting tourists in many regions and environments (Lothian, 1999). People who visit forests for recreation form perceptions of a place based on what they see and experience from the aesthetic point of view (Gobster, 1999). Coastal scenery is a major component of the desires of tourists visiting the coast, and it is a combination of the physical and cultural environment (Anfuso et al., 2014). Enjoying scenery is also an important subcomponent in recreational activities such as fishing and hunting (Arlinghaus, 2006; Rolloff, 1998). Scenic appeal of landscapes is particularly relevant to the post-industrial tourism paradigm, referring to the Urry's concept of the tourist gaze (2002, p. 149): 'Almost all environments across the globe have been transformed, or are being transformed, into diverse and collectable spectacles, spectacles often now involving 'gates' in order that paying visitors can enter, be charged and can consume them.'

Knowledge of the relationship between visitors' activities and their landscape preferences may be of great help in the management of natural areas under high recreational use (Atauri et al., 2000). Most natural landscapes are relatively fragile and susceptible to anthropogenic impacts developing through poor management of scenic resources (Chhetri and Arrowsmith, 2008). Hence, scenic landscape aesthetics can facilitate combining sustainable management goals with a scientifically grounded understanding of how visitors make landscape preferences (Parsons and Daniel, 2002). The possibility of relating individuals' landscape preferences to sociological, psychological or cultural features allows planners and decision-makers to incorporate public perception explicitly into the policy-making process in a more proactive and innovative way (Scott, 2003).

Scenic beauty can be a fair measurement proxy for perceived acceptability of land management (Ribe, 2002). Consideration of the aesthetic perceptions, judgments, needs and demands of the public can contribute to a wiser resource use and more effective and intelligent planning of future landscapes (Vining and Stevens, 1986). What is needed is a visual aesthetic assessment of geographic and temporal patterns of environmental conditions in comparison to other possible alternatives (Daniel, 2001). As it is aptly noted by Lewis (2006, p. 88): 'In effect, bringing aesthetic
expectations into play in a way that provides mutual benefits to natural and human ecosystems requires designing landscapes and crafting policies with an awareness of what different stakeholders value and require from their environment.‘

Thus, in the US, in recent decades, there has been a move away from managing scenery towards designing forestry activities to fit into or at least to try not to cause negative impacts on the aesthetic quality of the forest landscapes (Bell, 2001). In the US state of Rhode Island, aesthetic value (along with natural, commercial, industrial, and recreational features) is officially recognized in the state’s legislation as a primary asset of the coastal zone (Dalton and Thompson, 2013).

1.2. Interpretations of the scenic quality of landscapes

The linkage between landscape and scenery as the main way to judge on its quality is well-documented (Ribe, 1989, 2002; Rolloff, 1998; Tveit et al., 2006). It has been suggested that: ‘the aesthetic dimensions of viewing landscape and experiencing scenic beauty are an integral part of an individual’s overall experience in natural environment’ (Ormsby et al., 2004, p. 34).

A number of different yet closely interrelated terms have been used to denote the aesthetic dimensions, including: ‘aesthetic appeal’ (Shafer et al., 1969), ‘scenic beauty’ (Daniel et al., 1977; Daniel and Vining, 1983; De la Fuente de Val et al., 2006; De Vries et al., 2012); ‘scenic quality’ (Arthur, 1977; Ayad, 2005; Eleftheriadis et al., 1990; Palmer, 2000; Ribe, 2002; Wu et al., 2006); ‘aesthetic quality’ (Daniel, 2001; Gobster and Westphal, 2004; Ode et al., 2009), ‘scenic attractiveness’ (Chhetri and Arrowsmith, 2008), ‘visual quality’ (Lien and Buhyoff, 1986; Manning et al., 1996; Tveit et al., 2006; Wu et al., 2006). In most cases, the use of the term ‘scenic quality’ (or, interchangeably, ‘aesthetic quality’) has come to include most of the above.

The need for the aesthetic appreciation of coastal landscapes and habitats grows with an increasing environmental awareness and reflects the potential aesthetic and recreational value of these landscapes that can be pertinent for tourism development, in coastal heritage areas in particular (Povilanskas, 2004). The terms to denote the perceptual and cognitive processes of viewing, assessing, valuating and favouring landscapes are therefore widely applied, like ‘aesthetic response to landscape’ (Pitt and Zube, 1987), ‘appraisal of scenic beauty’ (Chhetri et al., 2004; Hull and Stewart, 1992); ‘visual landscape perception’ (Ervin and Steinitz, 2003; Fairweather and Swafield, 2001; Jacobsen, 2007; Nassauer, 1995; Shafer et al., 1969; Zube et al., 1982); ‘perception of scenic quality’ (Ribe, 1989, 2002); ‘landscape preference’ (Abello and Bernadéz, 1986; De la Fuente de Val et al., 2006; Jorgensen et al., 2002; Kaltenborn and Bjerke, 2002; Ode et al., 2009; Palmer, 2000; Purcell et al., 1994; Wherrett, 2000); ‘scenic and/or aesthetic preference’ (Gobster and Westphal, 2004; Lim et al., 2015).

Whereas each of the above terms has different shades of meaning, scholars and practitioners in the vast research field into the scenic quality are mostly concerned with the questions ‘What we see, and what we make of what we see’ (Ervin and Steinitz, 2003, p. 757) aiming to understand, interpret and utilize the judgment that a landscape is beautiful either as a source of aesthetic and psychological satisfaction, or as an economically meaningful amenity. But are visitors to nature areas, particularly to the coastal ones, indeed capable of distinguishing different landscape types in a way that were meaningful for spatial planning, landscape management and caring for the scenic quality? This question is especially challenging in the case of successive habitats gradually featuring different coastal landscapes: from shifting white dunes to scrubland, to mature forests and forest plantations. It is the central question addressed in the present case study.

2. Methodology

2.1. Study area

Our study focuses on the Curonian barrier spit which separates the Curonian Lagoon from the open Baltic Sea (Fig. 1 and Fig. 2). The length of the Curonian Spit is 94 km (sensu stricto), the width varies from 380 m to 4 km. It is the largest accumulative barrier sand spit in the Baltic Sea Region (Gudelis, 1995). The varied and dynamic dune landscape with high biological diversity is a distinctive feature of the Curonian Spit on the regional scale (Basalykas, 1977; Povilanskas et al., 2012). The 32.6-km long Grand Curonian Dune Ridge of 40–60 m high shifting dunes is the second longest coastal shifting dune ridge in Europe (Povilanskas and Chubarenko, 2000). It is protected as a strict nature reserve within the Kurshskaya kosa national park on the Russian part of the spit (est. 1987), and the Kuršių nerija national park on the Lithuanian part (est. 1991). Due to its unique blend of nature and culture values, the whole Curonian Spit was included into the UNESCO World Heritage List as a single cultural landscape of outstanding international importance (UNESCO, 2001).

Until now, the dune landscapes of the Curonian Spit are among the most dynamic in the Baltic Sea Region (Gudelis, 1998). There are five strips of shifting barchans still remaining on the spit. The total length of these strips is 32.6 km, 21.9 km being on the Russian part, and 10.7 km on the Lithuanian part of the spit (Povilanskas et al., 2006). The shifting dune landscape forms the most distinctive natural heritage value of the spit, with the highest shifting dunes exceeding 50 m in height and protected within four strict nature reserves (Povilanskas et al., 2014).

Unfortunately, the policy of senseless forestation which prevailed on the Curonian Spit after the World War II, and particularly throughout 1970s–1980s, had speeded up degradation, fragmentation and flattening of the shifting dunes (Povilanskas et al., 2009). As a result, the shifting barchans of the Curonian Spit became devoid of any local sand supply sources and rapidly degraded with the scrub and forest succession facilitated by the climate change (Povilanskas et al., 2011). Therefore, the key pre-condition to ensure a truly integrated management of amenities and values of the Curonian Spit is balancing different priorities in the management of the shifting dunes and the forest plantations, also based on scenic quality assessment (Povilanskas, 2009).

2.2. Long-range and short-range viewsheds in the scenic quality appraisal of coastal landscapes

View distance has long been recognised as a crucial factor in landscape preference studies (Jorgensen et al., 2002). A deep, wide viewshed has been shown of great importance in determining visual quality (Appleton, 1996). This is closely linked to the feeling of having a general or panoramic view of the landscape (Hagerhall, 2000). Therefore, first scenic quality and landscape perception studies investigated the aesthetic appeal of various long-range wilderness vistas (Daniel et al., 1977; Shafer et al., 1969; Shafer and Mietz, 1969; Shafer and Richards, 1974). Yet, soon the focus shifted to the investigations of the near-view aesthetic quality, which proved to be more practical regarding management and policy prerequisites (Rolloff, 1998).1

Arthur (1977) used multiple regression analysis to develop the first successful models for predicting near-view scenic beauty based on vegetative characteristics of forest scenes. As a result the

1 Here and further in the text a ‘viewshed’ is interpreted as the extent and location of terrain visible from a given viewpoint (Florians and Magillo, 1999).
potential utility of near-view scenic beauty response models soon became well documented (Brown and Daniel, 1986), and already by the end of the 1980s, a remarkable amount of empirical research has explored the aesthetic perception of near-view forest scenery, primarily in the US (Ribe, 1989). Most studies of view preference have dealt with small viewshed areas where a neighbourhood, or small grove of trees, might comprise a view (Germino et al., 2001; Kaplan and Kaplan, 1989). Llobera (1999, cited from Llobera, 2003)
distinguished the near viewshed as the smallest continuous area immediately surrounding a viewpoint and tried to describe some of its characteristics.

2.3. Application of photographs for scenic quality appraisal

Photographs are the most common visual stimuli used in social science research (Emmison and Smith, 2000). Shafer (1964, cited from Brown and Daniel (1986) was among the first to suggest using colour photographs and psychophysical techniques to measure the scenic quality of forest landscapes. Up till now, photographs remain the most widely used technique in landscape perception and preference research (Jacobsen, 2007; Jørgensen, 2011; Karjalainen and Tyrväinen, 2002). A series of comparative evaluations have confirmed the general viability of photographs as surrogates for landscape experience (Fairweather and Swafield, 2001; Vining and Stevens, 1986; Zube and Pitt, 1981). Photographs permit control by the researcher over presentation contexts and procedures and of the conditions under which the landscapes will be perceived: atmospheric and light conditions, number and type of elements present etc. (Jacobsen, 2007). Yet another advantage is the possibility for a given subject to simultaneously compare several photographs (Real et al., 2000).

Photographs are particularly pertinent in landscape preference studies of tourist destinations, since visual stimuli are more readily recalled and affect attitudes towards tourist destinations whereas tourist offers and destinations are promoted by means of photographic representations (Laskey et al., 1994; Mackay and Couldwell, 2004). Images are considered to be crucial in determining a number of important consumer variables, including destination choices, tourist behaviour, and product satisfaction (Garrod, 2007, 2008; Scarles, 2010). The variety of approaches which have been taken to apply visual methods for examining people’s perceptions of destinations range from the highly interventionist, wherein researchers choose the visual images to be studied, to the highly participatory, wherein the research subjects themselves collect photographic representations of those images, which are subsequently analyzed by the researchers (Garrod, 2008, p. 382).

One of the more popular approaches, which was developed a few decades ago and applied by numerous authors (Abello and Bernádez, 1986; Atauri et al., 2000; De Lucio and Múgica, 1994; Múgica and de Lucio, 1996; Vining and Stevens, 1986), is the method of paired comparisons. This response method consists of the systematic pairing of objects or stimuli. As each pair is presented, the observer makes a judgment indicating which member of the pair has a greater value of some attribute. In this way, scenic beauty of several landscapes might be assessed by presenting pairs of landscape scenes to the observer. On each presentation, the observer would indicate which scene is perceived to have greater scenic beauty.

Yet, there are some reservations concerning the notion that photographs and on-site observations are alike. Questions concerning the reliability and validity of the photographic representations and the judgments have been raised, even when landscape simulations might be of high image quality (Daniel, 1992; Daniel and Meitner, 2001; Jacobsen, 2007; Lange, 2001; Paar, 2006; Palmer and Hoffman, 2001). Photographs are not able to represent the whole richness of real nature. They are not only less complex and less multidimensional, but they also offer less interaction than real scenes. The effect of factors such as novelty, surprise, variety, and sensory inputs (sound, smell) are characteristics of the on-site observer experience which photographs cannot convey (Hull and Stewart, 1992; Karjalainen and Tyrväinen, 2002; Ode et al., 2009; Oku and Fukamachi, 2006).

In spite of the above reservations, comparisons between results gained from photographs, and from experience ‘in the field’, suggest that for the study of tourism-related landscapes the use of photographic representations is valid and consistent with direct experience of the represented landscapes, if appropriate methods are applied to ensure the reliability and validity of the representations (Daniel and Meitner, 2001; Fairweather and Swafield, 2001; Jacobsen, 2007). Stewart et al. (1984) asserted that the validity of photographs as visual alternatives to on-site judgments depends on the following characteristics: 1) vision is the dominant sense used to gather relevant information; 2) observers are stationary when the judgments are made; 3) relevant visual information is located far from the observer; 4) visual information out of the observer’s field of view should be irrelevant to the judgment; 5) observers are trained to make sound visual judgments; 6) visual distortions (e.g. colour) in photographs are replaced by other information of equivalent value.

2.4. Survey design

Palmer and Hoffman (2001, p. 159) provided the following recommendations for ensuring the reliability and validity of the photographic representations in scenic quality assessment: 1. Establish the reliability of professional ratings. This may be accomplished by having several professionals evaluate each view and then calculating the reliability coefficient. It is also desirable to establish the relationship of professional ratings to a criterion group, such as a random sample of the public. 2. Establish the validity of each landscape representation. This may be accomplished by comparing the ratings of the representations and actual field conditions from several individuals. In situations where the visual condition might be quite diverse, use panoramic images or more than one photograph from each viewpoint. 3. Establish a record of preparing valid visual simulations. It is, of course, not possible to establish the validity of a simulation before it is built, but it is possible to validate the existing condition’s representation.

In the current survey we have focused on these all three stages of ensuring the validity of scenic quality assessment of the Curonian Spit dune landscapes. We have started from establishing the reliability of professional ratings of each view and the relationship of professional ratings to a random sample of the public. One critical problem in the survey design was the use of black and white photographs. Some references on photograph-based landscape simulations indicate that lack of colour makes a difference in simulation validity (Stamps, 2004), yet, as mentioned above, colour can be also interpreted as a kind of distortion for the assessment (Stewart et al., 1984).

Furthermore, applying larger samples of landscape photographs in the questionnaires in field conditions, with limited possibilities for using electronic gadgets to present large-scale colour images, requires huge funds for printing. Therefore black and white photographs are regularly and successfully used as visual stimuli in scenic quality surveys (Kearney et al., 2008; Orland, 1994). Hence a bigger attention to the challenge presented in the title of this study: can lay people indeed distinguish different successive landscapes portrayed in black and white photographs, and if so, then which concepts and attributes make the investigated forest and dune landscapes distinctive in the eyes of the people.

To answer this question, the authors of this study have compiled a full list of dune, forest and transitional successive habitats of the Curonian Spit. Then we have compiled all available short-range viewshed combinations of the habitats in the foreground and the background. The total list of the short-range viewsheds of the Curonian Spit landscapes under scrutiny comprised 45 foreground and background dune, scrub and forest habitat combinations (Table 1).
Other potential short-range viewsheds of the dune, scrub, and forest landscapes are either absent on the spit, or are so rare that visitors almost never encounter them in practice. In June 2014 we have visited the entire area of the Kursiu Nerija national park taking high-resolution black and white images of the short-range viewsheds of the landscapes. We thus have created a database of 900 images portraying the 45 available short-range landscape viewsheds. It means that 20 images portrayed every single short-range viewshed of the dune, scrub or forest landscape available on the Curonian Spit. After that, the database entries were submitted to a group of seven independent experts comprising two forestry experts, two geographers, two botanists and one social anthropologist — all of them familiar with the Curonian Spit and its landscape features. The experts in several stages of individual and group selection have selected three photos for each of the short-range viewsheds of the investigated landscapes. Hence, the total database of the viewsheds presented to the lay visitors of the Curonian Spit comprised 135 images. These images have been paired semi-randomly in the way that the pairs of images portraying both, the same and the different landscapes of the Curonian Spit had equal chances to be included into each photo-questionnaire.

For this purpose, all three images portraying the same landscape have been paired among themselves and all these pairs have been 22 times repetitively included into the questionnaires. The images representing different landscapes were paired in the way that each of all possible 990 pairing combinations of 45 investigated landscapes were represented in the questionnaires once, and each of the three images portraying every landscape should have been given an equal chance to be paired with an image portraying a different landscape. The questionnaires also contained a basic definition of landscape, i.e. ‘an area of land that has a particular quality or appearance’ (Merriam-Webster, 2014).

Thus altogether the complete array of the image pairs assigned to the photo-questionnaires comprised 2970 pairs of the images portraying the same landscapes, and 2970 pairs of the images portraying different landscapes. Each image was presented in the questionnaires 88 times – 44 times paired with other two images portraying the same landscape and 44 times paired with the images portraying each of the different landscapes.

Having fulfilled these preconditions, there were 20 randomly selected pairs of images provided in each photo-questionnaire. Altogether there were 297 different questionnaires produced and given to a group of lay respondents (randomly chosen visitors of the Curonian Spit).
Kuršių nerija national park). The respondents have been approached and asked to make their choices in August 2014 at the exit ferry pier before leaving the national park thus meeting the requirement that relevant visual information were located far from the observer (Stewart et al., 1984). The waiting time in the line before embarking the ferry (5–7 min) was sufficient for the respondents to study the presented photos carefully and make their judgement.

The distinctiveness of landscapes was tested by applying the chi-square test of the frequency distribution of correct and wrong answers (‘same’ or ‘different’) including both cases: whether the assessed pair had contained the images of the same landscape, or the images of different landscapes. All successive stages of the survey are summarized in the flowchart (Fig. 3).

3. Results

The main results of the study are summarized in Table 2. The results of the chi-square test securely prove that the respondents were capable of statistically reliable correct distinguishing of all 45 surveyed landscape types, i.e., all the different surveyed near-viewsheds of the Curonian Spit are reliably distinguishable by lay visitors of the national park. In all the surveyed cases the ‘null hypothesis’ was rejected at a very low probability (p) ranging from the highest ones in the case of the forest glades surrounded by the mature Scots pine stands (Fig. 4), to the lowest one in the case of the mature Black alder stand (Fig. 5) with grey dunes (Fig. 6) and white dunes (Fig. 7) representing intermediate cases. If the photographs representing the landscapes are carefully selected by a dedicated group of professionals, then lay visitors can correctly distinguish the landscapes and/or habitats even in the case when black and white photographs are applied as visual stimuli.

4. Discussion

Any kind of human activity dealing with landscape is the use of its values that are interpreted in a specific way according to the circumstantial needs. The appreciation of one specific need at the expense of others elevates conflicts (Kaur et al., 2004). Clashing interests hide two major distinctive motives. One can be classified as practical or functional, regarding the use of land, while the other, related to personal perceptions, could be specified as more intrinsic in essence. Practically, the need for landscape planning departs from opposing understandings on the use of the landscape (ibid.). Thus, biophysical processes are accepted as appropriate instruments for changing landscape features, and human perceptual judgments are the most important indicators of visual aesthetic quality (Daniel, 2001).

At the same time discord in valuations also springs from perceptual differences of people, as landscape is viewed through the variety of associations by people, determined by their personality, prior experience and influence of culture (Kaur et al., 2004). Therefore, changing public landscape perceptions and preferences in any fundamental way exceeds the mandates of traditional landscape management, and is better addressed in a broader, explicit social-political discourse about environmental values (Daniel, 2001). This statement is especially true considering the aesthetic appreciation of the successive series of iconic and visually distinctive coastal landscapes such as the ones present on the Curonian Spit.

As the appearance of landscapes communicates cultural values (Nassauer, 1995), the debate on the aesthetic quality of forest plantations and shifting dunes might provide a valuable, although by no means exclusive, insight regarding the appropriateness of the considered forest and dune management and conservation policies in order to strike a proper balance among the objectives of nature conservation, land management and sustainable tourism development on the Curonian Spit (Armitiêne et al., 2007; Povilanskas, 2004; Povilanskas et al., 2014). Preference for more complex and
As it is aptly noted by Nassauer (1995), landscape architects may consult the genius of the place, but they do not expect the genius of the place to design it. Yet, quite often aesthetic, ecological, nature conservation and recreation development priorities appear to be coherent, particularly in the case of the most attractive and salient forest and dune landscapes and habitats which are so common on the Curonian Spit. People with different types of environmental attitudes agree that the most beautiful landscapes are also the most acceptable ones (Ribe, 2002). E.g., surveys do suggest aesthetic merit in forests with a variety of species when they create visual diversity (Ribe, 1989).

<table>
<thead>
<tr>
<th>No.</th>
<th>$\chi^2 (p)$</th>
<th>View type</th>
<th>Landscape/habitat type</th>
<th>Landscape attributes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>&lt;0.00001</td>
<td>Open view</td>
<td>White dunes</td>
<td>Spectacular vastness; dunes as iconic landmarks</td>
</tr>
<tr>
<td>2.</td>
<td>&lt;0.00001</td>
<td>Grey dunes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>&lt;0.00001</td>
<td>Sandy grassland</td>
<td></td>
<td>Familiarity, comprehensiveness and readability of the landscape both as a recreational space</td>
</tr>
<tr>
<td>4.</td>
<td>&lt;0.00001</td>
<td>Forest glades</td>
<td></td>
<td>and a fragile heritage site</td>
</tr>
<tr>
<td>5.</td>
<td>&lt;0.00001</td>
<td>Scrubland</td>
<td>Willow scrub</td>
<td>Diverse land cover; equal share of forest, scrubland and sandy grassland in the near-viewshed</td>
</tr>
<tr>
<td>6.</td>
<td>&lt;0.00001</td>
<td>Juniper scrub</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td>&lt;0.00001</td>
<td>Mugo pine scrub</td>
<td></td>
<td>Mountain landscape in a miniature; a ‘rupe carpet’</td>
</tr>
<tr>
<td>8.</td>
<td>&lt;0.00001</td>
<td>Forest</td>
<td>Scots pine stand</td>
<td>Tidy clean dry forest without understorey vegetation</td>
</tr>
<tr>
<td>9.</td>
<td>&lt;0.00001</td>
<td>Silver birch stand</td>
<td></td>
<td>Structural integrity of forest and understorey vegetation; absence of visual traces of forest management</td>
</tr>
<tr>
<td>10.</td>
<td>&lt;0.00001</td>
<td>Black alder stand</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11.</td>
<td>&lt;0.00001</td>
<td>Norway spruce stand</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12.</td>
<td>&lt;0.00001</td>
<td>Forest clearing</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Fig. 4. Representative photo of the forest glades surrounded by the mature Scots pine stands.

Fig. 5. Representative photo of the mature Black alder stand.
eventual loss or gain of scenic resources in the case of opting for certain forest and dune management strategies. Yet, in addition to the desirability of preserving existing landscape identity, the protection of existing elements, space and functions should not blindly rule out the possibility of new developments emerging with new values (Krause, 2001). Landscape preferences evolve over time and are to some degree dependent upon a person's interaction with that landscape (Kaltenborn and Bjerke, 2002).

The emergence of a particular cultural landscape, among numerous potential landscapes, depends on policy options, on prevailing attitudes in society, and on culture (Kaur et al., 2004). This is especially true in the case of the forest and dune conservation and management on the Curonian Spit, which is featured by changing landscape preferences (Povilanskas et al., 2011). In the 1990s, academics and practitioners have developed a new understanding of the evolution of dune landscapes, their role in maintenance of the biological and landscape diversity, and their management regime reflecting greater appreciation of the importance of the revival of landscape dynamism (Doody, 2013). The results of this study provide a strong aesthetic evidence and support for this shift in dune and forest management policies on the Curonian Spit.

5. Conclusions

Answering the initial question highlighted in the title of this paper we can confirm with strong statistical evidence that yes, indeed ordinary visitors of a coastal national park can visually distinguish different landscapes and habitats occurring in the succession series from the shifting dunes to the mature forest. Distinguishing different landscapes and/or habitats in nature might be more problematic for a lay visitor since usually the mosaics of habitats prevail there. Yet, coastal dunes and forests which are characterised by a relatively strong homogeneity can be easier segregated visually than the terrestrial ones. The full array of the elicited 45 viewshed images represented the whole landscape diversity of the Curonian Spit, and it can be concluded from the positive chi-square test results of our study that seaside visitors are well aware of local environment features as they move through different landscapes. This conclusion is valid at least for the coastal barrier spits which are characterized by visually expressive and distinctive dune, scrub and forest landscape patterns.

References


