



The modern tourist's perception of the beach: Is the sandy beach a place of conflict between tourism and biodiversity?

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Abstract

As economic growth gave people more free time, since the 1950s coastal areas have become increasingly desirable holiday destinations, and beach tourism has grown at an enormous rate, becoming a mass phenomenon. Next to their ecological importance as bio-filters, sandy beaches in Europe tend to be of great economic value through tourism. Although, modern tourists are largely peaceful, tourism itself creates much damage to the environment. Nowadays a common feature of the European seas is the diffusion of plastic debris on the coasts, either abandoned by beach users or deposited by the sea during storms.

There are some 4 to 8 million tourists vacationing each year on Polish beaches. What is the purpose of their visit to the beach? What things do they most dislike there? What is the perfect coastal landscape of the sea for them? What is their imagination of the beach life? Questionnaire surveys, carried out during summer 2003, aimed at ascertaining what public opinion was/is regarding the beach, were useful to answer these questions. At each site, from 80 to 160 people filled out the questionnaires asking what their opinion was of the beach, scenery, animals and aesthetics.

In a modern, democratic society, the public stakeholders, not the experts are having the final word. It creates, however, problems with public opinion: there is seldom direct experience (visual, practical), and there is no common perception of values. Do we really have similar values? For many, the plastic net covers on cliffs and the coastal motorways are more attractive than underdeveloped shore.

1 Introduction

1.1 Human impact on the coastal zone due to tourism

Exposed sandy beaches are highly hydrodynamic. These ecosystems usually present low biodiversity and high specialization, due to the regime of permanent abiotic changes that governs their functioning. The tiny number of species, however, hide high biomass and production rates along all the trophic web, and the surf zone has been recognized as a nursery for many marine fish species (Brown & McLachlan 1990). Also, coastal regions of Europe have witnessed human settlement and economic activity for thousands of years. Depending on the definition used, 20-50 % of Europe's population live within the coastal zone and depend on it for their living and quality of life (ESF Marine Board 2002). Caffyn et al. (2002) report that 50-70 % of humans live within 60 km of the coast and this proportion is increasing. Furthermore, by the year 2020, 75% of the world's population will live within 60 km of marine coasts and estuaries. Influxes of tourism add to this human impact on the coastal zone as well. In the mid 1990s, the Mediterranean coastline alone received annually an estimated 75 million international and 60 million domestic tourists (ESF Marine Board 2002). Montanari (1995) reports that over 200 million tourists visit the Mediterranean basin every year, 80% choosing European Union countries as their travel destination. The biodiversity of, and the impact of tourism on, sandy beach biodiversity is a subject currently generating great scientific interest in Europe. It is the key topic of the international research programme "Sandy", which involves scientists

from 12 European countries and has recently been funded by the European Commission. Part of this concern is expressed in initiatives like the SCOR Working Group 114 on permeable sediments (SCOR 1998; <http://www.scor-wg114.de>). The Importance of Critical Transition Zones (including sandy beaches) was the focus of the SCOPE meeting (Levin et al. 2001). To meet the challenge of progressing integrated coastal zone management (ICZM) and governance, baseline interdisciplinary research is required (Emeis et al. 2001). The importance of those ecosystems for the countries in different regions (e.g. Europe, South America, South Africa, Australia) has been pointed out in the workshop "Beaches: what future?" (Florence, 2001, Proceedings in press, ECCS). This focused on adaptation of communities and populations along the world's coasts and it highlighted the need of common protocols and frequent exchanges between the partners of the research network on beaches (Scapini 2002). It set out to fill important gaps in our knowledge concerning sandy beach biodiversity in Europe, and to link beach biodiversity to tourist impacts, using both a descriptive and an experimental approach.

Scientists, resource managers and medical experts today widely accept the idea that human society is dependent upon a healthy environment and that continued environmental degradation threatens the quality of life (Bickham et al. 2000). Although direct links between ecological effects and human health have proven difficult to establish, the use of wildlife species as sentinels of environmental problems is the conceptual basis for this connection (Colborn 1994). Furthermore, considering the principles of sustainable management of marine and coastal areas, defined in the Rio conference of 1992 (Chapter 17, Agenda XXI), the topic of sustainable management has acquired a fundamental role in the country policies all over the world, and must be faced at an international and multidisciplinary level. The intervention through management plans and the use of supporting tools in decision-making acquires particular importance for relatively fragile ecosystems such as sandy beaches.

This paper is not concerned with the ICZM aspects of implementation and assessment, but is a pilot project as to how the public perceive a beach. In essence, are beach landscapes, aesthetics, and nature acceptable, or unacceptable, or is the public indifferent to them?

1.2 Methodological strategies

The purpose of questionnaire surveys, carried out at 3 beaches on Northern coast of Poland (Hel, Gdynia, Sopot) during the summer at 2003, was to ascertain what public opinion had been regarding beach perception (Figure 1). At each site, from 80 to 160 people filled out the questionnaires asking what their opinion was of the beach, scenery, animals, and aesthetics. Questions related to the perception of the visual world - after the classic research works of Gibson (1950, 1966, 1979), and specifically were geared to:

- the aim of the visit to the beach,
- things that people most dislike on a beach,
- their perfect coastal landscape of the sea,
- their imagination of beach life - what animals the public know live on a beach and what animals they want to avoid meeting during a visit.

2 Results

Table 1 presents the main reasons why people visit the beach. These results are very intriguing and more research needs to be carried out, as to why the public were so interested in fresh air, wildlife, and nature, instead of sunbathing and water sports, which would seem to be the most important aims



Figure 1: Gulf of Gdańsk - location of study sites (estuarine areas of the 2nd stage marked in red)

for visiting a beach. The results suggest that fresh air is the most important 'product' that beaches offer to us in accordance with the concept of ecosystem goods and services from Constanza et al. (1997). Naturally, such activity needs some shore-based recreation infrastructures, i.e. 'promenades', beach access (roads, footpaths, etc.), waterfront housing development, car parks, camp/caravan/picnic sites, playgrounds, swimming pools, service areas, beach facilities (toilets, lifeguards), walkways and walkover structures, coastal protection structures (groins, etc.), sand beach nourishment, moorings, boat docks, marinas, navigation canals, reclamation of coastal wetlands, drainage and stream canalisation. It may create, however, many conflicts and adverse impacts, i.e. complexity of interaction between activities, landscape and scenic quality alteration, shoreline modification, erosion, disruption of sediment transport, pressure on local cultural values, water/land space conflicts, ecological disturbances (dunes, reefs, wetlands, etc.), traffic intensity, sewage, litter, oil seepage, water quality, wakes from boats, noise, air pollution, accidents and hazards, dune path network (dunes flattened to build houses and roads), habitat loss and damage, exotic vegetation, higher risk exposure to coastal hazards, reduction of recreational use, and scenic appeal.

PURPOSE	%
Fresh air	26.53
Swimming	18.37
Nature and wildlife	15.65
Walking	15.65
For children's play	9.52
Scenery, scenic watching	6.12
Water sports*	6.12
Sunbathing	2.04

Table 1: What is the reason people visit the beach? (* i.e. sailing, power boating, surfing, shore angling, boat fishing, water skiing, whale watching, sand sports, snorkelling, para-sailing, kiteing)

Table 2 summarizes the results of the public's perception of beach aesthetics and presents issues that tourists dislike the most on a beach. Unsurprisingly, the very low position of groins in Table 2 confirms other studies (e.g. Williams et al. 2003). Some of the reasoning for groin penchant are that they acted as wind breaks, provided a comfort zone (or 'rugged fun zone') for children, are part of our Heritage (sic!) or are natural and give character to a beach. Especially rock ones are warm for the back and give a 'seat' - they 'break up the beach'. The public think that groins are: familiar and epitomise happy seaside holidays, clean and dominant, peaceful and look right, interesting and beautiful, and dilapidated, but still attractive. Litter and man-made debris, poor water quality, crowd on a beach (especially with dogs) and poor facility are issues that beach visitors dislike them the most.

ISSUE	%
•Lack of sand/shingle beach	0,00
•Groins	1,25
•Beach erosion	2,50
•Bed smells from industry	2,50
•Washed-up seaweed	3,75
•Noise from industry and vehicles	5,00
•Difficult access	5,00
•Seawalls	5,00
•Flies and other insects	5,00
• Poor facilities	7,50
• Dog waste/excrement	7,50
• Crowded beach	11,25
• Poor water quality	13,75
• Litter and man-made debris	30,00

Table 2: What do tourists dislike the most on a beach? (the highest values are bolded)

The public opinion's knowledge of the coastal natural environment is best seen in two additional issues (Figure 2): 56% of beach visitors are sure that some small animals live in a beach environment, but 16% think that sunbathers are the only inhabitants of a coastline.

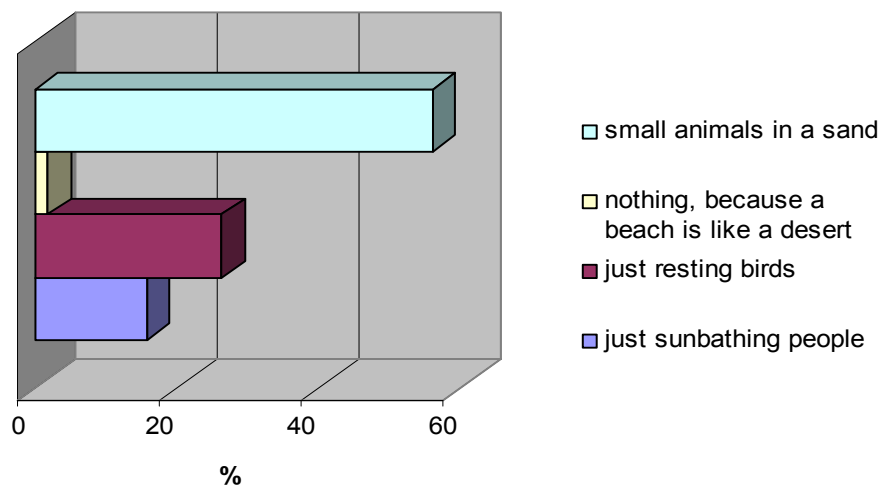


Figure 2: What lives in a beach ecosystem according to the visitor's perception?

Apart from that mentioned above, the beach users rated the vertebrate animals living on a beach to be more attractive than invertebrates (Figure 3): e.g. 9.3% of respondents know that *T. saltator* lives on a beach, but 8.5% of people don't want to meet this animal on a shore. In contrast a lot of people recognise beach birds, and there are no objections to meeting them during his/her stay on a beach. Gregory (1998) has argued that 'perception can affect emotions... some things look beautiful, others ugly'. This comment is exemplified with respect to animals. More research is needed on the findings, especially the question as to whether the perception of risk (danger) equates with a dislike of animals, and is derived from emotional responses rather than reason (Slovic 2000).

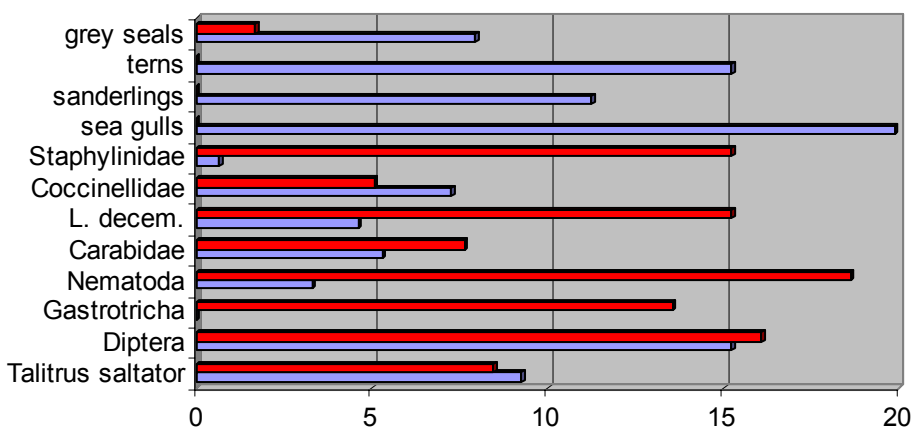


Figure 3: Beach visitors vs. beach animals: blue – „Yes, I know that this animal lives on the beach”, red – „I don't want to meet this animal on a beach during my stay!”.

Results obtained from asking people to rate beach scenery proved to be extremely interesting. Table 3 summarizes the results of the research findings. The only beach interviews that produced clear evidence by respondents of all three study sites was a 'horizon' - here many people chose 'vessels and boats'. It seems to be that the main reason for this was that beaches in the study are directly the

vicinity of harbours in Gdańsk and Gdynia and travel paths of ships. It makes the presence of vessels a very familiar view for people resting at neighbouring beaches.

The majority of people visiting beaches in Hel and Sopot wanted to have a very natural environment with dunes. On the contrary, the Gdynia's visitors definitely needed to have a guarded beach with full services. Their opinion about beach scenery was not very clear. However, more than 50% of respondents in Hel and Gdynia preferred pure sand in surf zones. Sopot's respondents were more likely to expect herds of fish when bathing. This is the next interesting issue, as the Hel beach is more 'pristine' than the typical urban beaches of Gdynia and Sopot. More research is thus needed on the above findings.

Beach location	SEA HORIZON			'I do not know' or 'I do not care about it'
	Clear horizon	Vessels and boats	Windmill parks	
Hel	20,74	62,20	8,53	8,53
Gdynia	20,80	58,40	20,80	0
Sopot	32,70	40,88	26,42	0
Beach	BEACH			'I do not know' or 'I do not care about it'
	Guarded beach with service	Unguarded empty wild beach	Bulwark and speedway	
Hel	25,00	66,46	0	8,54
Gdynia	64,43	35,57	0	0
Sopot	29,56	67,30	3,14	0
Seashore	SEASHORE			'I do not know' or 'I do not care about it'
	Palm lines along the shore	Dunes with sharp-edged grass	Flower beds	
Hel	33,54	53,66	0	12,80
Gdynia	22,15	22,15	21,48	20,80
Sopot	18,87	62,89	18,24	0
Underwater	UNDERWATER			'I do not know' or 'I do not care about it'
	Herds of colourful fish	Tufts of sea grass	Non-covered pure sand	
Hel	37,80	0	53,66	8,54
Gdynia	13,42	28,19	58,39	0
Sopot	53,46	22,64	23,90	0

Table 3: What is an ideal shore landscape? (in %; the highest values are bolded)

However, on the basis of the present results, we know that the choice of the ideal beach is a choice of extremes between a full set of facilities, and the wilderness. According to the questionnaires, the majority of those surveyed would like an uncrowded beach with full facilities (Figure 4).

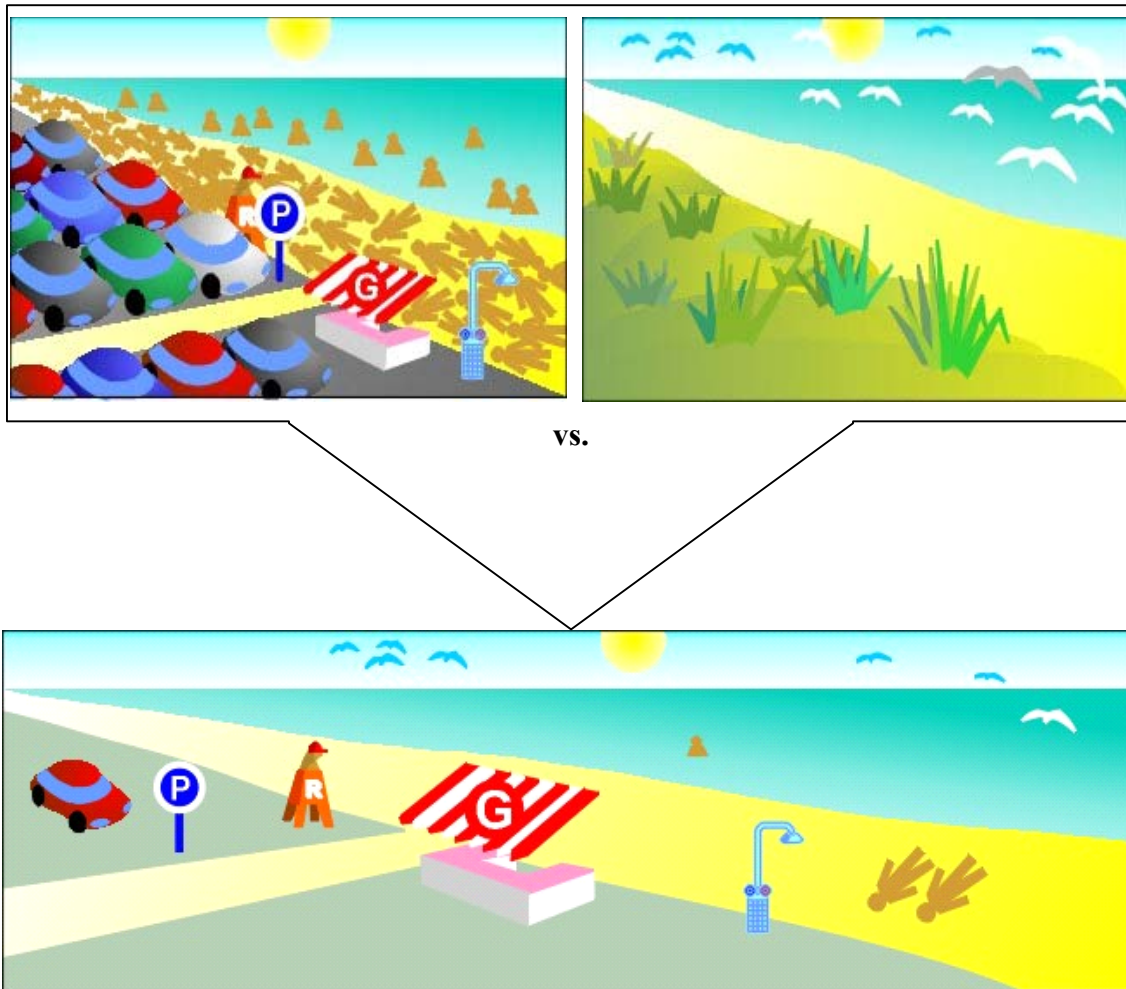


Figure 4: The choice of ideal beach is the choice between extremes – the effect is a theoretical compromise which cannot be applied in practice.

3 Discussion

Nowadays, it is a commonly occurring phenomenon that plastic debris litters the European coasts, either abandoned by beach users or deposited by the sea during storms. Urban residents usually declare their longing for contact with nature and the need to protect the environment. Few realise that contact with nature is intimately related with the giving up of some of the comfort offered by civilisation. Being able to choose, few people sacrifice their time and comfort in order to be able to experience the natural environment. The consciousness of nature is limited to charismatic species and extreme phenomena. Without judging attitudes, we should learn what the predominant approaches are in the European society. The following questions arise: how do people use marine coasts? How many prefer sand over a lounge chair? Will a marble-stone swimming pool replace the sea? How much do people want to spend on marine recreation and what quality do they expect? How many want to keep out of their minds that nematodes also live on the beach? And we have to formulate the final important question: Are we losing something by turning pristine coastlines into leisure industry centres? If so, what is the extent of the loss?

Such questions, of obvious importance in terms of management and planning may, to a certain extent, be approached through model simulations, which appear therefore as a powerful tool. There are many tools that are very useful for such reasons (Caffyn et al. 2002). The easiest is a **beach usage by visitors and tourists** - count and observations to collect various types of data through observational surveys conducted at each beach site. It is important to record the numbers of beach users over time and to distinguish between recreational users and any local people using the beach as part of their

business or normal daily lives. Thus regular counts are taken of people on the beach during each day of the survey. In addition to exact numbers, other data are collected such as the types of activities taking place, the types of visitors present and any conflicts or problems observed. Data are recorded on specially designed record sheets and photographic records are also taken each hour. The next tool are **stakeholder analyses** in order to undertake an analysis of stakeholders, their views and priorities, including the different groups of resource users, local people and other non-governmental stakeholders. Each stakeholder is asked to provide similar information – about what they have, what they want, who they interact with and how, and what problems they are experiencing. **Visitor surveys** are the most complex tool in order to monitor the characteristics and views of visitors to beach environments. Visitors are interviewed using a standard questionnaire. This provides much more information than observational methods, as it is possible to ask visitors about their behaviour, views, knowledge, preferences and feelings about the site. The data can be analysed with a mixture of quantitative and qualitative methods to produce statistics about characteristics and opinions but also people's responses about the meaning the site has for them or their views on its management. Sample sizes need to be reasonable to ensure statistics produced are reliable and to monitor trends from one year to the next. It is important to sample at both weekends and during the week as types and numbers of beach users will vary from day to day. Similarly, sampling should take place throughout the season the beach is used, which could be over a six month period or more. The best sampling points should be considered where a large site is being surveyed - as again different users may prefer different areas of the beach.

To date, there has been extremely little published work regarding coastal perception. However, there have been many publications on hazard perception, which can be incorporated into beach studies, as plastic debris on the coasts especially, can be grouped under the term 'hazards'. Kates (1962) was the first to highlight how perceptions differ between individuals. People who denied that flood hazard existed, saw it as a regular occurrence whilst others saw flooding as an 'act of God' and viewed the hazard in a detrimental way. In time, the emphasis shifted from flood hazard to drought by Saarinen (1966) in a perception study of Great Plains farmers. Prior to this study, floods had dominated research attention being the most commonly occurring hazard. In 1967, a collaborative research program carried out by the universities of Clark, Toronto and Chicago attempted to use findings from flood hazards and apply them to other hazards and cultures (White 1973). Hazards including hurricanes, snow, earthquakes, volcano and coastal erosion, were also studied in countries as diverse as Pakistan, Peru and Japan (White 1973). The findings of this extensive research showed not so much public ignorance but public indifference. In detriment-free periods, little interest was shown in hazards and information regarding adjustments.

Why do things look the way they do? Perception is the process in which the brain receives, selects, modifies, and organises impulses and the basis of perception is sensorial knowledge (Sekuler & Blake 1994, Moscovici 2000). Much of what is perceived merely provides raw data that comes to the senses from the object and is assimilated in the brain where perception starts. This sensory information is transferred, elaborated upon and combined to create what a person basically experiences or perceives. This elaboration makes perception a personal process, coloured by the individual and his/her experiences both past and present. Much of the data processing for perception takes place in the eye and this pre-processing is conducted by 120 million receptors down to 1 million optic nerve fibres. However, only a small fraction of the sensory input received at any one time is experienced or perceived. This is because there is a 'focus' and a 'margin' to the conscious experience. Events perceived clearly are in 'focus', whilst those in the 'margin', may be dimly perceived, or not even perceived as such. Many factors direct the 'focus' of our perception. Some of the most important are:

- External: intensity and size - the brighter and bigger, the more one can see it; novelty and contrast - the appearance/disappearance of a stimulus can gain attention; repetition - repeated stimuli, can cause one to ignore/pay attention depending upon stimuli;

- Internal: are concerned with needs e.g. hunger, thirst; interest etc. and are not of great concern in the context of the present study, as people on a beach are usually relaxed having ample food, drink etc.

Very little appears to be known regarding the relationship between perception and behaviour. 'The primary purpose of perception is to identify and classify objects and places and to attach meaning and significance to them. Therefore, it is concerned with the enduring character of objects' (Milner & Goodale 1963). Some of elements of a beach scenery, like vessels and boats or wind parks, human traffic and beach facilities etc. are large-scale, enduring objects and people's perceptions of them, influence behavioural patterns, so that the response is usually either favourable or unfavourable. Emotions also come into play, as these can be the sensations of bodily adaptation to a situation - the James-Lange theory, and these are deeply associated with meaning, which is of vital importance to perception. Slovic (1997) has argued that a 'Worldview' e.g. social, cultural and political attitudes, guides a persons judgements regarding good/bad, beauty/ugly adjectives given to an object, i.e. it is an orientating mechanism directing how people make judgements. All these points merit further indepth investigation, because in the modern, democratic society, the public stakeholders, not the experts are having the final word. It creates, however, problems with public opinion: there is seldom direct experience (visual, practical), and there is not a common perception of the values. The quality of the beach ecosystem generally depends on the shoreline stability, and healthy ecosystems in turn contribute to shoreline stability, as they allow for natural equilibrium. Human intervention, management, and other changes may upset the balance of this equilibrium. Do we really value in a similar way? For many, the plastic net cover on cliffs and coastal motorways are more attractive than underdeveloped shore (Figure 5).

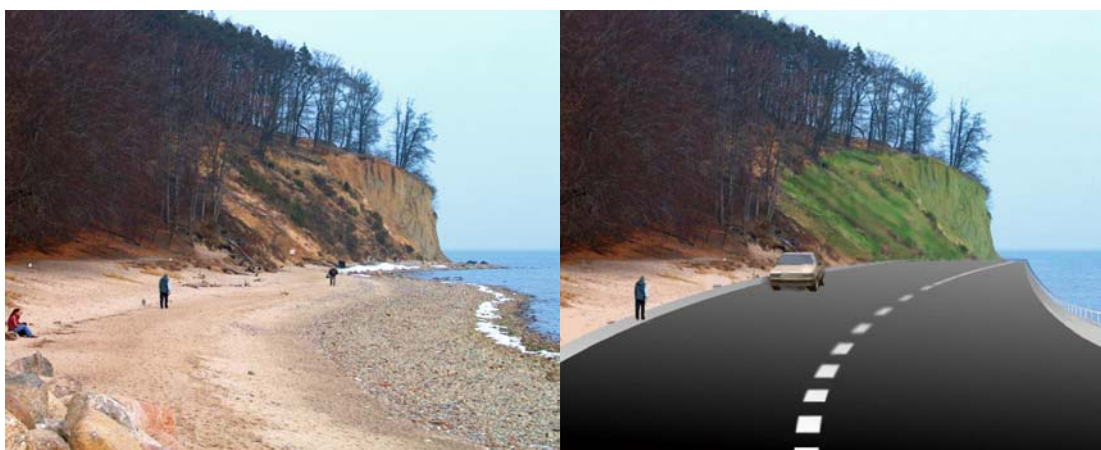


Figure 5: Do we have similar values? An example of various ways to manage the same area: a natural beach ecosystem (left) and an antropogenically-created system with a road (right). From the LITUS website: www.iopan.gda.pl

In the recent study of the Polish coastline, Węśławski et al. (2000a, b, c) showed a marked decline in the localities inhabited by the sandhopper *Talitrus saltator* and of its average density when these were compared with previous recordings. The sandhopper, the only macroscopic consumer of lignin in marine environment, lives along the whole 500 km of Polish sea coast, but effectively on less than 2 km². Several reasons such as pollution, climatic changes in storm frequency, severity of winters, the rise in sea level, changes in trophic conditions and the increase in recreational use of beaches are all proposed to have caused the decline in the species. Mechanical cleaning is regarded as an important limiting factor for sandhoppers and it is stressed that amphipods could still recover if several kilometres of less frequently visited beaches between crowded areas were left untouched. There are some 4 to 8 million tourists going on vacation each year on Polish beaches. There are some places with more than 3000 persons crossing each square meter on the water line daily. Poles and Germans

tend to aggregate close to the beach entrances, while Scandinavians keep maximal distance from the nearest person on the beach. Considering the number of visitors coming to Sopot, it may be concluded that 60% of the Polish coastline receives more than 100 human steps per square meter daily during the peak summer season. Of course, trampling may have a positive effect on the number of microorganisms, since plant debris is fragmented and mixed with sand grains on this way. It speeds up the process of decomposition and organic matter turnover in the beach. However, the question to be studied is that maybe sandhoppers are victims of increasing tourism activities on a sandy beach?

Regarding the point mentioned above, research on socio-economic issues on a sandy beach seems to be of great importance. An axiom in psychology is that only a fraction of what exists, is perceived and only a fraction of what perceived is responded to. With respect to beach users perception of coastal nature at three Polish coastal sites, the general opinion is that it is not very visible and badly linked to the main goals of visitors. A preference was expressed that a beach with a full facilities just for one family was more attractive than a crowded one without such services. A preference for birds was clearly expressed and any invertebrate animals disliked immensely. Age, sex, socio-economic status, visitor or local, had no bearing as to linking/not linking beach scenery.

Acknowledgements

I would like to gratefully thank Prof. Jan Marcin Węśławski (IO PAS) for his inspiration and review that greatly improved the final written product. The drawings in Figs. 4/5 and Table 3 are reproduced by courtesy of Stanisław Węśławski (IO PAS). Thanks are also due to Juliet Szyprowski for her critical language corrections of an earlier draft of this manuscript. The European Science Foundation (ESF) partly ensured financial support for this study within the LINKECOL Exchange Grant No. LCEE/2002/0245.

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