PAN ARCHIVES OF ACOUSTICS
Vol. 41, No. 3, pp. 415–426 (2016)

DOI: 10.1515/aoa-2016-0041

Analysis of Social Conflicts in Poland's Soundscape as a Challenge to Socio-Acoustics

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(*received March 12, 2016; accepted June 15, 2016*)

The study objective was to understand the character and location of social conflicts in Poland's soundscape. The analyses were based on a review of press and Internet articles from the years 2008–2015 and reports on noise, preceded by a review of the legal framework of protection against noise in Poland. Questionnaire surveys concerning Poland's national parks and health resorts and the city of Lublin were an additional source of information. In the case of the former, the surveys were supplemented with a general examination of the acoustic determinants of social conflicts in the Podzamcze district.

An analysis shows that sound in landscape has been a source of more than 100 social conflicts which were most frequently related to unpleasant sounds (noise nuisance) and the right to peace and quiet. The public demands acoustic comfort, one of the determinants of the quality of life. Therefore, it is necessary to know the public opinion on soundscapes (survey of sound preferences). Public consultations concerning the assessment of acoustic disturbance and sound preferences will make it possible to avoid social conflicts arising from insufficient knowledge. A major role is also played by the education of the public and decision-makers through sound awareness campaigns, e.g. as part of ecology education. The subjective assessment of noise nuisance severity and the acoustic design of public spaces should be an integral part of environmental noise control programmes and revitalisation programmes.

The conducted studies demonstrated that understanding the character and location of social conflicts in soundscape is a major scientific problem. Its resolution requires combining sociological studies (questionnaire for the valuation of the subjective feelings of respondents) with field analyses (observations, acoustic measurements). It is a promising research field that has been developed to a limited extent so far.

Keywords: noise; soundscape; perception; social conflict; Poland.

1. Introduction

Sound is the object of interest of many scientific disciplines such as acoustics, cultural anthropology, landscape architecture, ethnology, aesthetics, geography, medicine, musicology, psychology, sociology, urban planning. Sound is defined in different ways (Bernat, 2008) but it is also a phenomenon that we encounter every day as part of our experience; it is also a factor shaping this experience. Sounds have a particular significance for the blind and partially sighted. They enable these people to locate sites and phenomena in space and thus enhance their sense of direction. The reception and accurate interpretation of environment information carried by sound waves improves the quality of life and facilitates safe movement in urban environment (e.g. Bogusz *et al.*, 2011; Hojan *et al.*, 2012).

Recent years have seen a dynamic development of soundscape studies that regard sound as a valuable asset, a source of meanings and aesthetic experiences (Brown, 2010). Soundscape studies complement studies on noise where sound is treated as a threat and source of discomfort. They are also developed in Poland by representatives of various scientific disciplines (e.g. Losiak, Tańczuk, 2014; Bernat, 2015; Preis *et al.*, 2015; Wiciak *et al.*, 2015). In the early 1990s, the idea of soundscape, created by R. Murray Schafer, became a starting point for acoustic ecology – an interdisciplinary research field analysing, from the

perception and socio-historical perspective, the correlations established my humans with their environment through sounds. Depending on the scientific discipline and methodological tradition, soundscape is defined as a set of sounds of biological, geophysical and anthropogenic origin occurring in landscape and resulting from natural processes and human activity (e.g. Pijanowski *et al.*, 2010; Farina, 2014) as well as a sound event experienced by an individual or the community in a specific area of space (e.g. Schafer, 1977). Thus, soundscape is the sound layer of landscape, correlated with the visual layer and reflecting the socio-economic, cultural and natural phenomena taking place in the geographic environment. Characterised by a transient (ephemeral) nature, it is an important element of natural and cultural heritage, particularly sensitive to changes associated with the development of civilisation (Bernat, 2015). According to Schafer, soundscape can have a high-fidelity quality, where sounds can be heard clearly without being crowded or masked, or by a low-fidelity quality, where sounds are overcrowded, resulting in masking or lack of clarity and perspective (Truax, 1999). The latter is linked with noise, i.e. undesirable, irritating sounds that have a destructive impact on human health (Noise impacts on health 2015) as well as adverse economic effects, e.g. decreased quality and usefulness of areas threatened with noise (e.g. spa areas), increasing costs of healthcare and protection of the environment against noise (e.g. acoustic maps, noise barriers, low-noise paving materials) (e.g. Lipowczan, 2013), lower value of residential properties (SENETRA et al., 2014). The perceived quality of life is also reduced due to noise (e.g. Seidman, Standring, 2010).

More and more often, noise and concern about tranquillity and the quality of soundscape become the sources of social conflicts, i.e. differences of opinion, habits or preferences as well as clashes of opposing and mutually exclusive interests. In the light of a report of Public Opinion Research Centre (Polish acronym: CBOS), a majority of the respondents (71%) are concerned about noise in the streets, at work, in transport, supermarkets, at home or in places of recreation such as parks or beaches (Noise pollution... 2009). The severity of noise increases with the increasing levels of urbanisation. The following noise-related complaints were reported by the respondents most frequently: nervousness, irritability, exhaustion, headache or vertigo, migraine, impaired hearing or hearing loss. The respondents use various methods to defend themselves against noise, e.g. they avoid noisy places or muffle the sources of noise. Some try to ignore or get used to the noise. Attempts to intervene with those making noise or the authorities are very sporadic (only 3% of the respondents).

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This study is an example of research the field of socio-acoustics whose goals include the identification of the views of specific social groups on the current state of the acoustic climate (Kompała, Lipowczan, 2007; Guggenheim, 2011; Lipowczan, 2016). Since the subject matter is very rarely discussed, it has been assumed that the overview presented by the article can be an introduction to detailed field studies concerning the acoustic determinants of social conflicts.

2. The legal framework of protection against noise in Poland

The legal framework of noise control in Poland is based on the Act on Environmental Protection Law (2001, hereinafter "EPL") and relevant ordinances taking into account the provisions of the Noise Directive (Directive 2002/49/EC of the European Parliament and of the Council relating to the assessment and management of environmental noise). Except for a few cases (e.g. criteria for delimiting quiet areas), it is transparent and uses acoustic standards and a system of penalties for non-compliance with the law. However, the Directive has not contributed to the improvement of the acoustic climate in Poland so far.

The amended Act on Environmental Protection Law (2001), specifically Chapter V "Protection against noise" (Articles 112–120a), indicates that protection against noise is based on ensuring the best possible acoustic state of the environment, particularly by maintaining noise at, or preferably below, the maximum permitted levels and reducing noise if the permitted levels are exceeded. The above Act introduced the obligation to prepare acoustic maps (every five years) for assessing the acoustic state of the environment in urban agglomerations with more than 100 thousand inhabitants and for roads, railways and airports in areas outside agglomerations if a considerable area can be negatively affected by the use of these facilities. Furthermore, in areas where maximum permitted noise levels are exceeded, it is necessary to prepare an Environmental Noise Control Programme aimed at reducing noise to the permitted level.

Relevant implementing ordinances were published to supplement the Act. A new Ordinance of the Minister of the Environment, dated 1 October 2012 and

effective as of the end of October, changed the previous ordinance relating to the permitted environmental noise levels. The permitted short-term noise levels were raised from 55–65 dB to 61–68 dB (daytime) and from 50–55 dB to 56–60 dB (night-time), depending on the kind of area. These changes do not apply to protective zone A in spa and hospital areas outside cities where the maximum permitted noise levels are 50 (45) dB in the daytime and 45 (40) dB at night-time, depending on the source of noise. According to the Supreme Audit Office (Polish acronym: NIK) report "Protecting the inhabitants of large cities against noise" (2014), raising the permitted long-term noise levels related to traffic noise resulted in a radically reduced size of areas where the permitted noise levels were exceeded (e.g. almost three times in Radom and over eight times in Koszalin), as shown by acoustic maps. This contradicts the recommendations of the World Health Organisation (WHO), according to which environmental noise should not exceed 50–55 dB in the daytime and 40–45 dB at night-time.

The EPL (2001) imposes an obligation on those in charge of roads, railways, tram rails, airports and harbours to implement prevention measures limiting the propagation of noise (Article 173). According to the 1999 Ordinance of the Minister of Transport, the basic facility protecting against noise are noise barriers (soundwalls) which constitute a natural or artificial obstacle preventing the propagation of sound waves, most frequently located along noise-generating roads (Engel *et al.*, 1990). The amendment of the Ordinance, dated 23 April 2013, replaced the specification of the technical means with the provision that if a violation of the permitted noise levels is forecast, appropriate means of protection should be provided for.

According to the EPL (Article 135), if an environmental review, environmental impact assessment or post-implementation analysis indicate that environmental quality standards cannot be met despite the application of the available technical, technological and organisational solutions, an area of limited use can be designated. This applies to areas adjoining airports or roads, among other areas.

"Quiet areas" or "tranquil areas", also introduced by the Act mentioned above, are another important instrument of noise control (both in and outside urban agglomerations). A quiet (tranquil) area in a conurbations (a city or several cities within a common administrative boundary) is an area where the permitted noise levels, expressed as the noise index L_{DWN}, are not exceeded while outside a conurbation it is an area that is not exposed to the impact of traffic or industrial noise or noise caused by recreation and leisure activities (Article 3). The establishment of these areas through a county council resolution is binding for spatial planning and spatial development instruments (Article 73 and 118b), which means that such an area may not be used for activities that might cause increased noise levels. In addition, in order to provide suitable acoustic conditions in areas "designated for recreation and leisure purposes", it is possible to establish quiet (tranquil) areas that encompass selected lakes and other water bodies and rivers and where the use of internal combustion engine-propelled vessels is restricted or forbidden. However, neither the EPL (2001) nor other pieces of legislation specify in greater detail what criteria should be used when identifying quiet (tranquil) areas.

Besides the above noise-control instruments introduced by the EPL (2001), it is worth noting that, according to Article 156, it is forbidden to use public address systems or equipment in publicly-accessible areas in cities, built-up areas and areas designated for recreation and leisure. However, this prohibition does not apply to occasional religious ceremonies, sports, commercial and entertainment events and other local gatherings. Pursuant to the EPL (Article 273), the violation of the environmental noise emission standards is liable to a pecuniary penalty. According to the Notice of the Minister of the Environment, dated 8 September 2015, on the rates of penalties for non-compliance with the requirements of waste discharge into water or ground and for exceeding the maximum permitted noise level set for 2016, the penalty for every dB above the permitted noise level is 11.37–51.26 PLN depending on the degree of the violation and time of day. The body responsible for environmental protection can also issue a decision ordering a natural person to take action aimed at limiting the negative impact on the environment (Article 362).

The Nature Conservation Act (2004) introduced bans on violating tranquillity and using motorboats and other kinds of motor equipment in national parks and nature reserves (Article 15), organising motorcycle and car rallies as well as using motorboats and other kinds of motor equipment on open water bodies in landscape parks (Article 17), deliberate scaring away and disturbing animals occurring in the wild and protected under the species protection law (Article 52), using recordings of animal sounds (Article 54). Furthermore, the Act on Forests (1991) contains a ban on making noise and using sound signals, except for emergency cases requiring the raising of an alarm (Article 30).

Although the Act on the Protection and Care of Historic Monuments (2003) did not introduce a ban on making noise in cultural parks and other protected areas but, taking into account that advertisements of goods or services can take any audio or visual form, Article 17 of the Act can be also interpreted as prohibiting the acoustic pollution of landscape. The Act on Spa Treatment (2005) protects zone A in spas by imposing a ban on locating industrial and commercial facilities (potential sources of noise), organising

car and motorcycle rallies and public events as well as activities of an entertainment nature disturbing the night-time quiet hours.

Pursuant to the Act on Access to Information on the Environment and Its Protection, the Participation of the Community in Environmental Protection and Environmental Impact Assessments (2008), an assessment is required for a planned project that can have a considerable or potentially considerable impact on the environment (Article 59), also with regard to noise hazards.

The problem of environmental noise control is linked with spatial planning. The EPL (2001) sets an obligation to take the problem of noise into consideration in the National Spatial Development Concept (Polish acronym: KPZK), spatial development conditions and directions study (Polish acronym: suikzp) and local spatial development plan (Polish acronym: mpzp), among other documents. The KPZK 2030 indicates that "infrastructural projects require a special approach to cultural landscape management and noise reduction measures, particularly in areas of areas of landscape protection" (KPZK, p. 132). Article 72 of the EPL (2001) states that the spatial development conditions and directions study and the local spatial development plan specify the conditions for the maintenance of the natural balance and rational management of environmental resources, for example, by implementing comprehensive solutions of problems in built-up areas, with a special consideration of noise control. When preparing a local spatial development plan, it is necessary to differentiate between areas according to the permitted noise levels (Article 113). It is also important to designate tranquil areas and areas of limited use. Planning instruments enable the appropriate (i.e. in a manner that causes the least nuisance) distribution of sites and areas with different functions or different rules of management. For example, in accordance with the zoning principle, a road (a source of noise) should be lined by service establishments (except healthcare and education centres) that will serve as a buffer for the noise. Later, local transport facilities and residential/service areas can be located here along with a lot of green areas that do not reduce noise levels considerably but help reduce the subjectively perceived severity of noise nuisance. Residential and recreation areas should be located in zones where the highest acoustic standards are met. It is also important to use appropriate shapes, dimensions and proportions of urban complexes and to eliminate adverse factors intensifying the noise, e.g. large concrete surfaces reflecting acoustic waves. Therefore, measures have to be undertaken to minimise the impact of sources of noise in the area of acoustic wave propagation and impact. According to Michalski (2010), the modern character of spatial planning with regard to noise control should not be based on a restrictive approach and imposition of orders and bans. Instead, it should be based on finding comprehensive solutions to noise problems, combining planning with organisational and technical measures (reduction of noise emission from sources of noise). Furthermore, giving priority to noise control cannot lead to the degradation of landscape, e.g. through the construction of noise barriers and the resultant fragmentation of landscape, particularly in areas where other solutions can be applied.

Noise control should also be linked with measures described as revitalisation. According to the Act on Revitalisation (2015), it is a process of bringing degraded areas out of a critical condition through measures integrating intervention for the benefit of the local community, space and local economy, implemented by the stakeholders of this process based on the municipality revitalisation programme. The inhabitants of degraded areas are the key stakeholders in revitalisation. The complete success of revitalisation requires their broad participation and cooperation from the outset of the implementation of this process. Consequently, the public opinion has to be taken into account. The local community assesses landscape in a less static manner, more favourably and with a broader range of perspectives than experts who rely on scientific theories. Revitalisation is aimed at improving the inhabitants' quality of life, restoring spatial order, achieving economic recovery and rebuilding social ties. The criterion for delimiting crisis areas, as specified by the above Act, is the occurrence of at least one of the following kinds of negative phenomena within a municipality (district): economic, environmental (particularly the violation of environmental standards), spatial and functional (particularly the shortage or poor quality of public space) and technical. Although it is not defined with precision, based on the provision above it can be assumed that acoustic degradation, i.e. the presence of noise defined as violation of the permitted noise levels and/or occurrence of sounds irritating or bothersome to residents, can be a factor determining the necessity to undertake revitalisation measures. Acoustic revitalisation measures can create a new quality of soundscape and play an important role in establishing order in space while taking into consideration the natural conditions such as diversity of land relief, land cover, meteorological conditions and the site-specific cultural context. The measures mentioned above should be implemented first in neglected areas that offer the possibility of creating unique public space (Bernat, 2007).

3. Examples of conflicts

An analysis of the press and Internet sources from the last seven years shows that sound in landscape was the source of over 100 social conflicts, most often related to irritating or bothersome sounds (noise) and the right to peace and quiet. They occurred mainly in

large cities (e.g. Warsaw, Poznań, Katowice, Częstochowa, Lublin) but also in towns, villages as well as localities and regions attractive to tourists, often located within or in the proximity of protected areas (e.g. Okuninka on Lake Białe, Lake Czorsztyn, Masurian Lake District). The most frequent parties to the conflicts were residents (groups of residents), authorities, investors and sometimes tourists. Sound was not always the main cause of disputes. Sometimes it accompanied other causes and was mentioned as one of the arguments for or against a particular course of action. Noise related to the functioning of airports and road traffic was a frequent cause of conflicts. According to the report "Acoustic Climate in Poland in 2012", traffic noise, particularly caused by roads, is the biggest problem. In the daytime, about 4 million and at nighttime, about 2.9 million residents living close to the main thoroughfares of conurbations were exposed to excessive noise levels. Excessive noise levels were also recorded in 80% of the measurement sites in protected areas both in the daytime and at night-time.

The inhabitants of the Poznań agglomeration received damages up to 100 000 PLN for noise and loss of property value in an area of limited use because of the acoustic nuisance caused by the Krzesiny military airport and Ławica civilian airport. The residents of the Bemowo district of Warsaw established an association called "Quiet Sky Over Warsaw" (in Polish: "Ciche niebo nad Warszawą"), demanding the "calming" of the Babice civilian aviation training airport whose negative impact also affected the Las Bielański nature reserve. Small towns, such as Zgon, Żelazowa Wola, Stryków, Nałęczów, suffer from heavy goods vehicle traffic that causes a huge noise nuisance. Residents protest against it but their protests do not always bring the expected results. In Nałęczów, a spa town, heavy goods vehicle traffic going through its centre due to the lack of a ring road leads to the violation of the permitted noise levels. Consequently, the threat of Nałęczów losing its spa status emerged in 2008. The town's authorities made a pledge to take remedial action to divert transit traffic from the town centre, thanks to which the spa status has been conditionally prolonged to the year 2019. In recent months, noise barriers are one of the major causes of social conflicts related to road and railway noise control as indicated by headlines in the press such as: "New noise barriers erected. People don't want them", "They prefer car noise over noise barriers". Sound barriers stretch along hundreds of kilometres, reach the height of as much as 9 metres and screen the noise from sites such as tram depots, shopping centre car parks as well as fields and forests. Trees are felled to make room for these noise barriers which, consequently, have been described as a plague and a blot on the landscape. Noise barriers conceal valuable sites, dissect open and urban landscape, create "troughs" in the landscape and obstruct the views from the windows of some flats and block their access to daylight. In addition, they lead to increased costs of road construction. According to the report "Construction of Roads in Poland: Facts and Myths, Experiences and Perspectives" (2013), the share of noise barriers in the costs of building stretches of the A1 motorway ranged from 2.10% to 10.30%. In recent months, the problem of noise barriers has attracted a lot of interest among journalists, which is reflected in the multitude of press articles whose titles usually express a critical view of "noise barrier-mania" (term coined by Professor Engel).

The Supreme Audit Office (NIK) revealed a number of irregularities in the construction of noise barriers. According to the report "Legitimacy of Building Noise Barriers..." (2014), there are too many noise barriers in Poland because:

- the investor did not take into account other technical solutions;
- the investor left the choice of noise control measures to the contractors;
- noise barriers were the preferred solution under Polish law;
- the erection of noise barriers was favoured by the noise control standards in place at the time;
- noise barriers were also erected to protect areas where building development was planned in a distant future;
- noise barriers were erected parallel to noise embankments.

Therefore, a number of motions were submitted to the Council of Ministers, including a motion calling on the Minister of Health to define indices reflecting the harmful effects of noise on human health.

According to the questionnaires addressed to national parks services in Poland, the ban on disturbing peace and quiet, understood as the audibility of the subtle sounds of nature, is rarely the cause of social conflicts in protected areas. That being said, interventions and disputes over issues such as the use of cars and traffic restrictions, were indicated in as many as 16 parks (Bernat, 2013). In the case of the Bory Tucholskie National Park (Charzykowskie Lake) and Pieniński National Park (Czorsztyńskie Lake), disputes over tranquil areas were highlighted. A debate went on for two years over whether Czorsztyńskie Lake (part of it is within the National Park's buffer zone) should be a noise-free zone or whether motorboats could be used on it. The arguments by nature conservationists and enthusiasts of quiet water sports clashed with the interests of motorboat users and owners of the local guesthouses. However, in September 2009, the councillors of Nowy Targ County passed a resolution establishing a noise-free zone (tranquil area) and banning internal combustion engine-propelled vessels from the lake. Tranquillity is regularly disturbed in

Świętokrzyski National Park (ŚNP) due to the high intensity of tourist traffic, particularly along trails to Święty Krzyż (Łysa Góra mountain) from the village of Nowa Słupia and during religious celebrations at Święty Krzyż. Alongside noisy tourist groups and religious celebrations using public address systems at the Święty Krzyż religious site, motor vehicle traffic is one of the factors disturbing the perception of the sounds of nature, according to the ŚNP services. The asphalt road crossing the ŚNP from Huta Szklana to Święty Krzyż is used by cars to a limited extent but it still poses a potential threat to nature and people. The noise is a particular nuisance during the rush hour and, in the case of Łysa Góra, also during the celebrations and events at Święty Krzyż. A dispute has been going on for many years between the ŚNP and the County Road Administration in Kielce over the intensity of car traffic along the route to Święty Krzyż. For years, the National Park has regarded the traffic as too intensive.

According to the report on the campaign "The 7 Wonders of Masuria" (2014), including the "Sail out on the Clean Masuria" (in Polish: "Wypłyń na czyste Mazury") campaign of the Our Earth Foundation and Foundation for the Protection of the Great Masurian Lakes, Masuria is chosen as a place of recreation because of the opportunity to go sailing (71%), admire unique landscapes (53%) and in order to find peace and quiet (41%). However, the Masurian Lake District is often described as a "noise zone" due to the roar of motorboats: from May to October about 60 thousand people go out on the lakes every day. It should be noted that 158 noise-free zones have been designated in the Warmia-Masuria Province. They usually encompass lakes where the use of motorboats and other motor equipment as well as the practicing of water and motor sports are totally prohibited due to the need to maintain suitable acoustic conditions in areas designated for relaxation and recreation. According to the report on the "The 7 Wonders of Masuria" campaign, 66% of the respondents declare that they know where noise-free zones have been designated; 25% indicated noise as a behaviour of tourists responsible for the degradation on the environment. The conclusion is that a considerable proportion of visitors (tourists, holidaymakers) do not notice the noise hazard resulting from the behaviours of other visitors. Similar problems occur in many other areas with lakes or other open water bodies. On the one hand, there are advocates of peace and quiet, and on the other, enthusiasts of water motor sports.

Resort towns and centres of large cities face a growing problem of noise related to the functioning of local restaurants, clubs, discos, etc. In Świnoujście in 2007, the municipal council passed a resolution restricting the use of amplification equipment in restaurant gardens between 10 pm and 10 am during the summer season (June–September). The resolution was a response to the complaints made by convalescents about loud music as well as acoustic measurements indicating the violation of permitted noise levels which may result in the city losing its spa status.

According to the questionnaires addressed to health resort municipalities and spa towns in Poland, the acoustic protection measures in place are rarely the cause of social conflicts. Only one fourth of the spas provided examples of disputes and interventions associated with, inter alia, the functioning of food establishments, loud (dance) music, vacuum cleaning or mowing, disruption of night-time quiet hours, public events or renovation works in health and holiday resorts. They usually occurred sporadically.

Opposition to loud parties at night (on the banks of the Vistula among other places) took the form of the "Quiet, Please" Coalition established by residents of Powiśle, one of the most "fun" districts of Warsaw. The goal of this association is to "make the functioning of the city at night-time more civilised" by reaching a compromise satisfying both parties in the conflict, i.e. the residents and food establishment owners. As part of the project "Let Them Hear Us" (in Polish: "Niech nas usłyszą"), consultations, debates, training workshops, conferences as well as awareness campaigns in the media and on billboards were conducted in order to develop a local policy regulating the functioning of the nuisance-causing night clubs, pubs and restaurants. In addition, a survey was carried out to examine the impact of noise generated by the clubs on the quality of life of Warsaw's inhabitants. The survey showed that a clear majority of the respondents encountered violations of the right to rest at night (night-time quiet hours) as a result of loud music in clubs and noisy behaviour of their clients (Report "Influence of the noise...", 2014). A considerable proportion of the respondents declared that they felt helpless and had given up defending their rights and demanding from the relevant authorities to protect them. A vast majority of those who reported a noise nuisance to the law and order services (police and municipal police) and asked for intervention replied that the response of these services was unsatisfactory (e.g. because it was delayed). The respondents unequivocally believe that there is a need for a joint initiative of the residents in order to develop a "night life" policy for the city. Based on the findings, the authors of the report concluded that the key task is to strengthen the community ties among residents, which will lead to increased levels of understanding and sensitivity to the needs of various parties and stakeholders making up the fabric of the city. The Coalition initiated the "Code of Good Practices for Clubs and Cafés" (in Polish: "Kodeks dobrych praktyk dla klubokawiarni"), recognised as a fruit of dialogue involving both the residents and owners of these venues. As regards noise, the managers were obligated to monitor the levels of sound emitted in their

venues and, if necessary, to reduce noise levels. In the case of planned events that would take places outside the premises, the manager should notify the residents of the neighbouring buildings about his or her plans with several days' notice. The creation of the Code is just the beginning of the road, however. The next step is to invite entrepreneurs to cooperate and implement the proposed changes so that they bring the desired results. It is also worth mentioning that, as compensation for the restrictions on night-time entertainment in the Powiśle district, the association proposed the establishment of areas without night-time quiet hours, i.e. zones of entertainment where noise would be allowed also at night, in the post-industrial areas in the Żerań or Ursus districts. Music events using powerful sound amplification systems (e.g. Orange Warsaw Festival at the National Stadium) as well as artistic activities (sound installations), e.g. Minaret in Poznań, can also be an ordeal to city dwellers.

The pealing of church bells, indicating the presence of the sacred in landscape for centuries, can also become a source of conflict. Despite their high volume, the sound of bells, as kind of "sacred noise", has been tolerated and regarded as an acoustic source of unity (Kapelański, 2011). According to Schafer (1977), a religious community was defined in the past by the audibility range of the church bell. In recent years, however, conflicts have arisen over excessively loud electronic bells and chime tunes. In Sterdyń, a small village in Masovian Province, a complaint was filed by the residents with the police and then with the court. The dispute concerned the interpretation of Article 156 of the Environmental Protection Law (2001) prohibiting the emission of loud sounds in publicly-accessible areas in towns, built-up areas and areas designated for recreation and leisure. However, the ban does not apply to celebrations related to religious worship. In the course of administrative proceedings, the councillors of the municipality rejected the complaint as they found that most of the residents do not mind the bells. A similar conflict in Lewin, a village in Łódzkie Province, ended in the sentencing of a priest to 30 hours of community work for disturbing the night-time quiet hours with church bells and chimes. In Słotowa, a village in Podkarpackie Province, electronic bells were originally played between 6 am to 9 pm every 15 minutes (a total of 262 loud signals every day). The problem has received extensive coverage in the national media. Eventually, the parish council decided to turn down the volume of the bells and play them once an hour.

Other social conflicts related to soundscape have arisen due to noise from construction sites (Słupsk), a playground or sports field (Stalowa Wola, Świdnik, Bydgoszcz, Olsztyn, Krapkowice, Płońsk), a car wash (Tarnobrzeg, Kłobuck), a supermarket (Warszawa), a sawmill (Szczecin), railway (Podkowa Leśna), quad rides and wind farms. According to the Ambiens report (2014), social conflicts related to the wind power industry are most often caused by the decreased quality of life of residents as a result of noise (94%), concerns over health or decreased property value, degradation of landscape or negative impact on nature. In 2014, the audit of the Supreme Audit Office revealed that wind farms were located in areas of significant landscape value because the regulations allowed investors to choose such a location (e.g. in areas of protected landscape) despite controversies and public protests (The location and construction of land wind farms... 2014). Furthermore, regulations on the methodology of noise measurement did not guarantee a reliable assessment of the nuisance level of such devices. Pursuant to the applicable regulations, the measurements could be conducted only under mild wind conditions (below 5 m/s) while wind turbines generate the highest noise intensity only with the optimum wind speed of 10–12 m/s when measurements were not allowed. Lebiedowska (2015) notes that the issue of social conflicts is treated in environmental reports in a way that shows disrespect to local communities, and the problem of decreased value of properties located near wind farms is marginalised. Furthermore, the author lists seven cardinal sins committed in environmental reports with regard to the acoustic impact of industrial wind turbines. These sins include the use of an inadequate computing method to determine the audible noise level, the lack of analysis of the acoustic climate at the stage of investment project planning, application of erroneous simulation calculation results to the non-existing regulations on permitted noise levels in the environment (the regulations do not specify the permitted level of noise emitted by wind turbines), and lack of on-site visits.

As regards other examples of social conflicts resulting from the concern about the quality of soundscape, disputes over audio advertisements in public spaces should also be mentioned. In 2012, over 100 Internet users, fed up with a commercial played through the loudspeaker of a restaurant in Lublin's main pedestrian precinct (Krakowskie Przedmieście Street), joined a planned event that would consist of walking into the restaurant on the specified day and time and playing a recording of the same irritating commercial on a phone or other device. In response, the restaurant owner stopped playing the commercial. Afterwards, the Municipal Police announced that they would impose fines for playing commercials, including those played from car trailers. However, during the following 12 months, no fine was imposed for this offence. Journalists observed that the Municipal Police officers deliberately ignored the "talking-and-playing" trailers because fighting them was difficult. Besides, to impose a fine, the Municipal has to stop the vehicle and they have a right to do that only in the case of a violation of the "No entry for vehicular traffic" sign. Fur-

thermore, the use of sound amplification is prohibited by the Environmental Protection Law (2001), not the Traffic Law (1997). In February 2013, however, the first driver was fined for three offences consisting of playing a commercial from a PA system mounted on a car trailer. A street musician performing in the Old Market Square in Poznań was also fined for using a PA system because his loud music was regarded as a nuisance by others (mainly restaurant owners).

According to the studies on the perception of landscape in Lublin, conducted in the years 2007–2009 among school and university students and senior citizens, the soundscape of Lublin is mostly rated negatively (57.3%) as loud, unpleasant, tiring, worrying, oppressive, poor, monotonous, lacking distinctive sounds. It was rated positively by only 26% of the respondents; 18% did not express their opinion on the subject. The sounds that can usually be heard in Lublin include alarm sirens, human shouting, loud conversations, ambulance signals, automotive and traffic noise (the hum of the city). According to the respondents, the most distinctive places, from the perspective of sound, include the bus station area, the main streets, the Old Town and downtown along with the pedestrian zone. Every now and then social conflicts occur in the above places (Bernat, 2012).

In 2014, field studies were conducted in order to analyse the soundscape of the Podzamcze district that constitutes part of the Czechówka valley, has great historical and cultural value but is subject to the progressing visual and acoustic degradation (Bernat, 2015). After World War I, a bus station with a large manoeuvring area and a chaotically developed municipal market as well as the main transit route were located here. As part of the field studies, the landscape was examined (with a focus on identifying the structure and evaluating the quality of sound layer) and sound pressure level (SPL) was measured in several places situated in Podzamcze. SPL ranged from 50 to 95 dB, depending on the time of day and acoustic events. Among the distinctive sounds occurring in this district, it is worth noting the regular sounds of bells and carillons that lend character to the area and constitute a key element of its identity. However, they are often masked by noise resulting from intensive traffic and urban development (facades parallel to the street, scarcity of vegetation). Open-air concerts with high power amplification organised in Plac Zamkowy (Castle Square) are occasional acoustic events that cause social conflicts. Depending on the acoustic events, the soundscape of Podzamcze in Lublin can be described as a powerful soundscape or a crowded soundscape (cf. Hedfors, 2003).

In the opinion of the students, Podzamcze represents a multifunctional urban landscape with a disrupted harmony. Stark contrasts occur in the soundscape, to the dissatisfaction of both tourists and residents. The persistent, monotonous, continuous and oppressive sounds discourage people from spending more time in such space. On the other hand, the calm, atmospheric sounds of bells were rated positively because they have a soothing effect, are conducive to reflection, give a sense of warmth and create the unique ambience of the city.

The field examination and field studies revealed that acoustic conflicts in Podzamcze are justified given the close proximity of areas with various functions (residential, tourist, commercial, transport, entertainment and other functions). Therefore, acoustic design is needed in the area in order to eliminate the oppressive traffic noise, enhance valuable sounds and introduce new sources of sound related to the historic assets of the place.

4. Conclusions and final remarks

The conducted studies demonstrated that understanding the character and location of social conflicts in soundscape is a major scientific problem. Its resolution requires combining sociological studies (questionnaire for the valuation of the subjective feelings of respondents) with field analyses (observations, acoustic measurements). It is a promising research field that has been developed to a limited extent so far.

The examples presented above show the value of high-fidelity soundscape associated with tranquillity or distinct sounds performing important social functions. Many people do not appreciate its value until it is replaced by low-fidelity soundscape associated with noise. People who have been passive and have paid little attention to issues related to acoustic comfort before now begin to defend their right to peaceful existence. The reasons behind the difficulties in solving social conflicts concerning sound in landscape are similar to the reasons of many other conflicts arising from the "competition for space." Attempts to resolve these conflicts are usually taken too late and are usually resolved through legal means rather than on the basis of rational and objective arguments. Persuading the protesters is regarded as the only and sufficient form of communication with the public. Dialogue with the public is not established at the initiative of the authorities but rather as a response to the conflict forced by the circumstances (cf. Pawłowska, 2008). If the needs of residents are recognised at the stage of making the decision on the location of potentially noise-generating activity, many conflicts can be avoided. In France, a mediator is appointed to work out a decision accepted by the local community, including decisions on investment projects. The mediator's role is to hear the parties interested in a particular place, provide them with information, give access to the record of feedback and then draw up a report based on which the decision is made (Bukowski, 2008). This has helped avoid many

social conflicts that could have arisen from the lack of dialogue with the residents.

More and more often, noise becomes a problem that concerns not only city dwellers but also the residents of towns, villages, even protected areas. Local governments, however, are not always interested in the frequent dissatisfaction and protests of the public against noise nuisance. As Wilińska (2012) observes, local governments have access to a greater amount of information on a particular problem but do not pass on this information to the residents and do not take into account their feedback in the process of making decisions related to noise. Thus, in the context of soundscape management, it is advisable to use elements of participatory management (involvement of the broadest possible range of residents) aimed at empowering social partners to jointly determine the programme of public actions at each stage of the decision making process. The efficacy of these actions is enhanced thanks to the public approval of the proposed solutions and increased sense of empowerment and satisfaction of residents. Although the obligation to inform the public about environmental decisions and the necessity to conduct public consultations on important documents (e.g. the environmental noise control programme) are imposed by law (Act on Access to Information on the Environment.... 2008), local governments often display a reluctant attitude to this obligation and, consequently, pretend to conduct consultations. The reasons for this reluctance include the fact that consultations reveal the competing goals of various social groups and sometimes it is impossible to satisfy the interests of one group without compromising the interests of another. Furthermore, if the outcome of the consultations is a rejection of the solutions proposed by the local government, the problem of the costs of finding new solutions arises. The outcome of the consultations can also undermine the position of decision makers and harm the good relations previously established with residents and organisations (Wilińska, 2012). The conclusion above is based on the author's experience as a participant of several public consultations, e.g. on environmental noise control programmes and revitalisation programmes. Similar conclusions were reached by Pawłowska (2008) and Wilińska (2012). It is vital for the success of participatory management that consultations are conducted at an early stage of the decision-making process when it is possible to introduce changes without generating high costs. Furthermore, they should be effectively publicised via various information channels without discouraging people to exercise their right to vote and in a reliable and unbiased manner. A response to every comment or motion submitted by a person taking part in the consultation should be prepared: it should explain why the motion has been accepted or rejected. The final decision made based on the public consultation should also be transparent and communicated to the public. It would be advisable to conduct several consultations at various stages of project implementation.

Actions taken in Poznań and Essen are examples of good practice comprising elements of participatory management in noise reduction programmes. In order to prepare the noise control programme for the city of Poznań, a questionnaire survey was conducted. It clearly showed locations where noise problems were the most urgent (these indications did not always correspond to the values of the L_{DWN} index). In some locations in the city, the survey results indicated the necessity of noise control measures even though the noise was emitted from a source that was not on the acoustic map, e.g. a racing track. The questionnaires helped identify the source of noise that should be muffled first. The subjective assessment of sound nuisance severity was thus a valuable supplement to the conclusions following from the quantitative methods used in the noise control programme for the city of Poznań. Public participation was also used extensively in the city of Essen as part of a programme for improving the quality of life through noise reduction (Pawłowska *et al.*, 2012). After an elaborate information campaign encouraging people to take part in the survey, the stakeholders were reporting locations that they regarded as particularly noisy, marking them on an interactive electronic soundscape map. In total, 913 locations were identified: one fourth of these locations were outside areas with particularly high noise levels previously designated in an acoustic map. Then, conclusions were drawn based on the survey and some of these conclusions were marked for immediate implementation while others were referred to appropriate experts so that suitable solutions could be developed. In the subsequent stage of e-participation, the solutions were commented on and assessed by residents. Consequently, a joint implementation plan was worked out and will be implemented until 2018. E-participation in the noise reduction programme in Essen has been a huge success and has become a model for other German cities (Pawłowska *et al.*, 2012).

Public participation in the assessment of noise nuisance and sound preferences will make it possible to avoid social conflicts resulting from insufficient information. A very important role is also played by the education of the public and decision makers through awareness campaigns shaping sound sensitivity, e.g. as part of ecological education.

The use of Geographic Information Systems (GIS) in the participatory management of noise has a lot of potential. For a few years, municipal geoportals have offered information on the state of the infrastructure, legal situation of land, acoustic map, etc. (hard data). It is also recommended to supplement this data with information reflecting the knowledge and perspective of the citizens (soft data). This is made possible by

the *SoftGIS* method whereby geographic data can be obtained from residents and other users of space by means of geosurveys, i.e. Internet surveys published on maps (Kahila, Kyttä, 2010). The respondents can mark points, lines and areas on the map as well as answer questions about the locations indicated and questions not directly related to any location. According to its authors, the *SoftGIS* method is to serve as a bridge linking residents and urban planners through the sharing of everyday knowledge in a form useful to experts. *SoftGIS* was used in over ten cities in Finland to survey residents about the level of their satisfaction with the quality of environmental management. Geosurveys can support the diagnosis of the quality of space and provide data on the activities undertaken in urban space. Thanks to the use of modern visualisation and communication methods, Internet tools can complement traditional forms of participation.

Thus, soundscape should be an object of management understood as well-thought-out, ordered and efficient action leading to the goal, i.e. the preservation of soundscapes and enhancement of their value. The efficacy of management depends on the knowledge and skills of professionals as well as support of the public (including officials) by means of public participation in the shaping of this management. It is essential to ask residents what sounds they want to hear at the specific designed site, which source of noise is a particular nuisance, which locations are attractive from the acoustic perspective and which are not. The subjective assessment of noise nuisance severity and the acoustic design of public spaces should be an integral part of environmental noise control programmes and revitalisation programmes. A very important role is also played by the education of the public and decision makers through awareness campaigns developing the sensitivity to sound, e.g. as part of ecological education. Success also depends on the authorities being open to acoustic problems, placing trust in society and developing a long-term action strategy. It should be remembered that soundscape management will lead to an improved quality of life of residents. Sound helps one understand a particular place and get one's bearings; it makes public space more lively, favours recreation and enhances or reduces aesthetic experiences. Therefore, it is necessary to include acoustic design and soundscape protection in local and regional policy-making, and to link the recommended actions with special planning, revitalisation, environment and landscape protection (including noise control), culture, tourism, recreation and education.

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