

TOWARDS CRITERIA FOR OUTDOOR SOUNDSCAPES

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Introduction There is growing interest in soundscape concepts in the planning and management of outdoor space. This may be constructed space - parks, squares, residential precincts, or rural, wilderness or recreational areas. Since Schafer's (1977) 'The Tuning of the World', *soundscapes* (Truax, 1999) has entered the lexicons of a range of disciplines. The soundscape of a place is simply its sonic environment. Environmental noise deals largely with 'sounds of discomfort' (Augoyard, 1998), sounds that disturb sleep, interfere with communication, distract or annoy people. Limits are based on acceptable risk, and seek to minimise negative effects on people in high exposure situations. By contrast, soundscapes focus on positive acoustic environments that people prefer. Noise control criteria can have little or no relevance in the acoustic design of outdoor space. Acoustic criteria, or preferred listening environments in cities and countrysides, are required.

Research into Acoustic Criteria for Soundscapes Appropriate acoustic objectives for soundscapes has had little attention. There is copious data on *What noises do you hear /annoy you?* but very little on *What sounds do you prefer?* A study in Yokohama (Tamura, 2002) reports not only sounds that were observed by and were annoying to residents, but also sounds found favourable. Sasaki (1993) also sought opinions on outdoor sounds that people preferred in urban areas. Other scientific investigations into perceived quality of soundscapes include that reported by Berglund *et al* (2001) and Berglund and Nilsson (2002). Their work, in residential areas, is directed towards new tools to measure the way people perceive soundscapes. There is also interest, in Sweden (Skanberg and Ohrstrom, 2002) in understanding how preferred soundscapes (particularly quiet in courtyards) can support health. Carles *et al* (1999) conclude that further research into soundscape preferences is required, after reporting the results of their laboratory study of the interaction between visual and acoustic stimuli on perception of the pleasantness of environment.

Proposed Acoustic Criteria: While these research results are not counter-intuitive, to date they provide little guidance as to how to set soundscape objectives? The solution is to depart radically from the nature of most environmental noise criteria in practice and to adopt criteria for soundscape design based on the *information content* of sounds, not their *level* (Table 1). This list is based on experiences and intuition, but it does embody much of the observation and commentary found in the soundscape literature to date, and the limited research regarding human acoustic preference.

Table 1 Acoustic criteria for soundscapes

Moving water to be the <i>dominant</i> sound	Sounds that identify place to be heard
Hear, <i>mostly</i> , people sounds	<i>Not</i> be able to hear sounds of people
Sounds of nature to be <i>dominant</i> sounds	<i>Only</i> the sounds of nature to be heard
Hear <i>unamplified</i> speech/music	Suitable to hear <i>amplified</i> speech/music
Acoustic sculpture sounds to be <i>audible</i> .	Sounds of city vitality to be <i>dominant</i>

These criteria have been crafted to achieve absolute clarity in intent. The criterion, *moving water should be the dominant sound*, is unambiguous and appropriate, both for a space intended for peace and tranquillity where the users can hear the murmuring of a brook and for a

space intended for appreciation of the forces of nature in the crash of waves on a cliff. They deliberately do not specify other acoustic dimensions of the sounds such as loudness.

Translating Soundscape Criteria to Measurable Acoustic Parameters These criteria, while the essence of simplicity, are statements about complex outcomes concerning *two component of sound* within the space – the *wanted signals* and the *unwanted signals* - and the proposed masking relationship between these. To use the criteria for assessment in any particular context, it will be necessary to measure or model the wanted and the unwanted sounds separately. This disaggregation of sounds is a specific, and critical, divergence from the traditional environmental noise approach, and needs a different tactic in measurement and prediction. Most environmental noise descriptors (eg L_{eq}) make no recognition of *information content*. While microphones faithfully transduce, and tapes faithfully record, the sounds that are present, in processing these signals through SLMs, level recorders and analysers, all source discrimination is lost. Berglund and Nilsson (2002) have previously commented on the inappropriateness of conventional noise measurements for soundscape planning. Having assessed the wanted and the unwanted sounds against the criteria in Table 1, acoustic specialists can then manipulate one or both of them, using standard noise control techniques, to achieve the desired outcome. The loudness of the different sounds, their duration, the reverberant characteristics of the space, the nature of surface materials to be used, the potential to control source levels or to provide attenuating structures etc, are all tractable to design.

Conclusions Further research is necessary to validate this information content approach to soundscape criteria, and to examine their universality and utility. It is suggested that such criteria be termed the *Proposed Acoustic Environment* for a any particular place and context. A new approach is required in the measurement of sound in outdoor space that differs from that used in noise control.

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