

New Directions in Soundscape Management

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Introduction

Although human actions now affect the whole biosphere, which includes the sonosphere, the implications do not appear to have been accepted. Will this become the century of responsible planetary management? The flooded landscape has become one of the icons of global warming, but the aural equivalent has already happened to many soundscapes. Climate change, the century's greatest challenge, demands that we live in greater harmony with other living things. Reconnecting with our sound worlds could play a pivotal role in the cultural transformations this will require.

Soundscape evolution

The world once spoke to us in a million voices, rich with meaning, but now we effectively live within a global megamachine which hums constantly. We have moved from 'learning through listening', as hunter gatherers, to situations where most soundscapes tell us little that is meaningful. Most humans in urbanised, industrialised societies cope by switching off or tuning out, living largely in a 'learnt unlistening'. Sustainability may imply a need for reconnection, but, since many of us now spend so much time in abstract thought and virtual worlds, do we need more tools to support selective listening?

Conventional acoustic management

Acoustic management has traditionally been largely a reaction to individual noise problems, not based on any overall assessment of what the resultant soundscape mix means for humans, still less for other life. The scale of human actions demands we can no longer work as though we were just controlling individual noise intrusions into otherwise satisfactory soundscapes - we must develop new forms of acoustic management which reflect implications for the whole soundscape mix.

Soundscape research has tended to focus on design of specific places, e.g. setting objectives, in terms of 'Proposed Acoustic Environments' [1]. Such methods may be justified for places of highest value, but are labour intensive. Most intrusions in most soundscapes come from internationally regulated machines. How can soundscape research guide product regulation?

The Niche Hypothesis

"...insects, birds and mammals in any given environment have been finding their aural niche since the beginning of time... each creature appears to have its own sonic niche (channel, or space) in the frequency spectrum and/or time

slot occupied by no other at that particular moment." [2]. As human machines spread in space and time, noise affects the ability of wildlife to establish territory, find mates, hunt prey or avoid predators. Soundscape management can thus contribute positively to nature conservation, and needs to consider emissions outside human hearing range.

Managing the soundscape mix

Road vehicles can be designed to meet a single test condition, e.g. ISO362 'drive-by' test, while not necessarily becoming quieter in other operating conditions [3]. There is an argument for testing in a wider range of conditions. It is typically cheaper in engineering terms to reduce high frequency noise than low, so, over time, simple dB(A)-based vehicle noise certification testing can increase the proportion of low frequency noise in an environment. Should soundscape management aim to 'share out' emissions, e.g. using 'differential sound frequency charging', subject to limiting information content? Instead of setting just a maximum dB(A) level, could regulators test the contribution of new products in a small number of operating states, e.g. stationary, low speed acceleration, high speed acceleration, and in a small number of cumulatively evolving 'archetypal soundscape mixes', e.g. representing a busy canyon street, quiet suburban street, rural motorway. Could designers be incentivised to minimise the overall burden of change, e.g. in terms of a Soundscape Impact Score? 'Archetypal soundscape mixes' could, of course, be applied to freefield test results using modelling.

Soundscape Management Plans

Natural soundscapes are not always quiet, but when they are, soundscape management can be particularly important, both to the restorative value of human experience, and to the survival of animals which depend on high soundscape quality. The Natural Sounds Program of the US National Parks Service has strong legislative and policy mandates to conserve the sounds of wildlife along with healthy populations. Examples of soundscape objectives for visitor services area are [4]:

"Natural sounds are audible and discernible, with common noise intrusions by visitors and park operations. Active intensive management is used to maximize noise-free intervals and limit the intensity and duration of noise intrusions."

"Sound levels that interfere with interpretive programs do not occur except when caused by emergency services and search-and-rescue operations (sirens, search-and-rescue aircraft)."

The US National Parks Service argues its case using simple indicators, e.g. percentage of time intruding noise from human activities is audible. Where participants can be assumed to have normal hearing, a simple PDA may be used to record the start and stop time of each sound event. Several metrics can be derived - percentage of time audible, noise-free interval, number of events, and event durations.

While in the US, simple techniques are being used to protect areas of high natural soundscape value, one main focus of the European Environmental Noise Directive 2002/49/EC is on Quiet Areas within Urban Agglomerations. In the UK, noise mapping is typically not actually accurate enough to allow identification of urban quiet areas, e.g. below 50 or 55 L_{day}. Meanwhile, rural areas of high soundscape quality continue to be under greater threat from road and air traffic growth and new infrastructure.

The Single European Sky has long been promised as an advance on a historic patchwork of nationally-based airspace blocks. Instead of aircraft following non-direct routes, 'handed over' from one national Air Traffic Control centre to another, more aircraft routes would be able to fly the shortest line between two points, saving time, fuel and carbon emissions. However, big turbofans can be audible in quiet soundscapes even from cruise altitude of 30,000 feet. Europe has a huge range of wildlife habitats, providing for about 550 species of bird and 400 species of mammals. However, debate on European wildspace[5] does not appear to be actively considering the implications of noise from aircraft overflights, such as the significant changes in aircraft density over particular places implied by Single European Sky.

Hybrid and electric cars could lift a burden from our soundscapes. However, some car makers want to add sound to make new cars more attractive to certain car drivers. Concern has also been raised at the road safety of hearing-impaired people, although it is not clear if sound is needed in all situations, or if activation by proximity sensors would be effective. With product differentiation, could we end up with a 'streetful of ringtones', if regulators cannot be persuaded to assess the overall soundscape mix?

Steps to sounder soundscapes

Future steps in soundscape management are likely to include:

1. More account of listener states and activities, sound qualities and meanings,
2. Automated source identification and new soundscape quality indicators,
3. Incremental adjustment of standards, regulations and guidance,
4. Protection, unmasking, enhancement of positive soundscape characteristics,
5. More use of auralisation in decision-making,
6. Demonstrating and evaluating soundscape interventions,
7. Interactive personal listening augmentation,
8. New approaches to sharing acoustic space using ecological principles.

A critical area will be the extent to which we can develop forms of soundscape management which mirror how natural systems behave. For instance, can we generate internal feedback loops, so that actors are incentivised to do complementary things which help soundscapes overall to evolve in more sustainable ways, in place of simple dB(A) standards, which mean all actors may do roughly the same thing, concentrating emissions in flatline drones?

Soundscape management probably needs a simple hierarchy giving a rough priority in designing interventions – managing soundscape at source wherever possible accords with the 'polluter pays' principle in first considering the responsibility of the noise maker. However, incremental management is unlikely to be sufficient. We need to lift our aim to 'Soundscape Recovery Plans'.

Computerised noise mapping under Environmental Noise Directive 2002/49/EC has used significant resources. Can additional resources be secured for soundscape management, or do we need to simplify the Directive approach to free capacity for new soundscape work? Should we focus effort on priorities, such as protecting wildspace and adding soundscape mix to vehicle noise regulation?

Securing effective soundscape management will require popular support. Ways of engaging the public include inviting nomination of sounds of local value or special interest, perhaps through mass media, as well as oral history, soundwalks and wildlife recording. It will also be important to demonstrate how soundscape design can enhance public enjoyment of space, and to consider the role of sound art and events. The Noise Abatement Society's 'Love Your Ears' and other healthy hearing campaigns can raise awareness of soundscape fragility and the need for creative management.

Literature

- [1] Brown, A. L., Muhar, A.: 'An approach to the acoustic design of outdoor space', *Journal of Environmental Planning and Management* 47 (2004), pp 827-842.
- [2] Krause B.L.: 'The Niche Hypothesis: A virtual symphony of animal sounds, the origins of musical expression and the health of habitats', *The Soundscape Newsletter* 06 (June 1993).
http://interact.uoregon.edu/MediaLit/WFAE/library/articles/krause_niche.pdf
- [3] Sandberg, U.: 'Noise Emissions of Road Vehicles: Effect of Regulations' Final Report 01-1, I-INCE Working Party on Noise Emissions of Road Vehicles (WP-NERV) (July 2001).
- [4] McCusker V, and Cahill K.: 'Integrating soundscapes into National Park Service planning', *Park Science*, Volume 26, Number 3, Winter 2009-2010, ISSN 1090-9966, National Park Service, U.S.
<http://www.nature.nps.gov/ParkScience/index.cfm?Page=4>
- [5] 'Wilderness and Large Natural Habitat Areas in Europe' Conference, Prague (May 2009)
<http://www.wildeurope.org/>