1.5. A note on terminology: Soundscape Perception?

According to the definition of soundscape provided in ISO 12913-1:2014 (2014), the soundscape is 'the acoustic environment as perceived or experienced and/or understood by people'[1]. Both in the standard and elsewhere, this has commonly been taken to mean that the soundscape is the perception itself, while the factors which lead to the soundscape are separate entitites. In this definition, the soundscape is not made up of sound sources, the visual environment, etc. but instead is the perception formed by them. This definition was proposed by A. L. Brown (2012) where the author made this distinction very clear in a section titled **'Soundscape is perception of the acoustic environment of a place'**: 'Thus, a soundscape exists through human perception [...] the soundscape of a place is thus a perceived entity'.

Given this definition, speaking about the 'soundscape perception' would be redundant; the soundscape already is the perception. By extension, saying 'the soundscape is perceived as pleasant' also would not make sense; we should rather say 'the soundscape is pleasant'. However, even among the foundational modern soundscape literature this use is relatively widespread; Ö. Axelsson et al. (2010); Liu, Kang, Behm, and Luo (2014) both refer to soundscape perception within the title.

This definition also conflicts with other popular definitions of soundscape. The term soundscape is commonly used in acoustic ecology and underwater acoustics – see titles such as 'The soundscape of bat swarms' (Kloepper et al., 2017), 'An integrated underwater soundscape analysis in the Bering Strait region' (McKenna, Southall, Chou, Robards, & Rosenbaum, 2021), 'Soundscape analysis and acoustic monitoring document impacts of natural gas exploration on biodiversity in a tropical forest' (Deichmann, Hernández-Serna, C., Campos-Cerqueira, & Aide, 2017), and 'Identification and quantification of soundscape components in the Marginal Ice Zone' (Geyer, Sagen, Hope, Babiker, & Worcester, 2016). Several analysis packages have also been developed for the purpose of soundscape analysis, whether for urban-, underwater-, or bio-acoustics, which include no aspect of human perception in context (see e.g. Soundscape Viewer (Y.-J. Sun & Lin, 2020) and `scikit-maad` (Ulloa, Haupert, Latorre, Aubin, & Sueur, 2021)).

These fields appear to use the term *soundscape* more broadly, without a reference to human perception, to refer to either a broad consideration of the entire sound environment or to a focus on the sound environment as perceived by all creatures, not just humans. This first definition comes from Pijanowski et al. (2011) where the authors state that 'soundscape ecology focuses mostly on macro or community acoustics [...] the composition of all sounds heard at a location that are biological, geological, or anthropogenic' to differentiate it from previous acoustic ecology studies which 'focus on a single species or a comparison of species'. Within the ISO 12913 framework, this would more accurately be described as the *acoustic environment* ('sound at the receiver from all sound sources as modified by the environment'). In the end, all of these conflicting and overlapping definitions can make cross-disciplinary communication

[1] This section on terminology is provided in the introduction to provide a common understanding throughout the rest of this thesis. In the narrative of the thesis, it comes somewhat early, before the background on soundscape studies is presented in Chapter 2. For readers less familiar with the field of soundscape, it may be worth returning here after reading that chapter.

more difficult and prone to disagreements and misunderstandings.

In an attempt to bring the term soundscape in line with these varying uses and to conform more broadly with its common grammatical usage, I propose the following definition:

> The soundscape comprises all of the factors which influence the sonic experience of or interaction with an environment; this primarily includes the acoustic environment, composed of all sounds heard at a location that are biological, geological, technological, or anthropogenic. The secondary factors included in the soundscape are those non-auditory factors which influence how the sound environment is processed, including (but not limited to) the visual setting, environmental factors, and the internal, personal factors which mediate the listeners perception.

This definition draws from both the definition of acoustic environment given in ISO 12913-1:2014 (2014) and on the use in soundscape ecology as given by Pijanowski et al. (2011). It reflects the holistic view of soundscape analysis which aims to consider more than the sound environment alone and also consider how non-acoustic factors impact how sound environments impact listeners. In urban and human soundscape studies, like this thesis, the investigation and understanding of the soundscape is focussed on human perception as in ISO 12913-1:2014 (2014). In soundscape ecology, it reflects the desire to consider sources from many species, including anthropogenic sources, and especially to focus on the impact on the animals and ecological systems.

This usage also seems to be more readily understood by lay-people. Explaining that the soundscape *is* the perception, not something which can be perceived, seems to raise an unnecessary barrier to effective communication. In contrast, when explaining a soundwalk to a participant, with this definition we could say "I'd like you to think about the soundscape of this space – not just the sounds you can hear but also the context you're hearing them in. Then tell me how you perceive that soundscape, is it pleasant, calm, etc.?" Removing the somewhat awkward idea of the soundscape is the perception, could aid in the communication of the soundscape to the public.