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## DIVERSITY IN SOUNDSCAPES STUDIES: A MONOCHROMATIC CASE ON NATURE

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### ABSTRACT

This paper offers a critical examination of Schafer's legacy by looking at the lack of diversity in one of the most studied aspects in our field: nature, and shows how the overrepresentation of green and blue is symptomatic of a Western normative listening style. Despite work within human soundscape studies that generally acknowledges differing gender-based, age-based and cultural responses to soundscape, dominant Western cultural narratives presuppose the benefits of specific kinds of nature sound and demonstrate a lack of further in-depth critical narrative. These narratives seem to be underpinned by a lack of diversity within human soundscape research, leading to a limited understanding, for example, of the role of socio-economic and cultural diversity within soundscape reception. We argue for further acknowledgement of the subjective perspectives present within the definition of soundscape that focus on the perception of the listener at a certain place and time and exercise room for both individuality and context. We invite soundscape researchers

to adopt a more inclusive approach to their studies and highlight ways in which a broader and more inclusive perspective can further a more representative and equitable understanding of the impact of soundscapes across communities.

**Keywords:** *soundscapes, diversity, nature*

### 1. INTRODUCTION

In her seminal work, *The Soundscape of Modernity*, Thompson [1] describes how advances in architectural acoustics have shaped modern soundscapes, moving away from organic and resonant environments to more efficiently managed ones. She argues that as part of this process, it is not only the built environment and the resulting soundscape that has changed ("the world") but also the way people perceive that environment (the "culture constructed to make sense of that world", p.1). Both of these aspects remain key elements in the current definition of soundscapes [2] and guide our efforts in studying and understanding how humans interact with their sonic environment. Much of these efforts have been aimed at standardizing methodologies and creating an internationally validated vernacular [3-6] adding consistency and reliability within the field. These developments, although undoubtedly progressive, have placed emphasis on identifying broader patterns and asserting more generalized statements about soundscape perception via the 'average listener' (both in the statistical and demographic sense), consequently overlooking the rich aural diversity present in humans [7]

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and the non-cochlear aspects of soundscape perception [8]. We, the authors - while aware of this trend within our own work - argue for the importance of recognizing how the definition of soundscape emphasizes a subjective perspective, focusing on the perception of the listener at a certain place and time and exercising room for both individuality and context. To illustrate this, we will investigate one of the most studied elements in our field, nature, and show how the overrepresentation of green and blue is symptomatic of a Western normative listening style that highlights a broader lack of critical narrative. To conclude, we offer suggestions on how to implement change and rethink our methods to make them more diverse and inclusive.

## 2. NORMATIVE LISTENING AND THE CONCEPT OF NATURE

The foundation of soundscape research lies in the work of Schafer from the 1970's [9] and although work in the field of sound studies shares this same foundation, there is evidence that it has progressed further in embracing societal diversity. Sterne [10] argues Schafer's use of 'hi-fi' and 'lo-fi' reflects a masculine, domesticated and bourgeois perspective on listening, which is supported by [11] who, while acknowledging Schafer's foundational contributions, challenges his binary categorization of sonic environments into "hi-fi" and "lo-fi" spaces as revealing an implicit bias against urban soundscapes. Kelman [12] also offers nuanced critiques that expose the term soundscape and its ideological underpinnings, arguing that Schafer's soundscape framework is fundamentally prescriptive rather than descriptive, advancing a dystopian narrative of sonic history that privileges certain sounds while dismissing others, particularly recorded and broadcast media. These critiques help to illustrate how Schafer's formulation neglects individual agency in sonic experience and conflates the acts of sound production with listening practices. Despite this, both authors recognize the enduring appeal of the soundscape concept, with Kelman noting its power to evoke relationships between sound and place and Minevich highlighting how the term has evolved beyond Schafer's original conception to embrace more inclusive interpretations that recognize sounds as autonomous aesthetic entities with associative and imaginative capacities. This critical evaluation helps to demonstrate both the limitations of Schafer's original framework and the concept's continued utility when approached with expanded nuance and awareness.

Another distinction present within Schafer's work is that of the increased productivity of humans and the subsequent impact on the natural world, observations which have led to important outcomes relating to acoustic ecology. Within contemporary research, it is impossible to ignore the focus on the perceived positivity of 'natural' elements that pervade urban soundscape studies. For example, the work by Payne [13] on the Perceived Restorativeness Soundscape Scale (PRSS) demonstrates parallels between perceptions of restorativeness and the prevalence of natural sounds, similar to the work of Ratcliffe et al. [14] and other studies demonstrate faster relief of psychological stress (through sympathetic activation) being associated with pleasant nature sounds [15]. Nuances have been highlighted here; for example, work by Ratcliffe [14] found that certain types of birdsong were rated as more restorative or pleasant than others, and water sound has been found to be preferable at higher frequency [16] with stream water sound as more preferable than falling water sound [17]. While these nuances pertain to the general reception of nature sound, there is a lack of engagement within the field on the relationship of different groups to natural environments.

While a connection to nature is often deemed inherent to all humans Bell [18] questions the idea that connection to nature is a universal position shared across society, highlighting how these assumptions may emerge from Wilson's 1984 work *Biophilia Hypothesis*, which, despite suggesting that people from different social backgrounds may need assistance in forming relationships with the natural world, still assumes an inherent connection. This shows that research on connections between well-being and the natural world might lean on uncritical assumptions without considering how diverse cultural and social backgrounds can shape experiences of nature and natural sound. For example, studies have demonstrated feelings of exclusion in green space amongst certain non-white communities [19-21] and while urban greenness has been shown to have especially beneficial mental health effects for women, they also have less access and are more likely to feel unsafe within it [22]. Stereotypes also emerge that reduce and generalize experiences of nature; for example, young people are often seen as either eco saviours or 'disinterested and disconnected from nature' [23]. From a soundscape perspective, limited but emerging studies demonstrate that responses to natural sound are also diverse in reception. For example, work by Cibrian et al. has shown that children with autism found natural sounds distracting and resulted in negative emotional responses [24], and work by Francomano et al. [25] and Yang and Kang [26] has shown that older people are more likely to have a positive affinity with natural soundscapes. From a noise





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management perspective, a small but growing number of studies demonstrate the disproportionately higher effect of noise on lower socioeconomic communities, including children. For example, the 2023 review *Investigating Sonic Injustice*, which called for further research into how different individuals are affected beyond ‘quiet’ places and towards more “dynamic and eventful sound environments that might nonetheless support positive health outcomes” (p.11), found only one study that looked at inequality in terms of access to beneficial sound environments [27]. The lack of research on inequality and noise further underlines the need to work beyond assumptions with regard to diverse experiences of sound in general, including natural sound, in order to avoid replacing one inequitable dominant narrative with another from both a research and policy-based perspective.

One of the dominant narratives within the study of nature sound is reflected in the monochromatic bias that exists within Schafer’s work and subsequent human soundscape studies, which tend to associate natural soundscape with temperate, lush environments (forests, lakes, meadows), creating an implicit hierarchy where “green” spaces are considered acoustically superior or more “natural.”. Research by Wheeler et al. [28] also raises questions about these homogenized discussions around nature, where ‘greenspace’ is often presented holistically as a descriptor of a natural environment. So far, the field seems to predominantly have focused on “green” soundscapes (forests, rural areas; [29-30]) and “blue” soundscapes (oceans, lakes, rivers) while largely neglecting “white” soundscapes (snow, ice, arctic regions) and “golden” soundscapes (deserts, savannas, grasslands). As a result, the sonic characteristics associated with these green and blue environments have become the default “natural” sound, e.g. birdsong, wind through leaves and water [31]. This chromatic imbalance reflects deeper Western normative biases in how we conceptualize and value natural sonic environments and reinforces colonial perspectives that romanticize certain landscapes and environments and marginalize extreme or harsh environments often populated by Indigenous communities. For instance, the rich acoustic ecologies of desert landscapes—with their unique wind patterns, sand movements, and adapted wildlife—remain underrepresented in soundscape literature despite their cultural significance to numerous communities worldwide. Similarly, white soundscapes of polar and alpine regions contain distinct acoustic properties—the crystalline resonance of ice, the compression of sound in extreme cold, and the absence of certain frequency absorptions—yet these sonic environments receive minimal scholarly attention. This chromatic bias extends beyond academic research; a

simple Google search on “the colour of natural environment” results in: “The colours most commonly associated with nature are shades of blues and greens” [32]. This popular response shapes a form of environmental acoustic privilege that centers on Western temperate experiences. By expanding soundscape research to include white, golden, etc., environments, we can challenge the normative assumptions embedded in Schafer’s legacy while creating space for diverse listening practices and knowledge systems traditionally excluded from the acoustic canon. Such expansion aligns with broader efforts to decolonize environmental studies by recognizing that different communities experience, value, and interact with soundscapes in culturally specific ways that may not conform to Western acoustic aesthetics or categorizations.

### 3. MOVING FORWARD

Despite work within the field that generally acknowledges differing gender-based, age-based and cultural responses to the soundscape, dominant Western cultural narratives presuppose the benefits of specific kinds of nature sound and demonstrate a lack of further in-depth critical narrative. These dominant narratives seem to be underpinned by a lack of diversity within human soundscape research, leading to a limited understanding of the impact of urban socio-economic and cultural diversity on the reception of soundscape. In investigating the impact of natural sound, it is therefore important to consider ways in which diverse groups may be excluded from the conversation and how experiences might differ depending on socio-cultural background. Thus, we invite soundscape researchers to adopt a more inclusive approach to their studies by recognizing diversity and uniqueness, using inclusive processes and tools, actively involving people who are generally excluded in the research and design process, and realizing that we are designing and researching a complex adaptive system [33].

One way to be mindful of this is to draw from the three principles of individuality as described by Rose [34] in his book *The End of Average*. For the first principle (that of jaggedness), he advocates that human traits (we argue human perception as well) are complex and multidimensional and thus cannot be captured by a single score or measure. In that same line of thought, we urge researchers to refrain from oversimplifying soundscape perception as two normative perpendicular dimensions and embrace more descriptive and colourful characterizations. Incorporating more creative and art-based methods into our work could capture this complexity, e.g. by actively





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focusing on embodied listening experiences [35] or cultural differences [36]. The second principle expresses that behaviour is context-dependent and changes based on location and context. And while soundscape research acknowledges this explicitly in the official definition, researchers could do more justice to this principle by making less general inferences and instead adopt an IF THEN reasoning and to provide more context while drawing conclusions (e.g. “By an able-bodied white Western listener, the soundscape associated with lush nature characterized by green vegetation and blue water features, is usually perceived as pleasant and calm.”). This holds especially true for listening experiments in the lab, where both the sounds and participants are entirely stripped from their usual contexts, decreasing the ecological validity while making inferences about soundscape perception outside of the lab (i.e. in another context).

The third principle states that, given the first two principles, for any given situation, there will be many equally valid paths that lead there. The most optimal pathway will differ for every person, based on their own individuality. For human soundscape research, this entails that while many people might enjoy the dawn chorus preluding the break of day, the underlying reasons for their enjoyment will probably differ because the sounds mean something different to different listeners in different contexts (soundscapes as meaningsapes [37]). This is related to the concept of intersectionality, which was originally developed by [38] and examines how overlapping social identities create unique experiences of discrimination or privilege. In our field, this means recognizing that people's experiences of sound environments are shaped by the intersection of their various identities (race, gender, ability, class, age, etc.), which is illustrated by the work of Robinson [39], pointing out that Indigenous soundscapes were appraised by Schafer according to Western listening norms, only to succumb to Schafer's desire for familiarity (e.g. describing the Inuit and indigenous people as an unmusical race). It is exactly that familiarity which is still one of the key drivers of soundscape perception in contemporary soundscape research [40-41]. Including a more diverse range of participants in soundscape studies is essential, as the accumulated culture of a place or context captured by its people is needed to truly understand the value and valence of different soundscapes. Without understanding these underlying mechanisms, we will fail to truly understand what drives the assessment and impact of soundscapes across communities.

By adopting the above mentioned principles, researchers could emphasize diversity and individuality,

leading to a better understanding of human soundscape perception within specific contexts and more personalized and effective approaches for soundscape optimization. Mansell [42] succinctly summarizes comparable invitations by Goh [43] and Robinson [39] to adopt a more humble attitude as researchers, to examine our positionality, and rethink our methods “as a form of “hearing with” rather than “listening to” subjects” [42, p. 11] so that we become guests in soundscapes without overstaying our welcome.

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