

A short intro to the “soundscape approach”

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15th October 2026

“To dB, or not to dB, that is the Question...” (*Hamlet* - Act 3, Scene 1)

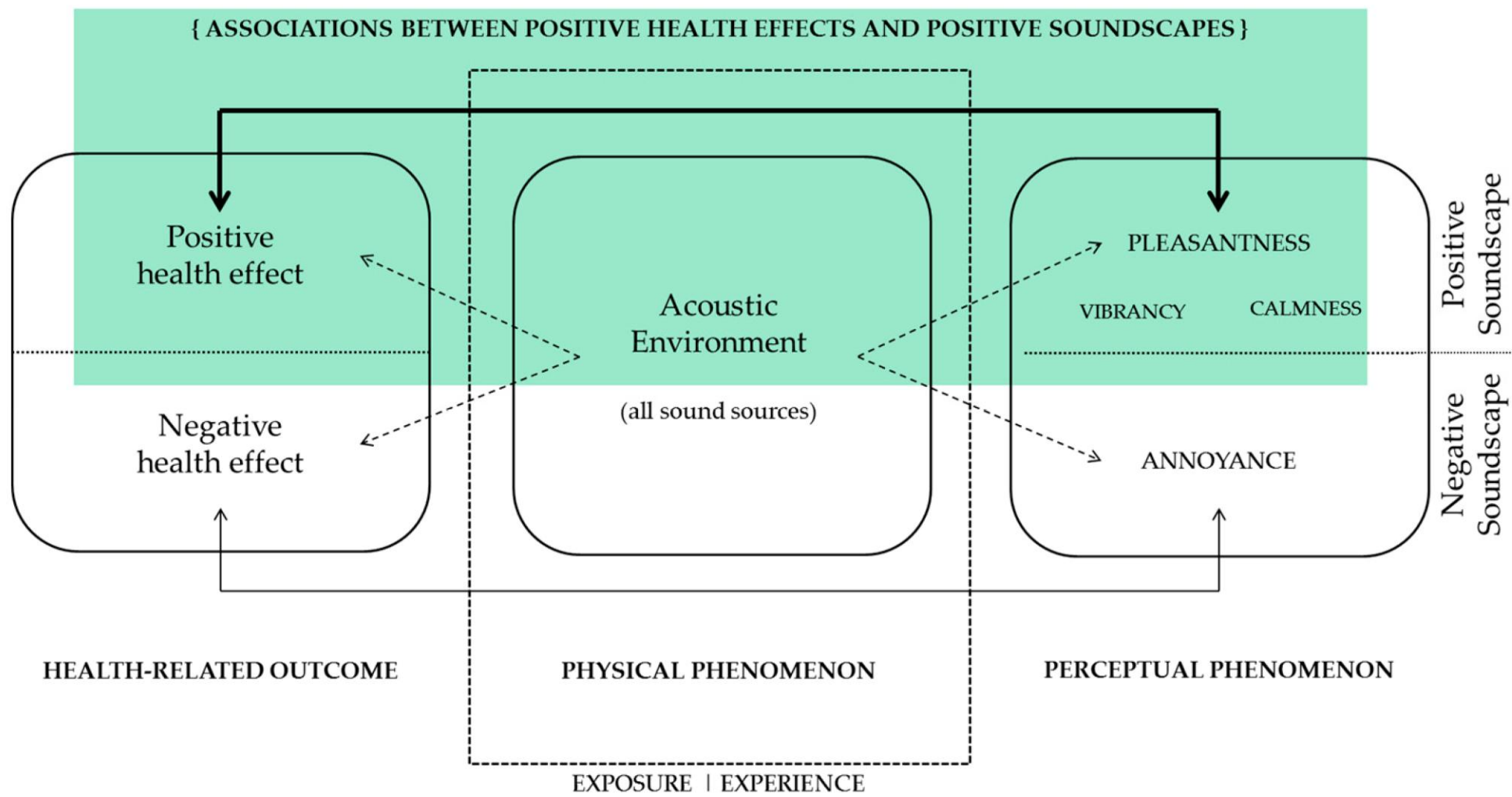
Main methods for identifying Quiet Areas:

- Noise Mapping
 - Sound pressure levels measurements
 - Evaluation of user/visitor experience
 - Expert assessment
- } opportunity for the ***soundscape*** approach



General Conclusions of the EEA report (2014):

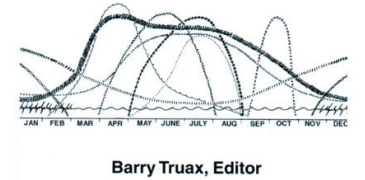
- Concept of quiet areas still under development: too early to determine what is preferable in terms of good practice.
- Unlikely that any single criterion will become “best practice”: different types of quiet areas, with diverse functions, situations, acoustic features, access, as well as visual and other qualities.
- A combination of the four methods for assessment is recommended.



SOUNDSCAPE is...

...an environment of sound, or sonic environment, with **emphasis on the way it is perceived and understood** by the individual, or by a society

(Handbook of Acoustic Ecology).



1978

...the component of the acoustic environment that can be **perceived by humans**

(Wikipedia).



2004

...acoustic environment as **perceived or experienced and/or understood** by people, in context

(ISO 12913-1).



2014

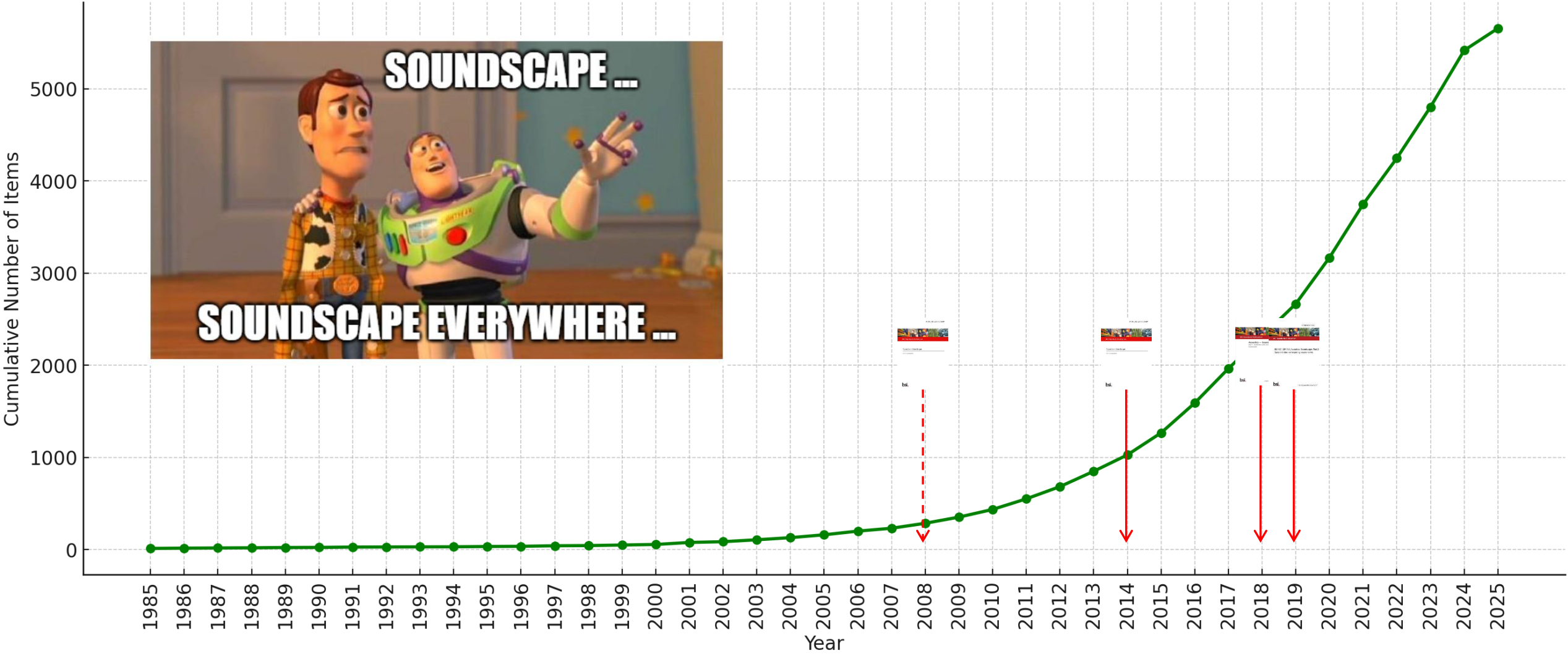
...think of it like a landscape, but for your ears!

(Copilot)



2025

Cumulative Scientific Outputs Including "Soundscape" in the Title, Abstract or Keywords (Source: WOS, 2025)



The standardization timeline...

ISO 12913 series by the ISO/TC 43/SC 1/WG 54 — *Perceptual assessment of soundscape quality*

- ISO 12913-1:2014 Acoustics — Soundscape Part 1: Definition and conceptual framework
- ISO/TS 12913-2: 2018 Acoustics — Soundscape Part 2: Data collection and reporting requirements
- ISO/TS 12913-3: 2019 Acoustics — Soundscape Part 3: Data analysis
- ISO/TS 12913-3: **2025** Acoustics — Soundscape Part 3: Data analysis (**revision**)
- ISO/AWI TS 12913-4 Acoustics — Soundscape Part 4: **Design and intervention (under development)**

Part 1: Definition and conceptual framework

acoustic environment

sound at the receiver from all sound sources as modified by the environment

soundscape

acoustic environment as perceived or experienced and/or understood by a person or people, in context

context

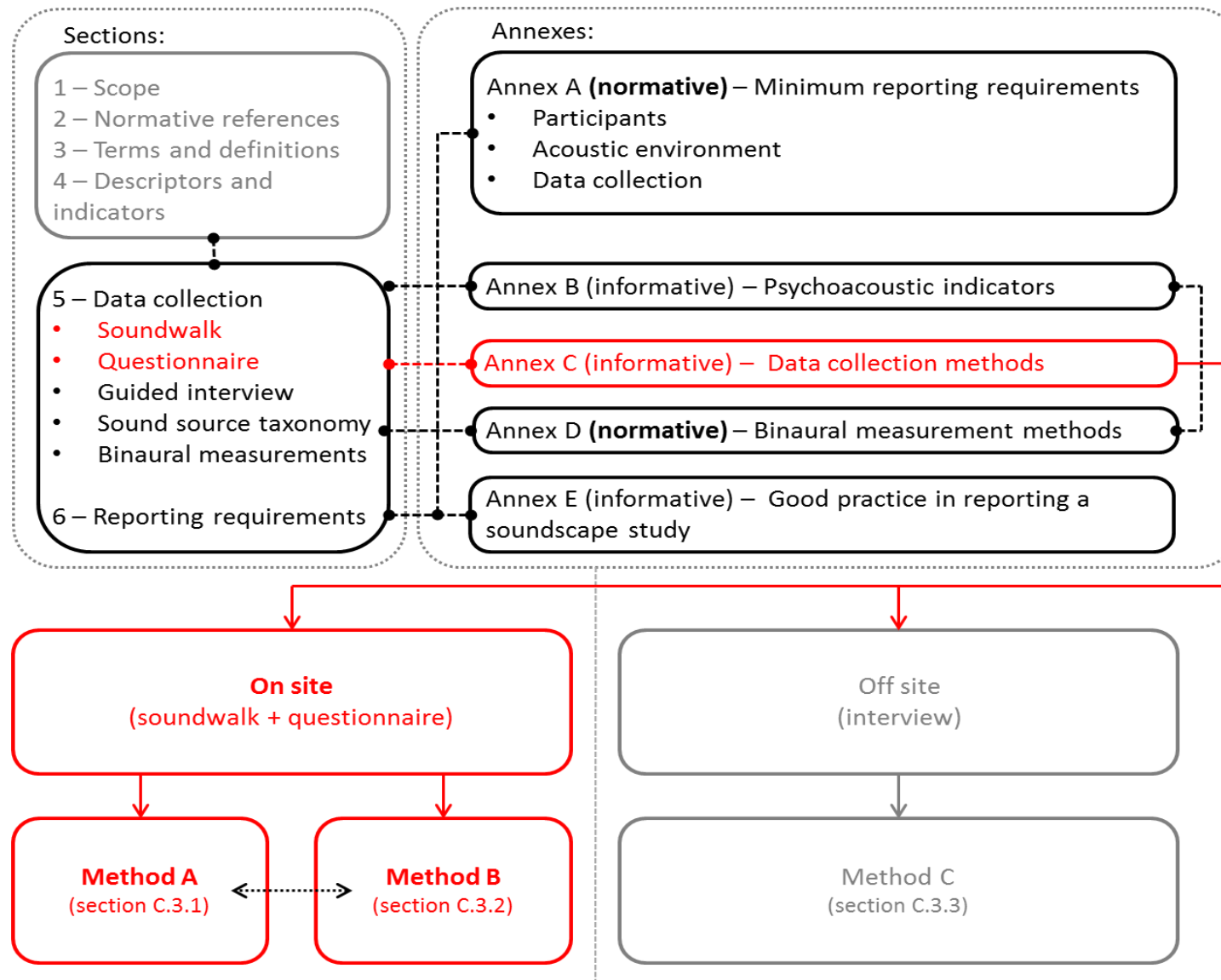
includes the interrelationships between person and activity and place, in space and time [...]

responses

include short-term reaction and emotion, as well as behaviour, which may change the context

“A soundscape is the sonic environment of a place, setting, or community, whose character is the result of the interaction with non-auditory and/or contextual factors.”

Part 2: Data collection and reporting requirements



ISO/TS 12913-2: 2018 (Method A)

Sound Source Identification – Questionnaire (Adapted Version)

To what extent do you presently hear the following types of sounds?

Please select one option for each sound type.

Sound Type	Not at all	A little	Moderately	A lot	Dominates completely
Traffic noise (e.g., cars, buses, trains, airplanes)	☐	☐	☐	☐	☐
Other noise (e.g., sirens, construction, industry, loading of goods)	☐	☐	☐	☐	☐
Sounds from human beings (e.g., conversation, laughter, children at play, footsteps)	☐	☐	☐	☐	☐
Natural sounds (e.g., singing birds, flowing water, wind in vegetation)	☐	☐	☐	☐	☐

Assessment of Appropriateness of the Sound Environment – Questionnaire (Adapted Version)

Overall, to what extent is the present surrounding sound environment appropriate to the present place?

Please select one option.

Not at all	Slightly	Moderately	Very	Perfectly
☐	☐	☐	☐	☐

Perceived Affective Quality – Questionnaire (Adapted from Figure C.4)

For each of the 8 scales below, to what extent do you agree or disagree that the present surrounding sound environment is...

Please tick one option per scale.

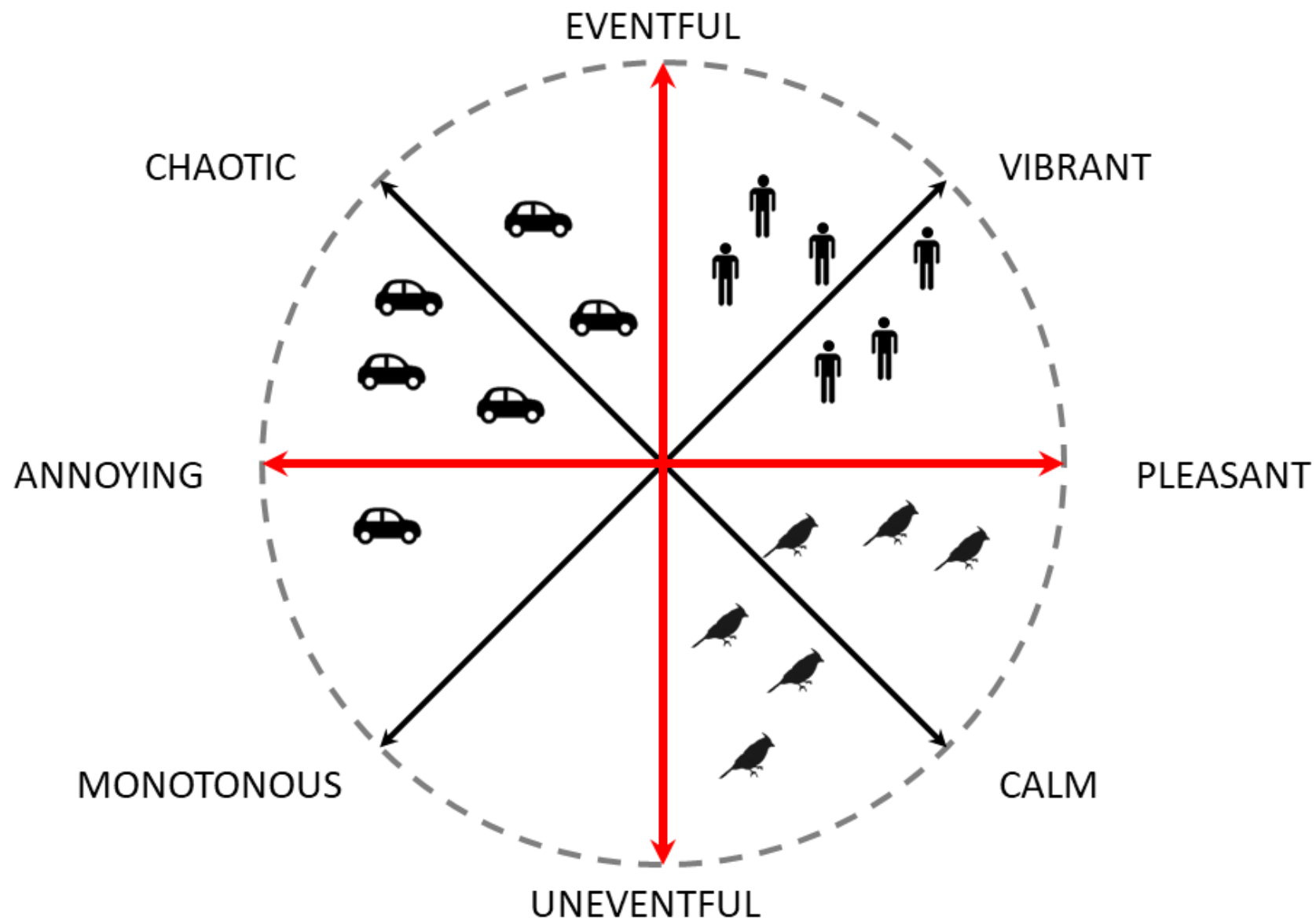
Attribute	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
Pleasant	☐	☐	☐	☐	☐
Chaotic	☐	☐	☐	☐	☐
Vibrant	☐	☐	☐	☐	☐
Uneventful	☐	☐	☐	☐	☐
Calm	☐	☐	☐	☐	☐
Annoying	☐	☐	☐	☐	☐
Eventful	☐	☐	☐	☐	☐
Monotonous	☐	☐	☐	☐	☐

General Description of the Sound Environment – Questionnaire (Adapted from Figure C.5)

Overall, how would you describe the present surrounding sound environment?

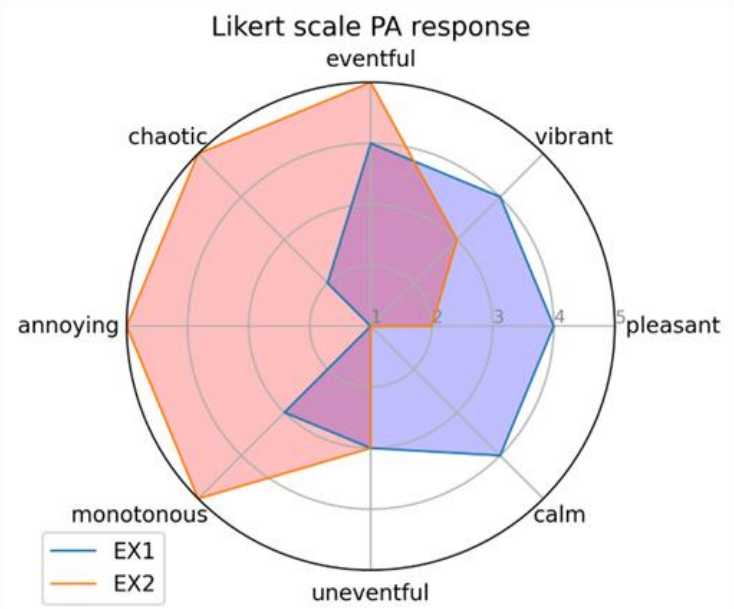
Please tick one option.

Very good	Good	Neither good nor bad	Bad	Very bad
☐	☐	☐	☐	☐



ISO/TS 12913-3: 2025 (Method A)

PA	ξ_i	EX1	EX2
pleasant	ξ_1	4	2
vibrant	ξ_2	4	3
eventful	ξ_3	4	5
chaotic	ξ_4	2	5
annoying	ξ_5	1	5
monotonous	ξ_6	3	5
uneventful	ξ_7	3	3
calm	ξ_8	4	1
<hr/>			
P_{ISO}	-	0.53	-0.75
E_{ISO}	-	0.03	0.35



ISO Coordinate Transformations (Formulae A.1 & A.2)

$$P_{ISO} = \frac{1}{\lambda_P} \sum_{i=1}^8 \cos(\theta_i) \cdot \xi_i$$

$$E_{ISO} = \frac{1}{\lambda_E} \sum_{i=1}^8 \sin(\theta_i) \cdot \xi_i$$

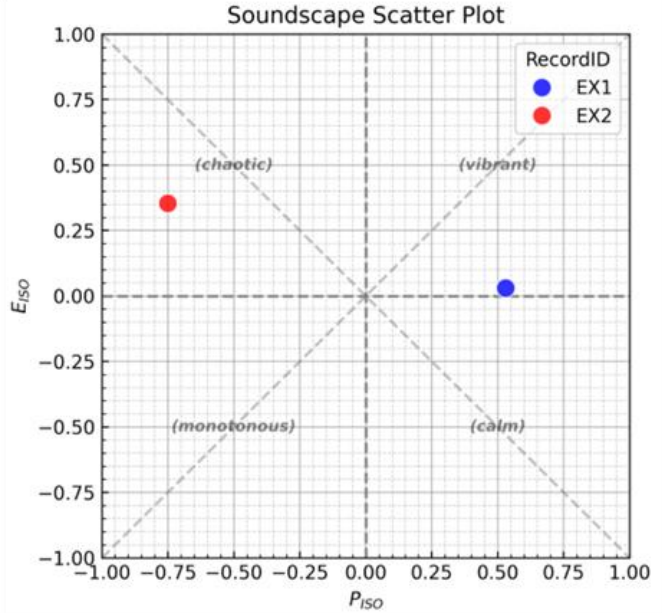
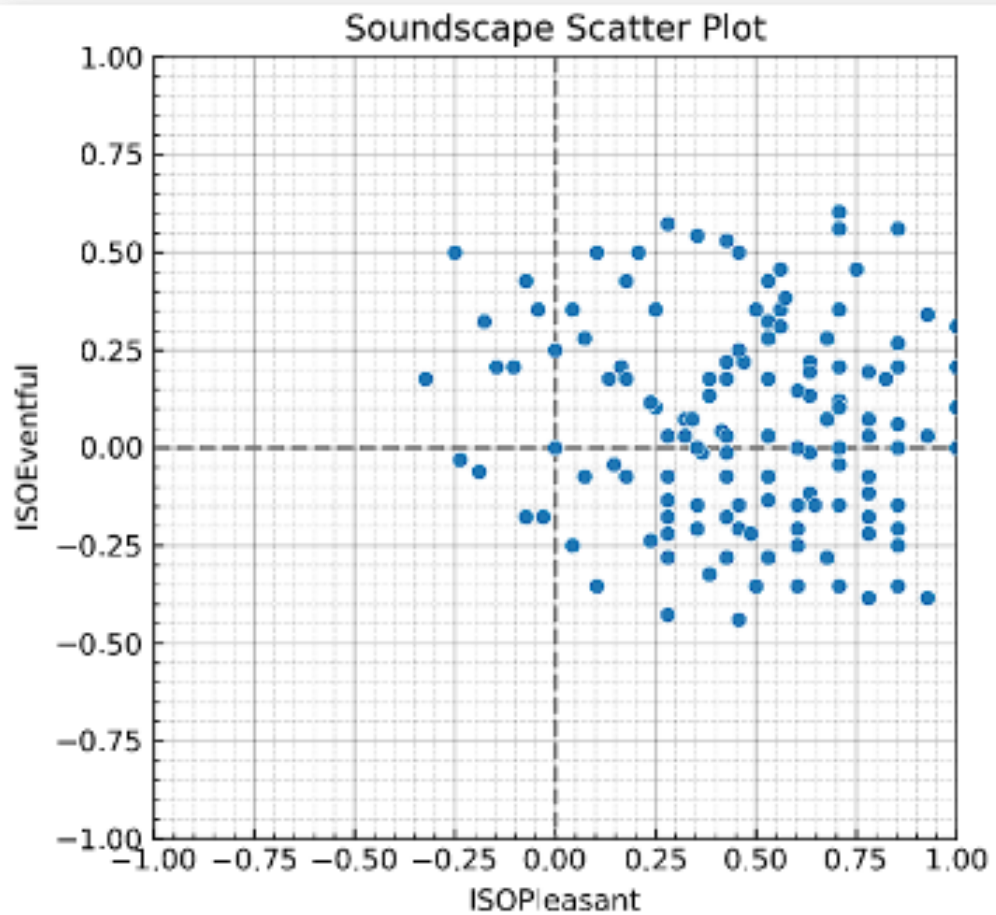
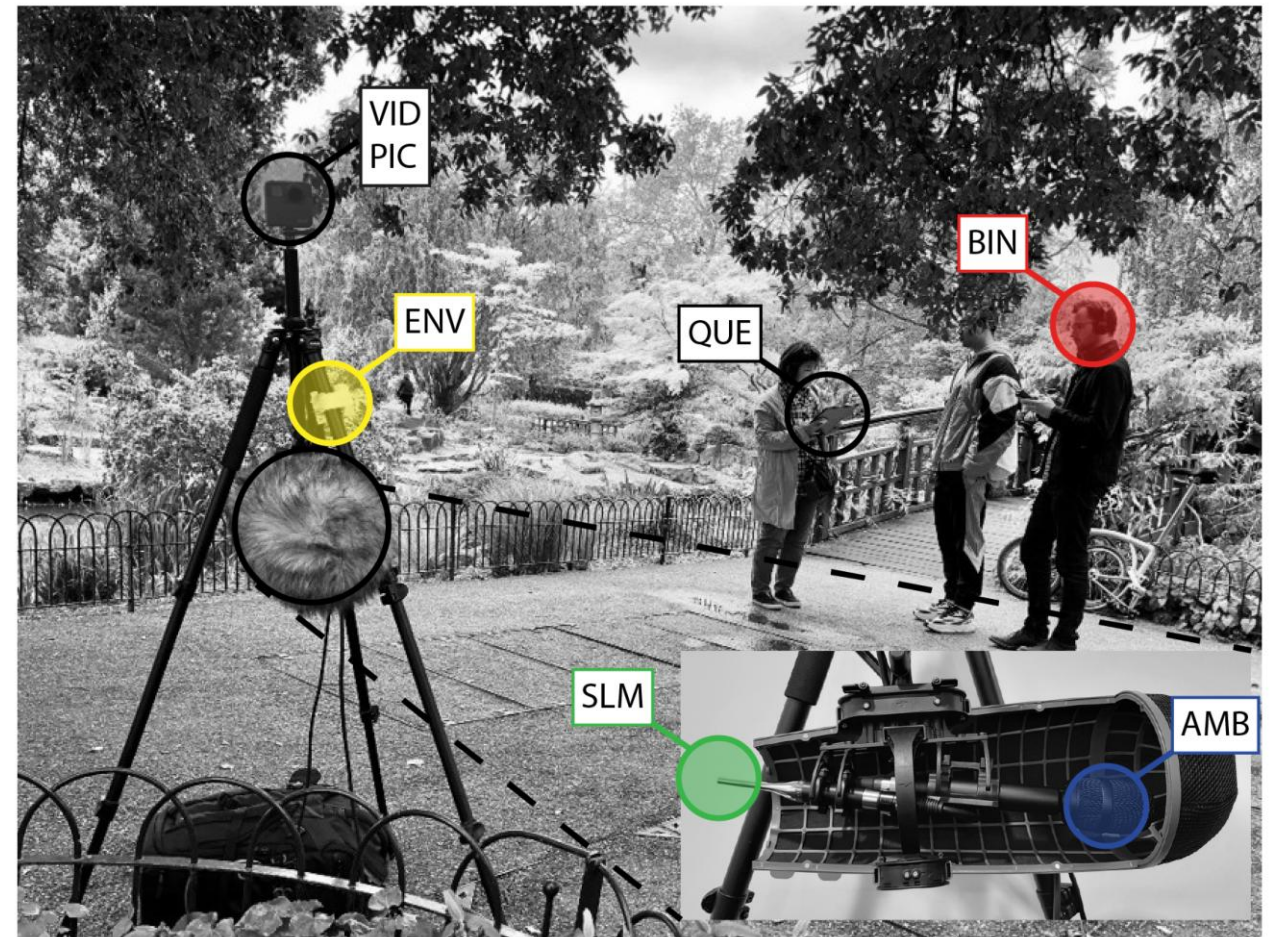
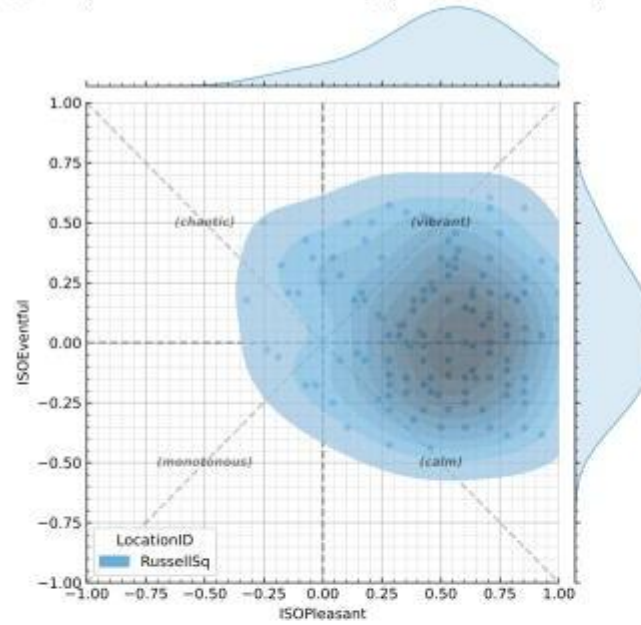


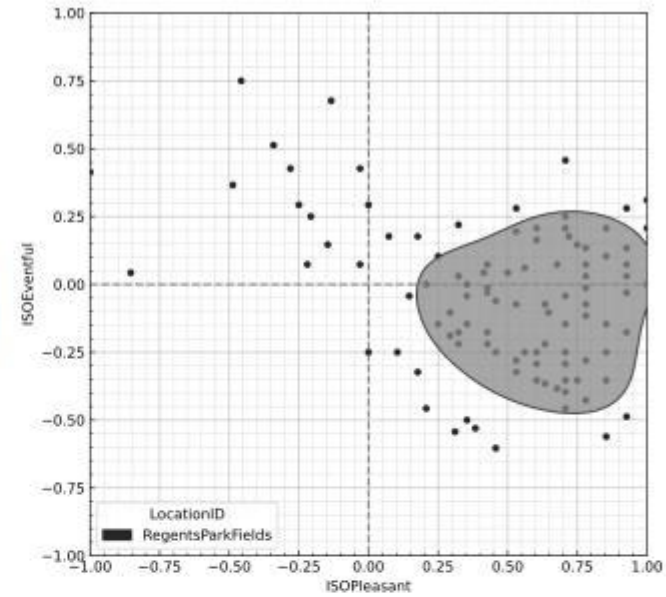
*image courtesy of Dr Andrew Mitchell



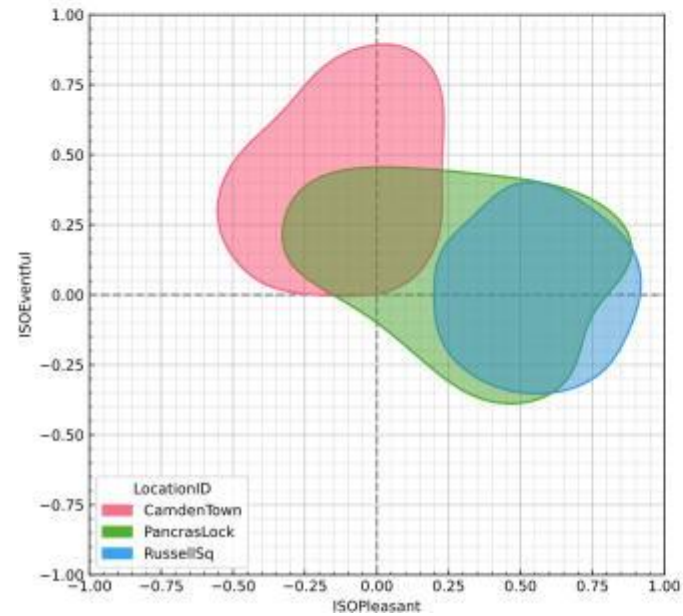
(a) Example distribution of the soundscape perception of an urban park



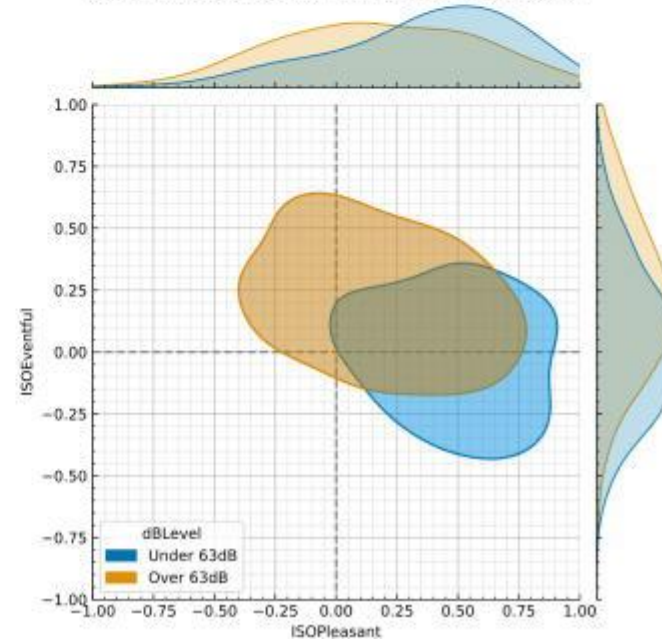
(b) Median perception contour and scatter plot of individual assessments



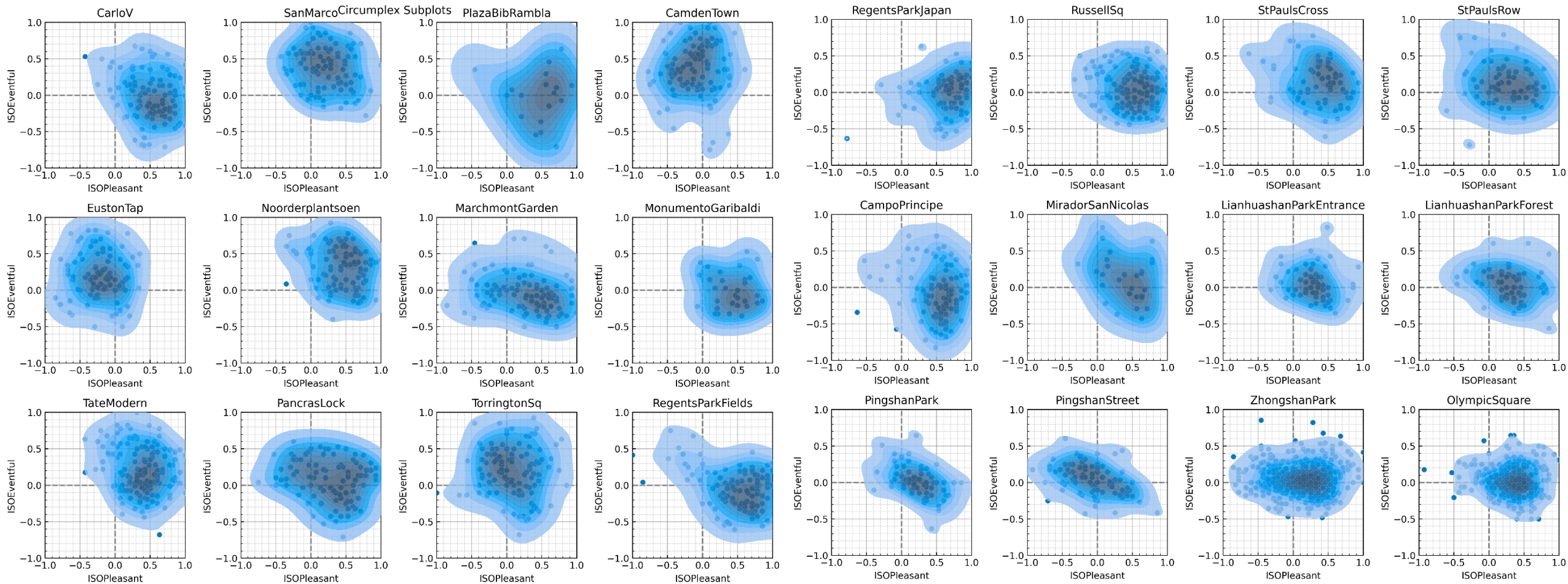
(c) Comparison of the soundscapes of three urban spaces



(d) Soundscape perception as a function of sound level



International Soundscape Database (ISD)





Provisional translations of soundscape attributes into the Irish Language (An Ghaeilge)

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ARTICLE INFO

Keywords:

Soundscape attribute
Translation
ISO/TS 12913
Irish Language
SATP

ABSTRACT

The purpose of this study is to select provisional translations in the Irish Language for soundscape perceptual adjectives (or attributes) in ISO/TS 12913-2:2018. The work is part of the Soundscape Attributes Translation Project (SATP). Candidate Irish translations were taken from both published and expert linguistic sources and numbered between 4 and 29 (mode = 7) per attribute. Translations were ranked according to five criteria, including suitability across regional dialects and the 'sense' of the translation in the soundscape context. Three groups of Irish scholars and lay persons worked independently and collectively to select provisional translations. It was not possible to provide single word translations of the soundscape attributes; 'annoying' and 'chaotic'. The provisional translations will be tested and validated at a future date.

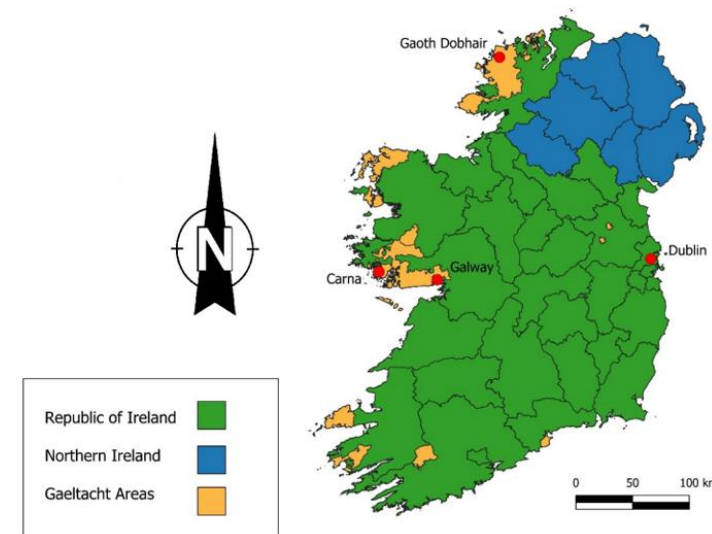
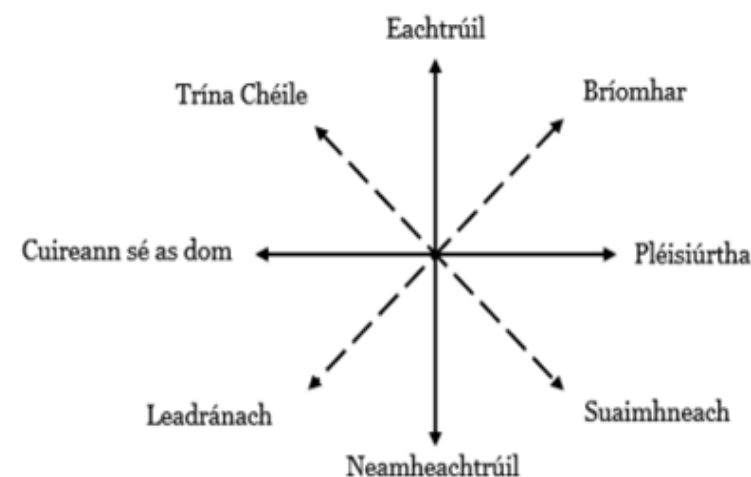


Fig. 1. Map of Ireland showing Gaeltacht areas.





Proposed Welsh translations for soundscape attributes

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ARTICLE INFO

Keywords:
Soundscape descriptors
Questionnaires
ISO 12913
Welsh Language
SATP

ABSTRACT

ISO/TS 12913-2:2018 (Method A) proposes a standardized method for collecting data on soundscape perception via questionnaires that use eight perceptual attributes: Pleasant, Calm, Uneventful, Monotonous, Annoying, Chaotic, Eventful, Vibrant. The Soundscape Attributes Translation Project (SATP) seeks to provide translations for these attributes to facilitate data collection in places where English is not the primary or only language. This includes Wales, which has two official languages: English and Welsh. Furthermore, soundscapes is a recently legislated area of Welsh Government environmental policy, and so data collection is due to increase in Wales, including via ISO/TS 12913-2:2018 (Method A), as recommended by the Government. Therefore, Welsh Language translations of the eight attributes are needed. This article proposes said translations, developed through four phases of research: linguistic research by the Welsh Government's Translation Service; a workshop attended by non-specialist Welsh-speaking civil servants; a review stage that included bibliographic research; and a second, informal, consultation with Government translators. Results detail the issues of comprehensibility and semantic suitability that arose when discussing translations, including discussions of English loanwords, cf. 'Chaotic', and the unfamiliarity of 'eventfulness' as a concept. Single word translations are suggested for four of the terms in the final proposed set, which consists of: *Dymunol/Pleserus*, *Llonydd*, *Digynnwrf/Diddigwydd*, *Undonog*, *Niwsans/Amhleserus*, *Cynhyrfus/Llawn digwydd*, *Caotig*, *Bywiog*. The article closes with suggestions for how the provisional translations ought to be tested and validated at a future date and highlights how the data generated may be useful when involving other Celtic languages in the SATP as well as the unique opportunity that Welsh offers in that all its speakers are naturally bilingual in Welsh and English, thereby allowing for comparison between the two languages without having to compare different sets of contributors.

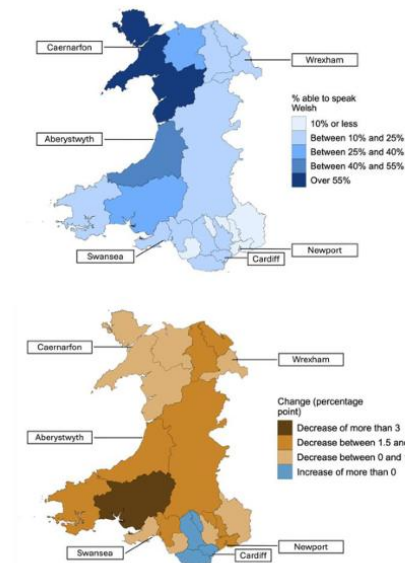
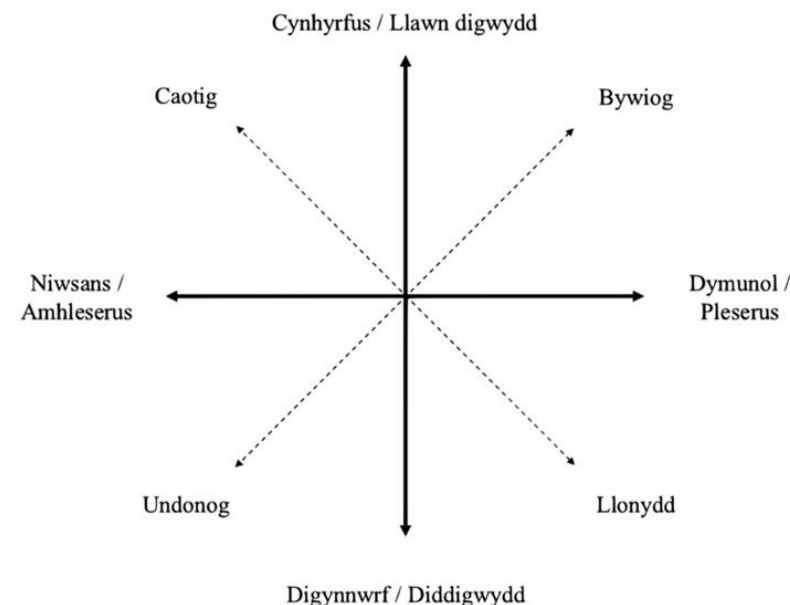


Fig. 3. Percentage of people aged three years or older able to speak Welsh, by local authority, 2021 (top); Change in the percentage of people aged three years or older able to speak Welsh by local authority, 2011 to 2021 (bottom). Adapted from [11] to include some cities as references.



National Annex NA

(informative)

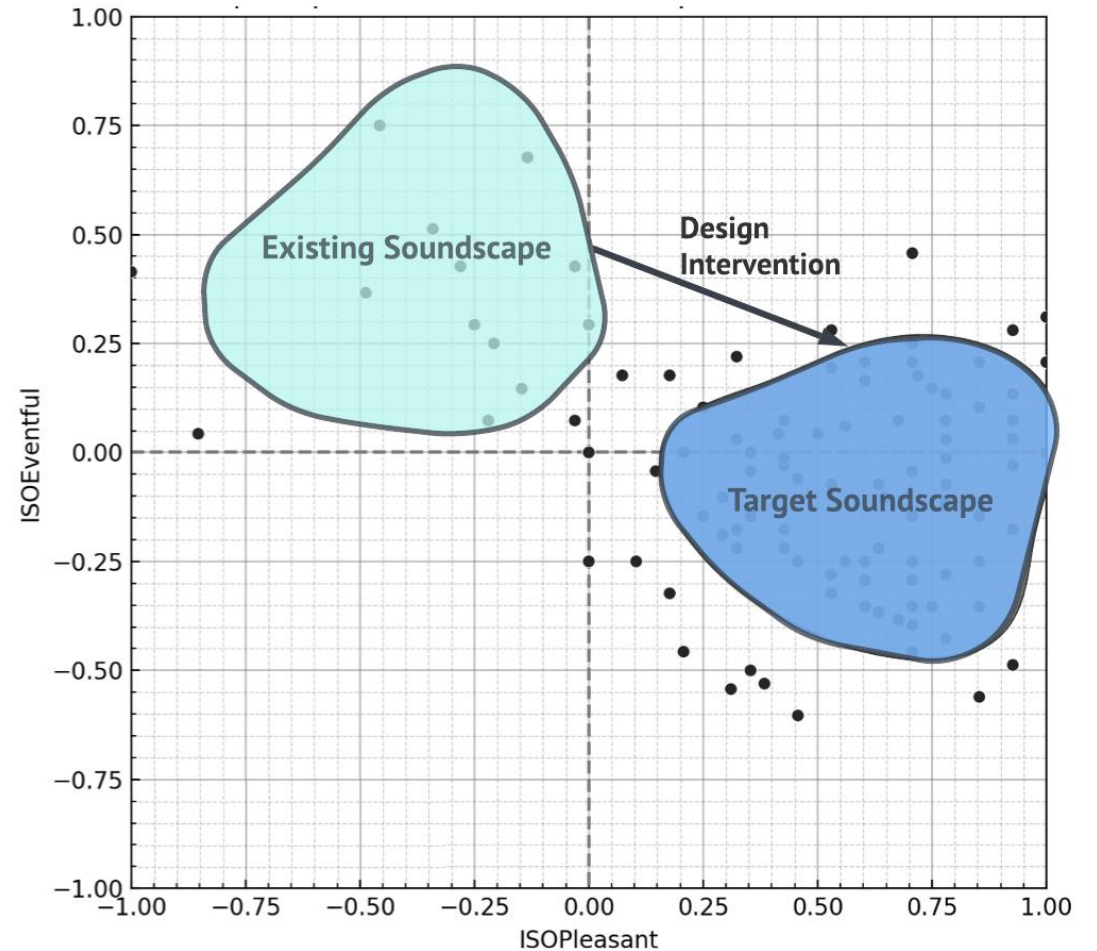
Welsh version of the soundscape attributes

English attribute	Welsh translation(s)
pleasant	dymunol / pleserus
calm	llonydd
uneventful	digynnwrf / diddigwydd
monotonous	undonog
annoying	niwsans / amhleserus
chaotic	caotig
eventful	cynhyrfus / llawn digwydd
vibrant	bywiog

How can we implement the soundscape framework for *design* purposes?

Is it possible to “engineer” a soundscape?

- Once the existing soundscape distribution is established (through prediction or surveys) the designer then defines their goal or target soundscape.
- By creating design proposals and running them through a predictive soundscape model, the success of the proposal for achieving the target can be assessed.
- With a predictive soundscape model which meets the defined goals & constraints, we can trial various designs to optimize and assess their success.



Kang, J., Aletta, F., Oberman, T., Erfanian, M., Kachlicka, M., Lionello, M., & Mitchell, A. (2019, January). Towards soundscape indices. In *Proceedings of the international congress on acoustics* (pp. 2488-2495). International Congress on Acoustics.

Mitchell, A. J. (2022). *Predictive Modelling of Complex Urban Soundscapes: Enabling an engineering approach to soundscape design* (Doctoral dissertation, UCL (University College London)).

Towards Soundscape Indices

Within the practicalities of built environment projects, the consequences and successes of a **design** often **need to be quantifiable within a single number, an indicator of impact, or key performance indicator**. This requires the creation of consistent and validated indices which indicate to what degree a proposed soundscape design achieves the design goal.

This presents two primary challenges:

1. How to summarise the dimensions of soundscape perception into a single index.
2. How to allow for various contexts and different design goals.

The Soundscape Perception Indices (SPI) method

Define target
soundscape
distribution



Sample target
distribution

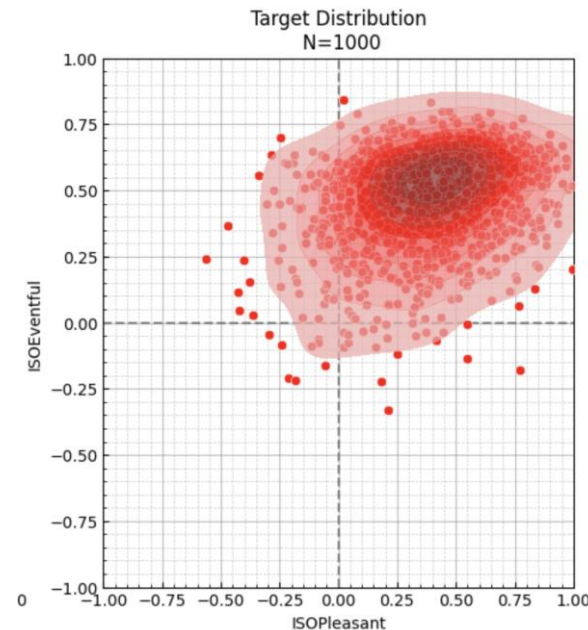
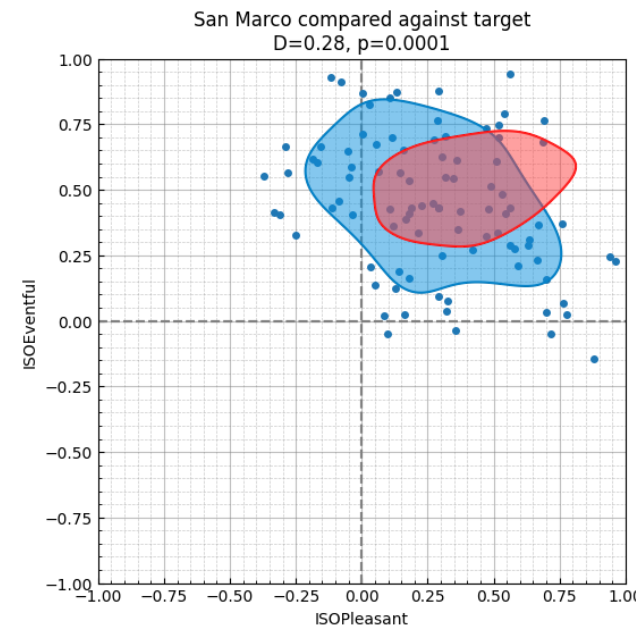


Compare test
and target
distributions



Calculate SPI

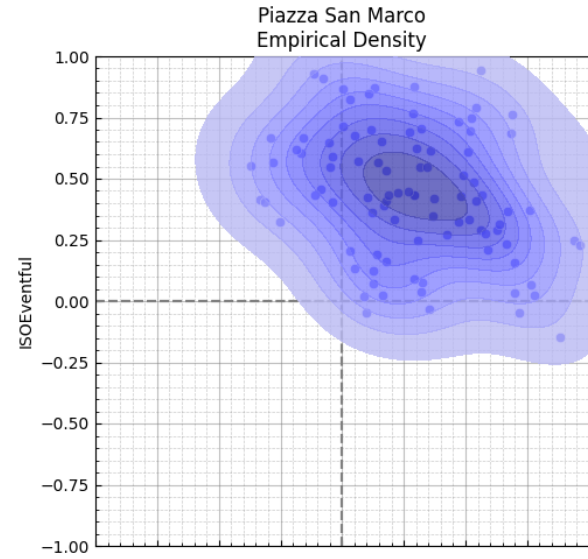
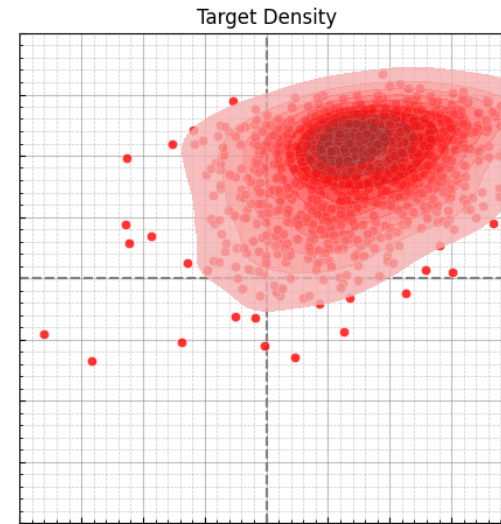
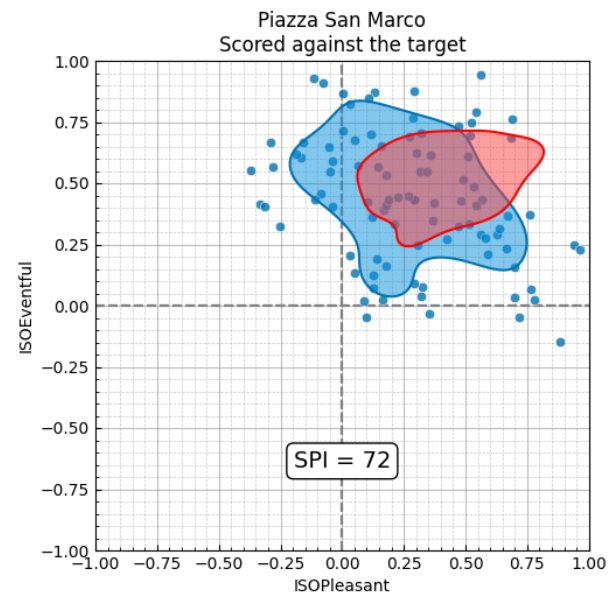
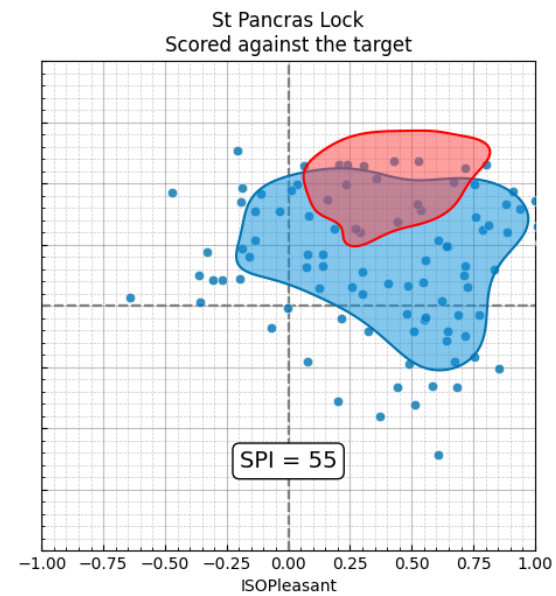
$$tgt_1 = \begin{cases} \xi = [0.5, 0.7] \\ \Omega = \begin{bmatrix} 0.1 & 0.05 \\ 0.05 & 0.1 \end{bmatrix} \\ \alpha = [0, -5] \end{cases}$$



$$SPI = 100 * (1 - KS\{test, target\})$$

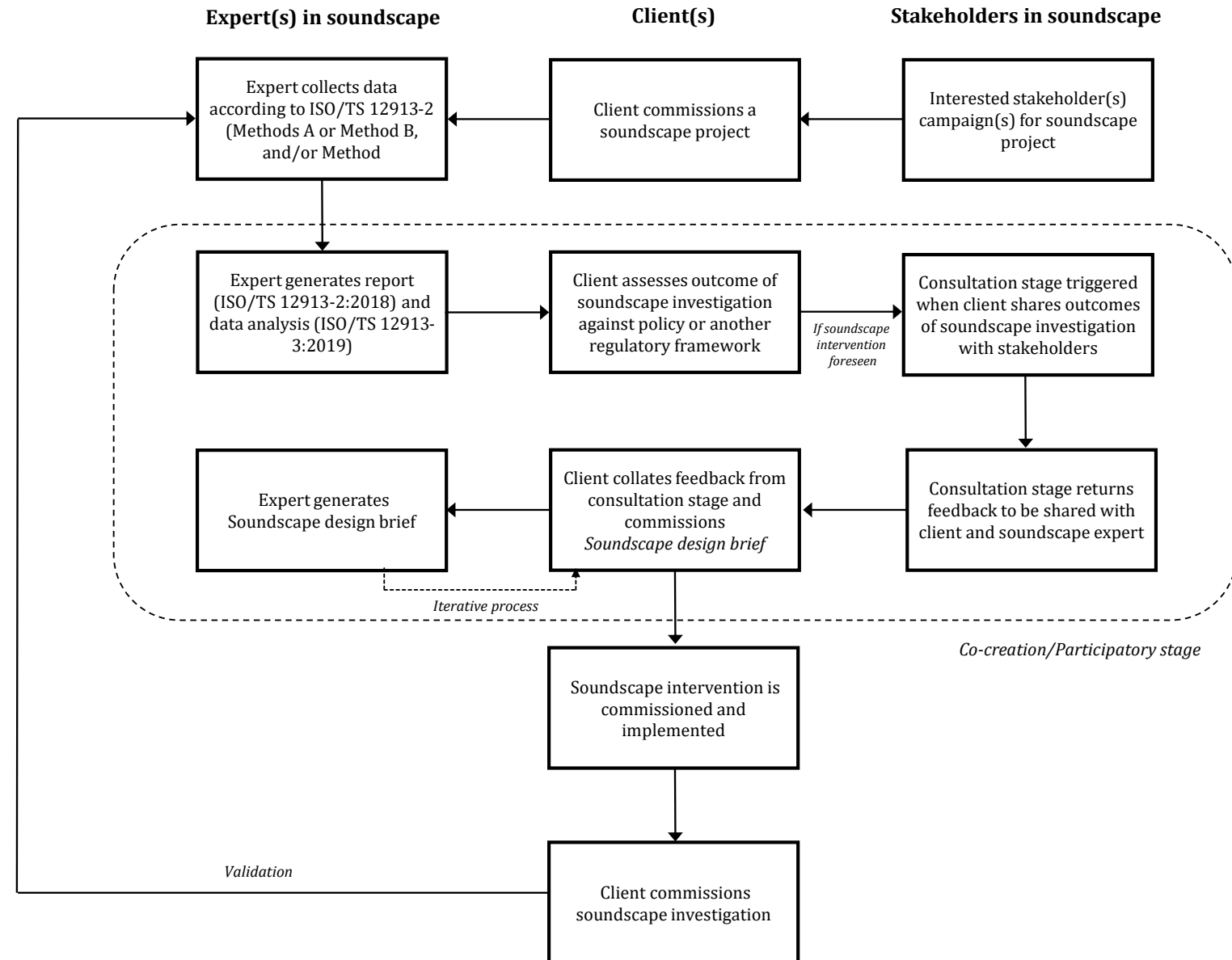
$$SPI_1 = 72$$

Applying an SPI Target



Coming next: ISO/AWI TS 12913-4: Design and intervention

Proposal of framework for: ISO/TS 12913-4 Acoustics – Soundscape – Part 4: Design and Intervention



Coming next: ISO/AWI TS 12913-4: Design and intervention

soundscape intervention

any site-specific implementation, outcome, process, or installation of a soundscape design aimed at preserving or improving a soundscape

soundscape design

refers to a plan or specification aimed at preserving or improving the soundscape

soundscape design brief

document based on a soundscape investigation and developed in consultation with the clients, local experts (see ISO/TS 12913-2) and soundscape stakeholders that outlines the soundscape investigation outcomes, design goals, and required deliverables

soundscape investigation expert

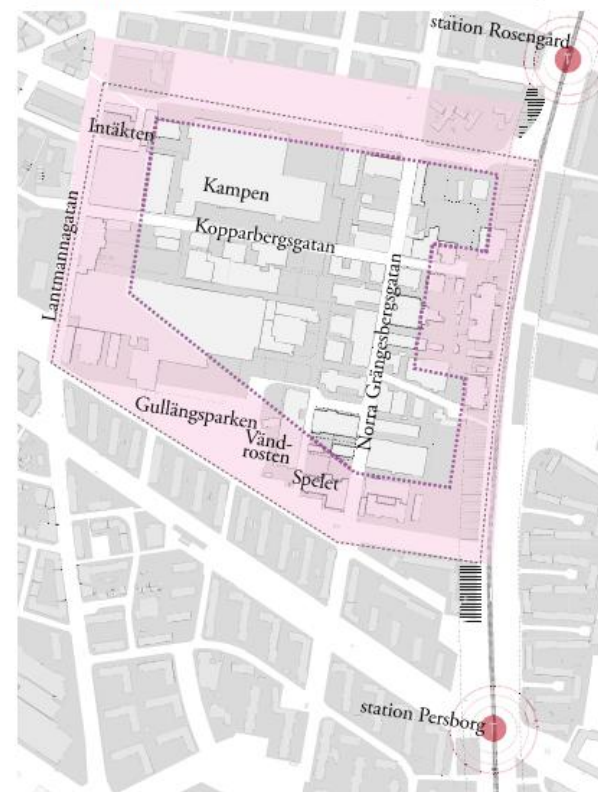
a professional in the field of soundscape, competent for the soundscape data collection and data analysis process according to ISO/TS 12913-2 and ISO/TS 12913-3, who is appointed to carry out a soundscape investigation

Malmö Cultural Sound Zone – *Kulturljudzon*



TECKENFÖRKLARING
STRUKTURPLAN

- ■ ■ Kulturljudzons yttre gräns (käll ljud 85 dBA) för events och aktiviteter utomhus på regelbunden basis.
- ■ ■ För att hela Kulturljudzonen ska kunna användas till fullo, kan inte heller bostäder tillkomma inom markerat område i kartan.



Kartdiagrammet visar en ungefärlig kulturljudzon som fungerar som ett varumärke för att aktörer ska kunna verka i ett mindre störningskänsligt område.



Gatufest NGBG, Foto: Gianluca Bruna

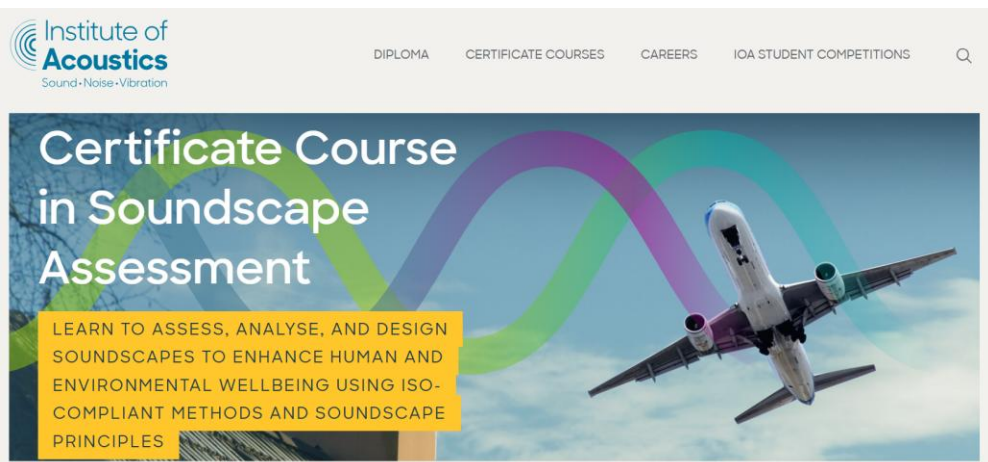


Temporära aktivitet i parken och i kvarter



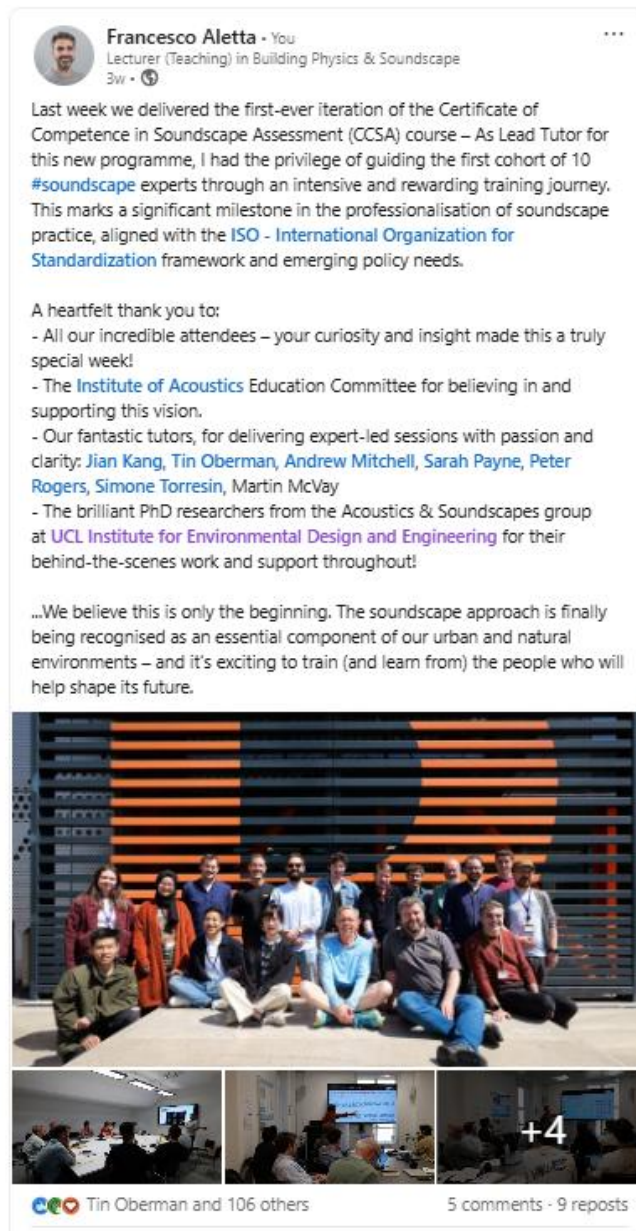
Pågen AB

IOA Certificate of Competence in Soundscape Assessment course



First editions, May 2025, May 2026
20+ certified professionals

Third edition, May 2027
[registrations open]



*“...if noise is defined only by loudness, then quiet must be the only sonic solution; thus less sound becomes the noise fighters’ categorical imperative – a battle that, globally speaking, **they cannot win.**”*

(Chris Berdik in *Clamor*, 2025)