

## WHAT DO HOLIDAYMAKERS IN AN ALPINE VACATION REGION WANT TO HEAR?

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### Abstract

In its 2024 summer competition, the Tourist Organisation of the lower Engadin (TESSVM) asked holidaymakers about their favourite sound in this vacation region. It received 2,500 responses. Almost 500 of these included further details (e.g., the exact location) or a reason for the choice. The huge response made it interesting to conduct an in-depth evaluation with regard to the following questions:

- Which sounds were mentioned most frequently; are they exclusively natural or also technical; does the ranking correspond to other studies in urban or suburban or Alpine recreational areas?
- Do these sounds have common acoustic characteristics (level, spectrum, time evolution)?
- To what extent are they linked to a specific place, situation, or experience?
- What determines the choice of favourite sound: the sound itself or associations it evokes, or ...?

The most popular sounds are those of water, e.g., mountain streams or village fountains. These are followed by marmots. Birds come in third place, followed by cow bells and herd bells. When it comes to technical sounds, the iconic three-tone post bus horn comes out on top.

The most popular sounds are completely different acoustically. One of the conclusions is that for the sound perception in such a recreational context, it is not the sound itself that matters, but its source and the associations and emotions it evokes.

**Keywords:** *Alpine, Soundscape, Vacation, Holidays*

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### 1. Introduction

Tourism Engadin Scuol Samnaun Val Müstair AG (TESSVM) focused on the region's soundscape in its 2024 summer campaign.



**Figure 1.** Lower Engadin [Photo: TESSVM]

In the "Favourite Sounds" project, guests were asked to submit their personal favourite sounds. The number of submissions (2500) resulted in a data set that could be evaluated statistically with regard to the questions listed in the abstract.

### 2. Data material and data cleansing

After anonymisation (names and IP addresses were removed), the following data was available in Excel:

Date of entry; Mr/Mrs/Family/Other; town, country; Response text (text field, in original language).

However, no information on age was provided. Some of the answers consisted of one or more sounds (keywords), while about 20 % contained comprehensive descriptions of an acoustic situation or a reason for their choice. These additional texts sometimes had even a poetic quality.

Duplicate entries from the same location were deleted.

### 3. Data processing

The first step was to review the responses and code the sounds. In some cases, a full-text search in the response field was sufficient, while in others, manual work was required. For example, around 10 different terms were used for the popular marmot, sometimes written phonetically in accordance with the dialect and therefore inconsistently. The coding was carried out according Table 1 with the refinements mentioned in the legend. It was quite common for several sounds to be listed in one response, and this was allowed.

The participants were composed as follows:  
62.8% women, 34.3 % men, 2.6 % families, 0.2 % various.

In terms of nationality, Swiss citizens made up the vast majority (92.8 %), 136 responses (5.4 %) came from Germany and a few from other countries (AT, NL, IT).

96.9% chose German, 2.2% French and 0.9% English as their language. Italian was not offered.

### 4. Results

#### 4.1 Ranking of sounds

Although silence and tranquillity actually mean the absence of noise, they are treated here in the same way as the other entries and included in the ranking of the most popular noises or acoustic situations. This also applies to echoes, which are not sound sources in their own right, but make the reflection of the original sound, e.g. on a vertical, smooth rock face, audible separately.

The ranking (Table 2) reveals a strong preference for natural sounds. This top group is interrupted only by cowbells or herd bells, which can be considered as cultural sounds (discussed in 5.4).

In positions 10 to 14, human, natural and cultural sounds alternate.

In positions 16 to 19 and 21, these are followed by signals and (historical) mechanical sounds.

Table 2: Most popular sounds, sorted by number (N) and percentage of responses in which they appear.

| #   | %    | Sound (source) / situation                     | Cat  | N   |
|-----|------|------------------------------------------------|------|-----|
| 1.  | 24.7 | Water: rivers, waterfall, ... (geo)            | nat  | 621 |
| 2.  | 20.3 | Marmot whistles (bio)                          | nat  | 511 |
| 3.  | 11.9 | Birds (21 bird species) (bio)                  | nat  | 297 |
| 4.  | 11.8 | Cow bells, herd bells                          | cult | 296 |
| 5.  | 11.7 | Silence, tranquillity                          | ---  | 294 |
| 6.  | 7.9  | Wind in vegetation (trees <sup>+</sup> ) (geo) | nat  | 199 |
| 7.  | 3.1  | Crickets (56x), insects (23x) (bio)            | nat  | 78  |
| 8.  | 1.9  | Bellowing stags (bio)                          | nat  | 48  |
| 9.  | 1.4  | Overall soundscape                             | nat. | 37  |
| 10. | 1.3  | Footsteps (incl. in snow), skiing              | hum  | 33  |
| 11. | 1.3  | Language, human sounds                         | hum  | 32  |
| 12. | 1.0  | Inn (river in the main valley)                 | nat  | 25  |
| 13. | 1.0  | Consumption of food                            | hum  | 25  |
| 14. | 0.8  | Church bells                                   | cult | 19  |
| 15. | 0.5  | Music                                          | ---  | 13  |
| 16. | 0.5  | Postbus (Postauto) triad                       | sig  | 12  |
| 17. | 0.4  | RhB Rhätische Bahn (railway)                   | tec  | 11  |
| 18. | 0.4  | Tessanda looms (Val Müstair)                   | old  | 11  |
| 19. | 0.4  | Alphorn                                        | cult | 10  |
| 20. | 0.4  | Fire, fireplace                                | nat  | 9   |
| 21. | 0.2  | Cable car, chairlift                           | tec  | 4   |
| 22. | 0.1  | Echo                                           | nat  | 3   |

Table 1: Classification of sounds

|                       | Sounds in the alpine soundscape, classification based on soundscape ecology |                    |                      |                         |                      |             |                   |               |                     |                                      |                        |              |              |                    |              |                       |              |         |                   |          |            |                |
|-----------------------|-----------------------------------------------------------------------------|--------------------|----------------------|-------------------------|----------------------|-------------|-------------------|---------------|---------------------|--------------------------------------|------------------------|--------------|--------------|--------------------|--------------|-----------------------|--------------|---------|-------------------|----------|------------|----------------|
| Category <sup>1</sup> | –                                                                           | geophony           |                      | biophony                |                      |             | anthropo.         | technophony   |                     |                                      |                        |              |              |                    |              |                       | Signal [sig] |         |                   |          |            |                |
|                       | –                                                                           | natural [nat]      |                      |                         | human [hum]          |             | "cultural" [cult] |               | pre-indust. [old]   | industrial/technical (current) [tec] |                        |              |              |                    |              |                       |              |         |                   |          |            |                |
|                       | –                                                                           | Elements           |                      | Animals                 |                      |             | People            |               | Bells               | Inst.                                | Historic               | Machines     |              | Means of transport |              |                       |              |         |                   |          |            |                |
| Sounds / Sources      | Silence                                                                     | Echo, thunderstorm | Wind (in vegetation) | Water <sup>2</sup> Fire | Birds <sup>(3)</sup> | Stags, deer | Marmots           | Animal sounds | Voices, Language(s) | Footsteps, movement                  | Bells (cow/herd bells) | Church bells | Alphorn etc. | Water wheel        | Looms, other | Agricultural/forestry | Other        | Railway | Cars, motorcycles | Aircraft | Cable cars | Post bus triad |

<sup>1</sup> Anthropophonic sounds are often summarised as those made by humans and machines. Here, however, a distinction is made between sounds or noises caused by humans themselves (anthropophonic) and those caused by engines, machines, devices, etc. (technophonic sounds).

<sup>2</sup> Further breakdown of water sounds: stream / waterfall / river /

<sup>3</sup> supplemented by crickets and insects, as these are also frequently mentioned

## 4.2 Differences between women and men

A breakdown was made according to women and men. It showed that the percentages of the different sounds generally do not differ much from each other, but with two exceptions: The bellowing of stags appeals more to men than to women (2.3% to 1.7% of responses), and the chirping of crickets is mentioned more frequently in women's responses than in men's (3.5% to 2.3%). The latter may also be influenced by the fact that high-frequency hearing loss is more pronounced in older men than in women. While older women can still hear the chirping clearly, older men ask, "What crickets?" Otherwise, however, no distinction needs to be made between women and men.

## 5. Discussion of most popular sounds

Is the popularity of the sounds related to their sound characteristics? The acoustic characteristics (sound level, spectrum, spectrogram if applicable) of the sounds that were mentioned more than 10 times are briefly described. Original quotes from the responses (*in italics*) are intended to help identify what lies behind the preference for a certain sound.

### 5.1 Water: streams, rivers, waterfalls, waves

Acoustically, water sounds are usually a modulated broadband noise, with a time structure when splashing. Water sounds almost always evoke positive feelings, because water is essential to life: water is and sounds invigorating: *"I love the sound of splashing water. Whether it's from a stream, waterfall or river. Water and its sound have a calming effect on me and help me relax from everyday life. That's why I prefer to spend as much of my free time as possible near water, in a variety of ways."*



**Figure 2.** Mountain stream [Photo: Doris Hohmann]

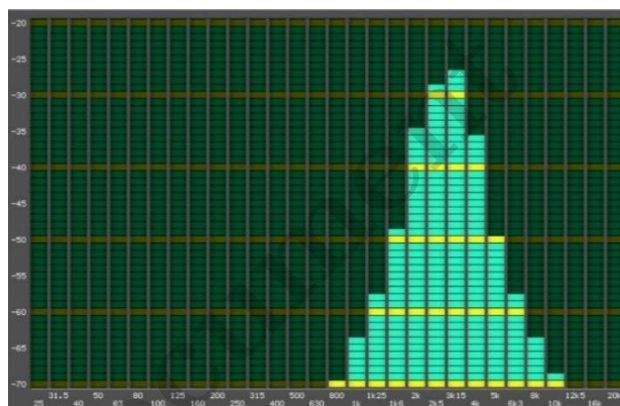
The high popularity of natural water sounds (but not those of channelled watercourses, whose hollow sound is less attractive due to strong resonances) has been found in many studies, e.g. [1] and [5], and most recently for protected natural areas in [7].

### 5.2 Whistling of marmots

The warning whistle of the (Alpine) marmot (*Marmota marmota*) is a high-pitched sound with a slightly different frequency depending on the region

(Figure 3), short and with longer pauses. Danger from the air is indicated by a single whistle, while terrestrial danger is indicated by several short whistles. As a mountaineer, you often hear marmots before you see them. This makes the whistle particularly interesting (although such a sharp alarm signal would be perceived negatively in other contexts).

As marmots only find suitable habitats in the high alpine regions of the Alps, their whistle is a soundmark of the landscape there: *"... because it is so unique to the Grisons region..."*



**Figure 3.** Marmot whistles, frequency analysis.

[Analysis: Beat Hohmann]

Thanks to the warning whistle, the other animals in the colony can get to safety in time. This social behaviour is well known among tourists and makes marmots likeable. As popular figures, they also often appear in tourism marketing.

### 5.3 Birds

We treat birds as a group here, but many competition entries are more differentiated and name a total of 21 bird species, namely swallows, buzzards, capercaillie, alpine chough, eagle, ptarmigan, spotted nutcracker, golden eagle, cuckoo, great spotted woodpecker, coal tit, black woodpecker, red kite, blackbird, great tit, blackbird, birds of prey, bearded vulture, eagle owl, magpie, song thrush and tawny owl. The various birds produce different sounds, but always in the higher frequency range (due to their body size and for acoustic efficiency). Some can be annoying (e.g. corvids with their cawing), while others delight with melodious songs, even in duets (e.g. blackbirds).

It is therefore not surprising that birds appear in third place here, as they are regarded as an indicator of a more or less intact environment. Some people have also witnessed the successful reintroduction of individual species and observe and listen to them with particular interest (e.g. bearded vulture). In peri-urban recreational areas in the lowlands, where there are no marmots, birds occupy second place in the ranking [1]. Recent studies have shown that an audible diversity of birds has a particularly positive effect on people [2].

#### 5.4 Cow bells, herd bells

Bells have been made by humans since time immemorial and are pre-technical sound sources that produce harmonious sounds with certain distortions, at least when tuned to a certain pitch. Since the sounds of the bells are triggered by the movements of the individual animals, they follow a typical random pattern.

*"This sound is not just a sound – it is a feeling of home, of freedom and of deep connection with the environment... It is a unique concert that can only be heard here – a piece of harmony that I want to share with the world."*

In addition, many people from the lowlands associate the sound of bells (individual responses express this explicitly) with the idea of contented cows, sheep or goats grazing in the Alps in summer – summer holidays for farm animals.

#### 5.5 Silence, tranquillity

The first acoustic impression in the mountains is often tranquillity. But this is not silence, because the natural sounds together reach a sound level of more than 30 dBA. *"Tranquillity does not mean the absence of sound. An environment is peaceful when the background noise is harmonious and there are no sources of disturbance such as aircraft or road noise."* (Kurt Eggenchwiler).

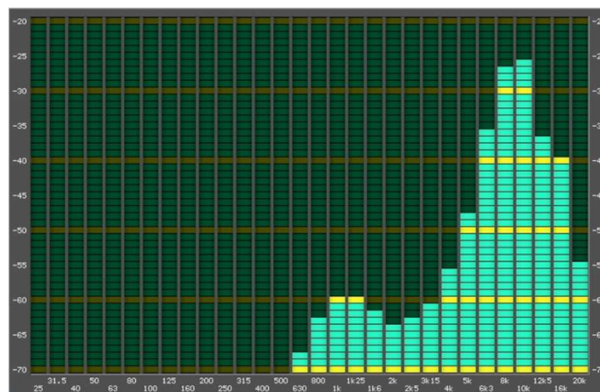
#### 5.6 Wind in vegetation

Although only faintly audible in normal weather conditions and sometimes inaudible in noisy environments, the rustling or whistling of the wind in forests and meadows ranks sixth here, and even third in the comparative study in the lowlands [1], where marmots and herd bells are not found. Wind brings vegetation to life and allows it to be experienced acoustically. One response was *"The rustling of the grasses when the wind makes them dance"*, another *"The rustling of the larch forests is unique to me, it makes me feel free and secure in one ..."*. Acoustically speaking, it is a slightly modulated broadband noise: a pleasant sound, as long as it is not so strong that it arouses fears of an approaching storm.

#### 5.7 Crickets and insects

The chirping of crickets is in the high-frequency range above 5 kHz, with overtones (the sound is produced by beating or rubbing the wings) extending beyond the human hearing range (Figure 4). Depending on individual hearing ability in the high-frequency range, where age-related hearing loss first becomes apparent and is most pronounced, it is perceived differently or not at all. Men are more affected by this impairment than women (difference typically 17 dB at 8 kHz at the age of 65) – a possible explanation for the relatively more frequent mention in women's responses mentioned above.

The chirping of crickets evokes associations with a sunny or even nocturnal meadow. Crickets have become an integral part of film sound as a symbol of a summer night.

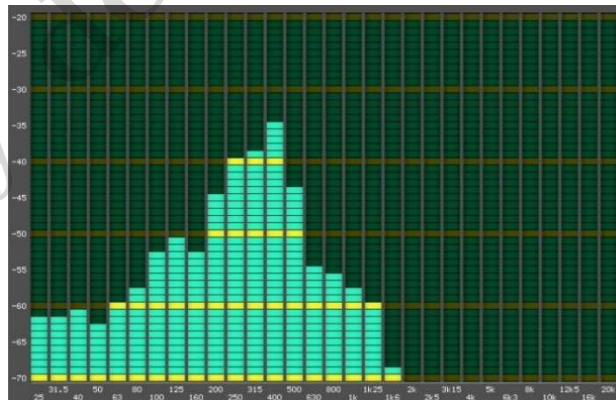


**Figure 4.** Chirping of crickets: frequency spectrum.  
[Analysis: Beat Hohmann]

Less than half as often, the buzzing of insects is mentioned, e.g. *"the buzzing of mountain bees and bumblebees on the wildflowers"* or *"... in a mountain summer meadow"*. Here, the emphasis is on the interaction between fauna and flora, not on the sound itself.

#### 5.8 Bellowing stags

The bellowing of red deer in autumn is an important soundmark of the national park region. It can be heard, for example, in Val Mingèr near S-charl, which is explicitly mentioned in several responses.



**Figure 5.** Roaring deer: frequency spectrum.  
[Analysis: Beat Hohmann]

As already mentioned, it appears relatively more often in the responses from men than in those from women. The frequency analysis of deer bellowing (Figure 5) shows a low to mid-range spectrum (maximum around 400 Hz) with harmonics up to slightly above 1 kHz. This means that (unlike with crickets) the frequency spectrum is not a plausible explanation for the difference in popularity between the sexes.

The comments provided do not shed any light on men's particular affinity for deer bellowing. However, the sound is not dissimilar to that of tuned "sports" cars, which also appeared sporadically in the responses. A recording of roaring stags in Val Mingèr is to be heard on SGA-SSA's map of 3D-recordings [3].

## 5.9 Overall soundscape

The soundscape as a whole is mentioned in 37 responses, e.g. *"The sound of nature. There is nothing more beautiful!"* Whereas individual sound sources are usually in the foreground, here it is about holistic hearing. One of the responses even refers to an orchestra of natural sounds: *"Le son de la nature pure"* and another adds to the effect: *"All of this is calming and relaxing for me and balm for my soul."*

## 5.10 Footsteps, skiing sounds

Hearing yourself – which is not a given in a noisy city – is one of the important qualities of a relaxing soundscape [4]. This applies not only to speech, but also to your own footsteps (28 mentions), which always provide information about the ground you are walking on, e.g.: *"The rustling of autumn leaves under my feet while hiking."* This group of sounds includes those made by other means of transportation, especially skis (5x): *"the creaking of snow under cross-country skis."*

## 5.11 Language, human sounds

Verbal communication is one of the most important aspects of living together. Half of these responses explicitly referred to the local language: *"Conversations with/by locals in their wonderful dialect. That's how I know I've arrived in the Engadin."* In fact, various studies have shown that Romansh and the Grisons dialect enjoy the highest levels of sympathy in Switzerland.

## 5.12 River Inn

25 mentions were made of the River Inn, the main river in the Engadin. On the riverbank, it reaches approx. 65 dBA. Because it is a line source, the sound level decreases with only 3 dB per doubling of distance and is heard also from a distance. In one response, however, the associations go far beyond the sound of flowing water: *"At night, with the window open, I hear the Inn rushing deeply and mysteriously, and as I fall asleep, I accompany it in my thoughts to Passau, to the Danube and with it to the Black Sea."*

## 5.13 Consumption of food

For some participants, their stomachs are closer than their ears when it comes to enjoyment in the Engadin. They mentioned, for example, the *"sound of wine glasses clinking on the sun terrace"*, the popping *"when opening the (local) Calanda beer"* or the bubbling when making coffee.

## 5.14 Church bells

Church bells, like cowbells, are man-made and therefore considered technical noises, but they can be regarded as cultural sounds, even more as they often have a special meaning: the call to prayer or to attend church. Responses to this question range from specific village churches, e.g. Lü (Val Müstair, audio recording on [5]), to special church bells such as the *"small, hand-rung bell of Claustra Son Jon in Müstair"* to the harmony of three church bells heard from a viewpoint high above the valley: *"Since 'Mot San Peder' at noon, the bells of*

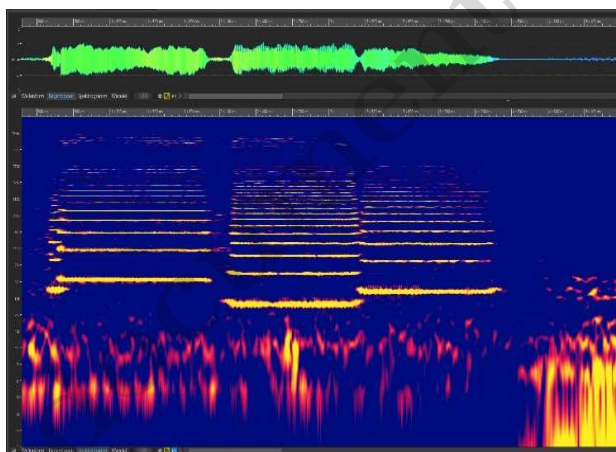
*the churches of Sent, Scuol and Ftan are ringing in unison."* Hear the simulation on [3].

## 5.15 Music

Music is mentioned thirteen times as a favourite sound. However, some answers are out of scope in this context because they are not linked to the region.

## 5.16 Postbus triad horn

In Switzerland, the C sharp-E-A sequence (from Rossini's overture to William Tell) has been standardised as the post bus (Postauto) triad since 1924 for defined mountain post routes and is only permitted there. Children often sing the sequence onomatopoeically as "Dü-Da-Do" (Figure 6).



**Figure 6.** Spectrogram of the Postbus triad: 5 seconds, with the hum of the diesel engine, first idling, then accelerating (from 80 to 100 Hz, bottom).

[Analysis: Beat Hohmann]

Guests from abroad have far-reaching associations with it: *"It reminds me of exciting mountain roads, the great alpine landscape and the fact that almost every place in Switzerland can be reached by public transport!"*

For many decades, this musical signal has become an iconic sound or soundmark of the Swiss mountains.

## 5.17 RhB – Rhaetian Railway

Very different sounds are produced by the Rhaetian Railway (narrow gauge), from the ringing of old-fashioned bells at stations to the sound of trains travelling through snow on the spectacular Bernina route in winter to the whistle or horn of the locomotives. The acoustics of the RhB also attract the attention of holidaymakers, and in a thoroughly positive way.

## 5.18 Tessanda hand looms

The Tessanda (Romansh for "weaving mill") is a hand weaving mill in Santa Maria in Val Müstair. It has been in existence since 1928. The rhythm of the historic hand looms (Figure 7) remains in the ears and memories of visitors, and the knowledge of their economic importance also resonates: *"The sound of the looms is so unique and important for Val Müstair."*

Hear the recording of different hand looms on [3].



**Figure 7.** Hand loom at the Tessanda weaving mill  
[Photo: Manufactura Tessanda Val Müstair Foundation]

Figure 8 shows its distinctive rhythmic structure.



**Figure 8.** Spectrogram of a hand loom (22-second time segment) [Analysis: Beat Hohmann]

The sound level at the weaver's workplace may exceed 85 dBA, requiring hearing protection during prolonged exposure. In any case, this is proof that unusual old technical sounds can also be appealing.

## 6. Conclusions on sound perception

The sounds and noises frequently mentioned in the competition have completely different acoustic characteristics (level, spectrum, time structure), and the comments hardly ever mention a pleasant or harmonious or rhythmically interesting (exception: hand looms) sound in the musical sense. The acoustic characteristics of the noise are therefore hardly relevant to the subjective evaluation. Acoustic analyses or the determination of so-called psychoacoustic parameters such as sharpness or roughness are of little use, because what counts is the source that produces the sound [5]. Both the quantitative evaluation (rank order) and the qualitative analysis of the additional comments indicate that associations, emotions and memories associated with a noise are the decisive factors, as is explained in [5].

Overall, it can be said that in this situation – where people are seeking joy, rest and relaxation – the preference is, as expected, for natural sounds (this is

also confirmed in many soundscape studies, e.g. [6]). The top position of water sounds of all kinds, from waterfalls to village wells and fountains is no surprise as water sounds evoke so many positive associations. Seeing a marmot in the wild is a highlight for every mountain hiker. In many cases, this is preceded by hearing the typical whistle, which, thanks to its narrow spectrum in the high-frequency range, can be heard from a long distance even with considerable background noise from wind or water. However, the marmots' second place ranking may also reflect the fact that Alpine tourism advertising likes to portray them as popular figures because they are a unique selling point compared to holiday destinations at lower altitudes.

The significant gap in the ranking between cow or herd bells (4.) and church bells (14.) is noteworthy. Both bell sounds are (indirectly) man-made, and as cultural sounds are deeply rooted in us. However, the (temporally and spectrally) random ringing of herd bells seems to be much more appealing than the strictly structured ringing of church bells. Moreover, the widely distributed ringing of herd bells makes the vastness of the landscape acoustically tangible. Composers also make use of the special emotional value of cattle bells, e.g. Gustav Mahler in his 6<sup>th</sup> and 7<sup>th</sup> symphony.

The Postauto triad is popular as it is a well-known soundmark of the Swiss mountains.

But unique (historical) technical sounds also attract attention and remain in the memory. A fine example of this is the clatter of the Tessanda hand looms or the old waterwheel at the nearby mill.

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