

## **Mapping and Digitizing Sarawak Bioacoustic for Soundscape Composition - The Bako National Park Project**

*Pemetaan dan Pendigitalan Rakaman Maklumat Bioakustik di Sarawak bagi Tujuan Penghasilan Komposisi Soundscape - Projek Taman Negara Bako*

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### **Abstract**

The entirety of sounds that can be heard at any particular time and place is referred to as the soundscape. Similar to how a landscape presents itself visually, one way to think of a soundscape is as the way the listener's surroundings show themselves through sound. Terminology such as sound ecology, bioacoustics, electroacoustic music and musical composition of sound art is something that is still a novel concept in Malaysia. In Malaysia, the genre of soundscape composition is relatively new. This research is conducted and mainly inspired by the World Soundscape Project by R. Murray Schafer. The World Soundscape Project is to foster awareness of sounds and to promote the importance of soundscape and nature. Hence, this concept was applied in this research in text by conducting soundscape research in Bako National Park, Sarawak. The purpose of this research was to record the acoustic environment as a case study of soundscape composition which leads to composing a musical piece of soundscape composition in the perspective of recognizable environmental sounds. Soundwalk methods was applied in this research to create documentation on database of sounds recorded of bioacoustics and soundscape environment in Bako National Park. Purposive sampling technique and focus group discussion were applied in this research whereas groups of students were selected to evaluate their appreciation of composed soundscape. In conclusion, this research shows that soundscape compositions can improve ecological awareness, build a sense of connection, and promote the value of taking care of the environment through thorough listening and thought.

*Keywords:* soundscape, soundscape composition

## **Introduction**

The study begins with a question about the importance of sounds around us. Without realizing it, one may not realize how important the sounds heard around them are. This is stated by researchers and activists who associate soundscape and the surrounding environment as a guide and reference to the sustainability of biodiversity (Krause, 2008), (Mitchell et.al, 2023). The study of soundscape was mainly inspired from a project that was led by R Murray Schafer in the 70s at Simon Fraser University (Truax, 2008). The project was known as the World Soundscape Project (WSP). To describe this project, the term “acoustic ecology” or also known as ‘soundscape’ was always used to described and associated to R Murray Schafer by many scholars in the field of soundscape.

The objective of the World Soundscape Project was briefly noted by Hildegard Westerkamp in the first edition of *The Soundscape Newsletter* published, in 1991, which was to create awareness on the importance of maintaining ‘acoustic balance’ within our environment and how its quality could be improved.

Soundscape, according to Ouzounian (2017), is the practice of recording sounds of our natural environment, and the result of the recording becomes what he described as a portfolio of ‘acoustic facts’. These ‘acoustic facts’ are then used as a reference or as a comparison through hearing to evaluate the sustainability of biodiversity as well as the ‘acoustic facts’ contained in it.

From the discussion by Westerkamp (1991) and Ouzounian (2017), it can be concluded that the sound density found around us, can give an indication the sustainability of our biodiversity and represent the state of our surroundings and this can be assessed through the sense of hearing with or without the sense of sight.

Earlier discussions by Westerkamp (1991) and Ouzounian (2017) as well as the soundscape project led by R. Murray Schafer and his companions have inspired the idea of how a project such as the World Soundscape Project can be adapted and applied in the Malaysian context. Based on the experience of Schafer, Truax and their companions, the researchers plan to adapt and improvise the project approach that they have established in the context of Sarawak, Malaysia with Bako National Park as the location for the case study.

In this research, the objectives were to: (1) record the acoustic environment with Bako National Park as the location of the case study; (2) compose a musical piece of soundscape composition from the perspective of a recognizable environment; and (3) evaluate acceptance and appreciation of the composed soundscape composition.

The approach of this research is to record sounds of the environment, sounds of animals as well as insects, with Bako National Park as the location for field recording. The research continues by identifying the location where the sounds are recorded and “soundwalking” approach was used. A database on the details of recorded sounds as well as their locations and classification of sounds were established and available online for the public to access. The sound recorded in the database were then used as a source for soundscape composition with the aim of raising ecological awareness among the listeners.

## **Background**

The Bako National Park Project begins with a question about the importance of sounds around us. Sounds play an important role in our lives and can be an important source of indicators for assessing the state of our environment. It should be emphasized here that this research is implemented and refers to the context in Malaysia, specifically at the Bako National Park in Sarawak.

Compared to western countries in Malaysia context, 21st century music genres such as twelve-tone techniques and avant-garde, apart from those categorized as "popular music", were considered as "experimental" music among those who did not receive formal education in the discipline of music.

The challenge here is how these "experimental" music genres can be presented, particularly to listeners in Malaysia. Soundscape composition is not a genre that is often heard or performed in Malaysia. Therefore, when this study was conducted, the research faced challenges in explaining such works, including those who were considered musically trained. Compared to other public universities in Malaysia, Universiti Malaysia Sarawak (UNIMAS) is the only university that offers courses related to electroacoustic music. The course with the code GKM2343 Electroacoustic Music has been offered since 2005 in UNIMAS. It exposes students to electroacoustic music and covers the appreciation and composition of electroacoustic music.

In discussing "soundscape composition as global music", Truax (2008) outlines several approaches. He relates soundscape composition to knowledge related to "acoustic communication" and regards it as "interdisciplinary". He also outlined aspects of performance through various channels, like "multichannel diffusion" and "granular time-stretching" sound processing techniques. He regards these as a form of methodology for producing a musical work produced from environmental sound recordings or "environmental sound". Truax (2008) also outlined the principle practices of soundscape composition. Those principles outlined are maintaining the recognizability of the source materials, perceiving the environmental and psychological context of the materials, composer's influence on the environmental and psychological context through the creative works. He also suggested the objective of soundscape composition as "the reintegration of the listener with the environment in a balanced ecological relationship".

This study aims to record acoustic environment by choosing Bako National Park as the location for a case study of soundscape composition, experimenting with new ways of making music through soundscape composition and compose a musical piece of soundscape composition from the perspective of recognizable environmental sounds and context.

## **Literature Review**

The word 'soundscape' has many definitions based on different scholars. The term 'soundscape ecology', Truax (1999)<sup>1</sup> through the online version of Handbook for

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<sup>1</sup> Online version of Handbook for Acoustic Ecology, Barry Truax Ed (1999). Published earlier by the World Soundscape Project, Simon Fraser University, and ARC Publications (1978) and was retrieved from

Acoustic Ecology as “.....study the effects of the acoustic environment, or soundscape, on the physical responses or behavioral of those living within it” or also known as ‘acoustic ecology’. The term, 'acoustic ecology', according to Truax (2021), was agreed to be used collectively by the delegates who participated in the Tuning of the World Conference in 1992 held in Banff, Alberta, and subsequently the formation of the World Forum of Acoustic Ecology (WFAE) (Truax, 2021).

In many discussions and explanations by Schafer (1994), especially through the text entitled "Our Sonic Environment and the Soundscape: The Tuning of the World", he outlined various aspects of sound in the environment where we live. Schafer has also placed aspects of the context in which sound is audible and finally leads to a relation between sound and the context in which it is heard through its functions and how it is ecologically related. Schafer's approach eventually led to associating sound as a measure of the relationship between humans and nature as well as sensitivity to environmental sounds and "acoustic design". (Schafer, 1994; Truax, 2008; Truax, 2012).

Soundscape recording is used as a technique to capture sounds from our surroundings and can be a portfolio of “acoustic facts” and reflect our “...acoustic environment at a given moment in time”, as mentioned by Ouzounian (2017). Before elaborate this further, Ouzounian earlier defines acoustic ecology as the “convergence between philosophical inquiry, sound art, and sound studies is in the field of acoustic ecology.....”, a concept most commonly used to characterize an environmental approach to “acoustic environments”. He offers an example of critical listening to “sounds of a place” and further elaboration from R. Murray Schafer’s works as well as other scholars in the field on studying how our environment is acoustically affected by the change in the environment, noise pollution, and use soundscape such as the density of “biophonic” and “geophonic” sounds as a measurement of our environment.

Pijanowski et al. (2011) introduce soundscape ecology as an "...emerging new science". He revealed that the terminology “soundscape” was first used by Southworth (1969). Based on Pijanowski et al., Southworth uses the term “soundscape” to refer to the value or acoustic conditions found in the city that help those who inhabit the urban area and associate it with a particular space. Pijanowski et al. gave an example of a test conducted by Southworth, in which he tested how visually impaired people use sound as a medium to associate the identity of a space or area. Truax (2021) in a tribute to Schafer, noted that the term “soundscape” was not a new term in the 1960s, and that Schafer had developed a more flexible use of the term as what we recognize now.

There are various references made by Pijanowski et al. (2011) when he discussed the definition of “soundscape ecology”, and he referred to scholars such as Schafer (1994), Truax (1999) and Coates (2005). Referring to the editorial notes by Ouzounian (2017), through Rethinking Acoustic Ecology: Sound Art and Environment, he describes "Acoustic Ecology" as a convergence between ".... philosophical inquiry, sound art, and sound studies.....". Ouzounian further elaborated on acoustic ecology, as focusing on "..... sounds of a place". This notion

was further described by Ouzounian as hearing a sound and visualizing it. R. Murray Schafer, who pioneered the World Soundscape Project together with his colleagues, as reviewed by Ouzounian, focused on how the acoustic environment is affected by environmental change, and the impact of sound on nature.

These describes the notion of “healthiness” of a soundscape, according to Ouzounian (2017), acoustic ecology activists have the objective to maintain and use this method as an approach for the purpose of conserving the acoustic environment. Among the measurement parameters used as described by Ouzounian are, density and diversity of sounds produced by biological organisms or "biophonic" and sounds derived from geological processes or "geophonic".

According to Schoeman et al. (2022), the current soundscape may change significantly from those a few hundred years ago and this is very concerning because a natural soundscape has an ecological value. Soundscape recordings not only benefit scientists, but they also attract people's interest in learning more about the value of ecosystems and their preservation, leading to conservation activities.

Through soundscapes, it reveals much more information about an environment at the given time as described by Ouzounian (2017) earlier. This is because a soundscape can be seen visually through a spectrogram and reflect the density and diversity of a place. Based on these variables, researchers such as R. Murray Schafer (1994) used the density of an area or location where he makes recordings as a medium or "tool" to assess the health of an area or location by using the richness of sound found in the location as an assessment, and his most significant project in translating this aspiration was through the World Soundscape Project (WSP).

Going beyond the "..... to conserve acoustic environments...." approach expressed by Ouzounian (2017), Licht (2009), earlier than that, articulated the concept of sound as the art of musical composition. In discussing this, Licht drew attention to the World Soundscape Project and described the "soundscape composition" method as a sub-genre of "musique concrète," pioneered by composers such as Pierre Schaeffer, Pierre Henry, and others, while, the soundscape composition was by R. Murray Schafer, Hildegard Westerkamp, and Barry Truax. Licht also highlighted how the soundscape composition was used as a medium of creative expression through sound and nature, delivered in the form of a musical composition.

According to Truax (2012) his soundscape composition approach employed in creative exploration, utilizing sounds from nature through storytelling. According to Truax (2012), when creating a work in the form of a soundscape composition, composers make sound recordings in the field, and later the recording is processed electronically. However, according to Licht (2009), in soundscape composition, the recorded sound is presented in the form of “real sounds” and “recognisable” sounds as to how and where it was.

In this research, the researcher's intention is to compose a soundscape composition by including the bioacoustic recordings as well as a source of materials from this study. Utilizing the sounds of nature and the biodiversity of Bako National Park, the researcher aims to create immersive audio experiences that can evoke a sense of location along with ecological awareness.

## **Methodology**

This research intends to explore the findings of bioacoustic scientific data and translate this scientific information into creative works. The researcher employed the “soundwalk” methods for the purpose of recording the sounds as a material for the soundscape composition.

Researchers take the approach of using the existing visitors’ trail as a basis for using this method. As the researchers begin walking along the selected trails, researchers have to be attentive to their surroundings, paying great attention to the sounds encountered along the trail during the soundwalk.

The researcher records the sound found and wrote notes on the species of animals or insects heard. The identification was done with the help of the accompanying park ranger, who also specializes in identifying the sounds produced by insects or animals in Bako National Park. However, there are also challenges when researchers try to identify the type of insect or animal. This is because some of the sounds heard are further away than the expected reach of the researcher. Nevertheless, efforts have been made so that each sound can be identified by the researcher with the help of the park ranger.

The researchers used the Parabolic System Microphone with the parabolic reflector to get high-quality sounds and Global Positioning System (GPS) to mark the locations of the sounds found.

In the context of soundscape composition, researchers used what are known as “Soundwalking” methods. It is a practice introduced by R. Murray Schafer, when he established the World Soundscape Project at Simon Fraser University in the late 1960s and early 1970s (Adams et.al, 2008). It is an empirical method for identifying the soundscape and components of a soundscape in various locations. Researchers and composers of soundscape pieces have utilized the concept of soundwalking to enable them to conduct studies within their environment. It has been interpreted as a method that allows the researcher to immerse themselves in their sounds and surroundings.

Sound walking according to Paquette and McCartney (2012), arose from a fascination with the “..... immediacy and the adaptability of walking in the setting of qualitative research” methods. To comprehend the soundwalk and its evolution, Paquette and McCartney suggested that we must first comprehend the activity of walking, which is an essential part of observing our surroundings, through “walk and listen”. This method was considered. In order for this study to be effective, researchers first need to identify the area that would be used as a focal point for sound walking. Since this sound walking method has been chosen by the researchers, the recording of sounds as artifacts is based on the route tracks that are often used by tourists. Those tracks are, Telok Pandan Kechil trail, Telok Pandan Besar trail, Lintang trail, Paku trail, Tanjung Rhu, Telok Tajor, and around the Head Quarters area (Figure 1).

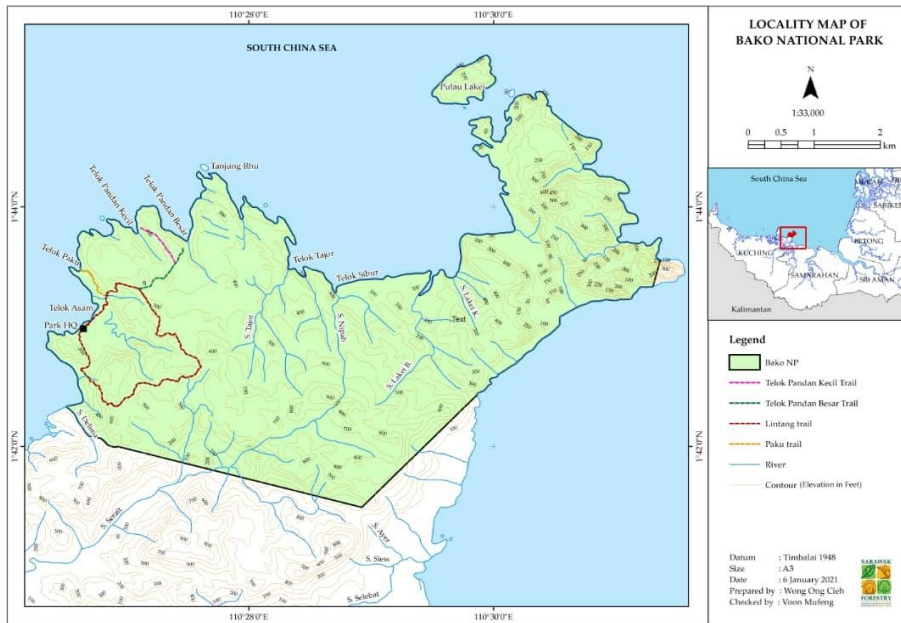


Figure 1. Locations and areas covered for the research conducted at Bako National Park, Sarawak, East Malaysia (Bako National Park, map dated 6 January 2021 from Sarawak Forestry Department)

The researcher used a set of parabolic reflector microphone systems for the purpose of field recording (Figure 2).



Figure 2. Parabolic Microphone System along with Parabolic Reflector used by the researcher and was described by Wahlström (1985).

This approach was considered and was introduced by Wahlström (1985). He has described the use of parabolic reflectors for the purpose of achieving quality of 'stereophonic' recordings. According to him, the parabolic reflector serves to center the sound "geometrically". Based on Wahlström, the use of parabolic reflectors was known as early as the 1930s, referring to the writings by Olson and Wolff (1930) and Hanson (1931). According to him, it was specifically used to record the sounds of wildlife. According to Wahlström, the use of the parabolic system will enhance the recorded sound. He mentioned that since all the sounds of wildlife are comparatively loud, the use of this device will enhance and amplify the sound of wildlife without affecting the quality of the recordings, especially if there is electronic noise, caused by increased input volume on the recorder. He also stated that the use of the parabolic reflector will also enable the sound recorder to control peaked or distorted sounds by adjusting the position of the parabolic reflector. Finally, Wahlström suggested that the use of parabolic reflector will enable focusing on specific sound.

A parabolic microphone has great sensitivity to sound in one direction at reasonable distant sounds. This is to ensure the high quality of sound recorded for this research. The parabolic reflector, which appeared like a concave dish, is the system's main feature. It is made up of a curved surface that reflects sound waves towards a specified location called the focal point (Wahlström, 1985). The parabolic reflector functions as a collector, gathering and guiding sound waves across a wide region towards the microphone. This makes it easier for the researcher in situations where the sound source is a long distance away at Bako National Park

The main recorder used by the researcher was the Marantz PMD670 recorder with the parabolic microphone system and TASCAM DR-40 with its built-in microphones, as a backup recording device to record sound. The TASCAM DR-40 includes a pair of high-quality built-in, stereo condenser microphones. These microphones are positioned by default, in an "XY" arrangement for the purpose of recording a wide stereo image. In both cases, the recording must be recorded using the basic principles of audio recording.

The type of microphone used is an omnidirectional microphone and is used in conjunction with a 'dish' which is shaped like a 'satellite dish'. This equipment is used because it is capable of centralizing all the recorded sound recordings. All recordings are stored digitally using an SD card.

In this study, a total of five trips were made to Bako National Park and each trip consisted of two to three days staying to do the recording. The first trips were made on 4th March 2019, second trip was on 14th April 2019, third trip was on 10th July 2019, fourth trip on 26th September 2019 and the last trip was on 16th October 2019. From the main city of Kuching, it took around 40 minutes to drive to Bako National Park's jetty. From the entry point, the journey continued by boat, and it took around 30 minutes to reach Bako National Park headquarters.

The researcher started recording the sounds from starting from 6 p.m. until 2 a.m. Early discussion with the park warden has suggested that animals are active during or after dusk as well as at night in the park. It was also mentioned by the park warden that, other than the insect sounds, the area is also known for various types of frog sounds. Frogs are known to be nocturnal, and therefore they are more active after



dusk. It was suggested that late evening between 6.30 p.m. to midnight is the best time to record the frog's 'calling' sounds.

### **Composing Soundscape**

Once the recording is done, the next process is the editing process, which is done in the studio. For the purpose of editing, the researcher used Logic Pro software. The editing process is done without involving any use of plugins sound effects, delay or filtering. This is because the researcher aims to maintain the quality of the recording source as it was recorded. This means that throughout the recording process, the researcher strives to obtain the best possible quality at the initial stage. This involves executing the recordings and at the same time monitoring the quality of the recordings as they progress. Full attention was given to the quality of the recorded material through listening, which requires a long recording session. Focus is also given to the depth of the stereo during recording.

As mentioned earlier, the method starts with *soundwalking*, followed by recording the sounds that have been identified. This is followed by a general identification of the type of animal or insect emitted by the sound heard, followed by searching for the animal, insect, or bird that emitted the sound by searching them around the location of the identified sound source. This process also involves the use of video recorders and cameras and taking pictures of animals, insects, or birds whenever possible.

The next phase would be composing the soundscape composition. The researcher went through the listening process of each sound recorded and selected the most compelling and relevant sounds that aligned with the researcher's concept and artistic vision. The researcher used Adobe Audition software to enhance the aesthetic qualities of the sounds as well as removing any unwanted noise during the recording, enhance the level of volume and details of recorded sounds. It is important to maintain the sound in its original source in terms of its quality and not manipulate or change it into another processed sound.

The next steps after the processing will be the "arranging and composition processes". The researcher arranged the processed and edited sounds into a composition by exploring different ways of organizing and layering the sounds to create a sense of depth, space, and gestural information.

The researcher arranged the sounds by exploring the interactions between different sounds of animals, insects, and the ambiance sounds of their surroundings to create contrast and a harmonious relationship between the sounds. Lastly, the researcher went through the process of mixing and mastering the final work of the composition. The process of balancing the levels of sounds, panning, and spatial placement of the sounds was made to ensure the individual sounds blend well and contributed to the overall sonic impression of the composition. The final audio and composition were then saved as ".wav file" format.

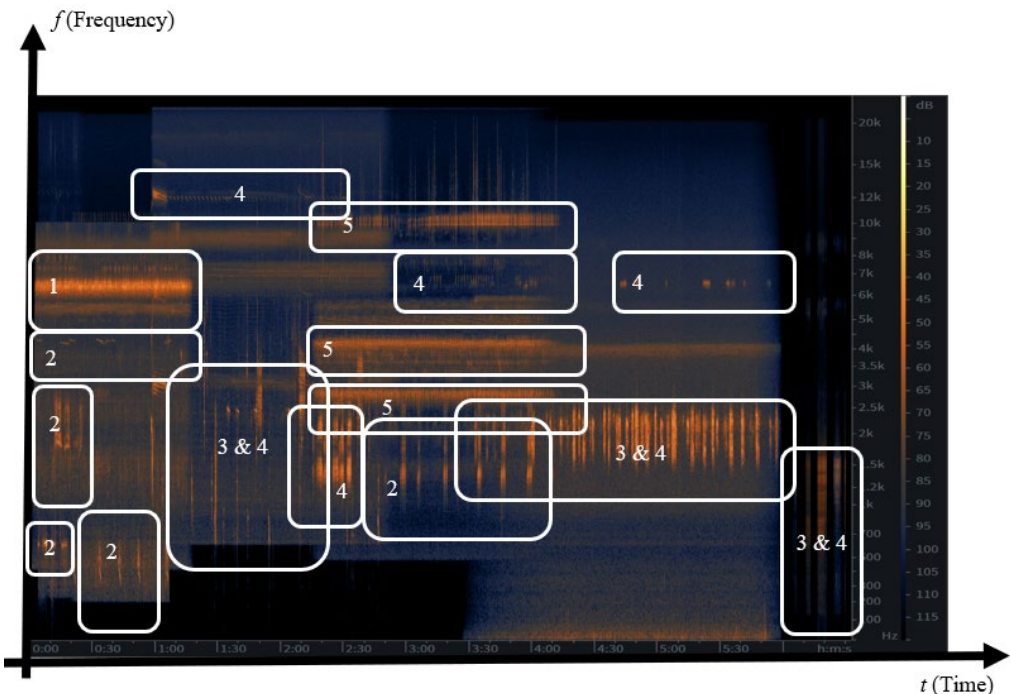
The composition resulted in three conceptual approaches, which are its ecology, biophony, and stereo depth. The soundscape ecology is regarded as the main feature or highlight in this composition, because it provides an overview of the diversity of sounds representing Bako National Park. It is a unique form of sound

representation because every sound and environment are unique to a particular place or its location.

In the composed piece, the researcher tried to portray communications that took place between animals and insects found in Bako National Park and resulted from sound recordings made by the researcher. In establishing the sense of immersive listening condition, it is important for the researcher to get a quality sound recording, and this should provide a form of "listening pleasure".

The original idea of this work is to use the sounds recorded around Bako National Park, and show the diversity found in it. This aims to give listeners experience of diving into the types and diversity found in this national park. This work uses recording material that has been recorded in Bako National Park specifically for the purpose of creation.

In this study, the composed soundscape piece is then evaluated to find out the extent of its acceptance and appreciation. A purposive sampling method was used by distributing a questionnaire to a group of selected students who have taken the GKM2343 Electroacoustic Music course at the University of Malaysia Sarawak (UNIMAS). The reason why this group was selected is because they were exposed to soundscape composition and have learned the methods of composing electroacoustic music, where soundscape composition is one of the sub-topics for the course.



*Figure 3.* A graphical representative of the composed soundscape (graphical score). Legend: [1] Water or stream [2] Birds [3] Frogs [4] Cicadas and [5] Insects. The composed music is available. Online at <https://soundcloud.com/user-645235396/masters-soundscape-composition-hellenda-harmon>

A focus group discussion (FGD) was conducted. The group consisted of students from different backgrounds and the aim of the FGD was to evaluate their reaction and attitude towards the soundscape composition. A “listening session” was carried out during the FGD session. They were presented with four short segments from the soundscape composition that was composed by the researcher as shown in Table 1 below. Upon listening to the segments of the composition, the group was asked a few questions on their attitude” towards the composition. Following that, a more detailed discussion on the group responses was recorded. Questions related to their reception of the composed soundscape composition, personal listening preferences, were asked, in order to get more in depth and detailed responses from the group.

The listening session is divided into four segments based on the recorded material, as shown in Table 1.

*Table 1.* List of segments for Listening Session (Soundscape Composition)

No	Segment (time/ms)	Type of sound
1	0.00.0 to 0.30.0	Bako National Park soundscape
2	0.54.0 to 1.20.0	Sounds of birds
3	2.15.0 to 2.48.0	Insects, birds, frogs, soundscape
4	4.12.0 to 5.10.0	Frog calling

## Results and Discussion

There are many types of sounds that were recorded during various trips to Bako National Park for the purpose of this research. There was a total of seventy-four sounds recorded and all of the sounds were named based on the location where they were recorded. As shown in Table 2, there are three sections. The first section is the location of where each sound was recorded, followed by a description of what kind of sounds were recorded, and lastly, the sound category, e.g. species of the sound recorded. Each sound is categorized with the help of experts from Bako National Park Ranger.

*Table 2.* List of sound entries recorded in Bako National Park

No	Location	Notes	Sound Category
1	N01.72302E110.47086	Unidentified species but same with sound recorded at N01.72280E110.47069	Unknown
2	N01.71869E110.44643	Unidentified sounds or species and not frogs.	Unknown
3	N01.7174E110.44483	Bird sound	Bird
4	N01.71129E110.44501	Bird sound	Bird
5	N01.71218E110.44578	Unidentified insects sound during field recording	Insect

6	N01.71914E110.44682	Unidentified sounds during field recording	Unknown
7	N01.72436E110.46422	Unidentified species but "eek!" sound is <i>Polypedates leucomystax</i> or 4-line tree frog	Frog
8	N01.71287E110.44624	Probably insect sound	Insect
9	N01.71308E110.44432	<i>Pulchrana baramica</i>	Frog
10	N01.71358E110.44418	Insect sound and <i>Pulchrana baramica</i> .	Unknown
11	N01.72366E110.47103	Unidentified	Unknown
12	N01.72057E110.45439	Unidentified species (probably not frog)	Unknown
13	N01.72062E110.45762	In the background there is sound similar with <i>Duttaphrynus melanostictus</i> (common <i>sunda</i> toad)	Frog
14	N01.72083E110.45547	<i>Pulchrana baramica</i> (Brown marsh frog) and <i>Leptobrachium ingeri</i> (Inger's black-eyed Litter frog) in the background	Frog
15	N01.72142E110.46214	Insect sound	Insect
16	N01.72153E110.44834	Unidentified species	Unknown
17	N01.72201E110.45221	Unidentified species	Unknown
18	N01.72223E110.46285	Unidentified species	Unknown
19	N01.72234E110.46290	Unidentified species but same with sound at N01.72234E110.46290	Unknown
20	N01.72267E110.44916	Unidentified species	Unknown
21	N01.70652E110.44663	Bako National Park	Soundscape
22	N01.70676E110.44981	Bako National Park	Soundscape
23	N01.70829E110.44587	Bako National Park	Soundscape
24	N01.71106E110.46027	Bako National Park	Soundscape
25	N01.71981E110.45370	Bako National Park	Soundscape
26	N01.71454E110.45724	Bako National Park	Soundscape
27	N01.71454E110.45724	Bako National Park	Soundscape
28	N01.72077E110.45248	Bako National Park	Soundscape
29	N01.72139E110.44736	Bako National Park	Soundscape
30	N01.72253E110.44980	Bako National Park	Soundscape
31	N01.72280E110.47069	Unidentified species	Unknown
32	N01.72343E110.45374	Insect sound	Insect
33	N01.72349E110.46393	Insect sound	Insect
34	N01.72366E110.45531	Insect sound	Insect
35	N01.72432E110.47068	Insect sound	Insect
36	N01.72461E110.46960	Unidentified species	Unknown
37	N01.72492E110.46931	Unidentified species but not frogs sound.	Unknown
38	N01.72549E110.45672	Insect sound	Insect
39	N01.72579E110.46699	Unidentified species but not frogs sound	Unknown
40	N01.72614E110.45635	<i>Pulchrana baramica</i> , but unknown from minute 1-1.10	Frog
41	N01.72682E110.45750	Insect sound	Insect
42	N01.72817E110.45502	<i>Polypedates leucomystax</i>	Frog

43	N01.72976E110.45339	<i>Polypedates colletti</i> (Collett's tree frog) (but not full call)	Frog
44	N01.73040E110.45194	Unidentified species	Unknown
45	N01.7148E110.44686	<i>Pulchrana baramica</i> and insect sound.	Frog
46	N01.73116E110.44466	Macaque	Monkey
47	N01.71128E110.44496	Unidentified species	Unknown
48	N01.71209E110.44550	<i>Pulchrana baramica</i>	Frog
49	N01.71267E110.44450	Unidentified species or insect sound? with <i>Pulchrana baramica</i>	Unknown
50	N01.71418E110.44382	Insect sound and <i>Pulchrana baramica</i>	Unknown
51	N01.71469E110.44352	<i>Kalophrynus heterochirus</i> (Variable sticky frog)	Frog
52	N01.71875E110.44658	Unidentified species but not a frog	Unknown
53	N01.72510E110.46817	Unidentified species but not a frog	Unknown
54	N01.71532E110.44325	Bird Sound	Bird
55	N01.71541E110.44419	Bird Sound	Bird
56	N01.71556E110.44350	Bird Sound	Bird
57	N01.71584E110.44360	Bird Sound	Bird
58	N01.71614E110.44452	Bird Sound	Bird
59	N01.71680E110.44436	Unidentified species	Unknown
60	N01.71685E110.44238	Bird Sound	Bird
61	N01.71689E110.44484	Unidentified species	Unknown
62	N01.71704E110.44460	Bird Sound	Bird
63	N01.71709E110.44469	Insect Sound	Insect
64	N01.72054E110.45672	<i>Microhyla borneensis</i> (Matang Narrow-mouthed frog, named Matang because first discovered there) and insect sound.	Frog
65	N01.72116E110.46122	Mix of insect sounds and probably <i>Fejervarya cancrivora</i> (crab-eating frog) and <i>Microhyla borneensis</i>	Frog
66	N01.72142E110.46213	Other than water and insect, there are soft sounds, probably from <i>Staurois guttatus</i> (Black-spotted rock skipper)	Frog
67	N01.72235E110.46288	<i>Fejervarya cancrivora</i>	Frog
68	N01.72249E110.44993	Unidentified species but the sound near the end is <i>Microhyla borneensis</i> .	Unknown
69	N01.72354E110.46392	<i>Microhyla borneensis</i> and insect sound.	Frog
70	N01.73191E110.46326	Unidentified species	Unknown
71	N01.73321E110.46275	<i>Microhyla borneensis</i>	Frog
72	N01.73445E110.46291	<i>Microhyla borneensis</i>	Frog
73	N01.73615E110.46252	<i>Microhyla borneensis</i> and insect.	Frog
74	N01.73682E110.46249	<i>Microhyla borneensis</i>	Frog

An online platform was created for the purpose of archiving all the sounds and mapping them accordingly to the results of the field trip conducted. All the recorded

sounds are also represented by their own spectrogram image, a visual representation of frequencies against time, as shown in Figure 4.



*Figure 4.* Author's visual image of sound of N01.70652E110.44663

As a result of the survey from the FGD, researchers have found that there are several important keywords used by respondents when answering the survey. Those keywords used are shown in Table 3.

*Table 3.* Keywords that have been used by respondent on questionnaire

Keywords	Very calm, relaxing, nature, great, very clear, amazing, high quality, interesting, love, evokes feeling, tranquil feels, vibes of forest, good soul, informative, satisfying, nature,
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All the respondents are able to recognize the sounds used in the soundscape composition and recognize the sound they heard. Table 4 summarizes the sounds that were recognized by the respondent.

*Table 4.* Key sounds recognize by respondent

Key sounds recognize by respondent	Bird, flowing water, cricket, nature sound, frog, river, monkeys, and jungle.
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The researcher used the sounds of birds, frogs, crickets, insects, and the atmosphere of the surroundings in the composed soundscape composition. The results show that the respondents were able to recognize the sounds used in this composition. Most of the respondents were able to identify the sound they had heard, and most of them able to recognise sound of birds. In this composition, the researcher used the sound of birds as “foreground sounds” followed by frog sounds. The purpose of this sound is to give the listener a sense of time and place. The sound of birds audible is the result of a recording made in the early morning. This gives an indication that the sound has succeeded in providing a related background atmosphere where the location of the recording is made in the work. This also means that the composition clearly portrays what it was intended for, from the perspective of recognizable environmental sounds and the context in which sounds exist. In general, most of the respondents give positive feedback on the soundscape composition. This is because, they can feel the sense of place when listening to this piece, as if they are in the place. Apart from that, some of the respondents also mentioned that the soundscape composition presented is very calming and pleasant to listen to, as is the nature of our feelings. The respondent also described the composition as having very clear and good quality sounds. This shows that the recording is of good quality and has been able to give the listener a sense of immersion. This shows that soundscape composition can have a big potential to attract more people to know more about soundscape and the place they visited, with particular attention given to how it should be recorded.

### **Focus Group Discussion**

The first segment of the soundscape composition was played to the focus group during the listening session. The first segment was from 0.00.0 ms to 0.30.0 ms of the soundscape composition. The purpose is to explore their level of knowledge or exposure to soundscape composition as well as their listening experience with the soundscape composition. The comments made by the FGD members about the segment were as follows:

“Everybody in electroacoustic class... Our lecturer has given some examples on soundscape composition before... I think most of us already heard, but not much, but maybe once or twice before”. (S1)

As the S1 is expressing, she was only exposed to this kind of music once or twice and was exposed to it recently. Another member adds in their feelings after listening to the first segment of the audio:

“Umm yeah... because aa... I have a few times I can't sleep, like insomnia and then I think some of us... One of the ways for us to sleep, to fall into sleep is like to listen to calm music, so that one reminds um... when I'm not falling asleep”. (S4)

“Release my tension and sounds like calm and give me relaxing”. (S17)

Thus, such composition are considered “calm” and “relaxing” for both of them. Another member of FGD groups S14 and S12 commented:

“For me, it’s a good for music student to learn about this nature sounds... because before ni, Semester 1 until now, we just learned about our music theory such as classical musical. Then when it comes to this semester, so it is interesting for us to learn something new, just not the music only, but the nature can make some energy also by their own sounds”. (S14)

*“Saya fikir sangat bagus sebenarnya sebab kebanyakan generasi sekarang... dia... saya rasa kalau sebut “electroacoustic” itu “apa itu ar?”. Komposisi merekod alam sekitar boleh cakap jarang didengar”* (S12).

[I think it is actually very good because the generation nowadays, I think if we say “electroacoustic”? “What is that (electroacoustic)?” Composition recording the environment is something rarely heard.] (S12)

S14 regards the composed music as “interesting” and “new”. This is because it incorporates sounds from nature and is different from the music that the member used to listen to, such as classical music. S12 regard the composed music as “electroacoustic” music. However, S12 noted that the generation nowadays is not exposed or has “no idea” about the genre of composition as it is rarely exposed to the public. S13, S8, and S16 commented:

*“Dia macam movie Jumanji... berjalan dalam terowong, bunyi air... semakin mau keluar ke hujung terowong tu, the nature sound semakin dengar... remind saya dengan soundtrack movie...”*

[It’s like Jumanji’s movie... walk in a tunnel, water sound... when it’s near the end of the tunnel, the nature sound is getting clearer... remind me of movie soundtrack] (S13)

*“Bila saya tutup mata, saya dengar macam saya di dalam hutan... ada macam-macam bunyi boleh dengar”.*

[When I closed my eyes, I feel like I am in a jungle... there are lots of sound can be heard] (S8)

“I feel like I was in my grandma’s village (excited) because my grandma’s village is in Kanowit... It is near by the river and there are sounds of water... and a situation in the village in the morning with bird sounds and wind”. (S16)

The soundscape composition “evokes the feeling” of being in a place or “sense of place” for the members. Some of them commented as if they were in a jungle, perhaps in a tunnel somewhere in the rainforest. It also reminded them of being in a village in the early morning. The sounds of water, birds, and the surroundings presented in the composition make them feel as if they are immersed in the sound.

The researcher presented the second segment of the composition to the group members during the listening session. The group was asked whether they were able to recognize any of the sounds presented to them. “Can you detect what kind of sounds you have heard just now? Can you recognize any sound throughout your listening? The researcher presents the diversity of bird sounds from the Bako National Park surrounding it such as water stream and insects. The members responded as follows:

*“Untuk audio tadi dapat detect bunyi burung. Aaa... bunyi air...”* (S10)

[Right now, I can hear bird noises in the audio. Aaa... The sound of water. (S10)



*“Aaa.. sama juga dia ada bunyi burung, ada bunyi cengkerik dan ada bunyi air”.* (S8)

[Aaa... I have similar opinion whereas it has bird sound, sounds of crickets and the sound of water.] (S8)

S10 and S8 mentioned that they are able to recognize the sounds of birds and water. Meanwhile, others in the member group are not able and encounter difficulty in recognizing what the sounds are. They are not sure whether it's a bird or other animal sound, as they have never heard the sounds before:

*“Saya rasa ada bunyi yang saya tak pernah dengar... mungkin bunyi burung ataupun another sound mungkin bunyi kelawar... dua bunyi ini la yang saya tak pernah dengar”* (S1).

[I think there are sounds that I have never heard before... maybe a bird sounds or the other sounds, might be a bat sound. I have never heard these two sounds before.] (S1)

*“Saya rasa dia spesies... Aaa... mungkin spesies monyet... atau beruk bunyi macam tu... (semua ketawa)”*. (S9)

[I think the species are... aaa... maybe a monkey species... or an ape sound... (everyone laughed)] (S9)

*“Mungkin itu bunyi katak... mungkin bunyi katak yang berbeza daripada yang lain. Sebab katak ada banyak jenis di hutan tersendiri kan?... So dia agak menarik sebab dia sangat luar biasa sebab tidak pernah dengar. Before ini, saya pun pernah pergi ke hutan di kampung so jarang dengar bunyi tu”.* (S14)

[Maybe it's a frog sound... maybe it's a different species of frog sounds. This is because there are many species of frogs in the jungle, right? So, it is quite interesting because it's something I have never heard before. Before this, I went to the jungle in my village but I barely hear this kind of sounds before.] (S14)

Some members of the group highlighted that they have never heard the sounds before. It is something new, and they are not able to identify the sounds. During the listening session of the second segment, they were exposed to different kinds of bird sounds that were “new” to them, and it was something interesting for them because they realized that these sounds do “exist”. When the researcher mentioned that they had just listened to varieties of bird sounds, it captured their attention, and they were surprised that there were varieties of bird sounds in the composition.

In the third segment of the composition, the researcher presents a segment that displays the overall diversity of living organisms in the Bako National Parks. In this segment, the researcher wanted to measure if they can relate the biodiversity, sounds, and populations of the living things in Bako National Parks. The group responded as follows:

*“Aaa... Taman Negara Bako ni, saya pernah terbaca dalam satu statement juga kalau saya salah tolong betulkan sayalah. Aaa... Taman Negara Bako ni adalah satu Taman Negara Bako yang paling kecil di Sarawak tapi dia paling tua dan saya boleh anggap ataupun saya boleh cakap populasi haiwan di sana terjagalah”.* (S9)

[Aaa... Bako National Park, I read a statement before, correct me if I'm wrong. Aaa... This

Bako National Park is one of the smallest National Parks in Sarawak, but it is the oldest and I can assume that the population of animals there are well protected” (S9)

“*Kita dapat dengar pelbagai bunyi haiwan... populasi ini masih bagus*”. (S11)  
 [We can hear a lot of animal sounds... the population is still good...] (S11)

“*Tempat tu, populasi burung masih banyak...*” (S13)  
 [That place has a lot of bird population.] (S13)

“*Macam semua cakap kan kat situ kata kat situ populasi burung dan habitat dia berkait rapatkan. So, banyak burung dekat situ banyak bunyi dekat situ, rantai makanan pun terjadi. Jadi saya rasa tempat tu macam, tempat tu makin “sihat”. Bunyi dia bunyi yang “sihat” jadi kita dapat tahu dekat situ ada banyak benda seperti burung dan banyak bunyi yang dihasilkan masih sihat*”. (S5)

[Like everyone has mentioned, the populations of birds and the habitat are closely related. So, as there are many birds and also sounds there, the food chains also occur. And I think that place is “healthy”. It has a “healthy” sound, and we know that the places have lots of bird and many other sounds produced are “healthy”.] (S5)

Most of the members indicate and believe the composition represents the rich biodiversity of Bako National Park. Through listening, they experienced a lot of bird and water sounds and were able to conclude how these sounds are connected to each other as an ecosystem. S5 regards the population and the ecosystem in the Bako National Parks as “healthy” environments.

The last segment, which is the fourth segment of the soundscape composition was presented to the group member. The segment portrays sounds of “frog calling”. The researcher wanted to know how the group responded to the sound of “frog calling” and how they reacted after listening to the sound. The responses from the group members were as follows:

“*Bagi saya, frog calling tu... mungkin sound of mating tu mungkin bunyi yang bersahutan... katak dekat sini calling to mate, so, katak dekat tempat lain tu menyahut... jadi ianya adalah bunyi mengawan la*”. (S1).

[For me, the frog calling sound, maybe it is a sound of mating due to the continuous sound... the frog here is calling to mate, so the frog at another place replied to the mating sound... so, it is the sound of mating.] (S1)

“*Saya rasa macam spesies katak tu... dia ada pelbagai sound and ada juga bunyi... err ini apa yang saya dengar, macam ada katak jantan, katak jantan macam bunyi dia tu macam nak mengorat female frog tu la...*” (S17)

[I think it is a species of frog, it has a lot of sound, and the sound... err... from what I heard, seems like a male frog, sounds like a male frog trying to mate with a female frog] (S17)

S1 and S7 indicate that the frog-calling sounds that they have heard are the sounds of frogs during mating seasons. While others regard the sounds as trying to communicate with each other:

This segment is like... compared to others three, is like this segment is more

danger, and conflict. (S4)

*“This sounds feels like it is more intense, dia macam bunyi dia lebih kedengaran macam dalam bahaya so signal dia tu macam dia dalam bahaya...”(S5)*

[This sound feels like it is more intense, it sounds likely more in danger and giving a signal that it’s in danger.] (S5)

*“Saya rasa, frog calls tu macam mereka sedang berkomunikasi antara satu sama lain, seperti macam dalam bahasa mereka la...saya rasa dorang ni macam ada..mungkin dorang mau bagi warning”. (S6)*

[I think the frog calls is like they are communicating with each other, in their own language. I feel like they are, maybe they are giving warning.] (S6)

*“Katak tu macam mengadu..dia macam nak buat teriak teriak dia mahu lepas kan.....sebab dia terperangkap dalam satu situasi, dia tidak bebas dan selesa so dia teriak...”. (S16)*

[The frog is like complaining, it’s like the frog is trying to yell for freedom, because it is locked in a situation where frog is not free and comfortable, so it yells out.] (S16)

*“Ada bunyi air... basically katak kalau dia nak bertelur, basically dia akan pergi ke kawasan yang berair la untuk dia bertelur, itu yang membuatkan saya yang teori yang mengatakan frog call ini basically stand for untuk masa katak itu mengawan”. (S11).*

[There is a sound of water, basically a frog when it wants to lay eggs, it will go to a watery place when it wants to lay eggs, that is the reason behind my theory saying that the frog-call is basically what it stands for when the frog wants to mate.] (S11).

It is very interesting to hear different kinds of responses from each member of the group and how they interpret sounds according to their own understanding and what they feel about the sound that they hear. Frog-calls happen when they are trying to find a potential mate during breeding seasons, as well as to warn others and it is a common way to communicate with each other. In general, they believe the sounds produced by the frogs, particularly the “frog-calls” have meaning and reason behind them. It shows that they are all aware of living things, such as frogs use sounds to communicate. Each sound emitted plays an important role in conveying what is happening around them. The group also concludes that sounds produced by animals, insects, etc., play a significant role in telling what is happening around their ecosystem.

The researcher finally asked the group on what have they learned during the “Intensive Listening Session” of the soundscape composition? In this section, the researcher would like to find out their final responses, especially what the group learned from the listening session on the composed soundscape piece. The aim is also to explore the level of group appreciation for soundscape composition and how it relates to their awareness for sound and ecology. Their feedback are as follows:

*“Dia membuatkan kita lebih alert dengan surrounding” (S14).*

[It makes us more alert on our surroundings.] (S14)

*“Daripada hanya dengan mendengar, kita dapat menghargai alam semula jadi itu”. (S17)*

[With just listening, we can appreciate the environment.] (S17)

*“Belajar untuk “how to appreciate diversity” lah... environment yang dihasilkan melalui alam semula jadi. Lepas tu kita dapat tahu bahawa satu tempat tu ada pelbagai jenis kehidupan”.*(S15)

[Learn to appreciate the diversity... (as well as) the environment created by the nature. And we learned that this place has a variety of living things.] (S15)

*“Apa yang saya pelajari mendengar yang soundscape itu... dari situ kita boleh menyimpan beberapa audio di mana mungkin sekarang ni ramai orang jarang mendengar populasi haiwan... mungkin kita tidak tahu masa depan mungkin dia akan jadi pupus. Kita tidak tahu tetapi melalui audio sound tu kita boleh mendengar “Oh...begini rupanya sound yang ada dekat hutan tersebut” (S7).*

[What I have learned from the soundscape is that from there we can keep few of audios where people rarely listened especially on the animal population... maybe one day, we never know, in the future the animals extinct, we never know, but through the sound audio, we can listen and have a thought, “Oh, so these are the sounds that were available in the jungle.”] (S7)

From the responses given by the group members, they realize that sounds play an important role in our surroundings, hence, we should “appreciate” our surroundings and environments. S7 also highlighted that recorded sound can be an “archive” for future reference.

As a conclusion from this focus group discussion, it is learned that humans’ mind has the ability to recognize and comprehend familiar sounds, which may trigger emotional and cognitive responses. Even though they are physically far away, the imaginative power of sound helps listeners feel a sense of presence and connection to the location. This connection can be as powerful as a visual, because it taps into our sensory memories and associations with specific locations. By highlighting the unique sound qualities of natural environments, it can foster appreciation and understanding of the delicate balance of our ecosystems.

In this soundscape composition, for example, it incorporates the sounds of animals, water, and insects. Listening to such piece may help one understand the web of life that exists inside these ecosystems and the importance of preserving them.

## **Conclusion**

In conclusion, through this research, the importance of sound awareness was successfully presented. Soundscape composition is a valuable and immersive tool for understanding the state of our surroundings. Soundscape compositions allow us to examine both the aural and ecological characteristics of an area by delving into the fine nuances of its acoustic environment. We can obtain insights into the distinctive traits and dynamics of different locations through properly designed sound arrangements, promoting a better connection and awareness of our surroundings.

The beauty of soundscape composition is its ability to capture the spirit of a place, allowing us to experience its landscape through listening. An intimate engagement with a location through acoustics allows us to understand the richness and diversity of the natural world. It also allows us to reflect on our personal relationship with the natural world through our aural connection through soundscape

compositions. We should become more sensitive to the noises surrounding us and realize the importance of changes that happen around us through sounds.

Lastly, soundscape composition can potentially be a powerful medium to represent the state of our surroundings. The genre allows us to appreciate ecological aspects through the medium of sound and establish ways to improve our surroundings. Soundscape compositions, not merely tools for entertainment, will also improve our sense and understanding of ecological awareness, build a sense of connection, and promote the value of taking care of the environment through listening.

Finally, the sounds particularly presented in this project can potentially be an intangible treasure for our tourism industry, because, in years to come, recordings made in the National Park, such as in Bako, will transform through time, as we progress forward.

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### References

- Adams, M. D., Bruce, N. S., Davies, W. J., Cain, R., Jennings, P., Carlyle, A., Cusack, P., Hume, K. & Plack, C. (2008). Soundwalking as a methodology for understanding soundscapes. *Conference Proceedings Institute of Acoustics 2008*, Vol. 30. Part 2, Institute of Acoustics Spring Conference.
- Coates, P. A. (2005). The strange stillness of the past: Toward an environmental history of sound and noise. *Environmental History*, 10(4), 636–665.
- Krause, B. L. (2008). Anatomy of the soundscape: Evolving perspectives. *Journal of the Audio Engineering Society*, 56(1/2), pp. 73-80.
- Licht, A. (2009). Sound art: Origins, development and ambiguities. *Organised Sound*, 14(1), pp. 3–10. doi:10.1017/S1355771809000028.
- Mitchell, A., Aletta, F., Oberman, T. & Kang, J. (2023). How do we define soundscape? *Forum Acusticum 2023, 10th Convention of the European Acoustics Association, Turin, Italy 11 - 15 September 2023*, Politecnico di Torino. doi: 10.61782/fa.2023.0359, pp.695-699.
- Ouzounian, G. Ed. (2017). Rethinking acoustic ecology: Sound art and environment. *Evental Aesthetics*, 6(1), pp. 4-23
- Paquette, D. & McCartney, A. (2012). Soundwalking and the bodily exploration of places. *Canadian Journal of Communication*, 37(1), pp. 135-145. doi:10.22230/cjc.2012v37n1a2543.
- Pijanowski, B. C., Farina, A., Gage, S. H., Dumyahn, S. L & Krausez, B. L. (2011). What is soundscape ecology? An introduction and overview of an emerging new science. *Landscape Ecology*, 26, pp. 1213–1232. <https://doi.org/10.1007/s10980-011-9600-8>

- Schafer, R. M. (1994). *The soundscape: Our sonic environment and the tuning of the world*. Retrieved from [https://monoskop.org/images/d/d4/Schafer\\_R\\_Murray\\_The\\_Soundscape\\_Our\\_Sonic\\_Environment\\_and\\_the\\_Tuning\\_of\\_the\\_World\\_1994pdf](https://monoskop.org/images/d/d4/Schafer_R_Murray_The_Soundscape_Our_Sonic_Environment_and_the_Tuning_of_the_World_1994pdf)
- Schoeman, R. P., Erbe, C., Pavan, G., Righini, R., & Thomas, J. A. (2022). Analysis of soundscapes as an ecological tool. In: Erbe, C., Thomas, J.A. (eds) *Exploring Animal Behavior Through Sound: Vol. 1*. Springer, Cham. [https://doi.org/10.1007/978-3-030-97540-1\\_7](https://doi.org/10.1007/978-3-030-97540-1_7), pp. 217-267.
- Truax, B. (2008). Soundscape composition as global music: Electroacoustic music as soundscape. *Organised Sound*, 13(2), pp. 103–109.
- Truax, B. (2012). From soundscape documentation to soundscape composition in acoustics 2012, *Proceedings of the Acoustics 2012 Nantes Conference, 23-27 April 2012, Nantes France*, hal-00811391 Retrieved from <https://hal.science/hal-00811391v1/file/hal-00811391pdf>, pp. 2103-2107. doi:10.1017/S1355771808000149
- Truax, B. (2021). R. Murray Schafer (1933–2021) and the World Soundscape Project. *Organised Sound*, 26(3), 419–421. doi:10.1017/S1355771821000509
- Wahlström, S. (1985). The parabolic reflector as an acoustical amplifier. *Journal of the Audio Engineering Society*, 33(6), 418-429.
- Westerkamp, H. (1991). The World Project, The Soundscape Newsletter, World Soundscape Project. *The Soundscape Newsletter*, 1., pp. 3-4. Department of Communication, Simon Fraser University, Burnaby, B.C. V5AIS6. Author's brief notes.

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**Hasnizam Abdul Wahid** is a electroacoustic music composer. He has been a first-prize winner in the residency category in the Bourges 2001 Electroacoustic Music Competition, received a Mention during the L'espace du Son 2002 Competition in Brussels, and a Pre-Selection of Jury for his work Ra'hah in the Electroacoustic Sonic Art Works category in Bourges 2003 and 2005 for his piece Interplay. Awarded 3rd Prize Winner for his piece 'Mikro II' in Musicacoustica – Beijing 2012 and most recent, "Special Mention" in Music/Sound Design category during the Art Beats Festival, 2023. His recent works include "Sape and Sampo", a live electronics performance in Auch, France (2023) through Artist in Residence program with Sampo Academy, include masterclass on mixed music techniques, live electronics, and improvisation and attended the Aqtushetii Artist Residency program, in Omalo, Republic Georgia (2024), exploring the intersection of global/local "traditional" music, music technology and musical composition.