What Should the Soundscape Community Do When Listening to the Soundscapes of Fukushima?

By Koji Nagahata

"Keeping silent after Fukushima is barbaric."
– R. Sakamoto (2011) [1]

Introduction

A magnitude 9.0 earthquake, the most powerful recorded in Japanese history, struck off the coast of eastern Japan on March 11, 2011; the quake was felt through quite a large area of Japan, and strong tremors shook the Tohoku region especially hard. This quake also triggered an enormous tsunami (tidal wave), which caused severe damage to the Pacific coastal areas of eastern Japan.

The combined disasters related to the earthquake caused immense damage. According to one official document (National Police Agency of Japan 2013), the disasters were responsible for the deaths of 15,879 people, while 2,700 people are still missing. Moreover, 128,911 houses collapsed entirely, and 268,882 houses were partially destroyed.

The quake and tsunami caused secondary disasters in addition to their primary direct paths of destruction, with the serious accident that occurred at the Fukushima Daiichi Nuclear Power Plant being one of the worst. It forced residents living within 30 km from the power plant as well as residents living in areas of extremely high contamination, where radiation levels exceeded 20 mSv/year, to evacuate. Although the restricted areas have been reduced gradually, and residents of relatively less contaminated areas have slowly been returning to their home towns, there are still many evacuees forced to live far away from their home towns. In addition, many people who lived outside of the restricted areas also evacuated voluntarily.

Fukushima city, where I live, is located 60 km from the Fukushima Daiichi Nuclear Power Plant. However, a large amount of radioactive contamination reached the city as a result of the direction of the wind on the day of the accident. Therefore, for most of the city, the current radiation dose levels are estimated as exceeding annual public dose limits (i.e., 1 mSv/year). In this situation, a large number of people, including my family (except me), evacuated the city voluntarily. According to a statement by the mayor in 2012, at least 6,000 people, or about 2 % of the residents, evacuated to areas outside of Fukushima. Thus, the daily lives of the city residents have changed significantly compared with before the quake, and in fact their lives continue to change even now. Along with these lifestyle changes among the residents, the soundscapes of Fukushima have also been changing.

Recording changing environments is the true study of soundscapes. Schafer (1977; 1993) proposed we consider the relationship between us and the sounds within our environment to better understand how that relationship is impacted when those sounds change around us. In his essay, *The Soundscape*, more than three decades later, his question remains relevant, inquiring again "what is the relationship between man and the sounds of his environment and what happens when those sounds change? (Schafer 2012, 95). These are the key issues of soundscape studies. Furthermore, we can say that researching the changing of soundscapes and then reconsidering and discussing desirable forms of soundscapes in response to those research results comprise the process of soundscape design as interdisciplinary as we rely on such knowledge, as Schafer states (2012, 96), "to use these insights in planning future environments for man." Therefore, I came to the conclusion that I, as a soundscape researcher living in Fukushima during this important period of its history, must record the changing post-accident soundscapes and report them to others around the world. Thus, I started the Fukushima Soundscape Project, in which the changing soundscapes of Fukushima are recorded, and then these records are released through a website (Nagahata 2011–2013)[2]. This project comprises one of the main parts of the Soundscape Project for Earthquake Disaster 3.11 (2011–2013), initiated by the Soundscape Association of Japan (SAJ).

This article outlines the Fukushima Soundscape Project and illustrates the symbolic soundscapes of Fukushima after the accident as recorded by the project.

About Fukushima City

Fukushima city is located in a basin in the northern part of the Fukushima prefecture about 40 km from the nearest sea. The population of the city is around 280,000; though it is the prefectural capital, it is only the third largest city and is not the business capital of Fukushima.

The city is famous for its flowers. In particular, cherry blossoms are quite famous; there are several popular cherry-blossom viewing sites and not only residents of the city but also visitors even from outside Fukushima prefecture visited the city to enjoy cherry-blossom viewing before the quake. Fukushima is also known as the "Fruit Kingdom." Cherries, peaches, pears, grapes and apples are especially notable. There are many tourist farms where visitors can enjoy picking various fruits when they are in season, and many people annually came just for that purpose, including the most recent season before the quake. In the winter, ducks and swans come to stay in the city as their wintering habitat. Before the detection of the bird flu virus from a swan in Japan in 2008, swan-watching was also one of the popular seasonal traditions in Fukushima.

The people of Fukushima, a region endowed environmentally in the many ways outlined above, were very familiar with nature before the accident. For example, in spring we would enjoy viewing cherry blossoms and the appearance of fresh green trees and other plants. In autumn, we would enjoy watching autumn leaves, and also hold outdoor *Imoni* (miso soup with pork and taro) parties, especially at locations along the river.

Regarding the Great East Japan Earthquake, although Fukushima city is located in the Tohoku district, the most damaged area, the actual destruction to the city was quite localized and relatively minor. Moreover, there was no damage from the tsunami. Therefore, recov-

ery of lifelines (i.e., water service and electricity) occurred relatively early in the disaster areas. Because of this relatively rapid recovery, temporary shelters could then be provided for evacuees from the nuclear power plant accident (from within 30 km of the Fukushima Daiichi Nuclear Power Plant), and around 12,000 people were evacuated to the city (Mayor of Fukushima 2012). Fukushima University also provided temporary shelter.

However, Fukushima city received a very large amount of radioactive contamination, and thus became a highly contaminated area, as described in the introduction.

Outline of The Fukushima Soundscape Project

When I started the Fukushima Soundscape Project, I hoped that the soundscapes of Fukushima could help illustrate aspects of the actual circumstances which the people living in Fukushima (including myself) felt in our daily lives but about which the mass media didn't (or couldn't?) report. Moreover, I believed such soundscapes could become a clue for others to learn what a nuclear power plant accident actually meant to the sufferers: knowing is the first step to action. Thus, I decided that the main purpose of the project would be to let people all over the world know about the soundscapes of Fukushima after the accident, as well as how they had changed, and still continued to change. For this purpose, I decided that the records of the project would be released via a website as soon as possible, from the very beginning of the project.

I went to conduct my first field recordings on May 1, 2011; I was unable to begin this project earlier because I was one of the administration staff members of the temporary shelter provided by Fukushima University, which closed at the end of April 2012 (Nagahata 2012). Four sites were selected for the first field recordings: Iizaka Hot Springs, Kotori no Mori (Forest for Birds), Mt. Shinobu, and Shinhama Park. The first three sites had been very popular among Fukushima residents before the accident. The latter two sites became well known after the accident as "hot spots" (i.e., places where radiation dose levels are especially high); therefore, they are symbolic of the accident. Also, I was familiar with each site before the earthquake. To record the soundscapes of each site, sounds occurring at the sites were recorded with a digital recorder, and several photos were taken.

Since making those original recordings, I usually carry my digital recorder and digital camera with me to record soundscapes whenever I happen to come across characteristic soundscapes of Fukushima. Once I have recorded the soundscape of a certain site, I add the location to a list of fixed observation points. I have visited each fixed observation point at frequencies roughly corresponding to the speed of their changing soundscapes. However, in cases where I did not feel that there was any significant change from a previous recording, I did not record or release a subsequent recording. Thus, the soundscapes of 22 sites have been recorded, with 13 of them having been recorded repeatedly. The soundscapes recorded at those sites and subsequently released can be heard at the project's website, "Fukushima Soundscapes" (Nagahata 2011–2013).

Symbolic Soundscapes of Fukushima after the Disaster

Among the fixed observation points, there are several sites whose soundscapes are especially symbolic. In this section, three such symbolic soundscapes are described.

Kotori no Mori (Forest for Birds)

Kotori no Mori (in English, Forest for Birds) is a bird sanctuary located near the center of the city. This forest has been maintained as a *sato-yama*, a traditional community-based forest. In former days, the *sato-yama* environment was preserved through sustainable use practices of mountain resources and sufficient maintenance by the local

Fig. 1: *Kotori no Mori*. Photo by Koji Nagahata

community. Similarly, volunteers would routinely cut bottom weeds, sweep up fallen leaves, and produce charcoal from wood obtained in the forest. The purpose for maintaining the forest was to create an environment where people, animals, and plants could live harmoniously together. Prior to the earthquake, the forest's conservation group actively offered nature education activities, and a bird-watching society of Fukushima held regular bird-watching parties at Kotori no Mori. In addition, my colleagues and I sometimes offered environmental education workshops for school children. Not only the birds, but also the people of Fukushima loved this forest. In fact, the soundscape of this forest was selected as one of the "100 Soundscapes of Japan: Preserving Our Heritage" (Torigoe 1999) in 1996.

On May 1, 2011, I visited this forest for the first time since the earthquake. The date fell on a Sunday during Japan's Golden Week holidays. Before the earthquake, on such a holiday many people, including families with school children, would visit this forest to enjoy the fresh, green natural environment. In 2011, however, the only people I encountered there were the staff of the forest's nature center. At that time, many elementary schools and junior high schools restricted students from playing outdoors to protect them from radiation exposure.

In contrast to these changes in human activities, birds were chirping lively as usual for that particular time of year. According to a forest ranger, the number and variety of species of birds in the forest were unchanged from previous years. In addition, there was the lively croaking of frogs. As a result, the sounds heard in the forest at that time were full of the songs of birds and frogs. Contrary to the world described in Rachel Carson's *Silent Spring* (1962), where birds do not sing because of chemical pollution, it was the humans instead of birds that were not singing or speaking in the forest as a result of radioactive pollution.

During the summer of 2011, a hot spot was found at a memorial park next to Kotori no Mori; therefore, a notice on a poster board located in the parking area for visitors to both the forest and the memorial park instructed people to avoid staying in the forest longer than one hour per day. When I visited the forest on August 5, 2011, cicadas were singing very loudly. According to the forest ranger, no effects of radiation had been found on either birds or insects. As for humans, only a few workers trimmed the bottom weeds at the front entrance of the forest, and no children were present. Therefore, the forest's soundscape that summer was dominated by the sounds of cicadas and the songs of crows and other kinds of birds. When I was leaving the nature center after talking with the ranger and a forest staff member, I observed their reactions to a visit from a school-aged boy to the nature center. They both happily exclaimed, "What an unusual event! A boy has come to this forest!"

On May 26, 2012, the notice was still up in the parking area. The monitoring post installed by the Ministry of Education, Culture, Sports, Science and Technology showed that the radiation level was 1.65 μSv/h; this is about 30 times higher than the level before the accident. But even in this situation, birds were still singing cheerfully as usual, and yet there were still no people talking or singing. The forest was so silent that one could actually hear military songs being broadcast from the nationalist party's political campaign cars about 1 km away from the forest. One year after the accident, humans, not birds, maintained their silence in the forest.

On August 5, 2012, the cicadas were singing loudly as expected, but I felt that the number of cicadas was a little lower than that of last year. The forest ranger said that he also felt the same. He related a story that he had heard that this phenomenon might be part of the aftermath of the radiation, but his personal diagnosis was different: the year 2012 was a leap year (with an extra month after May according to the lunar calendar), and it is known from ancient times that seasonal changes during leap years are quite different from usual years, and that there are explicit effects on living creatures. But of course it is difficult to make concrete conclusions about the cause of these changes without continued observation.

On the day of my visit, the monitoring post showed that the radiation level was 1.70 μSv/h. According to the forest ranger, this forest had been excluded from the official targets of decontamination because Kotori no Mori is not classified as a park but a forest, and therefore there was no way to realistically reduce the radiation levels over the near term. Thus, visitors, and especially children, never returned to the forest. In this way, the state of human silence in the forest remained unchanged.

Mt. Shinobu

Fig. 2: *Mt. Shinobu*. Photo by Koji Nagahata

Mt. Shinobu, located near the city center, is famous for cherry blossoms, fresh greenery, and a bird watching spot. It is popular with local citizens, and especially nature lovers. Many environmental events, including official ones hosted by Fukushima city's environmental agency, had been held here before the earthquake. I had also hosted sound education workshops at least once every year. Mt. Shinobu was once regarded as a sacred mountain, and it is still the site for religious rituals.

On May 1, 2011, the greenery on the mountain was fresh and birds were singing cheerily as usual. However, no people were present to enjoy the new season, because one of the first hot spots in Fukushima city had been found in one of the parks on the mountain, and the news had spread to the citizens. As a result, the mountain's soundscape was dominated by birds and crows; no human voices could be heard. Spring on this mountain was also a silent one in which humans instead of birds kept silent.

Decontamination work was conducted in early autumn 2011. Many older people (some of them volunteers) cut bottom weeds, swept up fallen leaves, and packed contaminated materials into large trash bags. The filled bags were then isolated from easily accessible places. However, these protective efforts did not achieve the desired results. According to an official monitoring post in a park on the mountain, the radiation level of the site was still around 1.2 μSv/h in January 2013 — about 25 times higher than the level before the disasters. The notice board still instructed people to limit their stay at the park to no more than one hour per day.

Although the sounds of crows and other birds appeared to be the same as before the quake, only a few people (mostly seniors) were observed walking or staying at parks on the mountain during this period. According to the city's environmental agency, all annual environmental events at Mt. Shinobu on 2012 were cancelled, and no events are planned for the immediate future.

Thus, the recent soundscape of this mountain can basically be characterized by the usual sounds of nature and the absence of human voices.

Some exceptional cases were observed, however. The traditional Dondo Yaki New Year's festival, in which ornaments are burned at shrines, was held in January 2012 at Gokoku Shrine, located on the mountain. While I was recording the soundscape of the festival (almost 30 minutes long) on January 8, several families, including some with children, were present, and there were always some visitors to be found around an open fire. Thus, the voices of children could be heard amidst the sounds of the open fire and the traditional festival music being broadcast. This was the first time I had heard children's voices on the mountain since the earthquake. The festival was held again in January 2013. The numbers of the visitors seemed to be more than that of 2012, when I visited to record on January 12. Moreover, I could hear children's voices more in 2013 than in 2012.

Another exception to the post-earthquake absence of people at Mt. Shinobu occurred during cherry-blossom viewing season in April. I visited the mountain for a fixed-point observation on April 25, 2012, a few days after the cherry blossoms on the mountain had fully bloomed, but still were beautiful. On that day, many people, but fewer than usual, were visiting the mountain to enjoy the cherry blossoms despite the fact that it was a weekday. Some people purchased food and drink from vendors who had set up stalls. In addition, five or six children played in the park where the monitoring post and the notice board were located, while their mothers enjoyed the cherry blossoms. The soundscape of the park at that time was dominated by children's voices and the songs of birds.

These exceptional cases suggest that the charm of seasonal traditions like festivals and cherry-blossom viewing was stronger than the fear of radiation for many people. This attitude may prevail because people stay outdoors just a few hours to enjoy each seasonal tradition, and therefore the additional exposure is thought to be negligible compared with the amount of daily exposure since the accident. It seems that residents in Fukushima are learning to adapt to scenarios that involve some radiation exposure.

Shinhama Park

Shinhama Park is located at the center of the city near City Hall. Workshops had often been held on its lawn, including my sound education workshops for school children. Before the earthquake, the park's playground equipment and wading pool were popular with children who lived within walking distance. My daughter loved this park, so I sometimes visited there with her on warm days. Before the quake, one could always hear children's voices on warm days. Unfortunately, the park was one of the first hot spots discovered in Fukushima city in late April 2011. This news spread quickly to the

Fig. 3: *Shinhama Park*. Photo by Koji Nagahata

citizens of Fukushima, and the park instantly became infamous.

On May 1, 2011, when I visited the park for the first time since the earthquake, a man who appeared to be homeless was napping on a bench, and several chirping birds could be heard. The park was unnaturally quiet for this time of day, and its soundscape was dominated by the sounds of birds and distant traffic.

Decontamination work at this location lasted from mid-July to August 2011. The work was large-scale: removal of the lawn and topsoil with heavy machines, replacement of the sand in a sandbox, and the cleaning of the playground equipment, benches, and a rest facility with high pressure water jets. The soundscape of decontamination here was therefore not unlike that of a construction site being developed.

The decontamination work at Shinhama Park was a success to a certain degree; according to official documentation (Fukushima City Office 2011), the average radiation level on August 29, 2011, was 0.31 μSv/h, and the reduction ratio was 86%. By June 2012, the monitoring post at the park identified the radiation level as only 0.25 μSv/h, and by January 2013, the radiation level had dropped to 0.21 μSv/h, although this level is still about four times higher than that before the accident.

Despite the decontamination and drop in radiation, however, children's voices did not return to the park. I visited this park at least once a month after the completion of the decontamination work, and the only people I met for some time were groundskeepers and adult passersby. It was not until a full year after the earthquake (March 11, 2012) that I heard children's voices for the first time following the disaster. On that fine day, two boys and a girl were having fun on the playground equipment under warm sunshine. The soundscape of the park at that time consisted of children's voices, the chirping of birds, and the cawing of crows.

Since then, it seemed that the warmer the days became, more and more children would play at the park throughout the spring of 2012. From that point forward, it seems that the soundscapes of the park have remained stable, although the number of children playing at the park appears still less than that before the accident.

Symbolic Sounds of Fukushima after the Disaster

In the previous section, I focused on those sites with characteristic soundscapes. In this section, I describe two new intrusive and symbolic sounds that can now be heard throughout Fukushima after the accident.

The Sound of Decontamination Works

As described above, the current radiation dose levels for most of the city are still estimated as exceeding annual public dose limits. To reduce the radiation levels to less than the annual public dose limits over the short term, decontamination works are necessary. The

Fig. 4: *Decontamination efforts*. Photo by Koji Nagahata

Fukushima City Office has been administrating its local decontamination works. According to the city's municipal report (Fukushima City Office 2012), the immediate target of the decontamination work is to achieve less than 1 μSv/h (still higher than the public dose limits) throughout the city within two years.

The official decontamination projects started at public schools and kindergartens located in especially highly contaminated areas in May, 2011, and then were subsequently conducted at other schools, kindergartens, and nurseries one after another. The decontamination works at schools mainly involved the removal of contaminated soil from schoolyards. During such projects, the soundscapes of the schools were dominated by the sounds of heavy machinery. Those works finished at the end of August 2011.

The decontamination works at parks began July 2011. These park projects were very similar to the work done at Shinhama Park described above, and therefore the soundscapes of the parks were very similar to that of Shinhama Park during decontamination. The works at the parks still continue today.

Schools and parks are ubiquitous across the city, and therefore the sounds of decontamination projects involving heavy machinery can be heard all over the city.

In October 2011, the official decontamination works at residential areas began at the most contaminated area of the city, and now the works have progressed to the second-most contaminated area. These works consist of washing roofs and walls using high pressure water jets and brushes, cleaning gutters, cutting garden trees, and removing contaminated soil. By my estimation, it takes on average three or four days for washing and cleaning, and then another week for cutting trees and the removal of soil per household. In this case, the residents remain living in their houses while the work is performed. As a result, residents who stay or work at home, such as home-based workers, homemakers, and retired people must continue to hear these new, unfamiliar intrusive work sounds for almost two weeks.

Radioactive Level Report

The second new intrusive symbolic sound I have observed is the radioactive level reports broadcast on radio and television. During these broadcasts, the daily radiation levels for several locations in Fukushima prefecture are reported in a fashion similar to a weather report, such as "Fukushima, 0.6 μSv/h. Koriyama, 0.6 μSv/h..." These programs are broadcast by all radio and television stations in Fukushima prefecture.

Discussion

From the above observations and data, we can see that the outdoor soundscapes in Fukushima since March 11, 2011, have been characterized by a lack of human voices, especially those of children. This has been observed easily throughout Fukushima. In addition, natural sounds, such as the singing of birds, the cawing of crows, and the chirping of insects, have remained unchanged and represent another salient feature of the Fukushima soundscapes. These two features

create silent soundscapes which are in contrast with the soundscapes described in Rachel Carson's *Silent Spring* (1962). I name this kind of silence - "radioactive silence."

Radioactive silence may be defined as "the state of a lack of human sound from a certain soundscape caused by fear of radioactive exposure, although other sounds from nature exist as usual." Thus, we can say that radioactive silent soundscapes symbolize people's anxiety about the effects of radiation; this means that living within a radioactive silent soundscape does not promote a state of mental well-being. Furthermore, the restriction of outdoor activities (whether voluntarily or compulsory) limits social activities, and therefore it can cause the degradation of social well-being. In this way, radioactive silent soundscapes also symbolize a state of social "unwellness" among the residents of Fukushima.

In addition, the new intrusive symbolic sounds that have arisen after the accident also seem to be strongly linked with the anxiety people feel toward radiation. Here again, we can find that the soundscapes of Fukushima after the accident have been deeply characterized by anxiety.

Although the Japanese government, Fukushima prefectural authorities, and their advisors have repeatedly announced that "the current level of radiation has no immediate impact on health," people living in Fukushima are clearly not healthy according to the World Health Organization, which defines being healthy as "a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity" (World Health Organization 1946). The soundscapes of Fukushima symbolize states of unwellness in the daily lives of Fukushima residents. Moreover, we, the residents of Fukushima, feel that our daily lives are not in a state of well-being when we realize that we are living in such soundscapes. This then deteriorates our well-being further.

Here I pose some questions. Is it appropriate (i.e., fair and justice) that the government and local authorities be able to induce people in Fukushima to live within these soundscapes? Should people in Fukushima endure living there after such disasters? Is it justifiable that nuclear power plants are operated after we have learned that merely one severe accident can instantly make similarly unhealthy soundscapes for thousands of people?

Utilitarians or economic supremacists may answer "yes" to these questions underscoring that prejudice is limited. In fact, several Japanese business leaders have advocated that all nuclear power plants should be restarted immediately. However, there exists other standpoints from which we can object to such advocacy. For example, some might argue otherwise, "no," with the reason that "[justice] does not allow that the sacrifices imposed on a few are outweighed by the larger sum of advantages enjoyed by many" (Rawls 1971). From the standpoint of Schafer (1993), soundscape can be best understood from within its environment, among those immersed and living within those acoustic spaces. I believe we should take the latter view when answering these questions, and be supportive of the people actually facing the aftermath of the accident and possibly future accidents.

Final Remarks

The changing soundscapes of Fukushima following the earthquake of March 11, 2011, have well reflected the states of unwellness among those residents whose daily lives have been affected by radiation. Furthermore, living in such soundscapes is not healthy for residents. Once we know these facts, what should the soundscape community do, not only for the people of Fukushima but for all the people of the world, in such situations? — I think this is an urgent question for the entire soundscape community.

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About the Author

Koji Nagahata is associate professor at Faculty of Symbiotic Systems Science, Fukushima University, Japan. He lectures on the soundscape. His research topics are varied: from soundscapes described in the world of Haiku to barrier-free acoustic environments. In recent years before the Great East Japan Earthquake, his main research interests were noise policies and barrier-free acoustic environments for all. Website: www.sss.fukushima-u.ac.jp/~nagahata.

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