

# An Assignment and Lesson Plan for Spectrogram Analysis of Hildegard Westerkamp's *Kits Beach Soundwalk*

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While spectrograms are not necessarily a core topic in undergraduate music theory curricula, they are commonplace in recent research and constitute a versatile tool for analyzing a wide range of music. The attached assignment and lesson plan do not provide a first introduction to reading spectrograms: other materials (such as Latartara 2008; Lavengood 2020; Heng and Lussier 2022) provide both a basic fluency in spectrograms' technical basics (such as the x-axis showing time and the y-axis frequency) as well as interpretive timbre semantics, so that students can relate descriptors such as “bright,” “hollow,” or “noisy” to specific acoustic features. Building on such a first introduction, this resource provides a “second lesson” so that students can practice these timbre-oriented skills in spectrogram reading while contextualizing such techniques within broader interpretive discussions.

Hildegard Westerkamp's 1989 *Kits Beach Soundwalk* is a canonical piece of electronic music with an extensive literature of its own, most of which concerns how Westerkamp constructs the listener's perspective and how her music relates to environmental movements (Kolber 2002; McCartney 1999; 2002; Sterne 2019; Westerkamp 2002). When teaching this piece in a music theory classroom, though, I tend to hew closer to the sounds in the recording. Because the composer speaks and describes sounds, students have a clear language of what they think the sounds “are”—that is, what sources they come from (Chion 2011; Demers 2010). I then challenge students to connect the composer's words to what they hear, and to use the spectrogram to describe the sound itself more precisely. When Westerkamp says, for instance, that we hear “a million tiny voices,” how can students use the spectrogram to enrich and more fully describe their hearings?

I find *Kits Beach Soundwalk* to be very versatile in curricular placement, fitting well with a wide range of recorded musics dependent on electronic sound technologies. Depending on the course, I have introduced spectrograms with either 80s pop music (Lavengood 2020) or György Ligeti's 1960s acoustic compositions (Iverson 2009; 2010; Levy 2009; 2017); in classes after the Westerkamp lesson, I might discuss any of *musique concrète instrumentale* (Féron 2024), recent EDM-influenced top-40 popular

music (Peres 2016; 2018), or dub reggae (Veal 2007; Yoganathan and Chapman 2018). While I most often include this unit either in core post-tonal courses or in special-topic electives after core theory, this material requires no familiarity with any specifics of pitch organization, and could be included in a sound or timbre fundamentals unit (such as in Maust and Smooke 2024, 15).

My goal in teaching Westerkamp's *Kits Beach Soundwalk*, surrounded by this vast array of contexts, is not to teach the norms of any specific musical practice. Rather, I challenge students to listen more carefully. In reading spectrograms, students connect sounds' specific acoustic features to what sounds are and what makes them distinct. Beyond the technical basics, such a lesson encourages students both to introspect on their experiences as listeners as they find words to describe their intuitions, and to refine their listening skills by focusing on aspects of timbre they might not otherwise notice. Such outcomes are not restricted to music based on field recordings—these listening skills can apply across a range of musical styles, which I ask students to engage with as soon as one lesson later. I hope that after this assignment, students can—to borrow a quote from Westerkamp's contemporary Maryanne Amacher—"delve into the interacting energy of the spectrum itself, and *listen into the inner life of sounds themselves!*" (Cimini 2022, 73, emphasis hers).

This resource contains:

- The assignment sheet and unannotated spectrograms that I provide to students. (The spectrograms were generated in Sonic Visualiser [Cannam, Landone, and Sandler 2010], and while I encourage students to use the software themselves, I do not always require it.)
- A list of the most common moments students typically identify.
- A lesson plan for in-class discussion, building on students' potential responses to the assignment.

Note that this assignment requires access to the recording of *Kits Beach Soundwalk*, available for purchase (for use with Sonic Visualiser) or streaming (at lower quality, but sufficient for listening) at <https://empreintesdigitales.bandcamp.com/track/kits-beach-soundwalk>.

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## Assignment Sheet

Hildegard Westerkamp's 1989 *Kits Beach Soundwalk* is a classic work of soundscape composition. (The title refers to Kitsilano Beach in Vancouver, BC, Canada.) It is an electronic composition for fixed media: there is no score to analyze, nor do any instruments perform. There is, however, a canonical recording, which I've uploaded to Blackboard/Canvas. Please use the provided recording rather than one from YouTube, as audio compression is particularly detrimental for this piece.

(Content warning: there is a mention of gun violence at 6:30–55, you may skip this portion of the piece without penalty.)

In this 10-minute piece, Westerkamp herself narrates a wide range of sounds that you'll hear. Your task is to use spectrograms to help you concretely describe the sounds she details.

Listen through the piece while viewing its spectrogram in one of the following ways:

- Download Sonic Visualiser from <https://sonicvisualiser.org>. Open the recording in Sonic Visualiser, press Shift-G to make a spectrogram, adjust the settings as discussed in class, press spacebar to start playing it, and it'll scroll along.
- Use one of the two attached pre-made spectrograms; follow along with the marked timestamps.

You may find this transcript of her speech (from McCartney 1999) helpful: <https://soundarto1.files.wordpress.com/2013/03/kits-beach-hildegard-westerkamp-transcript.pdf>.

On your second listen through the piece, choose four sounds that Westerkamp mentions, and describe them with the help of the spectrogram, connecting your aural impression to specific frequencies in the sound. Submit a document that contains, for each of the four sounds you choose:

- How or if Westerkamp describes the sound
- A timestamp in the recording
- A screenshot of the spectrogram, preferably with light annotation
- A few sentences connecting how you hear the passage to what you identify visually

### ***Most Common Moments in Student Responses***

Below is a table listing what, in my experience teaching assignments of this sort, are some of the most common moments for students to identify and describe in their assignments.

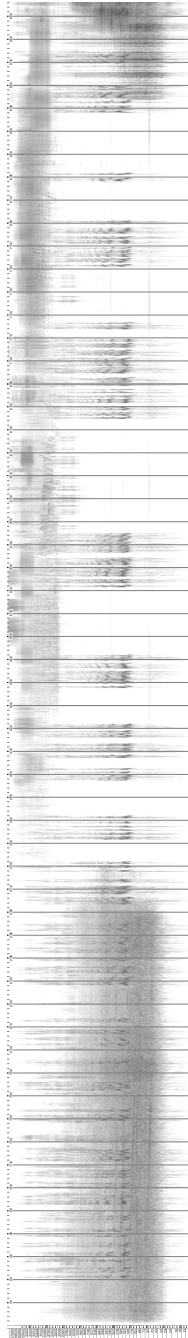
| Timestamp | Westerkamp's description of sound                                                                                                                                                                            |
|-----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 0:18–0:20 | Duck quacking, not mentioned by the composer.                                                                                                                                                                |
| 1:10–1:20 | The composer describes “the tiny clicking sounds;” city noise is also audible but is not described yet.                                                                                                      |
| 1:40–2:00 | “I could shock you or fool you by saying that the soundscape is this loud, but it is more like this.” Westerkamp begins to introduce the artificiality of the recording by adjusting how loud city noise is. |
| 2:33–2:50 | “Suddenly the background sound of the city seems louder again...”                                                                                                                                            |
| 3:00–3:20 | “Luckily, we have bandpass filters and equalizers. We can just go into the studio and get rid of the city.”<br>(This is the single most common sound for students to identify.)                              |
| 3:26–3:50 | “You’re still hearing the barnacle sounds, and already they’re changing.”                                                                                                                                    |
| 4:46–5:00 | “It sounded like a million tiny voices...”                                                                                                                                                                   |
| 6:34–6:48 | “In another dream, I heard bullets tinkling, bouncing like tiny marbles.”                                                                                                                                    |
| 6:50–7:40 | “Like in Xenakis Concret PH 2...”                                                                                                                                                                            |
| 7:40–8:17 | “...sounds of glass blinking and tinkling and sparkling...”                                                                                                                                                  |
| 8:50–end  | “Play with a monster, then I can face the monster.”                                                                                                                                                          |

### ***Sample Spectrograms to Provide to Students***

Examples 1 and 2 provide example unannotated spectrograms, exported from Sonic Visualiser, that can be provided to students.

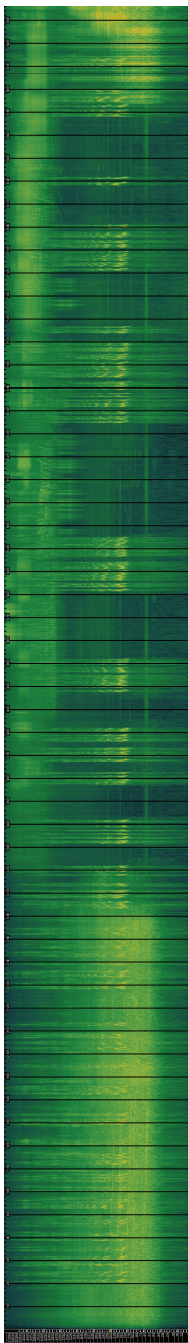
### ***Sample annotated spectrogram (2:55–3:30)***

In Example 3, an annotated spectrogram of a short excerpt shows more detail than a usual student would provide but illustrates the major events of a crucial passage. I have noted Westerkamp’s spoken vowels and consonants, overlaid her spoken text, and identified both city sounds that disappear and barnacle sounds (identified in the piece shortly after this passage ends) that intensify. For assignment security purposes, I have not included annotations for the entire piece.



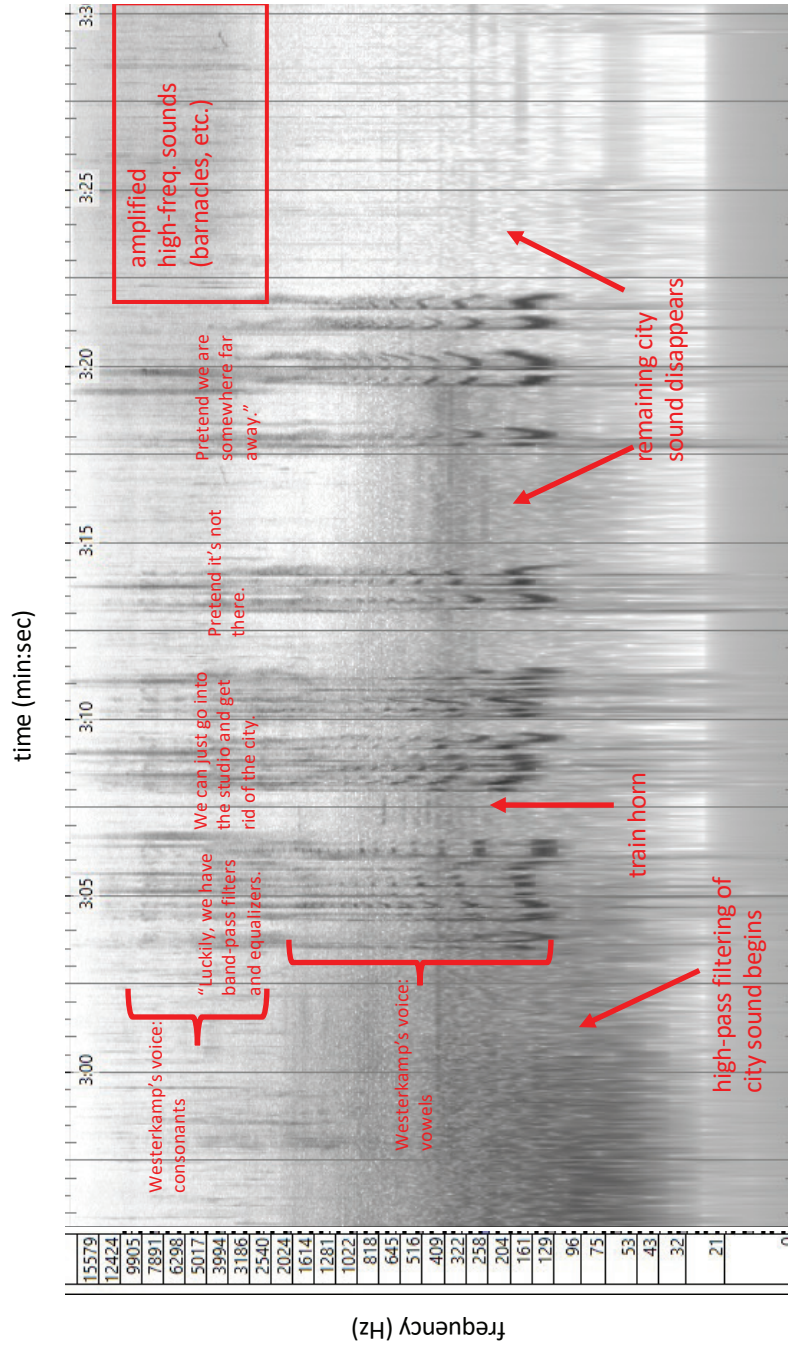
**Example 1**

Unannotated spectrogram in black and white. High-resolution version is available for download [here](#).



**Example 2**

Unannotated spectrogram in color. High-resolution version is available for download at [\[url\].](#)



**Example 3**

An example annotated spectrogram of a short excerpt (2:55–3:30).

***Sample Lesson Plan, Building on Assignment***

Before class:

- In the previous class, introduce the basics of spectrograms, as discussed in the introduction to this resource. At a minimum, cover the acoustic/physical meaning of spectrograms (that they are pitch-time plots) and some timbre-semantic overlay (that we interpret acoustic features of sounds through metaphorical vocabulary).
- Assign the homework shown earlier in this resource.
- I prefer to have the homework due a few hours before class, so that I can review all submissions. I tally all moments that students mention in their responses (the most common ones are shown above), taking note of which students mention which passages.

Class discussion, part 1: going over assignments, first impressions

- Begin by discussing the most identified moments in the piece, perhaps calling on students who mentioned specific passages.
- Most often, students will have mentioned the two clearest places where Westerkamp tells listeners how she is manipulating the recording:
  - 1:40, “I could shock you or fool you by saying that the soundscape is this loud...” On the spectrogram, low frequencies become visibly denser; on the waveform, the overall volume increases and then decreases. Westerkamp’s words describe manipulations she is making to the recording, visible in the loudness of low frequencies (representing city noise).
  - 3:00, “Luckily we have bandpass filters and equalizers...” On the spectrogram here, the low-frequency city sounds completely disappear over the course of 20 seconds; around 3:20, after Westerkamp says “pretend we are somewhere far away,” high frequency sounds (above ~4000Hz) are heavily amplified. See the example annotated spectrogram on page 9.
- These two examples serve to review basic principles of spectrograms and show what the piece does to manipulated sound.
  - Spectrograms are 3d plots—left-right is time, up-down is frequency, and the intensity of a point is a frequency’s loudness at a point in time. So, we can watch certain low or high sounds appear or disappear as the piece goes on.
  - In these passages, Westerkamp describes sounds such as “the city” or “barnacles” or “somewhere far away”—we can hear how each of these sounds maps onto a specific group of frequencies. (In short—the city is low frequencies, barnacles far away are high frequencies. While both seem “noisy,” the difference in register gives them very different characteristics.)

- Depending on the class, I will have us discuss a few other passages that were especially popular in assignments—some of which may be covered below.

Class discussion, part 2: Zooming out to a few general points.

To reinforce a few broader points about spectrograms and Westerkamp's approach to music, I try to weave the following passages into class discussion, even if just a few (or even no) students mention them.

- 0:18, duck quacks and "It's a calm morning..." The prominent duck calls at 0:18 are the first sound to emerge out of the roar of the cityscape, and their high frequencies are visible in the spectrogram. Westerkamp begins her narration immediately after, and the rhythms and pitch of her speech (fundamental and overtones/formants alike) are visible atop the noise.
- 5:36, "smacking and clicking and sucking and spitting." Westerkamp's words here are heavy on fricatives, meaning that her voice often produces very high frequencies. Because the underlying soundscape here is also so high frequency (as she discusses earlier), her voice starts to blend in with the sounds it describes, blurring the boundary between narration and object.
- 7:55, "the way Tomatis wants us to hear Mozart." Shortly after she mentions Mozart, a heavily filtered melodic line on violin becomes audible, and it juts out of the spectrogram with its clear contour and a slightly lower frequency than the shimmering sounds continuing from earlier. A large chord is clear at 8:25.
- 8:54, "then I feel the strength to face the city again...play with a monster, then I can face the monster." Although students often mention the "monster" that ends the last minute of the piece, I have found they seldom note certain details of it. It is, as Westerkamp implies, the background noise of the city that opened the piece, which slowly returns in bursts as her attention shifts. However, it is higher in frequency than the true city sound—comparing the very end of the piece with the opening, we can discover that the city sounds have been expanded to a wider range of frequencies to make them more monstrous.

Once discussion on *Kits Beach Soundwalk* has concluded, I move on to other pieces, possibly from different electronic or post-electronic musical practices. Two more classical pieces I have found to pair well with *Kits Beach Soundwalk* include Westerkamp's own *Fantasie for Horns II*, in which many of the same recording and editing techniques are present but Westerkamp's narration is replaced by an acoustic horn performance; and Helmut Lachenmann's *Pression* (Féron 2024), which encourages students to use spectrogram-style listening for sounds produced unconventionally on a cello. Within a popular music context, *Kits Beach Soundwalk* pairs well with dub reggae, which likewise filters prerecorded material that listeners may recognize—

appropriate examples include King Tubby's "Dubbing with the Observer" and "Fire Fire" (Veal 2007, 119–22). If one prefers more recent popular music, Rihanna's "We Found Love" provides a clear example of filters' importance in top-40 EDM contexts (Peres 2016, 172–82; 2018; see also McKittrick and Weheliye 2017). All three options provide students ample opportunity to focus their attention on changes to spectra across frequency ranges, and to connect their listening to their developing toolkits for describing sound.