

Hello. I'm Daniel Rothman, a sound installation artist, which means that I create environments to experience sound. This can take a variety of forms, but with Listening to Ballona I am very literally setting up an environment for listening to sound I recorded at the Ballona Freshwater Marsh, part of—incredible as it may be—Los Angeles's last remaining urban wetlands. This astonishing phrase, “last remaining urban wetlands” has always made me stop to think: This is Los Angeles County, a large county in a very large state. How is it possible that this patch of land just north of LAX, encompassing less than a square mile, is Los Angeles's last remaining urban wetlands? But that there is no other makes it a fact. I also must add that I began drafting this presentation before the tragic fires in Los Angeles County, this past month, which have had no less an effect on wildlife than it has had on human life.

From other panelists today you will learn about the Ballona Wetlands, what is special and important about it, its history and maybe something about its future. I am creating an aural history of life at the Ballona Wetlands that happens in real time. When I say “life” at the Ballona Wetlands, we must remember that we are talking about an urban wetland, an important ecological preserve embedded in an urban environment, urban culture, ours.

The recordings I made at the Ballona Freshwater Marsh begin April 2022, when I deployed bioacoustic monitors along its southwest side, inside an area protected from public access, as far from traffic noise as possible. Bioacoustic monitors are used by scientists for wildlife recording in the field, and not by musicians. The monitors I use are made by Cornell Ornithology Labs, with special features for continuous long durational recording: months and years long. Not a scientist myself, my purposes for these recordings differ from theirs, and the way their monitors are used.

Although I create sound installations, that was not my primary or, for that matter, original intent. The Ballona Wetlands are a few miles from my Venice home. In 2021 I read an article reporting that Antarctica's Thwaites Glacier is not only melting around its perimeter but also being hollowed by ice melting within it, causing deep sea rivers that

will raise coastlines around the world. This is a very simplistic description of what is happening, has been happening.

With our increasing concern about climate change, my idea was to make a sound document of what we perceive to be a very gradual process, and thus set out to record time passing. Here, I invite you to laugh. It is a preposterous idea. I know it. There is a 1952 piece by the American composer John Cage, 4'33", in which a person seated at a piano does nothing but open and close the keyboard lid between its three sections, never touching the keys; the audience is expected to listen to anything that might happen within that frame of time and accept it as music. Scandalous.

More absurdly, it is physically impossible to listen completely from the beginning of continuous recordings with no future endpoint; we listen in delay. When we use the expression Conceptual Art, this is not unlike what we mean. But the effect of entering into, engaging with the conceptual realm is transformative, and as much so for the sciences as for the arts. Consider for a moment Charles Darwin, who, in 1831, embarked on an uncertain five-year voyage—years spent traveling the seas months at a time to collect specimens from remote corners of the Earth. It is the passage of time that deserves our attention because nothing happens outside it. Listening requires time.

Now, to be sure, I wasn't just recording the passage of time, storing it to listen back after whatever catastrophic event had already transpired for clues, a signal moment we should have been listening for, setting into motion the collapse of a precious ecological preserve. However, this type of data is important for scientific research.

Quoting Michael Stoker, a bioacoustician and founding director of Ocean Conservation Research, endorsing my work to the Ballona Wetlands Conservancy: "While any area may not substantially change from a visual standpoint, systematic changes in an area can be readily tracked through sound — both biological and anthropogenic. [This] effort is important — particularly in light of the planned restoration projects. By having longitudinal soundscape data through the development of these projects, the success and

impacts of the projects can be tracked and — assuming we do arrive at a collection of soundscape metrics — measured.”

It is telling that what scientists call “data,” artists and musicians call “audio.” Scientists that use bioacoustic monitors for long-term recording do not listen to the soundscapes, but employ software to scan through data for the information that concerns their research. Applications such as Raven by Cornell Ornithology Labs and Kaleidoscope by Wildlife Acoustics allow researchers to determine their parameters for batch processing, filtering out extraneous information, i.e. noise.

When I returned to my studio with the first set of SD cards to listen, I really did not know what I should expect to hear. Like looking at a photograph of a familiar scene, the recording device—a lens, a microphone—captures so much more than we apprehend in the moment. We can spend several minutes studying a still image; but while an audio recording is never still we hear more the more intensely we listen. Our memory recalls things we did not think we registered. So conversely, what researchers might filter as noise is also information.

In his book *Consilience*, the late eminent evolutionary biologist Edward O Wilson wrote: “Neither science nor the arts can be complete without combining their separate strengths. Science needs the intuition and metaphorical power of the arts, and the arts need the fresh blood of the sciences.” A *plein air*—in the open air, to borrow from the French a term used for painting (in) the outdoors—recording introduces a strange problem. Whether it is psychological or philosophical, both or anything else, I hesitate to say exactly, so I will extend EO Wilson’s metaphorical power with an analogy, an observation by Robert Harbison that opens his section *Gardens*, from his book *Eccentric Spaces*:

“Every garden is a replica, a representation, an attempt to recapture something, but the form it finds for the act is that of a mental picture, so in spite of its special properties a garden is just another of the images of art. All landscape painting does a kind of gardening, though the idealizing impulse makes a show of diluting itself as we move

toward the present. Pictures like these make us wonder why we don't move from summary to more inclusive summary, leaving the elongated physical form of garden behind for the condensed rectangular versions, substituting pictures for landscapes, and perhaps maps for pictures. But to some extent this happens, and we replace the world with our ideas of it, gardens being intermediate enough to make us think they *are* nature and not simply embellishments or enhancements of it, regions which unlike paintings let us forget there is anything beyond."

It takes no leap of imagination to realize that the Ballona Wetlands, a wetlands that has been urbanized—abused, restored to some degree, overrun by non-native plants and animals, and currently awaiting legal and bureaucratic actions to determine its future—is not considerably different than how Harbison describes a garden: "a mental picture." Our mental picture of the Ballona Freshwater Marsh is not silent; it is exuberant with sound. For anyone who has never actually been there, its sound creates as strong a mental picture as anything. But further down in Harbison's passage—"gardens being intermediate enough to make us think they *are* nature and not simply embellishments of it"—resides our conflict between EO Wilson's "intuition and metaphorical power" of art, and science's "fresh blood."

A single common yellowthroat makes its first plaintive call in the very early morning hours over a chorus of American bullfrogs. No photographer's image or ornithologist's batch data can produce that effect. Dan Cooper, the ornithologist I consulted, who contributed to the 2012 Ballona Wetlands Baseline Study, was surprised to hear its nocturnal call in the recording.

The 2012 baseline study, commissioned jointly by The [Santa Monica] Bay Foundation and State of California Department of Fish and Wildlife, registered between 135 and 150 species of resident and migrating birds (avifauna) at the Ballona Wetlands. Since that study, surveys on a semi annual basis monitor breeding and post-breeding bird communities, and water bird communities are monitored on a quarterly basis. The most

recent count of bird species by the Friends of Ballona Wetlands numbers approximately 250.

Hearing birds sing is often compared to listening to music and there is no scarcity of musicians that have taken inspiration from birdsong. I confess to be among them. But while their sounds appeal to my musical sensibilities, it cannot be said that their songs exist separate from their environment, as let's say a phrase I would play on the clarinet in the middle of the Ballona Wetlands, something from Mozart, for example, even though it may, to us, sound lovely. Apart from our own aesthetic prejudices it is no more connected to nature than a police siren traveling south on Lincoln Boulevard.

Statistically, police sirens far outnumber the occurrences of Mozart and the clarinet at the Ballona Wetlands, and must be integrated into our listening to the urban wetlands, along with the 250 species of birds, and not filtered out as noise. They appear randomly, when the common yellowthroat sings or the great tailed grackle or any other bird, and is part of its soundscape, day after day. We begin hearing two parallel universes, the wild and the anthropogenic, merge and separate, merge and separate, but in spite of their difference these worlds over time blend into one. In fact it is one world, it is ours, not an abstract place on another continent or virtual space. Only by understanding that can "a collection of soundscape metrics" be determined.

Although scientific field recordings assign a single monitor to an area, I had experimented with deploying several monitors within an area. This would be redundant for scientific work where data is batch processed, but deploying several monitors creates for the listener a sense of distance and motion—birds flying, police sirens traveling south—producing the mental image Harbison describes, with maps from sound.

When stereo and multitrack recordings are made, a central clock synchronizes all the input signals. Think about the way we hear: the ears on both sides of our head help us locate sound in space; we are mapping. But although the distance from sound sources are

different to each ear—we have a block between them—our brains process this information so fast we are not conscious of it.

When I returned to my studio with the first SD cards, taken from two monitors situated along the southwest side of the freshwater marsh, separated by approximately 60 yards, I discovered that despite having synchronized their clocks to each other that time and space are not as we perceive them. One of the miracles of evolutionary biology is how our brains process signals so that from where we stand we can make a certain sense of the world around us. And because we all have the same sensory processing abilities we can be in general agreement about what they tell us: I am speaking to you from here.

Synchronizing both audio recordings with their time codes, some details were perfectly in time while others were very slightly off. The more I listened the more disconcerting the situation became because over very long timespans, hours and days, the harder, and indeed more confusing it became to determine which sonic events should be selected to coordinate the timing of the two tracks. It is also important to note that recording outdoors is very different than recording in confined spaces, with walls, floors and ceilings to reflect and absorb sound; barometric conditions are very stable indoors.

The outside is not a controlled environment, which we discover from acoustics; we learn that reality is distorted and making sense of it requires warping it. But how? Sound is affected by temperature, barometric pressure, reflections from buildings, among other variables; birds and vehicles are in motion. The simple sinusoidal tone of a sweeping police siren was useful for this problem.

When I walk the dirt road around the west side of the Ballona Freshwater Marsh and meet people out to photograph birds, their ears are their guides. Where would they begin to look other than for the most obvious avifauna gliding across the marsh?

They move through space with such intention that we often think no more of it: bird on a branch flies off somewhere. In general a bird is registered by our consciousness like a

random event. But let's try to overcome our cognitive handicap. The bird is going somewhere, navigating and mapping free space, space that is not a solid plane like ours; and moving a great deal faster through it than we do walking or running. The problem of sound synchronicity I encountered opened a window on the acoustics of avian navigation. We are not modeling how birds perceive but how open space around Ballona affects sound externally to the human. We can take this to be the environment birds navigate through better than the way we ourselves hear to infer some of these conditions.

It is difficult to summarize the many acoustic parameters birds in flight calculate: atmospheric effects include temperature gradients and barometric pressure that bend soundwaves, wind and turbulence; surfaces that absorb, reflect and refract sound at always changing elevations—the difference, for example between a body of water, which reflects sound, and the earth, which absorbs it. Two primary cues birds use for locating sounds in the horizontal plane are not so unlike humans: interaural time difference and interaural level difference; but birds can locate sound in the vertical plane without external ear structures by head-induced acoustic cues with a process called contralateral sound modification. With these and many other techniques, integrated with visual systems, birds map space.

“Birds,” of course, is a generic term. The 2012 Ballona Wetlands Baseline Study was the last comprehensive survey of vegetation, mammals, avifauna (birds), and water and soil analysis, made over a two-year period. It is based on earlier studies from 1981 and 1943, with conditions and findings quite different. While the most recent study from 2012 lists the different species surveyed, distributions are particularly detailed of where in the Ballona wetlands the Belding Savannah Sparrow and Common Yellowthroat reside—noting that different species have reasons to prefer different areas of its freshwater marsh, riparian streams and saltwater marsh, uplands and lowlands; each distinct ecologies. So we must infer that as many as one hundred or more migrating species find their essential Ballona Wetlands not by accident but by complex navigational systems, signal processing powers, decision-making skills and flock leadership when confronting conditions in the air. We know that they don't come to the Ballona Wetlands to decorate it, they find

sustenance in it: vegetation and insects, other wildlife, some of them other birds or their eggs. It is Romanticism but not always romantic.

Many of us can remember a day lying somewhere in a field or by a lake, briefly aware of the sounds in the environment before our minds drift off to someplace else. The sound installation *Listening to Ballona* in the Small Conference Center is someplace else, but if you concentrate your attention to the recorded environment it is even possible to hear daybreak, the heat of the sun and day turn to night, not only from the sounds of the wildlife, but the quality of the air itself.

Thank you.