

Making waves: underwater recording

Sound travels five times faster underwater than it does in the air and the sea is a hidden cacophony of sound that's being explored by field recordists and experimental musicians alike. Here, Jack Needham meets some of the people using hydrophone microphones to record the hidden audio of the earth's oceans...



All of us hold a perceived notion of what water sounds like. We hear the thick bubbling of waves lap against the shore or the gargled white noise as you dive into a swimming pool and generate our perceptions from there. Even in the groundbreaking TV series *Blue Planet II* we're offered an up close view of what the ocean depths look like, yet much of what they sound like is replaced with anthemic orchestral scores. But the ocean is a cacophony of sound far beyond anything Hans Zimmer conjures up, rich with an infinite amount of undiscovered aural textures.

"There's a wonderful and rich sound environment underwater," says Jana Winderen, whose underwater experiments have seen her place frozen underwater microphones - known as hydrophones - in water to record itself melting to lowering a microphone 90 metres below the surface to listen to life found underneath a glacier. "It's always exciting, and it's getting into people's minds more now which is fantastic."

In the '60s Katy Payne and her husband Roger were the first to discover that whale noises were composed songs that change and develop over time. Their work helped spark an aesthetic interest in underwater sound and built a burgeoning amateur interest in the musicalities of oceanic noise.

“These sounds are of our world, but they’re also not of our world, and therein lies the fascination,” thinks sound designer and composer Douglas Quin, whose sound works have featured in Werner Herzog’s Encounters at the End of the World. His 1998 release ‘Antarctica’ is formed of recordings excavated from across, and underneath, Earth’s most southern point, recordings that still resonate today. “We have this innate sense of wanting to connect, and sound operates differently than the other senses. It’s a different part of the brain, and it touches us in a slightly different way.”

For ‘Antarctica’ Quin experimented with multichannel microphone arrays, drilling through over two metres of ice to lower three hydrophones into the ocean at various depths, 100 metres apart from each other. This created a vertical column of sound that, when back in the studio, can be manipulated and tuned to a 5.1 surround sound environment or a 360-degree space for exhibitions.



Douglas Quin

On the LP, the call of a weddell seal resembles a synthesiser pulse, a deep sea lullaby that’s as blissful as it was sometimes troublesome to capture.

“I could hear the seals below, and the next moment I had fallen asleep in my tent and the heat of my face froze my beard to the ice,” laughs Quin. “Patience is the name of the game with any type of field recording, but it’s also about having the luxury of time and space to wait for your moment. The right time of day, season and weather, a perfect storm without the storm.”

Conditions were ideal for Quin when recording on the South Pole. Life underneath the ice affords a perfectly still sea state, drastically reducing distortion and interference. In more active terrain waves, currents and choppy waters make capturing a clear sound near impossible, something filmmaker Mark Lyken contended with for his *The Terrestrial Sea* project.

For ‘*The Terrestrial Sea*’, Lyken spent time recording on the Cromarty Firth, coastal waters found in the north of Scotland and home to competing landscapes as bottlenose dolphins and grey seals swim among cargo vessels. “Nothing prepares you for the size of an oil rig until you’re a couple of metres away from it in a boat,” says Lyken. “And they’re not silent. You’d be hard pushed to imagine there’s still life in the water with that going on, but it’s a rich, sonic environment, and when those things are happening sonically why would you try to augment that?”

Lyken spends his time in Dumfries and Galloway, operating his label Soft Error while nestled among the Scottish woodland. Soft Error leans toward the more experimental side of electronica, whether it’s the rumbling of broken waves on Phil Maguire’s ‘brak’ or, on Dirch Blewn’s ‘Care Work’, computer music composed by a robot called Leonard.



Jana Winderen

It's not a sound we more commonly associate with Scottish ambient. "One of the problems with making electronic music in Scotland is that as soon as you do anything, you sound like Boards Of Canada," he laughs, yet his work on *The Terrestrial Sea* marked a change for the former synthesiser obsessive.

"That experience opened up an entire universe of sound across many different possibilities that weren't synthesised. That was the real difference, going from making sounds to capturing sound, or in a live situation, creating collages by layering untransformed sounds. I still go through phases of using synths, but the real world is way more interesting."

Like any musical craft field recording has its various techniques. Some place a microphone in the water and capture those fleeting excerpts of sound. "I don't record from start to finish and log things along the way. It's great if you do that, but I just don't have the attention span for it," says Lyken.

Others, like Winderen, actively scope out those tiny sounds that awaken after five hours sat on a frozen lake. "We're really impatient in the environment we're in," she says. "It's hard to sit and look at nothing, but if you're impatient you can't listen. You can put out a hydrophone, leave it there and be excited about what you hear when you listen back, but if I hear a fish I search for it. It's an active way of listening."

Sound travels around five times faster through water than it does air. For some perspective, a whale will hear the rumble of a passing cargo ship for 24 hours, or in the moist, humid air of a rainforest, sound waves retain their shape for longer. In that, says Quin, landscapes have their own unique sound features.

"You can hear a valley before you see it through the trees," thinks Quin. "If you're tuned in enough, and this comes with experience, you begin to develop the faculty for reading a landscape in anticipation of how it may sound unique."

"10,000 year old ice will sound different to one year old ice," adds Winderen. "If you put the hydrophones inside of the ice itself, the pressure, how the ice melts, how the oxygen is released, it will all sound different."

To the Japanese producer Yosi Horikawa this vastness of underwater sound becomes something to manipulate. "I use the sound of water in my music in many different of ways," explains Horikawa. "When the water beats against a rock or hands touch the water, the sound changes every time, and I use it like the musical instruments. It can become percussion or a damp scenery, but it's not only the actual sound of water that appeals to me. Everyone recognises the sound of water so I try to connect

these sounds with someone's memory. These sounds could be someone's story, becoming a more complex experience that's greater than music."

Sound artist and composer Kaffe Matthews shares in Horikawa's belief in communal listening. Together with FoAM_Kernow and marine biologist Dr. Kirsty Kemp, she co-built the sonic kayak, a boat that uses the sea as an instrument. Hydrophones suspended into water from the kayak transport the sounds from below through speakers mounted on the boat itself, and as the water temperature fluctuates, this raises and lowers the pitch of the instrument, allowing listeners to detect and record ocean micro-climates as they float over its surface.

"The act of being on the water yet being able to have an experience of what's beneath the surface is incredible," explains Matthews. "We use them to gather data yet at the same time we get a weird, beautiful or interesting sonic experience you wouldn't have otherwise. It's a doorway into different things for different people."



Jana Winderen's location recording gear

In 2012 Matthews premiered her audio installation 'You might come out of the water every time singing'. Using data taken from the swimming patterns of six hammerhead sharks, mapped to a 3D space of latitude, longitude, and depth, she connected the movements of each shark to a tri-oscillator system, creating an 18 oscillator synthesiser that ebbs and flows with the shark's movements. First

appearing within an immersive audio installation, over time, this set of parameters became an instrument adapted from a gutted MIDI controller converted to OSC.

“The shark data is stored inside the computer, and when I kick the system off, the sharks will start to fly through the system of oscillators,” explains Matthews of the instrument. “I’ve played with it a lot so I know what they’re going to do but not exactly when. It’s always creating a new set of ingredients. Essentially I duet with the sharks when I do a gig.”

Travel back just 10 years and underwater recording was an endeavour reserved for those who could afford the expensive equipment. For ‘Antarctica’ Quin’s hydrophones cost over \$5,000 each, something your casual weekend recordist can’t afford, but nor do you need a set up of Quin’s standard to dangle a hydrophone from Brighton Pier. Starter level hydrophones like the Aquarian Audio H2a Hydrophone can be picked up for a few hundred pounds.

For beginners looking to scour the depths of their local pond, even a waterproof case for your iPhone would suffice. “I’m conscious of two things,” says Lyken, whose background as a graffiti artist and an electronic musician has influenced a more DIY approach to his work. “Firstly, I don’t have the money to buy high end mics, and secondly, I’d hate to suggest that you need to use really expensive equipment in order to create something. That’s not the case. It doesn’t need to be a privileged pursuit, if you have a laptop you have all you need to edit sound.”

Of course, the more people that take up the endeavour the more harmful it is to the environment you’re trying to record. Formerly disconnected refuges are now an AirBnB away, and while mostly well intentioned, amateur recordists may not be aware of the ethical rules that are vital in keeping field recording sustainable.

“The whole point is to share this world with as many people as possible, but too many tourists would destroy the environment,” says Winderen. In that, her work documenting the deep blue finds greater importance now more than ever, remaining committed to navigating those challenges in the pursuit of discovery.

“Once, people were not so aware of underwater noise, but thankfully people are realising we have this huge sound environment underwater and recording is a way to bring attention to these sensitive ecosystems through sound,” she says. “It’s an unusual sense for us to think about the underwater world but every time you record it you get a surprise. That’s what keeps me doing this.”