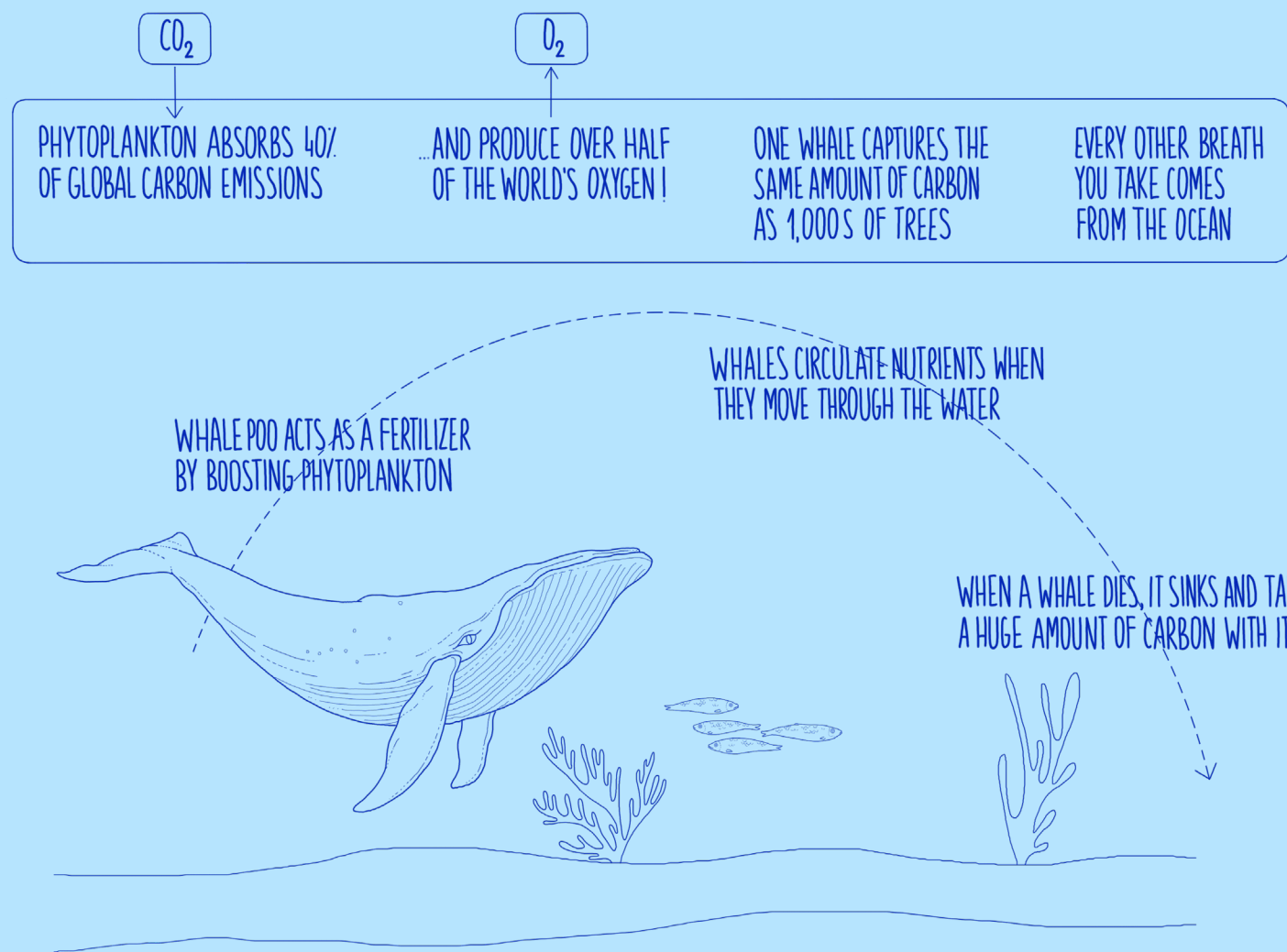




Whales and Anthropogenic Noise

A proposal by students from the Royal College of Art in
collaboration with students from the Royal College of Music,
London, UK.



Introduction.

Whales are indicator and keystone species, storing carbon in their bodies, fertilising the seas and circulating nutrients from the surface to the depths of the ocean. They have existed for over 50 million years, have complex, species specific culture, travel huge distances at varying depths and are found in all oceans. They speak uniquely of the health of multiple ecosystems impacted by the changes of the anthropocene.

Roger Payne's seminal 1970 album Songs of the Humpback Whale brought whale song and the soundscape of the ocean to public attention, helping foster the Save the Whale campaign against commercial whaling and the subsequent whaling ban by the International Whaling Commission in 1986. Whale song, with its phrasing, rhyme and continuous variation transformed our understanding of the ocean from a place of silence into a complex, vibrant soundscape full of sophisticated, intricate life forms. This soundscape is now known as the biophony.

Whales rely on sound in an extremely sophisticated, embodied way to hunt, socialise and navigate. As Philip Hoare notes in his book, *The Whale: In Search of the Giants of the Sea*, "light and smell doesn't travel easily through water but sound does. It is the most important sense for underwater animals." In addition, sound travels at least four times faster in water than it does in air. Biologist and author of *How to Speak Whale*, Tom Mustill, describes cetaceans as "super listeners" explaining "a sonar pulse close by could be like a sound bomb."

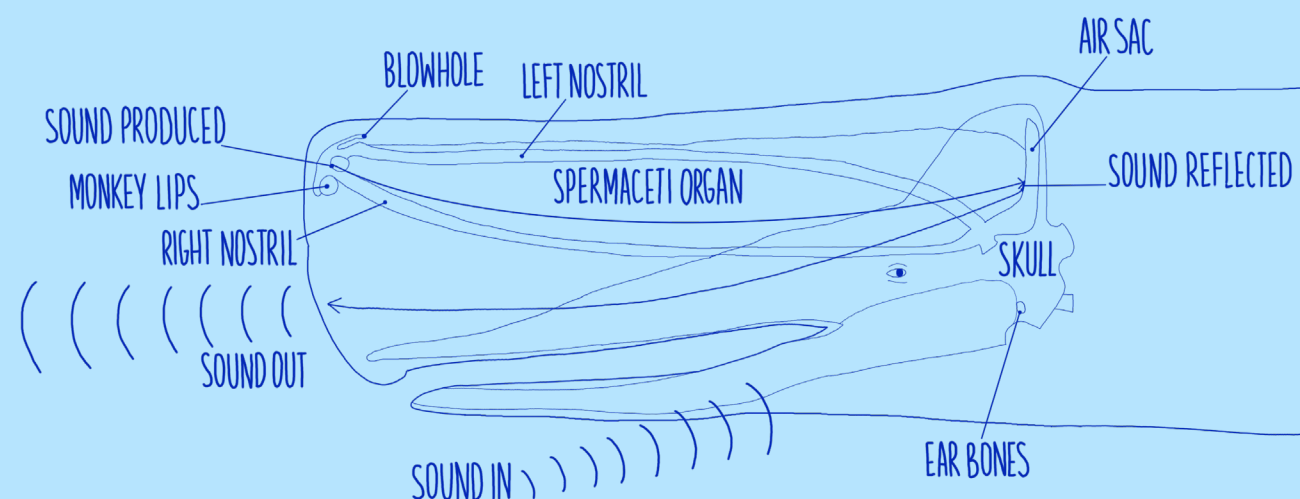
Whale song, and the culture it indicates, is once again under threat, this time from anthropogenic noise (anthropophony) that pervades every ocean, often at alarming frequency. Our proposal wishes to draw attention to the effect this changing soundscape has on whale behaviour and how this impacts the marine environment upon which we all depend.

NOISE IN THE OCEANS

As our reliance on extractive, capitalist led industry persists, the oceans are increasingly invaded by the noise of explosive devices searching for oil and gas, military exercises and ever expanding shipping channels. Fossil fuel searches are often conducted at the relentless pace of 10-20 second intervals throughout the day. As Nicola Jones notes in her 2019 article for Nature magazine:

'There is no global map of ocean noise, but researchers agree that ship traffic approximately doubled between 1950 and 2000, boosting sound contributions by about 3 decibels per decade. That translates to a doubling of noise intensity every 10 years...The blast of a seismic air gun used to map the seafloor for oil and gas can be as loud as a rocket launch or an underwater dynamite explosion; ship engines and oil drilling can reach the roar of a rock concert...Some of these sounds are audible for hundreds of kilometers.' (Jones, 2019)

In addition to machine derived noise, a warming climate also disrupts whale songs and their well-being. Melting and cracking icebergs as well as more extreme storms are changing the underwater soundscape. Even green energy initiatives such as wind turbines at sea have a noisy footprint.



IMPACT

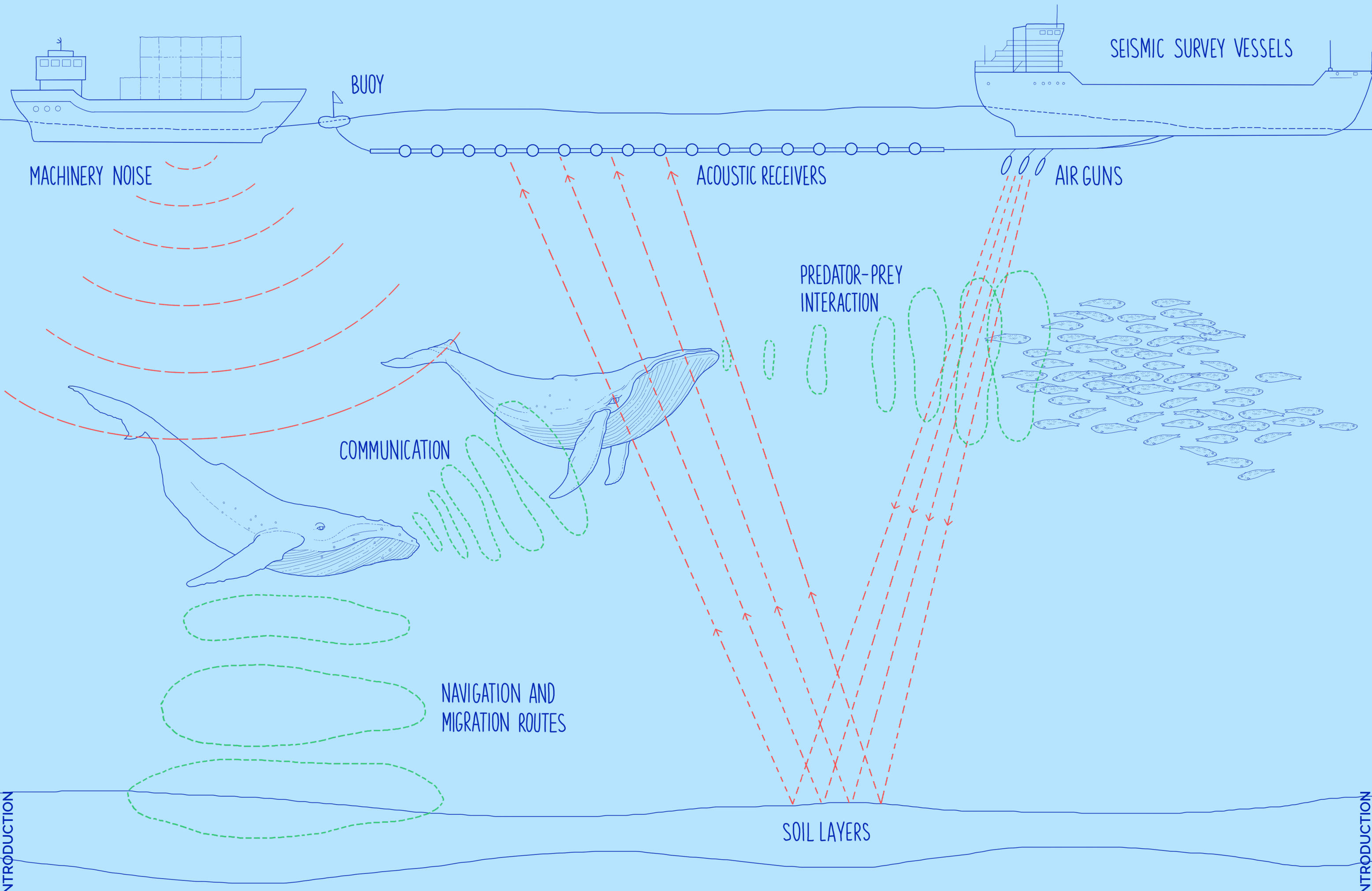
'Globally, there is growing evidence that anthropogenic noise is negatively impacting marine life.' (Rosalind et al., 2012)

'climate change is changing Earth's natural acoustic fabric.'

Studies published by The Royal Society in 2012 and OceanCare state that responses of whales to increasing noise from shipping and airguns include, among others: habitat displacement, behavioural changes and alterations in the intensity and frequency of intervals of calls, reduced communication, trauma, avoidance of loud areas even for years, as well as disruption of reproduction and migration processes.

Military sonar can reach volumes of more than 200 decibels and can be fatal for cetaceans; causing mass strandings, disorientation, decompression sickness and bleeding eardrums. Cracking ice and volatile weather patterns are moving water and wind in new ways, adding their own voices (collectively known as the geophony) to the ocean soundscape. In addition, the warming climate is acidifying the oceans, changing the speed and distance that sound travels through water. As the oceans continue to warm, different whale species are moving north for food. How will this impact the soundscape for species native to those regions?

How can we attempt to understand the full impact of this collective trauma on whales? Are they changed in ways we are unable to fathom? The environmental philosopher Glenn A. Albrecht coined the term solastalgia to refer to the lived experience of negative environmental change and argues that animals, as our kin, are also likely to experience solastalgia. Might anthropogenic noise in the oceans be a way to investigate this and the potential for communication between species further?



MACHINERY NOISE

BUOY

SEISMIC SURVEY VESSELS

ACOUSTIC RECEIVERS

AIR GUNS

PREDATOR-PREY INTERACTION

COMMUNICATION

NAVIGATION AND MIGRATION ROUTES

SOIL LAYERS



Photoshop visualisation of proposed lighting, projections and performance at The Natural History Museum

Proposal 1:

We wish to draw attention to the effect the sounds of the Anthropocene has on whale behaviour and how this impacts the marine environment upon which we all depend, in the form of:

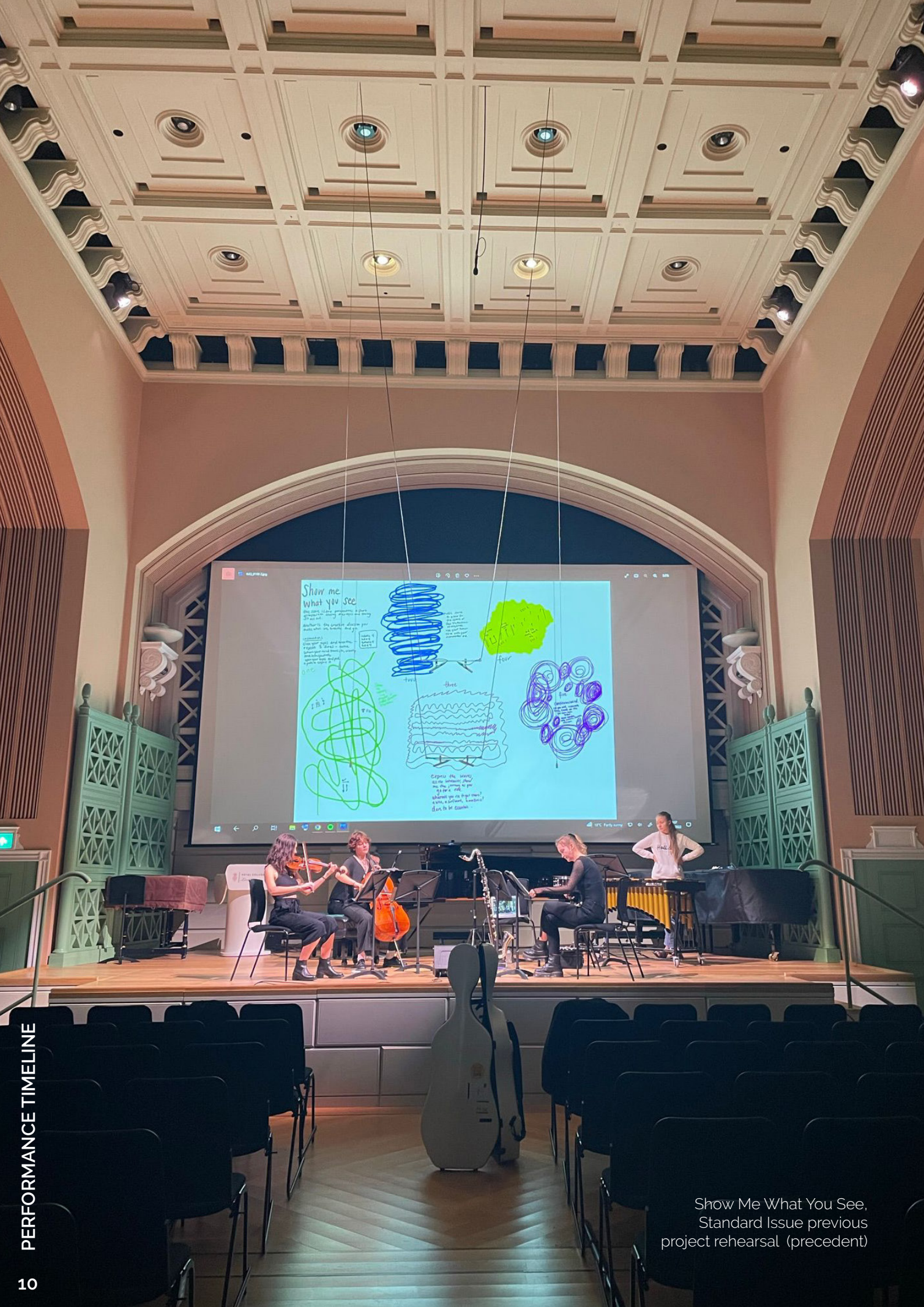
A MUSICAL AND VISUAL PERFORMANCE: HOME FAR AWAY

We are collaborating with musician **Michelle Hromin** and her collective **Standard Issue** on a performative response to the soundscape of the oceans, the invasion of anthropogenic noise and the concept of solastalgia. A workshop to gather feedback on the performance and the themes it explores could be held afterwards.

Standard Issue is a London based new music collective that is passionate about the accessibility of new and experimental music with an aim to create unique concert experiences and events that eliminate the barrier between performers and the audience. Artistic Director Michelle Hromin is a Croatian-American clarinetist specializing in contemporary and experimental music.

Together, we are drawing inspiration from field recordings of whales and anthropogenic noise provided by scientists to explore displacement and the idea of solastalgia. We are beginning with a text score called *Home Far Away* based on practices of deep listening and sound pulsation. Performers will then interact with pre-recorded sounds and cultivate a humanized sense of solastalgia to mimic that of whales. The final event will take the form of Standard Issue's live musical performance and a live drawing performance by RCA Painting student Cassie Vaughan. This drawing will be displayed on a screen behind the performers and act as a conversation, both with the musicians and the sounds to which they are responding.

Rehearsals will begin in early March at the Royal College of Music.



Show Me What You See, Standard Issue previous project rehearsal (precedent)

Performance Timeline:

MARCH

Standard Issue rehearsals at Royal College of Music to begin.

Standard Issue and RCA students to meet and discuss performance ideas and rehearse together.

Final sound files and related permission to be agreed.

Tech requirements for playing sound files and screen projection to be understood/prepared.

APRIL

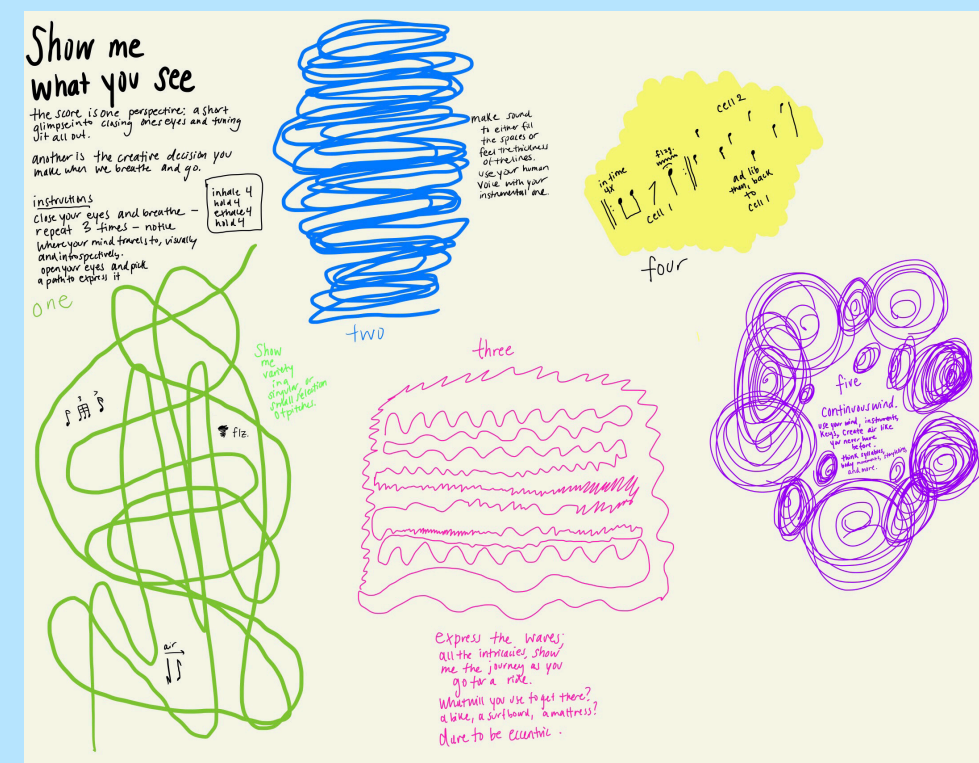
Set Design to be discussed/created.

MAY

Performance costumes to be designed in conjunction with RCA Textiles students.

JUNE

Performance to take place on World Oceans Day , 8 June.



Show Me What You See, Standard Issue previous project notations (precedent)

Proposal 2:

LIVE DISCUSSION

This will take the form of a seminar and Q&A with Tom Mustill, biologist and author of *How To Speak Whale: A Voyage into the Future of Animal Communication* to discuss the ways in which whales communicate and the potential for cross-species communication. This will take place at the RCA in March, 2023.

We have also contacted the following experts with questions relating to the research or regarding a possible event:

David Gruber // lead for Project CETI regarding the impact of anthropogenic noise on whale communication. Project CETI aims to deepen our ties to animals by seeking to understand sperm whale communication – and eventually talk back.

Glenn A. Albrecht // eco-philosopher, academic and author of *Earth Emotions*, who coined the term solastalgia regarding whether animals/non humans might experience solastalgia.

Ari Friedlaender // Ecologist and Associate Editor for *Marine Mammal Science*. Principal Investigator in the Southern Ocean Research Partnership to conduct non-lethal research on cetaceans in the Southern Ocean.

Jörg Rychen // Scientist and whale communication expert, currently recording vocalizations of wild orca.

DAREWIN // A collective of audio engineers, researchers, physicists, cinematographers, journalists, freedivers, and ocean lovers sharing ocean recordings and video footage on an online platform.

Sonia Levy // an artist and academic focusing on shifting modes of engagement with other/more-than-human worlds in light of prevailing earthly precarity. Levy was artist-in-residence at the Húsavík Research Centre on Cetaceans in North Iceland between 2013 to 2015, working closely with cetologist Dr Marianne H. Rasmussen and the Húsavík Whale Museum.

The producers of Sonic Sea // A documentary about anthropogenic noise in the oceans regarding a film screening at the RCA, which could be opened to the public. A workshop to discuss this documentary and the issue of anthropogenic noise in oceans with RCA students or local school children. (<https://www.sonicsea.org/film>)

National Oceanic and Atmospheric Administration Fisheries // A US based organisation responsible for the stewardship of US ocean resources and their habitat backed by sound science and an ecosystem-based approach to management.

Kate Stafford // Senior Principal Oceanographer at the University of Washington and an Affiliate Associate Professor in the School of Oceanography at the University of Washington in Seattle. She is also an Associate Professor and Principal Investigator at Oregon State University in the Marine Mammal Institute. Her research focuses on the changing acoustic landscape and the impacts of declining sea ice and human industrial influences affect Arctic marine mammals.

Thom van Dooren // field philosopher and writer and Deputy Director of the Sydney Environment Institute and an Associate Professor in the School of Humanities at the University of Sydney, Australia regarding whether non humans experience solastalgia and the impact of extinctions on ecosystems.

Lamya Essemlali // Environmentalist, Co-founder and President of Sea Shepherd, France. (<https://www.waterbear.com/watch/mini-doc/6307689d72702b44047186f4>)

About Us.

Aaron Naish

Aaron is a designer trained in architecture currently undertaking a Masters of Architecture degree at the Royal College of Art. He completed his undergraduate in 2021 at the Arts University Bournemouth, where he was awarded the Terence and Annette O'Rourke Prize for Architecture, the AUB Sustainability Award and was nominated for the RIBA Bronze Medal. He has previously installed a fabric and projection installation exploring the relationship between mystery and bodily movement; through light, shadows and tactile interaction.

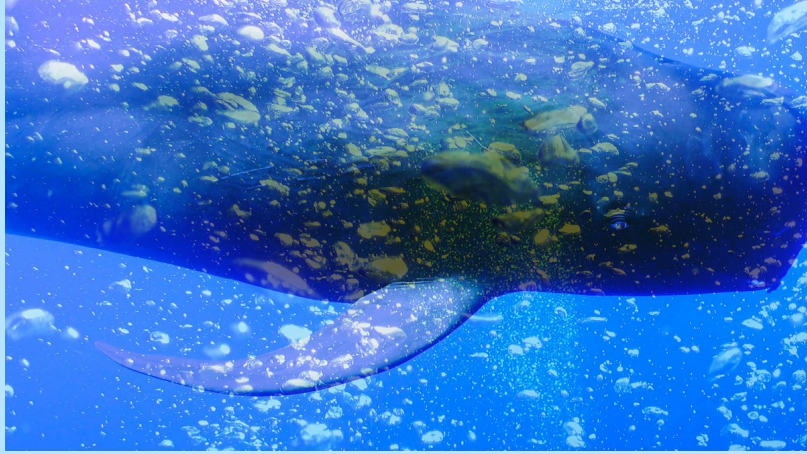
Cassie Vaughan

Cassie is currently undertaking a Masters in Painting at the Royal College of Art. She is interested in using unintentional marks to create nature based spaces that question the control of the maker and the dominance of human presence in ecosystems. Layering print, drawing, painting and collage, the work explores notions of excavation, environmental dislocation and spaces between decay and growth. Most recently, her paintings explore the concept of umwelten; how these worlds interlink and how they are disrupted by extinctions.

Daria Szmucer

Daria is a first year MA Architecture student at the Royal College of Art. Her interests lie in architecture for more-than-humans that removes the post-industrial separation between nature and people. In her studio project, she's been investigating relationships between humans and other-than-humans shaped by mass consumption and food production methods, in order to establish new, non-extractive forms of cohabitation.

Who Speaks for the Oceans?



On Sonorous Seas



Vox Balaenae



From a Whale's Back



Reference Projects.

Who Speaks for the Oceans?

<https://weissman.baruch.cuny.edu/mishkin-gallery/>

The exhibition proposed new and challenging ways to shift our understandings of and relationships to whales and other nonhuman animals. Through over fifteen interdisciplinary artworks in video, installation, painting, tapestry, music, performance, and more, Who Speaks for the Oceans? analyzed epistemological and historical knowledge built around what we think we know about life in the ocean through the charismatic "whale song."

On Sonorous Seas

<https://www.onsonorousseas.com/>

An exploration of the effect of military sonar on whale populations off the Hebrides. The project was spearheaded by artist and archaeologist, Mhairi Killin but collaborators include composer Fergus Hall, artist Tom deMajo, poet Miek Zwamborn and calligrapher Susie Leiper. The project took the form of a podcast series, an exhibition and poetry and musical performances.

Vox Balaenae (Voice of the Whale) // George Crumb

<https://www.youtube.com/watch?v=cGPQLXPV5wE>

A work for electric flute, electric cello and amplified piano by the American avant-garde composer George Crumb. Vox Balaenae was inspired by the whale song recordings of Roger Payne. In 1971, Crumb drew on these sounds as the inspiration... "Although the piece has eight movements, these are grouped into three structurally similar parts: the first two movements ("...for the beginning of time)", five variations named after geologic time periods, and the last movement ("...for the end of time)".

From a Whale's Back // Yolande Harris

<https://www.yolandeharris.net/project/from-a-whales-back-project>

From a Whale's Back (2020) is an installation that explores the visual and sonic underwater world inhabited by whales of different species—orcas, humpbacks, and minke whales—from Antarctica to the northeastern Pacific. It uses video taken from tags used by scientist Ari Friedlaender to monitor whales.

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Figure List.

Figures 1 & 2: Hromin, M. (2022). London.

Figure 3 (Who Speaks For The Seas?): Hatori, M. (2022) *Do Whales Dream of Electric Human*, Mishkin Gallery, New York

Figure 4 (On Sonorous Seas): Killin, M. (2022) *On Sonorous Seas*, An Tobar and Mull Theatre, Isle of Mull

Figure 5 (Vox Balaenae): Crumb, G. (1971) *Vox Balaenae*, performed by Christoph Boner, Anna Katharina Grote and Katrin Szamatulski, Jazzkantine 2012, Lucerne

Figure 6 (From a Whale's Back): Harris, Y. (2020), *From a Whale's Back*, Radius Gallery, Santa Cruz

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