Drawn Chorus: The creation of embodied drawing processes responsive to the detrimental impact of human-produced sound on humpback whales

An exegesis presented in partial fulfilment of the requirements for the Doctor of Philosophy, Fine Arts.

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ABSTRACT

Drawn Chorus is an embodied speculation on how "sound" is experienced as pressure from a whale's perspective. At the heart of this methodological drawing study is my investigation of an intuitive space between "perceiver and perceived", in which I listen, imagine and speculate on a whale's experience of human-generated sound as it interferes with the natural sound environment of oceanic space. Sound is essential to these marine mammals; it is a primary means of communication. Noise travels through the sea as pressure, and it travels further in the sea than in the air. Through the development of drawing research processes that tune into bodily, sensory and gestural responses to ocean acoustics, a visual language for the unseen sound forces experienced by whales has evolved. Relational encounters with science and nature played a role in this production of knowledge.

For this research, I have evolved a multifaceted visual language for pressure through attunement to: 1) NIWA scientists researching the impact of human-generated sound, 2) my own direct sensory experiences from swimming with whales in their wild habitat, and 3) my own speculative and imagined responses to environmental stresses. In my drawings I have intertwined the journey of a line with my own sensory and intellectual understandings of the complexities of pressure experienced by whales in compromised marine environments.

What knowledge does a methodological investigation amongst the "thick flesh" of the "world" between "the body sensed and the body sentient" (Merleau-Ponty 1968, 138) reveal? My embodied drawing methodology inhabits a critical space which contributes to aesthetic speculation on the whale's experience of human-generated sound. For this thesis, Maurice Merleau-Ponty (1968) provides a useful conceptual and theoretical entry point to an embodied understanding of the space in-between the "seer and the seen". This embodied research takes place in the perceptual space of the "chiasm"; Merleau-Ponty's theories of "intertwining" are relevant here because they explore a crisscrossing or exchange between the sensing body and sensed thing. I have reimagined this intertwining within the chiasm as a drawing process.

Donna Haraway's concept "making kin" is also crucial because it unfolds contemporary theory on entering the "troubled contact zone" or "troubled patterning" between human and non-human. This thesis also introduces the term "embodied pressure" to describe the key processual drawing investigation that evolved during this research. Through embodied understanding of environmental pressures this research explores the body as a site of cognition to address specific ecological concerns.

LIST OF ILLUSTRATIONS

Unless otherwise noted: all photographs of the *Drawn Chorus* examination installation have been taken by Harry Culy and are reproduced courtesy of Whiti o Rehua School of Art; all photographs of my own works have been taken by me.

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To my PhD cohort, dear friends and family, thank you.

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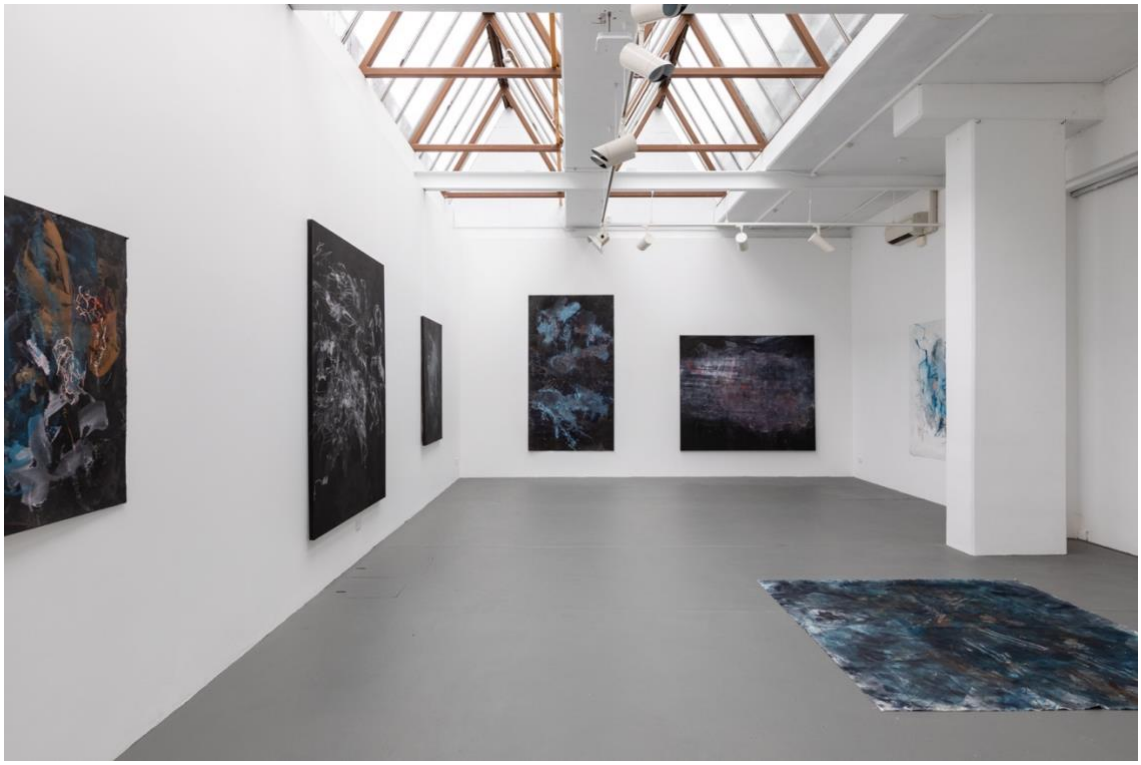

Figure 1. Installation view, Drawn Chorus. *The Engine Room, Massey University, September 2020.*

Figure 2. Installation view, Drawn Chorus. *The Engine Room, Massey University, September 2020.*

PRELUDE: Diary Entry, 30.8.17

As I write this, I am sitting on the water's edge of Sandy Beach at the northern tip of the Ha'apai group of islands in Tonga. The water laps onto the golden sand. For the last two days I have been swimming with humpback whales. The waters around the Ha'apai group of islands are a sanctuary for whales, who come here from the Antarctic via New Zealand and Australia to give birth to their calves. Locals tell me that the whales have been born early this year and that the population appears as strong as ever with a similar number returning.

The Tongans have strict ethical laws around swimming with the humpbacks. We only swim with the mother whale's approval. We swam toward her head so that she could check us out, keeping a distance of five metres between her and us. It's then her choice: she could dive with the baby or let us swim alongside.

It is a completely surreal experience swimming beside a whale and her baby with five metres between you. I stayed in line with the mother's eye, swimming on my side, keeping my fins low to cut down any noise that could frighten her.

My longest swim was close to an hour; ninety minutes is the maximum allowed by Tongan law. The mother whale was calm and the baby rode above or below her head coming up to the surface for air every three minutes. The mother kept an eye on my Tongan guide Victor and myself but swam slowly, possibly so that we could keep up. The mother does not eat while in the sanctuary, her sole job is to feed and teach the calf.

In the distance males sing to her. Groups of four or five male whales will compete to become an escort to the mother and baby. Groups of males will swim in what's called a heat run after the mother and baby. They will breach on each other with their heads until there is a winner; then the job application process is complete and he takes up his appointment as escort. The escort will accompany them back past New Zealand and on to Antarctica. I am told there is nowhere to rest between Australia and New Zealand so the calf must be strong enough for the journey. The Kermadecs is a danger region where white pointers could attack; again, the baby must be strong enough to fight off attacks here.

The juvenile males sing to the whale to attract her. During the swim I recorded the whale song on an underwater GoPro along with video and photographic documentation of the experience.

Figure 3. The artist swimming with whales in Tonga, 2018. Image courtesy of Glen O'Toole.

INTRODUCTION

What knowledge does a processual drawing investigation amongst the "thick flesh" of the "world" between "the body sensed and the body sentient" (Merleau-Ponty 1968, 138) reveal? I have been speculating on and imagining sound as it is experienced in the ocean by humpback whales. My research is concerned with the creation of innovative drawing processes responsive to ecological concerns; in particular, processes created in response to investigations into the detrimental impact of human-produced sound on humpback whales. Relational encounters with science and nature played a role in this production of knowledge. Through the development of an in-depth drawing research process that tunes into bodily, sensory and gestural responses to ocean acoustics, a visual language for the unseen sound forces experienced by whales has evolved.

Formulation of the Topic: *Drawn Chorus*

Sound is essential to whales; it is their primary means of communication. Noise travels through the sea as pressure, and it travels further in the sea than in air. According to the Discovery of Sound in the Sea project (DoSitS 2019), "masking" occurs when noise interferes with an animal's ability to perceive (detect, interpret and discriminate) a sound. This acoustic interference reduces their ability to identify or understand sounds of interest. The natural oceanic chorus is juxtaposed with noise amplified through increased human-made activity, including from freight, fishing and cruise vessels, as well as military sonar and seismic surveys undertaken by the oil industry. Oceanographer John Hildebrand explains this phenomenon as follows:

> Disruptions create barriers between whales and information they need to know about their habitat. There is growing concern among scientists that anthropogenic noise is having a significant detrimental effect, adding to stress caused by depleted food sources, fishing-gear entanglement, overfishing, pollutants and ship strikes (Hildebrand quoted in Grossman 2010).

This project began primarily when I first experienced swimming alongside whales with an indigenous guide in the Tongan outer islands. On my return to Aotearoa, I enquired into relevant ongoing research undertaken by the National Institute of Water and Atmospheric Research

(NIWA);[1] specifically, acoustic monitoring in Cook Strait led by Dr Kim Goetz. Her question, "How loud is too loud?" for marine mammals in the strait, resonated with me. Goetz's eco-acoustic study involved recording the full range of sounds in the Cook Strait area, including whale song and anthropogenic noise. Goetz's study is the first of its kind as previous data on marine mammals was collected by sightings from land.

The other impetus for this project is phenomenology, which plays a pivotal role in my understanding of the sensory embodiment of the space between the observer and observed—this is where my processual research takes place. French philosopher Maurice Merleau-Ponty (1908–61) introduced the concept of the "chiasm" into the phenomenological tradition. I interpret his chapter "The Intertwining—The Chiasm" (Merleau-Ponty 1968), first published in French in 1964 in his book *The Visible and the Invisible*, as framing a space where an exchange between the sensing body and the sensed being is possible.

Merleau-Ponty used the term "flesh" to emphasise the relation or "kinship" between the self (perceiver) and the world (perceived). He also uses the phrase "seer and seen" to describe an intertwining between subject and object or a weaving together of the self and the world. This research interprets Merleau-Ponty's framing of "The Intertwining—The Chiasm" and applies it to the creation of experimental drawing processes. It has the potential to make connections between human and non-human and to make an original contribution to the domain of contemporary, ecologically engaged arts practice.

Merleau-Ponty explains "intertwining" as a means of communication between the human and non-human. He notes that "the thickness of flesh between the seer and the thing is constitutive for the thing of its visibility as for the seer of his corporeity; it is not an obstacle between them, it is their means of communication" (1968, 135). Drawing primarily on his thoughts on intertwining, I am proposing a practice-led drawing methodology that derives more expansive knowledge through an embodied measurement of the quality of oceanic sound.

The "reversibility" between the observer and observed in Merleau-Ponty's theoretical concept of The Intertwining—The Chiasm underpins this processual drawing investigation into the embodied understanding of humpback whales' experience of underwater sound. However, I have expanded on his thinking. For example, reversibility is interpreted in the project by me listening to the underwater recordings, noise and so on, thereby imagining myself in the being of the whale. The practice then makes visible this experience through drawing responses. My

[1] *NIWA is a Crown Research Institute established in 1992.*

drawing process unfolds in an exchange between my sensing body and the sensed being. I am both the "seer and the seen", immersed in the "flesh of the world".

Donna Haraway, a prominent scholar in the field of the philosophy of science and technology studies, states the importance of attuning to links between humans and non-humans in her book *Staying with the Trouble: Making Kin in the Chthulucene* (2016). I am interested in Haraway's writing because she speculates on imaginative ways to generate patterns to tell stories. For instance, she uses the cat's cradle game as a metaphor to illustrate how complex stories are told by combining scientific fact and speculative futures. In her storytelling method "string figures", she suggests a way to work together to stay present with the way things are, claiming that "the task is to Make Kin in lines of inventive connection as a practice of learning to live and die well with each other in a thick present" (2016, 1). I see the evolution of my drawing process as a way to visualise invisible patterns within the chiasm; like Haraway's string games, interweaving both embodied and scientific understandings.

The methodological investigation underpinning this thesis is an embodied drawing process that speculates on and imagines whales' experience of human-created noise as it interferes with the complex sound environment of the ocean. Drawing is a durational activity; time spent looking and listening is an opportunity to learn. We often think we know what something is, but it is not until we draw it, that a real analysis begins. Things are often not quite as simple as we think they are; however, through a durational drawing study we find clarity. I liken listening deeply when drawing to being present with the world and responding with a sensory map. I listen to sound data and then express pressure through drawing as an act of interpreting sound as pressure through my own body and translating the qualities of that pressure into tonal values through drawing.

This open-ended, experimental research method is influenced by "the seriousness of play", a practice-led drawing research attitude developed by contemporary South African artist William Kentridge. His approach to process is playful: he lets the processual development evolve through drawing. He does not control its outcome. His playful attitude extends to physical acting out, which may relate to Kentridge's own background in performance.

I also bring my own prior experience of figurative life drawing using embodied drawing methods and these have been useful when considering the space between the human and the non-human. For example, when drawing a model I might adopt the same pose myself to allow me to feel where the weighty areas are. Intuitively, the line might change thickness in response to that weight, which allows for a transfer of how the body feels. When drawing the model, I make decisions on where to press harder and where to pull back based on looking and touch. It is a

spontaneous line; the thinking happens in the drawing. However, knowledge of my own body is present as I perform the drawn response.

Figure 4. M. OToole, Feel Where The Edges Are*, 2013. Graphite.*

In my search for new drawing processes that keep me present with my environmental concerns, I have adopted and expanded on the notion of "poetic space" found within the theoretical concepts of Gaston Bachelard (1884–1962). However, in this thesis I re-imagine Merleau-Ponty's thoughts from *The Visible and Invisible*, specifically "The Intertwining—The Chiasm", as I seek to generate process in my invented, reflective "drawing-room", which opens intuitive, imaginary spaces to observe, listen and speculate.

Preliminary research into interpreting sound by measuring or dissecting space was undertaken in the *Consonance Project* (2016/17). This research focused on measuring rhythms of native birdsong through listening and drawn scores. French philosopher Henri Lefebvre's theoretical concept of rhythmanalysis, developed in his text *Rhythmanalysis: Space, Time and Everyday Life* (2013), along with fellow French philosophers Gilles Deleuze and Félix Guattari's text *A Thousand Plateaus: Capitalism and Schizophrenia* (2013), informed an imaginative working space for that project, which has also flowed into this research.

Figure 5. Screenshot from an iPhone video taken by the author in 2017.

Another seed for this research was sown prior to my visit to Tonga to swim with whales: this was an experience that happened while driving my car on the only road to Wellington from my home in Eastbourne (pictured in figure 5). The ocean continues to rise and, in this area, it regularly washes over the shore and the road and over the car during extreme weather. On one occasion I noticed the feeling of the force of the wave as it hit the metal skin of the car with a thud. That feeling stayed with me. I recorded the experience on my phone. Replaying the video and sound recording in my studio prompted me to imagine how it is for the sea and its inhabitants. I asked myself, what have humans done to you, ocean, and how can I tell your stories?

Methodology and Methods

In *Art Practice as Research: Inquiry in Visual Arts* (2010), artist and scholar Graeme Sullivan defines the difference between method and methodology by referring to Raymond Morrow (1994) as follows: "The term *methods* refers more specifically to individual techniques (e.g., surveys, participant observation), whereas *methodology* can be construed broadly to suggest both the presuppositions of methods, as well as their link to theory and implications for society" (35). He goes on to state that "methodology, in short, more clearly implies a concern, an overall strategy of constructing specific types of knowledge" (35). Morrow identifies a fine art methodology as

the broader explanatory system of philosophy, art theory and practice in which a series of methods are nested.

My drawing practice is not activated within the four walls of the studio; rather, it begins and develops with reference to my expanded phenomenological understanding of being-in-the-world. In my earlier work it was through the practice of embodied awareness while walking that environmental concerns first began to appear or confront me. I did not purposely seek them out. They became apparent through repeated walks in a particular site attending to how my own body, including all the senses, experiences space.

This prior understanding of an embodied sensory drawing process has been pivotal in this research. However, I recognised that for a re-alignment or "pivot" in my drawing research to materialise, I needed to create a space where experimental methods or processes toward new systems could "manifest". I am thus re-learning ways to look at the world through exploratory drawing processes.

The methodology and the processual modes of enquiry (my methods) that evolved in this thesis were generated both in response to questions arising out of my environmental concerns as well as to my chosen focus on the impacts of human-generated sound within oceanic space. I have employed phenomenology as a metatheoretical strategy to address these larger concerns. Merleau-Ponty's theory of the chiasm provides the space in which my exploratory embodied drawing methods are nested in-line with the thinking of both Morrow and Sullivan. I explore new ways to perceive and understand the world through embodied knowing. I notice, listen and touch—the resulting embodied awareness of the space between observer and observed is then drawn. These drawings, notation or scores aim to visualise sound experienced as pressure in the oceanic world. Through drawn responses to deep listening, for instance, I am able to give a visible form to the unseen effects of anthropogenic noise.

Phenomenology is thus the key theoretical point of reference for this research as it supports an affinity with invisible experiences, by which I mean those perceptual experiences of the space between self and nature, self and others (including non-human), where there are tensions and pressures that are unseen and invisible. According to David Woodruff Smith (2018), "basically, phenomenology studies the structure of various types of experience ranging from perception, thought, memory, imagination, emotion, desire, and volition to bodily awareness, embodied action, and social activity, including linguistic activity". It is also a movement in the history of philosophy, pioneered by German philosopher Edmund Husserl (1859–1938) in 1900. Husserl wanted to start philosophy over again, beginning with experiences of the self.

Irish philosopher Dermot Moran, in his *Introduction to Phenomenology* (2000), states that Merleau-Ponty has "undoubtedly produced the most detailed example of the manner in which phenomenology can interact with sciences and arts to provide a descriptive account of the nature of the human body being-in-the-world" (434). However, it was Merleau-Ponty's late writing, in particular *The Visible and the Invisible* (1945), which was edited after his death, that captured my imagination. It revisits and expands on his earlier work—*Phenomenology of Perception*—to include a larger perceptual world.

Moran, however, is critical of this shift. He describes the complex perceptual world that Merleau-Ponty called "The Intertwining—The Chiasm" as cryptic and unusable. In his notes on *The Visible and the Invisible*, Moran writes that "the world of perception is now referred to as the domain of the 'visible' interwoven with the 'invisible'" (2000, 429). In his view, Merleau-Ponty's concept of "The Intertwining—The Chiasm" is problematic for the discipline of philosophy as it is impossible to create a workable ontology from it (2000, 429).

As an artist, however, I developed an affection for "The Intertwining—The Chiasm". I found the language used to describe the chiasm and the descriptive nature of an intertwining between observer and observed engaging. My own interpretation of the chiasm created between human and whale opened up modes for perceiving and thinking through drawing as research. Merleau-Ponty's chapter thus became a jumping-off point to embody a specific way to evolve a responsive methodology to address environmental concerns.

The adoption of the key theoretical concept of the chiasm thus opened up a new potential body of space in which to inhabit and to speculate, imagine and draw. I reimagined this body of space between the whale and myself as the flesh of the world, from where we both originated. Thus, we are "kin" and what happens in this body of space affects us both. The term "kin" was first used in this way by Merleau-Ponty, then later by Haraway in her investigation of theories that interweave human with animal. Haraway's ideas around string figure games are a way of thinking and making with environmental patterns that are at risk. Haraway employs an interpretation of making kin that is not reliant on bio-genetics, but instead proposes string figures, a game played by one, two or more players as an imaginative way of working together, of fabulating, thinking, sharing and making. She describes string games as analogous to connecting across space and species (2016).

My speculations reference both Merleau-Ponty and Haraway in my attempts to inhabit the troubled contact zone between human and whale. Through my adaptation of the space of the chiasm as a methodology, I inhabit the in-between for the purpose of constructing specific types of knowledge. This allowed for an interweaving of species in the imagined space of the

chiasm. The embodied drawing processes are nested within this methodological framework. The methods are the processual means to respond to the impacts of human-generated sound in compromised oceanic space.

The phenomenological drawing processes developed within this enquiry enable me to re-learn ways to become aware of the world through sensorial play. This is essential in regard to environmental issues arising due to human entitlement at the expense of the planet. It allows me entry to an imaginative and speculative space where I can spend time in the ocean. The time and energy I spend in this drawing space is an act of "empathy", it is where I describe "unseen" invisible experiences in visual terms.

The artists whose contemporary and historical art practices-have informed the experimental processes I have engaged with have all positioned their visual art practices in the in-between. This encompasses an embodied exploration between artist and social and ecological issues, such as land, culture, war, migration and racism. I have purposely concentrated my study of artists' practices on those areas that give visual language to unseen cultural, political and environmental pressures.

My defined area of research creates a methodological framework for drawing as research for the purpose of re-learning ways of knowing the world. I explore the intertwined space in-between humans and whales to better understand and give a visual language to unseen human-generated undersea noise, experienced as pressure by whales. I speculate on the impact this pressure places on the ability of ocean mammals to communicate effectively through experimental embodied drawing processes. Creating a visible abstract language for this unseen pressure is my attempt to locate this research in the field of contemporary ecological art. The embodied methodology and processual modes of enquiry that have evolved in this study are thus my contribution to the area of contemporary drawing that is concerned with eco-aesthetics.

Structure of the Thesis

Chapter 1 is the first part of the literature review. Here, I introduce "embodied pressure", the term I have given to the drawing process developed within this research. My argument hinges on re-orienting the body as an equally important site of cognition for the generation of new visual forms in response to complex environmental issues as I attempt to align my environmental concerns with my drawing practice.

Following this, I will explain how I understand the theoretical framework laid out by Merleau-Ponty in "The Intertwining—The Chiasm" and then reimagine his theory to build an

imaginary space to draw. I identified his theory as relating to my research because it facilitates an embodied reflexivity or criss-crossing between observer and observed. My imagined chiasm is the space of the exchange; a bodily space that explores sound and noise through listening and touch. I then relate my research to Donna Haraway's theoretical concept of "making kin". This is important because the purpose of my research is to *Stay with the Trouble* and create a visual form or myth from my speculated perspective of the whales' experience of undersea sound in an attempt to "redo ways of living and dying attuned [to] still possible finite flourishing" (Haraway 2016, 10). Lastly, I relate Rosi Braidotti's concept of "becoming" in relation to my own practice of generating processes for being present with compromised ocean ecologies. It concerns me that the whales' ocean habitat is being colonised by humans to the detriment of the whales' survival. In response, I have attempted to generate relational encounters and experiential knowledge of these issues through my work.

Chapter 2 is the second part of the literature review, where I will unpack the relation between the artists that have influenced my research, including Joseph Beuys, Torkwase Dyson, William Kentridge, Julie Mehretu and Janaina Tschäpe. I am specifically interested in understanding how these artists have explored embodied drawing practices or methods to give visual form to unseen trauma. I will continue to build on my argument from Chapter 1 through a survey of artists who have aligned their drawing practices with their political, cultural and environmental concerns.

In Chapter 3 I will describe my interdisciplinary engagement with scientific research and discuss how I utilise this work in my own research. I will describe my engagement with NIWA scientists and the role their knowledge played in generating new investigative drawing processes. In addition, I will discuss how science informs my understanding of the impact of human-generated undersea sound on whales. I will also review how science informs methods I use to listen to whales. Interpreting scientific data enables a more empathetic engagement with the experience of whales. I employed my own body as a listening, feeling instrument that is additionally informed by the NIWA scientific work. Thus, thinking across disciplinary boundaries contributed to the process employed and the research outcomes.

In Chapter 4 I will unpack the practical drawing concepts chosen for my methodology. I argue that through the creation of new embodied drawing processes, I have created a space for interspecies sensory mingling. I describe and reflect on the series of experiments that are perceptual explorations of the expanded space of the chiasm, the outcome of which resulted in the thesis exhibition.

In Chapter 5 I will discuss the final exhibition *Drawn Chorus*, held at The Engine Room art gallery at Massey University in September 2020. Discussion focuses on the installation of selected works and how they demonstrate my processual investigation. I also engage in a critical analysis of the project, aligning my aims with the outcome, including my intentions for an immersive experience of the work.

The conclusion will provide a summary of the processes nested within this inventive methodological drawing investigation. I will reiterate how this research contributes to the visualisation of unseen environmental pressures as they evolve and how it makes a contribution to the domain of contemporary, ecologically engaged art practice.

Figure 6. M. OToole, How Loud Is Too Loud? No. 7*, 2020. Willow charcoal and oil paint on Fabriano.*

CHAPTER 1: Literature Review Part 1, Embodied Knowledge

This review of literature introduces the process developed within this methodological investigation; specifically, "embodied pressure". I begin this survey by discussing the disembodiment of our brains and bodies in western culture and ask why we should revisit embodiment now? I unpack key theories and concepts that relate to my thesis—including spontaneous organisation, "The Intertwining—The Chiasm", "making kin", embedded/embodied and patterns of becoming—through written texts by Maurice Merleau-Ponty, Donna Haraway and Rosi Braidotti. I will provide some theoretical and conceptual background to the processes developed in this thesis relating to "listening in". Theories include Lefebvre's rhythm-analysis, Bachelard's dialectics of duration and Deleuze and Guattari's concept of the refrain.

Introduction to Embodied Understanding

My research is a manifestation of an "empathetic" interpretation of the impact of human-made sound experienced by whales as pressure. In this chapter I propose the term "embodied pressure" to define the processual drawing investigation that evolved in this thesis project. I argue that my drawing process inhabits a critical space to contribute new knowledge through speculation, sensory perception and imagination. Under this formulation, the body is a site for knowledge production and this thesis hinges on re-orienting the body as an equally important site of "cognition" for the generation of new visual forms in response to complex environmental issues as I attempt to align my environmental concerns with my drawing practice.

To begin, my methodology is informed by a particular area of phenomenological philosophy that embodies the "qualities" of an experience to understand and quantify it. Thus, my investigation of phenomenology is fundamental to this thesis. Dermot Moran (2000) tells us that phenomenology is best understood as a radical, anti-traditional style of philosophising, which emphasises the attempt to get to the truth of matters, describing phenomena, in the broadest sense, as whatever appears in the matter in which it appears; that is, as it manifests itself to consciousness, to the experiencer. Moran goes on to state that explanations are not to be imposed before the phenomena has been understood from within.

The concept of embodied cognition was introduced by early 20th-century philosophers, including Merleau-Ponty, and it recognises that the body is not only connected to the mind but

also influences it. The concept was in direct criticism of dualism, a concept introduced by Rene Descartes in the 17th century. Descartes' theory of "mind dualism" claimed that mind and body were different entities and that the body could not think; he considered the mind to be "disembodied" and therefore processes of conceptualisation and reasoning were also disembodied.

More widely, dualism has left its mark on western culture. Contemporary philosopher Mark Johnson (2007) describes our inherited conception of understanding as still not primarily dependent on the nature of our bodies and brains when it comes to processes of reasoning. Johnson argues as follows:

> The chief obstacle to employing the phrase "embodiment of understanding" is that the dominant intellectual traditions within western culture have bequeathed to us a view of understanding as either completely disembodied or at least not primarily dependent on the nature of our bodies and brains when it comes to the structures and processes of our conceptualization and reasoning. (2015, 2)

Johnson further reminds us that

> our very ability to understand our world and other people arises from the nature of our bodily existence (including our physical body and the structure and processes of our brains) plus the embodied interactions we have with our material and cultural environment. (2015, 2)

I argue in this thesis that direct physical experience with the oceanic sensorium leads to embodied understanding and new ways of speculating on and telling stories of human-generated sound in the sea and its effect on whales. Like Johnson, I believe that we can understand the world through our bodily existence. I am arguing for the creation of new platforms for the investigation of social sciences and humanities with a particular focus on environmental and social justice. I believe that artist drawing processes have a role to play here.

Many years of life drawing underpin this in-depth understanding of embodied drawing research. When drawing, I taught myself to look slowly, following or mapping the form of the body, object or space as if I were reaching out through the eyes with all the senses. This enables a "transfer" of felt experience through the development of a sensitive drawn line that changes in thickness through embodied force or "pressure".

When I draw the body or an object, I consider the sensitivity of the line, the push and pull. I ask myself where I push firmly to create a denser, thicker line, and where do I pull back to

create a more fragile, thinner one. In a continuous contour line drawing, I follow the form, not just an outline, changing the pressure on my charcoal to describe a more weighty area of the body. In other places, like the top of the clavicle, cheek or scapula, I might barely touch the surface; however, as I follow the clavicle bone over and around to its underside my pressure becomes firmer and the line becomes thicker. I touch a contour with my eyes, and at the same time and at a slow-speed, I draw the shape on the surface or ground. I look, draw and repeat.

I use the phrase "touching with the eyes" as I know what the body feels like: I have my own. I am drawing the model and myself at the same time; it is an embodied process. There is a reversibility between seer and seen created in the drawing process that allows for "embodied understanding".

In *The Natural Way to Draw* (1941), Kimon Nicolaides refers to drawing as a matter of learning to see correctly, which is more than looking with the eyes. He goes on to state that "the sort of 'seeing' I mean is an observation that utilises as many of the five senses that can reach through the eye at one time" (1941, 5). The sense of touch becomes heightened when choosing not to view the drawing during its creation process; it is a "blind" method. Complete focus is on the subject. It is a process developed to help students see what is actually in front of them. Our minds are tricky; they like to make things up and fill in gaps. This blind process keeps it real and is captivating because all the thinking is happening in the drawing process.

However, the artist's own body is a reference. The line becomes sensitive to weight, texture, volume, folds, light and shadow in response to what the artist already knows about their own body. The pressure applied responds to the imagined and real sense of touch and, accordingly, changes occur in the tonal qualities of the line. My perception or ability to see, hear and touch/feel (utilise the senses) informed this thesis, which led to an experimental processual investigation of sound. A shift to drawing in response to listening and touch rather that looking has evolved in this research for the purpose of aligning my environmental concerns with my drawing practice.

Humans and marine mammals hear at different frequencies; I am not experiencing sound as a whale does. However, I can speculate and show compassion by measuring the quality of my own lived experience through the development of a drawing process that is a critical reflection on anthropogenic undersea sound. In this way I re-imagine Merleau-Ponty's thesis of "reversibility" within the chiasm as the methodology. These terms and how they have informed this research will be discussed in depth in the following section.

Figure 7. M. OToole, How Loud Is Too Loud? No. 2*, 2019. Mixed media on black primer on paper.*

Key Theory and Concepts

The evolution of a processual investigation of pressure (sound felt by marine mammals in compromised environments) is informed first and foremost by my understanding of the late writing[2] of Merleau-Ponty. My primary focus is on *The Visible and the Invisible*; in particular, Chapter 4, "The Intertwining—The Chiasm". Concepts from Merleau-Ponty's "Cezanne's Doubt" (1993), originally published in 1945, are also relevant and will be discussed in the following.[3]

Figure 8. M. OToole, experiment for How Loud Is Too Loud?*, 2017. White chalk on black primer on paper.*

[2] They are referred to as the 'late' writings of Merleau-Ponty because they were collated together and published after his death. He passed away in 1961.

[3] A contextual review of the timeline of Merleau-Ponty's theoretical texts reveals that both Phenomenology of Perception *and "Cezanne's Doubt" were published in post-World War II France. In the 1960s, France was experiencing a period of rebuilding and renewal. Merleau-Ponty had already passed away aged fifty-three, three years prior to when* Eye and Mind *went to print in 1964. Merleau-Ponty's thinking was influenced by Henri Bergson (1859–1941), Edmund Husserl (1859–1938), Martin Heidegger (1889–1976), Max Scheler (1874–1928) and Jean-Paul Sartre (1905–80).*

Merleau-Ponty: "The Intertwining—The Chiasm" (1968)

Theoretical threads in "The Intertwining—The Chiasm" influenced my investigative drawing process. Research into embodied understanding—in particular, the chiasm—has revealed a reflective space in which to draw. The seer and the seen are no longer separate entities in this intertwined sensory space, they become "flesh-of-the-world", and the tissue between them is analysed through an embodied drawing process not just reliant on sight. The senses of listening and touch play a significant role in the analysis of vibration (sound) between the fleshy thickness of observer and observed. I am arguing for the body as a unique site of cognition from which to create new methodologies to broaden our understanding of other species, to think and live differently and ultimately to survive together.

What is the significance of "The Intertwining—The Chiasm" in relation to my research? The chiasm or crossing of the lived body and the world "connects" subject and object; they are "woven" together. "The Intertwining—The Chiasm" is Merleau-Ponty's ontology of "flesh"; the embodied relationship between perception and the world. His notions of flesh and reversibility underpin my drawing research; an embodied relationship between the self and the world. In the following, I will relate these concepts to my own process of drawing human–whale interactions and the impact of sound experienced as pressure.

When I draw the whale interacting with her calf, I am bringing my experience of being a mother to the sensitivity of the line. I can empathise with her, as I understand the pressure associated with caring for, feeding and protecting a young one. The qualities or values of mark-making relate to my knowledge of how things feel in my body. The distant vibration or pressure of a small vessel ripples through the ocean, I respond to how that felt in my body. It relates to touch, sensitivity and emotion. It is a translation of sensation. Through perception, observation and listening, I can look at myself and recognise in the other what I am seeing.

It is here that the seer and the seen become entangled in the tissue of the world. Merleau-Ponty states that in-between our bodies being noticed and our body noticing there is an overlapping where things pass into us, just as we do into them (1968, 123).[4] He also tells us that "perception is born" at the point where "two metamorphoses cross", and explains that this is the point where the reversibility process takes place.[5]

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[4] Specifically: "between my body looked at and my body looking, my body touched and my body touching, there is overlapping or encroachment, so that we may say that the things pass into us, as well as we into the things" (Merleau-Ponty 1968, 123).

[5] Merleau-Ponty tells us that "perception is born" at the point where "two metamorphoses cross". He explains that "this is the point where the reversibility process takes place and where what we call perception is born. Thus, there is also a reversibility of the speech and what it signifies; the signification is what comes to seal, to close, to gather up the multiplicity of the physical, physiological, linguistic means of

Merleau-Ponty felt that the significance of the body in philosophical tradition was underestimated. Although he acknowledged hard scientific ways of knowing the world, he argued that the body is more than an object merely receiving instructions from the mind; rather, the body's lived exposure to the world could also contribute valuable knowledge. He was concerned about society's loss of a physical connection with nature. His final text is a rewrite of his earlier seminal text *Phenomenology of Perception*.[6]

Merleau-Ponty's concern was that we had become too reliant on modern science to provide the answers to "global ecological problems" and have forgotten that before scientific laboratories, we experienced nature with our bodies. Our knowledge came from our phenomenology (our experience of phenomena); a qualitative research methodology that studies the individual's lived experience within the world. My creative response to an embodied processual drawing investigation was to slip into the Pacific Ocean and swim with whales in an attempt to understand this enquiry through my own body. I made my own moving body a site for knowledge production. Whereas scientists might map observations through a spectrograph, as an artist I am interested in the "affective"[7] nature of a type of drawing that uses the senses.

Drawing and science share a process of durational observation. Drawing is an analytical activity, highly suitable for fleshing out the detail between the listener and listened to. Through drawings, I transfer the qualities of ocean sound in responsive mark-making as it is experienced in my own body; a translation of sensation. Shared and embodied sensory knowledge informs this new process of situated knowledge production. Scientific fact and lived experience are woven together in this investigation and I will report on my engagement with marine research in Chapter 3.

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elocution, to contract them into one sole act, as it comes to complete the aesthesiological body. And, as the visible takes hold of the look which has unveiled it and which forms a part of it, the signification rebounds upon its own means, it annexes to itself the speech that becomes an object of science" (*Merleau-Ponty,1968, 154).*

[6] *Merleau-Ponty was influenced by the "father" of phenomenology, Edmund Husserl (1859–1938). Husserl questioned Naturalism: Husserl argued that the study of consciousness should be approached differently from the study of nature. "For him, phenomenology does not proceed from the collection of large amounts of data to a general theory beyond the data itself, as in the scientific method of induction. Rather, it aims to look at particular examples without theoretical presuppositions (such as the phenomena of intentionality, of love, of two hands touching each other, and so forth), before then discerning what is essential and necessary to these experiences" (see https://iep.utm.edu/husserl/).*

[7] *The word* affect *was introduced to the English language in the 1300s to describe being overcome by sorrow or joy. Baruch Spinoza distinguished affect from emotion by emphasising its transformative nature in the 17th century. Deleuze redefined it again in the 20th century and applied it to aesthetics. It is an interest in the complexities of experience of place and time that underpins the exploration of Merleau-Ponty and Spinoza.*

Figure 9. M. OToole, experiment for How Loud Is Too Loud?*, 2018. Chalks, gouache in ink on black primer, on paper.*

Merleau-Ponty: Spontaneous Organisation, "Cezanne's Doubt" (1945)

Merleau-Ponty's essay "Cézanne's Doubt" (first-published in 1945) is relevant to this research because in it he details the contribution to "new knowledge" made by artist Paul Cézanne through a perception process described in the essay as "spontaneous organisation" (Merleau-Ponty, Johnson and Smith 1993, 64). Cézanne explored "perceptual experience", or in Merleau-Ponty's words, Cézanne was "wanting to depict matter as it takes on form, the birth of order through a spontaneous organization" (1993, 64). His was a process free from inherited human organisation.

Merleau-Ponty's interest in Cézanne was motivated by his own interests in relating ideas, sciences, perspective and tradition back to the world of nature; he wrote essays not only on Cézanne, but also on Leonardo da Vinci (1452–1519) and Paul Klee (1879–1940). He used Cézanne's approach to perspective to illustrate his argument for returning to the world of nature to construct our sciences. Accordingly, in Merleau-Ponty's essay, he writes that Cézanne "makes a basic distinction not between 'the sense' and the 'understanding' but rather between the

spontaneous organisation of ideas and sciences. We see things, we agree about them, we are anchored in them, and it is with 'nature' as our base that we construct our sciences*"* (1993, 64).

What is spontaneous organisation and how has it manifested in the development of my new drawing process? Merleau-Ponty describes spontaneous organisation as a continuity between subject and object. He recognises that Cézanne follows the "swell" or contours of an object; in this way he depicts matter as it takes on form. Furthermore, he writes that "if one outlines an apple with a continuous line, one makes an object of the shape whereas the contour is rather an ideal limit toward which the sides of the apple recede in depth" (Merleau-Ponty, Johnson and Smith 1993, 65).

My investigation stems from my lived perceptual experience of the ocean sensorium, including human-made sound. I draw my observations or phenomenological science by adapting the blind method learnt from life drawing. I listen and draw, listen and draw; following the contour of undersea sound as it feels in my body. In doing so, I expand Cézanne's visual perceptual process to sensorial perception. The spontaneous organisation of continuous contour line developed in my research depicts undersea acoustics and depicts embodied sound in visual form: a score. Merleau-Ponty argued that embodied experience is a primary source of knowing the world and that an artist's perception of objects was critical to forming new knowledge through spontaneous organisation during the creative process. Our perception is informed by the "body-being-in-the-world", mediated by our "senses".

Donna Haraway: "Making Kin" (2016)

Like Merleau-Ponty, scientist and philosopher Donna Haraway is concerned with "kinship" (see Merleau-Ponty 1968, 138). Her text, *Making Kin: Staying with the Trouble; Making in the Chthulucene* is relevant as it proposes that "all critters share a common 'flesh', laterally, semiotically and genealogically*"* (Haraway 2016, 103). She stresses that all earthlings are kin in the most profound sense. Haraway also defines making kin as meaning "something other/more than entities by ancestry or genealogy. Kin-making is making persons, not necessarily as individuals or as humans*"* (2016, 103). Haraway speculates on ways to reimagine our relations with the earth and all its inhabitants, writing that "I am deeply committed to the more modest possibilities of partial recuperation and getting on together. [I] call that staying with the trouble" (2016, 10). She thus investigates interweaving the human with the animal as a way to consider multiple species.

This idea of making and remaking inherited patterns that may fail is at the core of my drawing process and involves composition and erasure. Haraway speaks of inhabiting the "troubled contact zones" (unfair patterns where human exceptionalism reigns) as a way to

strengthen the arts of living on a damaged planet through a process of composing and decomposing (2016). As I worked toward an experimental method for a bodily understanding of the whale's experience of anthropogenic sound-pressure, the "thick-present" was informing my process, and I was attempting to create a way of drawing that allowed me to stay present with the trouble.

In making kin with multiple species, Haraway is concerned with inventive processes of making kin, non-biogenetically. Haraway employs an interpretation of making kin that is not reliant on bio-genetics, but instead proposes string figures, a game played by one, two or more players as an imaginative way of working together, of fabulating, thinking, sharing and making. She describes string games as analogous to connecting across space and species (2016). The indigenous peoples of Africa, Eastern Asia, the Pacific Islands, Australia and the Americas play string games or cats-cradle. For Haraway, string figures are like stories, as

> they propose and enact patterns for participants to inhabit, somehow, on a vulnerable and wounded earth. … My multispecies storytelling is about recuperation in complex histories that are full of dying as living, as full of endings, even genocides, as beginnings. (Haraway 2016, 9–21)

Haraway developed her theory on speculative fabulation as a way to connect across space and species. She describes string figures as a way of thinking and making with environmental patterns that are at risk.

The Belgian philosopher Isabelle Stengers' essay "Gaia, the Urgency to Think (and Feel)" discusses string figures and makes the point that "the ongoing weaving of a string figure may be an important image for the kind of help we need to learn giving and receiving" (2014, 8). She also gives her thoughts on cat cradling and the opportunities in the "woven process" of giving and receiving, noting that

> It should be obvious that belonging to a weaving process does not exclude formulating matters of critical concern, but the concern must be such that it is liable to be shared with the concerned people, to be relayed by other hands, liable to add new dimensions and opportunities to what is woven. (Stengers 2014, 8)

Haraway states that what is important is what stories we tell. This research is concerned with connecting with non-humans through a sensory translation of gestural mark-making to flesh out another perspective of the story of anthropogenic undersea sound pressure and its

effect on mammals. Like Haraway, I am interested in finding ways to explore kinship with multispecies.

Haraway has created a conceptual niche space she refers to as "Terrapolis", in which she describes the critters in her string-figure stories as inhabiting an n-dimensional niche space called "Terrapo". Similarly, I have invented a niche practice-led drawing space, embodied pressure, by reimagining Merleau-Ponty's chiasm. Here are the details of Haraway's niche space:

> Terrapolis is a fictional integral equation, a speculative fabulation.
> Terrapolis is an n-dimensional niche space for multispecies becoming-with.
> Terrapolis is open, worldly, indeterminate, and polytemporal.
> Terrapolis is a chimera of materials, languages, histories.
> Terrapolis is for companion species, cum panis, with bread, at table together—not "posthuman" but "compost."
> Terrapolis is in place; Terrapolis makes space for unexpected companions.
> Terrapolis is an equation for guman, for humus, for soil, for ongoing risky infection, for epidemics of promising trouble, for permaculture.
> Terrapolis is the SF game of response-ability.
> (Haraway 2016, 11)

This research engages with an inventive drawing process of kinship between human and whale by "tuning" into the other through an embodied intertwined process. My multisensory thesis asks what new methodology can be born or created through a bodily engagement of the space between humans and whales to tell a richer story of sounds in the sea.

https://people.ucsc.edu/~haraway/Wellek.html

Figure 10. Nasser Mufti, Multispecies Cat's Cradle*, 2011. Image from Donna Haraway (2016, 9).*

Figure 11. M. OToole, Sound Score Experiment*, 2018. Charcoal on Fabriano paper.*

Rosi Braidotti: Framework for the Critical Posthumanities (2018)

As already touched on earlier, I am arguing for embodied knowledge production as complementary to traditional empirical scientific approaches. This resonates with philosopher Rosi Braidotti's proposition; specifically, she termed the type of phenomenological process of enquiry that I am engaged in as the "minor sciences" (2018). These processes are, she wrote, "underfunded and marginalized", which is in juxtaposition to what she describes as the "royal sciences", which are "institutionally implemented and well-funded—science/knowledge, compatible with the economic imperatives of advanced capitalism and its 'cognitive excursions' into living matter" (Braidotti, 2018, 47). She describes the minor sciences as "embedded, embodied, relational and affective forces that generate patterns of becoming, of minor science, of intensive shifts" (Braidotti 2018, 51). I have been experimenting with embodied relational and affective forces in the generation of drawing processes that reflect my environmental concerns. She also states that expressive bodies, or bodies "embodied and embrained" in phenomenological study (minor science), travel at a different speed to capitalist acceleration (Braidotti 2018, 52). My adaptation of "reflexivity" as a drawing process has allowed me to "embody" the experience of whales and undersea sound; it is a slow durational activity.

Braidotti expresses her thoughts on the need for research that operates in-between as follows: "subjectivity is a trans-species effort that takes place transversally, in-between; nature/technology; male/female; black/white; local/global; present/past as assemblages that flow across and displace binaries" (2018, 33). She goes on to write that "these in-between states defy the logic of the excluded middle and, although they allow an analytic function to the negative, they reject negativity and aim at the production of joyful or affirmative values and projects" (2018, 33). Which bodies are counted and which bodies are marginalised and excluded from the conversation?

The durational activity of drawing allows for a study of the minutiae of the sea of sound in the production of a visual language or sound scores. I argue that the development of embodied drawing processes that weave between science and culture reveal another story that isn't explored in mainstream research. Furthermore, it has the potential to tell stories of those at the margins. My concern is to give a visual form to unseen anthropogenic underwater sound through the development of drawing processes.

In Chapter 3 I will discuss my interactions with NIWA scientists and describe how their knowledge sat at the periphery of my thoughts and eventually became woven into my process. I will follow this argument through a survey of thinkers and artists who are also moving towards new methodologies that allow them to be present with compromised oceanic ecologies.

However, first I need to clarify the purpose of my listening/drawing processes and where they come from. My interest in making a connection with the non-human did not begin with whales; rather, the first year of this research was consumed with listening to birdsong and developing research from weaving together embodied processes that respond to what I am noticing during lived experience.[8]

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[8] *A proposal was submitted to the Upstream Art Trail in 2016, that introduced questions around the recently released New Zealand Government's Predator Free 2050 target. The submission suggested a social sculpture work questioning the relationship between humans, science and nature. An interest in being in dialogue with the local community in an exchange of thought within Central Park around community structuring a sustainable eco-system was expressed.*

The callout for the Upstream Art Trail was made by The Friends of Central Park, a group of volunteers that meets monthly to help maintain park amenities and environs. The Friends also undertake special projects, including the biennial Upstream Art Trail, curated by artist Gabby O'Connor. Central Park *is on the margins, it borders the urban and CBD environment. It was colonised for an English garden, whereby the food source for local indigenous native birds, animals and insects was cleared. Prior to settlement, Māori grew kūmara there. It has been affected by introduced predators and pollution. The Moturua stream runs through the park and it is the only area where the water and its inhabitants see daylight throughout the journey to the sea. It was once a temporary military camp in WW2 for American Marines. It is known among some for its late-night sexual hook ups and in juxtaposition its children's park complete with flying fox. The Park is part of the Town Belt, and is one of Wellington City's oldest public parks, sometimes home to the homeless. It extends for 13 hectares from the edge of the CBD and Te Aro Valley up to the suburb of Brooklyn.*

The Upstream volunteers addressed the artists at our initial meeting, The volunteers mentioned that they would like some of the twenty works to spread into areas that the public may not have experienced before and to get an appreciation of the area the park covers and to fully engage with the ecological diversity within. A space deep within the park was purposely chosen to challenge the project further. An area referred to as the wilderness by volunteer gardeners was selected and within that space an area just north of Bridge 9 became the drawing space.

This project was approached by embodying the birdlife at the centre of the Predator Free Target in an attempt to understand more about them. The question was how to take participants along the same journey or slow them down enough to stop and experience with their own senses with the hope they would feel more emotionally connected.

In this project encounters and conversations with the public were anticipated, a prepared question around the predator-free targets was asked to those who approached me at the drawing site. The public became active participants and our conversations were recorded with the intention that they would be woven into a sound work. There was another interesting aspect to collecting the participants' opinions and their stories of becoming involved in local environmental initiatives: how that connection made them feel. If we aspire to a future with less extinction this connection appears essential. The encounters also informed the drawings on site.

The analysis of bird songs, or lack of song depending on population density, was an attempt to talk about predators. This analysis began with the dawn chorus at my own property and then in Central Park. Discovery took place by analyzing the rhythms in life; in this case, native bird life. The conversations and engagement with participants was an important aspect as the predator free target is a big one, possibly an impossible target, especially without volunteers and community connection. It became very obvious in this project—this is true throughout many areas of our society now—that without volunteers it wouldn't be possible to deliver or care for those at the margins.

A collaboration was arranged with sound artist Thomas Lambert. Drawings from the site along with the sound recordings of birdsong and conversations were given to Thomas. A sound mix was returned and the process repeated.

This first body of research was performative. I positioned my workspace in a park that borders the Wellington CBD and is a throughfare for many of the city's inhabitants. From previous experiences of drawing in public I knew they would approach with questions. I had prepared my own question for them. I wanted to know their opinion on the New Zealand government's plan to halt the decline in our threatened species and restore them to healthy populations: that is, the "Threatened Species Strategy" of 2017 (Department of Conservation 2017). In this way public opinion was woven into my process.

I also made sound scores from listening to the public along with listening to natural and un-natural sounds in the park. This research manifested in sound scores, which were translated into a sound sculpture; there was also a collaboration with a sound artist that was exhibited as part of a sculpture walk. Listening, like drawing, is durational. It opens up the rhythms that surround us. I began giving these rhythms visual form. The following section gives an overview of the thinkers I was absorbing into my process at that time as I wrestled with forming a process from listening.

Listening In: Foundational Theory and Concepts

Through preliminary research I found three fundamental concepts, all of which have played a role in the early development of this processual research. These include: 1) Bachelard's 1958 text *The Poetics of Space* (Bachelard et al. 2014), specifically "Intimate Immensity", which led me to his work *The Dialectic of Duration* (2000); 2) Henri Lefebvre's *Rhythmanalysis: Space, Time and Everyday Life* (2013); and 3) Deleuze and Guattari's essay "1837: Of the Refrain" (Deleuze and Guattari 2013, 361), which discusses the birdsong work of French composer Olivier Messian. It is in this context that I developed my understanding of listening, which proved incredibly productive throughout this research. Therefore, I will now present an overview of the founding theories of influence.

Gaston Bachelard: The Dialectic of Duration (1950)

It was the work of Bachelard that first pointed me toward Rhythmanalysis. The last chapter of *The Dialectic of Duration* is devoted to rhythmanalysis and Pinheiro dos Santos's work. In this chapter, Bachelard discusses "dialectical durations", which are constructed on "waves and rhythms" produced by sound. Although there is very little known about dos Santos, apart from the "La Rhythmanalys" Rio de Janeiro (1931) work he has shared with Bachelard, we do know that dos Santos studied the "phenomenology of rhythm".

Bachelard and Henri Lefebvre further developed rhythmanalysis. Bachelard first led me into the practice of "reinterpreting poetic spaces" from literature as a mode of enquiry. His chapter on intimate immensity in *The Poetics of Space* (Bachelard et al. 2014) is where my intuitive embodied abstract drawing process combining the sensed and imagined vastness of lived experience originated during my MFA research.

Henri Lefebvre's *Rhythmanalysis: Space, Time and Everyday Life* (1992)

Within the first iteration of my research I reinterpreted French philosopher Henri Lefebvre's rhythmanalysis as a "drawing process". Lefebvre was interested in turning the concept of rhythm into science in order to create new knowledge. He believed that by analysing rhythm, we could gain more insight into everyday life. As Lefebvre notes, "a rhythmanalysist is capable of listening to a house, a street, a town as one listens to a symphony, an opera" (2013, 5).

Lefebvre's theories around rhythmanalysis proved to be the answer to finding my way into a new drawing process and enabled the analysis of rhythms of native bird populations, who were marking their territory with song. Regular blind drawings at the site explored space and territory. The sense of sound was heightened when vision was removed; each tone formed a visual language or sound score on the page. I used my own body, including its senses, to respond in mark-making to the rhythms of sound within the park. With this direct mode of enquiry I gave visual form to the unseen sound of the dawn chorus. Lefebvre states that "we train ourselves" and are trained by our "working lives"; however, a rhythmanalyst "uses the body as the first point of analysis" (2013, 6).

Like Lefebvre, I recognise the co-existence of rhythms in the lived environment and the body. I was attempting to tell a story about native bird life co-existing with introduced predators (rats, mice, stoats, etc.). The duration of time spent on the modes of listening and drawing opened up a vast array of rhythms and perspectives.

Gilles Deleuze and Felix Guattari's "1837: Of the Refrain" (1988)

Deleuze and Guattari also informed the early stages of this research. In *A Thousand Plateaus* they discuss the work of French composer and ornithologist Olivier Messiaen (1908–92) in "1837: Of the Refrain". Messiaen collected the songs of thousands of birds throughout France. Birdsong became a musical source for his work. In the words of Deleuze and Guattari,

> Messiaen is right in saying that many birds are not only virtuosos but artists, above all in their territorial songs (if a robber "improperly wishes to occupy a spot which doesn't belong to it, the true owner sings and sings so well that the predator goes away. ... If the

> robber sings better that the true proprietor, the proprietor yields his place. The refrain is rhythm and melody that have been territorialized because they have become expressive—and have become expressive because they are territorializing. (Deleuze and Guattari 2013, 368)

With my body I analysed the rhythms of birds as they became expressive through modes of listening and drawing. Their songs are territorial. Ironically, it was not just birds attempting to claim territory. Humans were also sleeping in the park. The co-existence of rhythms in the park became dense and layered (see figure 12).

What became most apparent through listening to public opinions and in some cases to people's stories of becoming involved in local environmental initiatives was how that connection made them feel. If we aspire to a future with less extinction, then developing new processes to connect the human and non-human emotionally appears essential. Through this initial research I became focused on developing a new drawing process that could weave in-between, between the human and non-human, using the body, including the senses, to create a tangible visual language for ecologies under pressure.

Figure 12. Installation view, Drawn Chorus*, 2016. Mixed media on paper. Installed at The Academy of Fine Arts for the Parkin Drawing Prize Exhibition, 2017. Image courtesy of M. OToole.*

In Chapter 1 I have discussed the key theoretical concepts that have influenced the direction of my drawing methodology, which I call embodied pressure. These thinkers reinforce

my argument that embodied understanding explored through drawing research is a way of "intertwining" with whales and of "staying with the trouble" of undersea sound. In Chapter 2 I will introduce the artists' practices that relate to my research and will continue to build on my argument for the generation of new knowledge derived from embodied drawing processes.

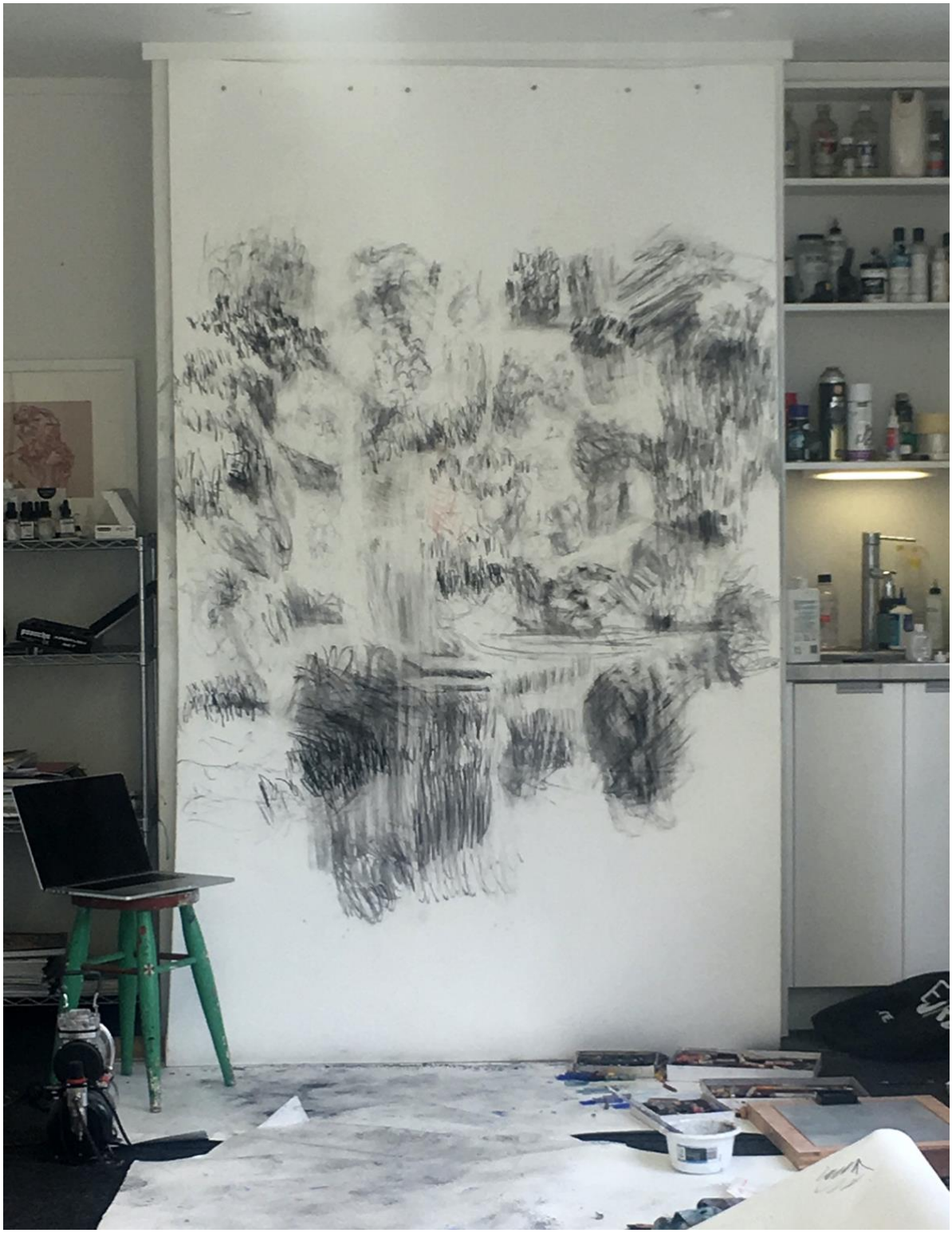

Figure 13. M. OToole, Studio: Work in Progress*, 2018. Graphite and charcoal on Fabriano paper.*

Chapter 2: Literature Review Part 2, Survey of Artists

In Chapter 1 I introduced key theoretical texts informing my practice-led research. These thinkers reinforced the first layer of my argument as I investigated methodologies that originate through embodied understanding. In Chapter 2 I will introduce artists who align their drawing processes with their concerns. They each uniquely embody their subject matter as a way to give visual form to issues that are troubling them.

Joseph Beuys and Embodied Knowledge: The Drawing Process as Development of Thought

Joseph Beuys (1921–86) created an experimental drawing process from his own lived experiences of war. For Beuys, drawing gave form to his thoughts, which he felt were impossible to describe in words at that time. Drawing was therefore his means to convey them. Like Beuys, I am attempting to give visual form to an intuited and imagined trauma, although in my work, that trauma is experienced by whales when their communication is masked by human-generated underwater noise.

Beuys served in the German Airforce in World War II: initially, he was a radio operator and later a gunner. His plane crashed in the Crimea, and he became a prisoner of war. After the war, he studied art. He was influenced by Austrian philosopher Rudolph Steiner (1861–1925). MoMA curator Bernice Rose explains in *Thinking is Form* (1993) that

> Beuys, wounded in World War II and living in a divided Germany, had come to see human experience as it is reflected through the body's drives and sensations, its pleasure and pain. The metaphor of the wounded body is at the heart of his work, a motif woven throughout as both its source and its essence. (Temkin and Rose 1993, 73)

This research will focus only on the development of Beuys's drawing process with a particular focus on how he gave the invisible inner trauma of war visual form.

https://www.tate.org.uk/art/artworks/beuys-probe-in-the-bloodstream-of-the-oak-ar00634

Figure 14. Joseph Beuys, Probe in the Bloodstream of the Oak*, 1958. Envelope, tempera, graphite and pin on paper. Collection of Tate and National Galleries of Scotland.*

The Wounded Body: The Body's Drives and Sensations, its Pleasure and Pain

How did Beuys align the emotional and social legacy of the war in Germany with his drawing process? Bernice Rose says that he attempted to reclaim the past, prior to his experiences during the Nazi regime in Germany, his exposure to it or being affected by it as a soldier fighting for Fascist Germany (Temkin and Rose 1993). There is quite a lot of controversy around Beuys and his past, some of which he chose to obscure and most of which he chose to mythologise.

Rose retells Beuys's story about being rescued by the Tartars after his plane crash and being wrapped in "felt and fat and suffused with life giving energy"; she goes on state that it "provided specific imagery in early drawings as well as for his theory of sculpture, which was profoundly spiritual and specifically worldly" (Temkin and Rose 1993, 84). She claims that the felt and fat event depicts a resurrection of sorts. The story is considered a myth by many; however, I believe there are some elements of truth and that something in his experience generated warmth, energy and healing, and that this act contributed to the development of his drawing process. It appears that in reaching back to his spiritual knowledge and his lived experience he found a reflective drawing research method that explored storytelling and healing.

Giving and Receiving: The Traumas of a Time and a Circular Vocabulary for Healing

I speculate from an artist point of view that Beuys's drawing method was an act of giving and receiving. In his process he noticed with his body and asked himself how does it feel? In the process of giving himself this time and space to reflect on the projections in his brain and the wounds in his body he received imagery transmitted through his body as energy. This energy manifests itself in drawings, so that his situation is reflected back at him. In this imagined mirrored space, his body gives trauma a visual form.

https://magazine.artland.com/the-other-joseph-beuys-the-drawings-of-the-myth-making-action-artist/

Figure 15. Joseph Beuys, Elk with Woman and Female Faun*, 1957. Joseph Beuys Estate, Düsseldorf.*

Drawing became Beuys's first step toward an abstract language; it provided him with a space to align science within his art practice. He was looking for an "ethical" process to express his thoughts. Rose states that he found this process through drawing:

> Beuys's search was not for a style but for an ethical model, a form of discourse that was more authentic than the one he began with. He needed a legitimate vehicle for the

> realization of his human aspirations, and throughout his life he used drawing, in one form or another, either as a working model or a tool—even a weapon—to realize those ambitions. (Temkin and Rose 1993, 75).

Like Beuys, I have been searching for ways to align my drawing practice with my environmental concerns. I hadn't been focused on drawing as an ethical model, as some have speculated Beuys did. However, on reflection, drawing is honest. Its construction is visible; nothing is hidden.

Drawing as Thinking

Beuys describes his drawing process as a development of thought and offers examples across various disciplines, explaining that "architectural drawings are structural thought given form" and industrial fields "such as chemistry and physics also create a physical product on a flat support and use drawing to broaden our understanding" (Beuys, 1983). Beuys adopted this architectural and scientific argument to experiment with changing the social order. Through drawing, he developed his thoughts; this led to him widening the experience of science through performative blackboard drawings or action. (Beuys, 1983). He called for a new declaration that unites man and the world, with humans acting as representatives in "terrestrial" relationships (Beuys 1983).

https://www.tate.org.uk/art/artworks/beuys-four-blackboards-t03594

Figure 16. Joseph Beuys, Four Blackboards*, 1972. Collection of the Tate Galleries.*

Beuys aspired to achieve a unity of people with the world. I have also been exploring ways of connecting people and the world through adopting ideas of the flesh, chiasm and kinship. He strongly argued that in the scientific research and analysis of nature, hard science held all the power because of its links to industry and capitalism. He identified this as one-sided and contributing to a dying planet. He was concerned with nature's problems, such as the quality of the atmosphere, including water. Furthermore, he was interested in restoring a sense of purpose aligned with nature through "caring" for air, plants, water and animals. Beuys used the metaphor of the "shepherd" to describe caring and survival. He claimed that he wanted his drawing to create a more extensive understanding of art and science to preserve nature and humankind from destruction.

https://www.tate.org.uk/art/artworks/beuys-score-for-action-with-transmitter-felt-receiver-in-the-mountains-ar00683

Figure 17. Joseph Beuys, Score for Action with Transmitter (Felt) Receiver in the Mountains*, 1973.*

Beuys claimed that his political interests evolved from drawing through a projection of what takes place in the brain, including imagination, intuition and inspiration. Furthermore, technology and ideas metamorphosise in this way as we strive to overcome inner crises. He describes this process as a dynamic system that everyone can participate in, and these are the concepts behind his social art and sculpture theories. In his own words, "art is the science of freedom and freedom as a type of technology" (Beuys 1983). Beuys believed in the ability of people and their inner freedom for creativity; a space to decide their shapes and their qualities. In his words, "I am not a politician; I am an artist" (Beuys 1983). He stressed that art is the only way to change the situation; however, something must happen with art, but "not in the traditional sense but with vibrancy, by moulding the problems of the world into a better shape" (Beuys 1983). Beuys described "form" as the most crucial idea for artists, not politics, and recommended that we think with more than our heads.

Alternative Perspectives

I understand that Beuys's statement "art is the only way to change the situation" was controversial. I acknowledge that artists may not be able to change the world. However, they do change my view of the world by offering alternative perspectives. The drawing process that has evolved in my investigation tells the story of the humpback whale through human speculation (imagination, intuition, senses) of underwater sound. It is not a scientific perspective, although I have consulted with the relevant science.

How do I create drawing processes that unite artist and whale, while also representing them in an ethical relationship? Through imaging "The chiasm—The Intertwining" as a methodology, I have found a more comprehensive space to embody the whales' experience through my own lived experience, imagination, intuition and speculation of the barriers presented by anthropogenic undersea sound, specifically oil extraction methods, but also more general human-made undersea sound, which is constantly increasing due to the requirements of increasing populations and shipping. Beuys said that "a more comprehensive understanding of truth happens through the direct action of the observer and the observed", and he further

argued that the analysis of nature is one-sided: humans hold all the power (Beuys 1983). He called for a new declaration that unites man and the world, with humans acting as representatives in terrestrial relationships.

Figure 18. M. OToole, experiment for How Loud Is Too Loud?*, 2018. Chalk on black ink and gouache.*

> Bernice Rose compares Beuys's drawing process to a scientist recording data:
>
> Like a scientist recording data, he charted the structure of his art, its "gestalt", through drawing. As the central aesthetic subject and center of the world, man became the control for the social body, and it, in turn, was reconceived as an artifact, one great sculptural enterprise in the process of formation, with a vital pulse—the human heart—at its center. It was the artist's particular responsibility to lead mankind to this new realization of society; thus art became politicized and politics aestheticized as a means for reconciling man to his social role. (Temkin and Rose 1993, 75)

This concept relates to the development of my process because I am attempting to tell stories from a non-human perspective using my own body and the space between myself and the whale. This offers a chiasm to speculate and imagine sound as pressure in visual form. Like a scientist, I am also recording data; however, I am charting a sensory space, the chiasm between seer and seen.

Torkwase Dyson: Giving Shape to Space, Making the Invisible, Visible

I wanted to understand how contemporary US artist Torkwase Dyson creates process from embodying stories of environmental and racial injustice. An example is the abstract process she has developed by considering the lives of Anthony Burns, Henry "Box" Brown and Harriet Jacobs, "19th-century individuals who hid in architectural spaces—ship hulls (Burns), a shipping crate (Brown) and an attic crawl space (Jacobs)—on the path from enslavement to freedom".[9] Dyson explains that she uses geometric forms and light to understand the histories of architectures and how people might negotiate freedom.

Dyson has been exploring the way space is perceived and negotiated by black and brown bodies since 1999. She is interested in environmental racism and is mining art history to invent a new form of art-making—a new language for how people occupy space. She does this by understanding how artists have used space and shapes. Dyson states that "the shape makes the black", and mark-making and line inform her black compositional thought. She speaks of an equation that includes the curve, rectangle and irregular triangle to discuss self-emancipation, asking "how do you pivot the body through a landscape pictorially?" When speaking with scholar Christina Sharp, she expressed an interest " in tackling meaningful and ethically responsible ways to wrestle with the many challenging issues of contemporary society, including those influenced by post-civil rights and [the] postcolonial landscape" (Dyson and Sharpe 2018). Dyson speaks of "the ability to create representational drawings that describe more live-able spaces and how we feel about them", also stating that they can, alternatively, "describe existing space that we must come to know and understand their operational capacity and how we feel about them", which, she says "is critical to creating the conditions under which environmental transformation occurs" (Dyson 2017).

https://www.colby.edu/lunderinstitute/explore-our-work/fall-2018/torkwase-dyson/

Figure 19. Installation view with Torkwase Dyson, 2018. Image credit, Colby, Lunder Institute.

Black compositional thought is the term Dyson gives to her experimental process exploring the ways black people have moved their bodies through space. She describes the critical tension she struggles for as follows:

[9] *See https://www.torkwasedyson.com/installation.*

> From the black-inside-black position, I stand in front of a surface with my mind in complete awareness of form as power. As I begin to convey shape, line, movement, weight, scale, proximity, and perspective, representations of subjects oscillate between scaled diagrammatic images and expressive drawings. In the act of making, I understand that it is the integrations of forms folded into the conditions of black spatial justice, where I begin to develop compositions and designs that respond to materials (Dyson, 2017).

Dyson thus responds from a black perspective through the integration of forms. In the act of making, she integrates form into the conditions of black spatial justice. She is interested in making spaces more liveable and by understanding their capacity, she creates conditions for transformation.

https://www.torkwasedyson.com/about1

Figure 20. T. Dyson, Looking for the People (Water Table Ocular #3)*, 2017. Polymer gravure on Hahnemühle Copperplate White paper. Edition of 10, published by Brodsky Center, collaborating master printer Randy Hemminghaus.*

http://pelicanbomb.com/art-review/2017/black-interiority-notes-on-architecture-infrastructure-environmental-justice-and-abstract-drawing

Figure 21. T. Dyson, Fugitively*, 2016–17, from the series* Fugitive Architecture (autonomy and body). *Gouache on paper.*

Dyson has found a way to give shape to space; she makes the invisible, visible through the development of a visual form. She uses the phrase "black compositional thought" to describe the complexities behind how black bodies have moved through space. This addresses critical questions about global warming because, sadly, it is the most marginalised communities that will suffer the most through climate change. Her research questions whether "drawing and painting [can] help people understand what global warming is?" (Dyson 2017). She describes being an artist as being bound in the condition of politics. The pleasure for Dyson is understanding the history of art and applying it in the invention of new forms of art-making. She tries to figure out more liveable futures (Dyson and Sharpe 2018).

Dyson identifies a history tied to the industrial revolution where humans began to operate in an invention that takes power. During this time, people of colour suffered under geographical shifts. The practice of extraction—oil and coal—led people to move away from their homes, leading to the displacement of black lives. Dyson thus developed an art process to turn understanding into a visual language to give form to the invisible shifts in power that evolved through a combination of racism and rapid technological evolution. This language stems from spatial design and the history of art. My research stems from a sensory line developed in drawing from life; this process has evolved into an embodied language explored through my direct and sensory experiences of the chiasm, the in-between space of the observer and observed. In this space I attempt to be a "representative of nature" through the development of experimental embodied drawing methods. This embodied process aims at reflecting nature's side of the argument. I want to rebalance the power between human and nature.

Where have Beuys and Dyson left their mark on my process? Like both artists, I want to create more extensive understanding. I attempt this by weaving my body, including the senses, between art and science in order to develop new processes. I am concerned with multispecies extinction and am attempting to shape my thoughts on the subject of anthropogenic sound into visual form. However, my process reinterprets Merleau-Ponty's chiasm for my own purposes; I turned it into a fleshy mass or body between the whale and myself and personified sound in the sea through listening and touch in this imagined space. In this way, the invisible intrusion of human-made sound under the sea was given a visible form. An experimental drawing process was the means to convey my thoughts and contributed towards an abstract visual language.

William Kentridge: The Nature of Being Human

From artist William Kentridge (b. 1955, South Africa), I wanted to understand how he develops drawing processes from the injustices he witnessed as a child. In particular, I was interested in evolving a drawing process from the body at play. How, then, does Kentridge align his drawing practice with his concern for historical inequality in South Africa? Like Dyson, Kentridge's work is related to extraction and labour. South Africa's history is built on the exploration of its natural resources: diamonds and gold. Kentridge grew up immersed in conversations about injustice; his father was a lawyer in apartheid South Africa. His investigations explore the nature of being human. He shows compassion for the pressure black South Africans experienced under the apartheid regime through the time and effort he affords his analogue drawing process.

Kentridge is a white South African, of privilege, and is speculating on how racial oppression feels from his experience of being immersed in South African society and his

historical research. This is where Dyson and Kentridge differ. Kentridge can only speculate on how it feels to be marginalised because of the colour of his skin. However, they both explore embodied understanding and historical narratives in their practices. Kentridge says that he tries to re-evoke in drawings the way he felt when first witnessing violence against black South Africans as a child (Kentridge 2010).[10]

https://www.goodman-gallery.com/exhibitions/950

Figure 22. William Kentridge, drawing for The Head & the Load (Fallen Figures)*, 2018. Charcoal and red pencil on paper (Triptych). Goodman Gallery.*

Kentridge works in theatre, drawing, animated film and printmaking. Like Beuys, his areas of interest are drawing, myths, political histories and literature. He emphasises the necessity of working with his hands to think. His studio process has been fundamental to the development of my approach to experimental methodology. His process begins with an impulse to cut, draw and combine to transform. He describes this process as "the seriousness of play" and explains that "in the looseness of trying different things, images emerge" (Kentridge 2010). Thus, he does not know in advance what will happen.

Kentridge has described his walking and thinking process concerning animation drawing. Specifically, he walks forward, does some drawing, walks back to take a photo; in the active body something happens between thinking and doing, he refers to it as "stalking the image". For Kentridge, phenomenological questions are also raised around the embodiment and the production of drawing. He speaks of the studio as a "physical and metaphorical space" (Kentridge 2010), and his drawing happens in the quiet space of the studio where he allows the drawings to show him new things as they progress. Kentridge's activation of the pictorial surface through physical engagement and the handling of materials has influenced my methodology and for this reason his process of "drawing at the periphery" will not be expanded on here, instead it will be unpacked in Chapter 4 in relation to the development of my own process.

[10] Kentridge's great grandfather left Lithuania in the 1880s during a mass exodus of Jews from the Russian Empire after the assassination of Tsar Alexander II. He migrated to South Africa via England, where he assumed the English name Kentridge, leaving his Jewish name behind.

Julie Mehretu: Revolution and Freedom

Ethiopian-born artist Julie Mehretu (b. 1970, Addis Ababa) also creates her own visual language from first-hand experience and historical narratives. Her process evolves through laying down autobiographical and researched information layer upon layer in a palimpsest. Mehretu's drawing takes place in both Berlin and New York and is focused on issues around migration. Mehretu emmigrated from Ethiopia, coming with her parents to the US in 1977. She meditates on revolution and social change and builds a palimpsest of spaces, drawing on visual and cultural memories. Mehretu uses gestural sweeps of ink, responding over the top of printed photoshop imagery, which depicts movement. She paints layers of automatic mark-marking and refers to them as lines of flight; these broad, hand-brushed ink strokes locate the artist on the surface of the work—the movement and energy inherent in her mark-making speak of "chaos and tension" and sometimes "revolution and freedom" (Butler and de Zegher 2010).

French Marxist theorist Guy Debord (1931–94) and the Situationists have influenced Mehretu, along with the Constructionists. Debord's theory of the dérive (drift) was one of the critical texts of the international organisation, the Situationists (1957–72). The Situationists were interested in spontaneous and ever-changing experience. For example, the dérive refers to the drift, where people travelled on foot without a pre-determined path across Paris in the hope of seeing the city differently. Artists of this period also practised détournement, a cutting up or juxtaposition, where things were put together in different ways to explore a new view of the world. This practice is evident in Mehretu's drawings, where she adopts détournement within the modern collage technology of Photoshop and uses it to blur and distort imagery, which she responds to with a variety of mark-making (Butler and de Zegher 2010).

https://www.sfmoma.org/exhibition/julie-mehretu-howl-eon-i-ii/

Figure 23. Julie Mehretu, work in progress for SF MOMA exhibition, HOWL, eon (I, II), *2017.*

Mehretu's work at SF MOMA (figure 23) is of gigantic proportions. Here she responds to photographic imagery of US race riots that have been blurred in Photoshop beyond recognition and printed onto the canvas. In the gestural language she has developed she responds with drawn and painted marks to the imagery beneath. Photoshop has always been part of her preliminary process; she plays between digital and analogue.

Despite my interest in Mehretu's approach to mapping experience or palimpsest and mark-making, I haven't been interested in making a ground or support from digital imagery;

instead, I am responding to lived experience. I need to ask myself, how did it feel there? This question has become essential to understanding issues around the pressures presented by climate change.

https://www.tate.org.uk/art/artists/henri-michaux-1628

Figure 24. Henri Michaux, Untitled Chinese Ink Drawing*, 1961. Paris and DACS.*

In drawing on Mehretu's work, I have also reached back to her influences, among whom Belgian-born French artist and poet Henri Michaux (figure 24) stood out. Michaux's drawings are full of intense energy; he prefers the medium of Indian ink but does use oil and watercolours. He often paints three wide vertical bands using only a little ink to give a dusty effect. In this vague medium swim dozens of "desperately articulate small figures" (De Zegher 2000, 167). Since 1927, his drawings in water-soluble, transparent fast-moving materials have transformed his own multidimensional, gestural experiences into a two-dimensional experience on the page. Curator Catherine de Zegher describes these drawings as "oscillating between order and disorder, language and non-language, form and informe, social and personal escape" (2000, 168).

However, the experiences Michaux was responding to are different from my own. We differ in that I immerse myself in an environmental space that poses a political and ecological challenge and I have built a unique language from rhythms that respond to life and exist through my sensory response. In contrast, Michaux is known for his experimental drawing process, responding to the psychedelic drug mescaline. He was commissioned by Swiss drug company Sandoz (now Novartis) to make a visual response to the experience of their medication.

The traces of experience, along with gestural and tactile activity within Michaux's and Mehretu's invented alphabet and narration has informed my research. I experiment with developing my visual language of pressure informed by the movement of sound by creating space through the push and pull, a tonal variation of materiality and overlapping of colour. I have adopted a practice of lightly loading a broad brush dipped in ink or gouache and dragging it across the page horizontally as an act of erasure. The pastel/chalk drawings are partially disturbed and then depict a blur or movement. In these images, I am asking "how loud is too loud?" by distorting the visual language layer by layer. This process will be expanded on in Chapter 4.

Figure 25. M. OToole, experiments for How Loud Is Too Loud?*, from the drag series, 2018. Gouache, ink and chalk on Fabriano paper.*

Mehretu's process involves construction and deconstruction: she lays down marks and erases parts of them. Her process is visible to the audience through mark-making and violent erasure, and she depicts her political perspectives as she wrestles with issues that concern her. Like Mehretu, I am attempting to keep an audience engaged in the work. However, I want them to consider the perspective of ocean mammals and the effects of anthropogenic undersea sound. Mehretu has explored erasure to express violence relating to a political stance she is taking. The gesture and movement Mehretu creates through erasure has influenced how I create the pressure or force of anthropogenic noise moving in the ocean and potentially masking whale communication.

Janaina Tschäpe: Imagining an Oceanic Worldview through Art and Science

An ongoing exchange with US marine biologist and ocean explorer David Gruber inspires the drawing practice of German-born Brazilian artist Janaina Tschäpe.[11] Gruber searches the undersea world for bioluminescent and biofluorescent marine animals and is concerned with pushing the boundaries of our understanding of life in the deep sea. Tschäpe listens to Gruber's scientific stories, which come from his laboratory and from his underwater adventures. Tschäpe contributes her imaginary perspective in a translation of Gruber's stories into drawings and paintings. According to curator and art writer Stefanie Hessler, "Tschape's work captures water, its fluidity, and its mythological dimensions, as well as its ecological importance as a habitat for a multitude of creatures from jellyfish to algae to octopus" (2018, 73). Tschäpe thus attempts to understand the perception of aquatic creatures from within their worlds and experience.

http://press.tba21.org/news-tidalectics-2-juni-19-november-2017?id=50195&menueid=9361&tab=1&imageid=128816&l=english

Figure 26. Janaina Tschäpe, Fictionary of Corals and Jellies*, 2017. Watercolour pencil on paper, leporello.*

http://press.tba21.org/news-tidalectics-2-juni-19-november-2017?id=50195&menueid=9361&tab=1&imageid=123216&l=english

Figure 27. Detail of Figure 26.

In her works *Fictionary of Corals and Jellies* (2017) and *Blood Sea* (2017), in collaboration with Gruber,[12] two Leporello were filled with drawings by Tschäpe accompanied by annotations by Gruber. The mark-making is reminiscent of her large painted and drawn works and combines layers of line and colour to create a gestural swirling enacting the movement of water. In

[11] The artist was born in Munich in 1973, and raised in São Paolo, Brazil.

[12] Marine biologist, ocean explorer and professor David Gruber is providing a wealth of new insights into a secret "language" of shining colours and patterns that help many marine creatures communicate, interact and avoid enemies. He and his collaborators have illuminated and discovered novel fluorescent molecules from numerous marine animals and are working at the interface between glowing sea life and the ability to visualise the inner workings of human cells. His research group at City University of New York and the American Museum of Natural History has deciphered the genome of scores of new fluorescent proteins, which are being developed as tools to aid in medical research and illuminate biological processes. On land, his team designs submersibles and other technologies to revolutionise ocean exploration and push the boundaries of our understanding of life in the deep sea. See https://www.ted.com/speakers/david_gruber.

juxtaposition to Tschäpe's fluid line is Gruber's notation in graphite pencil; scientific-looking five-sided cells, some connected, some not. Numbers and letters surround the cells in graphite markings. The works are presented on a long table: Tschäpe's line bubbles and curves between dots, dashes and lines. In places, line work in multiple colours appears as a palimpsest of experience. White space is respected like a children's storybook: there are intense areas of marks and then breath; a rhythm exists between the pages. This breath or white space would typically be for the text, but in this case, only Gruber's notation is present. The shared oceanic obsession between artist and scientist is evident in the marks; a shared map of experience[13] (Hessler 2018).

The research for *Fictionary of Corals and Jellies* and *Blood Sea* took place on board the research vessel *Dardanella* as part of the TBA21 Academy (Thyssen-Bornemisza Art Contemporary Academy).[14] The *Dardanella* was founded in 2011 as a mobile site of cultural production. The academy is temporarily inhabited with artists, scientists and other thinkers and practitioners (Hessler 2018).

Embodied Knowledge and Tschäpe

Tschäpe explains in a video uploaded to YouTube by her gallerist Sean Kelly that she became obsessed with drawing as a young person (Tschäpe 2018). For her, the drawing process created a space to be, to inhabit. In this space she experienced complete freedom to try things out. She moved away from drawing and painting at art school and began a performance practice. Through this practice she became absorbed with exploring ways to express what was going on in her world in simple bodily gestures.

More recently, she has returned to painting and drawing to deal with issues in abstract ways. She says that "painting and drawing have their own language and through gesture the body expresses it" (Tschäpe 2018). In describing her approach, she speaks of the tension between wet and dry media, and the stress around where to stop and the memory of lived physical experiences. She says that she hopes that the audience can feel the tension between drawing and

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[13] I would like to point out that I have only been able to view these works online. The gallery has supplied two images of the work. One is a daylit installation. The other is a darkened space with only the drawings lit from above, much like the creatures depicted would be in their own habitat.

[14] TBA21–Academy leads artists, scientists and thought-leaders on expeditions of collaborative discovery. It is dedicated to fostering a deeper understanding of the ocean through the lens of art and to engendering creative solutions to its most pressing issues. It commissions interdisciplinary research that catalyses engagement, stimulates new knowledge and inspires artistic production. Established in 2011, the non-profit's programme is informed by a belief in the power of exchange between disciplines and in the ability of the arts as a vessel for communication, change and action. See https://www.tba21.org/#item--academy--1819.

paint in viewing the work (Tschäpe 2018). There is an interplay between what interests Tschäpe in the landscape and her search for a process.

Tschäpe is included in my survey of artists because I feel a connection to her practice due to my oceanic immersion in Tonga and the conversations I have had with NIWA scientists. However, mostly she is included because of her exploration of the gap between perception and understanding. Like Tschäpe, I am imagining and attempting to speculate from the whales' perspective. In this way I am engaged in myth making as my drawing process imagines and speculates intuitively. Unlike Tschäpe, I do not have an ongoing collaboration with science; however, my conversations with NIWA did impact the direction of this research and hard science is informing my process too, as will be explained in Chapter 3. We are different because Tschäpe responds to stories told to her by Gruber. I am also listening too; however, I listen to recorded sound from my own lived experiences when swimming with whales along with the sound files shared with me by NIWA and their stories. I then respond in drawings from the memories of my own experiences.

Embodied Knowledge: Summary

Merleau-Ponty defined embodied knowledge as a type of knowledge where the body knows how to act; it does not depend on instruction from the mind. All the artists that I have surveyed in this chapter have explored embodied knowledge in the creation of their drawing processes. They look, listen, touch and experience with the body through their own memories as they work with materials. They do not know what their output will be, they engage in a haptic process. Their process evolves through a bodily response.

For Beuys, drawing gave form to his thoughts, which were impossible to describe in words at that time; drawing was his means to convey them. His abstract drawings gave a visual form to the unseen trauma of war. Dyson has found a way to give shape to space; she makes the invisible, visible through the development of a visual form. She uses the phrase "black compositional thought" to describe the complexities behind how black bodies have moved through space. Kentridge explores embodied knowledge through looking, seeing and physically acting out movement. His drawing process is an act of compassion and stems from the trauma inflicted on black South Africans. It responds to the brutality he witnessed as a young child, where he struggled to understand why white adults did not intervene to stop the violence. Mehretu meditates on revolution and social change and builds a palimpsest of spaces, drawing on autobiographical and cultural memory. Finally, Tschäpe's imaginary drawing process revolves

around scientific and fictional storytelling and begins with listening to scientist David Gruber. Their collaboration allows for an imaginative space for Tschäpe to create imagery that depicts the importance of the ocean as a habitat. She imagines from the perspective of undersea life as explained to her in intimate detail by Gruber.

All artists discussed have developed drawing processes that enable them to "stay with the trouble". My process relates to each one for the reasons discussed above. However, we differ, because my research is primarily concerned with undersea sound and noise. I am concerned with understanding the perspectives of multiple species. I have identified that my reinterpretation of the chiasm as an imaginary space to speculate and draw is a unique methodology. This investigation reveals new knowledge through the crisscrossing of information between human and whale. The collection of data from the artist's body as it moves through the world informs this drawing process.

In Chapter 3 I will expand on my relational encounters with science for the purpose of weaving that knowledge with embodied knowledge. I will describe the interplay that evolved between artist and scientist and the practice-led research that flourished from those conversations. This thesis is focused on critiquing an unsustainable present to achieve a liveable future.

Figure 28. M. OToole, How Loud Is Too Loud? No. 5*, 2019. Chalks and wet media on Fabriano paper.*

CHAPTER 3: Generative Relational Encounters: Towards a New Methodology

This investigation is concerned with the development of listening as a mode of drawing research. It encompasses the development of a phenomenological investigation that relies on being aware of and responsive to one's surroundings. I will discuss the scientific mode of enquiry uncovered through relational encounters with NIWA. Key to my research is their explanation of the Fourier transform, which led to research around sound, pressure and touch. Issues raised by the question "How loud is too loud?" for whales in Cook Strait became something I wanted to understand further.

This research positions the body as a valuable site of cognition for the generation of new visual forms in response to complex environmental issues, specifically the effects of human-generated sound on marine mammal communication networks. I am mining drawing processes to acquire knowledge and understanding through experience and the senses. In this chapter I will recount my conversations with NIWA scientists and describe a pivotal conversation where the story of sound as pressure in the ocean was related powerfully with an emphasis on pressure through touch. I will sketch out my lived experiences with humpback whales in Tonga. These experiences inform the foundational premise for this research.

Listening as a Mode of Drawing Research

Listening to the rhythms of sound and noise has enabled me to stay with the trouble, as Haraway would say. Instinctually, I gave those rhythms visual form. Through drawing marks on paper I build a "score". This research reflects the concert in-between human and non-human through an enquiry informed by empirical science and phenomenology.

A Phenomenological Investigation: Being Aware of and Responsive to One's Surroundings

During a visit to the Tongan outer islands I experienced an ethical whale swim. The swim took place in the Ha'apai group of islands, with a local indigenous guide, Victor, from the small village where I was staying. My investigation toward new methodology was generated by multiple relational enquiries woven together. My drawing research analyses and interprets lived

experience; it is a phenomenological mode of investigation. As discussed previously, and as will be sketched in more detail in this chapter, this is 1) my own phenomenological experience and 2) my conversations with NIWA scientist Dr Kim Goetz and her assistant Dr Giacomo Giorli.[15]

On the few occasions that an internet connection was available on the island, I received several email messages. The first was from Greenpeace, informing me of a fossil fuel exploration and seismic blasting protest, happening just off the Wairarapa coast. Fossil fuel exploration consists of seismic blasting into the seabed to discover potential oil mining sites. For this purpose, a ship tows large airguns that shoot air pressure into the seafloor. I became curious about these agents operating within the proximity of the Cook Strait environment: firstly, oil companies Statoil and Chevron engaged in fossil fuel exploration; secondly, a Greenpeace protest; and thirdly, the acoustic monitoring of whales by NIWA.

It was not until I returned home to New Zealand and looked into the migratory path of the whales I had swum with in Tonga, and noticed the route they would take on their way back to Antarctica via New Zealand, that I realised these whales would swim along the eastern side of Aotearoa past Cook Strait and the Wairarapa coast. I became concerned about what might happen to them when they swim through seismic blasting. To find out more I contacted NIWA and presented my concerns to them.

Scientific Method: Relational Encounters with NIWA

I first encountered the following work when listening to an interview on Radio New Zealand. Dr Kim Goetz (marine ecologist) and her assistant Dr Giacomo Giorli (marine mammal acoustician) of NIWA began acoustic monitoring of whales and dolphins in the Cook Strait region in June 2016. Goetz and Giorli began this pioneering underwater research to identify through underwater audio recordings which species of whales and dolphins travel through the strait. They placed hydrophones in Cook Strait as a non-invasive method of listening in on whales and dolphins.

This research is motivated by the fact that although New Zealand's waters are home to half of the planet's whales and dolphins, little is known about their distribution or the impact of humans on their environments. Goetz explained to me that "Cook Strait is one of the most dynamic tidal cycles on the planet and a busy area for fishing vessels and ferries. There are a few other places in the world that are this noisy that also have large numbers of marine mammals".

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[15] Unless otherwise noted, all quotes from Goetz are drawn from conversations with the author in September 2017.

Goetz then continued to explain that they "will be able to quantify how loud it is and where the noise is coming from", adding this research is significant because it "has never been done here" (NIWA 2016). The following is an outline of the scientific process of data collection along with specifics around the research site and a review of the preliminary acoustic data findings.

Goetz deployed seven hydrophone receivers from the NIWA research vessel *Tangaroa* and moored them to the seafloor throughout the strait, including in the canyon system. The purpose was to understand and quantify whale species and human-made sounds, such as vessel traffic (including ferries and fishing boats) and seismic surveys for oil and gas. They were deployed in June 2016 and removed in December 2016. A second deployment took place between February 2017 and August 2017.

Goetz and her team captured both non-biological and biological sound and teased them apart to quantify their nature. She describes this process as the point "where the detective work begins" (Goetz 2017). It is a manual process of going through all the files to determine what species of whales and dolphins are in the region. Before Goetz's research, all information on mammals in the area had come from strandings and surface sightings. The reason for listening to whales as opposed to sighting them from land or boat is that marine cetaceans are deep diving, very allusive and only visible for short periods. Deepwater canyons close to shore are unique to the area and make it an accessible and exciting site to study. Noise travels further in deep water; therefore, the Cook Strait canyon is ideal for acoustic recordings. The following graph shows the positions of the hydrophones in the Cook Strait region.

https://niwa.co.nz/coasts-and-oceans/research-projects/acoustic-monitoring-whales-dolphins-new-zealand-cook-strait-region

Figure 29. Placement of hydrophones in Cook Strait. Source, NIWA website.

Acoustic monitoring is not weather dependent and is carried out 24 hours a day, allowing for data collection during the night. However, the draw-back of acoustic data is that it is dependent on animals calling. As an example, male humpback whales sing when attracting a mate; if there were no female whales in the vicinity, they might not sing. The female humpback does make social sounds but does not sing. It is the male that sings a mating song; humpback vocalisations, including the complex and wide-ranging "whale song", are performed by males.

The acoustic receiver used was chosen for its wide range. Baleen or blue whales' low sound frequency travels further than the high-frequency dolphin call. The research is aimed at capturing a broad range of species. The multi-channel hydrophones therefore need to flip between low and high frequency.

Goetz describes her research as an Eco-Acoustic project, meaning it is not only collecting biological data. The research has also captured anthropogenic sound, including that produced by vessels and seismic surveys, in addition to natural sounds related to earthquakes and weather-events. She gives the example of a day when there was no acoustic data at any of the seven locations. It turned out that there was a particular weather event that day with 150km winds. She explains that "listening in" as a research method paints a picture. Goetz explains that "there needs to be an understanding of the underwater environment" (where the receiver is placed) when making her observations. The shallowness of Queen Charlotte Sound confines boat noise, whereas in the Cook Strait canyon noise travels further (Goetz 2017).

Focusing on the question "how noisy is Cook Strait?", Goetz makes her way through the massive quantities of recorded data. While listening, she is also watching the spectrogram. Specially created audio detectors assist her in the identification process by distinguishing the calls animals make. However, the meaningful research outcomes are still reliant on manual analysis, which teases out identified species and anthropogenic noise from natural sounds, including weather events. This following graph, taken from the NIWA website, distinguishes vessel traffic, seismic activity and total activity.

https://niwa.co.nz/coasts-and-oceans/research-projects/acoustic-monitoring-whales-dolphins-new-zealand-cook-strait-region

Figure 30. Total, vessel and seismic-associated daily sound exposure and equivalent continuous noise levels at station 6 (> 1,000 m depth). Source, NIWA website.

Goetz's findings confirm that the humpback whales' migratory pattern align with previous land and boat sightings; that is, the whales pass through the region up until mid-August and then move on to warmer waters—including the Tongan Islands and the birthing sanctuaries that surround them. The data collected indicates that the Antarctic minke whale travels along the east side of Aotearoa while the New Zealand blue whale travels along the west. She questions whether Cook Strait is a migratory corridor or a barrier between species. Humpback whales migrate through the west coast, with some on the east coast too. The recordings identified the distribution of species of whales and dolphins throughout the area along with human activity in the form of vessel traffic and oil and gas exploration and extraction.

Initial research on whale song being undertaken by Victoria Warren, a PhD researcher based at NIWA and supervised by Goetz, focuses on identifying differences in whale song

between migration groups. Warren explains, "the singing of whale song varies between families and groups of whales, and particular songs identified as specific to migration groups depending on their destination" (Warren et al. 2017). This suggests that migrating groups are communicating through song. How does a noisy Cook Strait impact on the whales' ability to support each other for safe passage, if their song is masked by anthropogenic noise?

Warren's research and Goetz's question on noise in Cook Strait resonated with me and thus I expanded my research enquiry to ask the following: "How loud is too loud, and what are the consequences for ocean mammals?" Also, does this noisy space impact whale migration patterns? I decided to contact Goetz to ask if she would show me how she and her team visualise the recorded sounds. During this meeting, Giorli explained the Fourier transform, which defines the wavelength and amplification of noise in the ocean. The Fourier transform takes a time-based pattern, measures every possible cycle and returns the overall "cycle recipe" (the amplitude, offset and rotation speed for every cycle that was found). It turns a signal into circular time paths.[16]

I asked Goetz and Giorli about how the seismic blasting, mining and shipping in Cook Strait could affect the communication and health of the whales as they move through these waters. In response, Goetz gave the analogy of a café/bar environment. If, for instance, the bar surrounds become louder and louder, we are forced to raise our voices to communicate. It becomes difficult to hear and be heard. Giorli further added that sound, which travels much further underwater, also travels as pressure. As he explained this, he tapped my arm as a demonstration of how this continual sound pressure in busy Cook Strait could be impacting on whales. As a result of this discussion, I identified "pressure" as a quantifiable measure of impact on whales and I gained a more profound understanding of the idea of pressure related to environmental impact. Giorli expanded his words through "touch"; he speculation on the whales' experience by pressing a fleshy part of my arm with his hand, which enabled me to imagine the whales' experience. This sensory conversation was transformative. I made links between drawing, listening, sound, pressure, touch, flesh and skin. Thus, an artist's embodied speculation on how sound is received as pressure from a whale's perspective sits at the heart of this enquiry.

Goetz tells us that the scientific audio data paints her a picture of Cook Strait; it gives her an insight into who, what, when and where. From this data, she can create maps for industry and conservation based on specific species relating to the time of year they are migrating through the region. However, I need to be transparent here. The sponsors of the NIWA research include

[16] *The Fourier transform was discovered by French mathematician Joseph Fourier (1768–1830).*

OMV New Zealand, Marlborough District Council, Chevron New Zealand Holdings LLC and Woodside Energy Ltd. By claiming to be "green" these companies can carry on with their exploration and seismic blasting and extraction from the sea floor.

During this research process I have had moments where I have wrestled with my own ethics. As explained, I have experienced private whale swims with an indigenous guide. The rules were obeyed and I understood that the whale cow was in Tonga to give birth and to feed and train her calf for the journey back to Antarctica. She was not there to meet me and I kept my distance accordingly. However, on my most recent visit to Tonga my whale swim was with a small commercial operation. On this swim a tourist was weighted, which is illegal. He wore weights in order to dive down deeper and he purposely got between the calf and cow to photograph, he breached the five-metre rule set by the Tongan government and the Tongan guide's instructions were ignored. Distress was evident in both calf and cow. After this experience, I now believe that all tourist whale swimming should be illegal. The calf needs to feed for the journey ahead, not entertain humans.

The NIWA scientists' investigation recounted above has added an important strand to this research. It has anchored my creative response in factual data and establishes a relationship between my method and science. I will now expand on my understanding of these scientific studies with an account of my experience of swimming with whales through embodied, experiential data gathering.

Embodied Experiential Data Gathering: A Translation of Sensation

I will now sketch my understanding of how embodied sensory knowledge can inform new processes of creative production. Through listening, touch and memory I transfer the qualities of ocean sound experienced in my own body through responsive mark-making into a visual language. The following extract is drawn from my diary notes, the experience I retell took place with a private indigenous ethical guide.

> *We slid quietly off the old wooden boat, Victor, my Tongan guide, went first and I followed him into the water. Floating on my side with one arm outstretched ahead and kicking gently, we swam toward the whale and her calf. Slowly, they came into sight as a blur and then the shape of them became apparent. I experienced a mixture of excitement and awe at their scale. Victor motioned me to stay where I was. He swam over to the whale's*

eye and began a graceful dance with his arms. Her calf bounced around her head, but Victor focused on the mother. He motioned for me to approach; in the last few metres, he came to me, took my hand, and we approached her eye together.

We hung there looking at her, she at us. Time became irrelevant; I cannot describe the duration. It was as if she were not just looking at me, but inside me. I had this feeling she was measuring; I believe she knew I was a mammal but that I was not of the sea. I wanted to tell her that I too was a mother, that I knew that feeling of the baby using your body as a plaything, wriggling, climbing and pinching as the calf rubbed and pressed on the whale. She slowly began to swim; Victor indicated that she wanted us to swim too. I stayed in front of her eye five metres away. I was not kicking hard, and we swam for close to an hour, I kept eye contact with her throughout. The calf was like any baby, adorable, playful, curious and hungry.

However, I was captivated by the mother whale, with one flick of her tail she could be gone, she could dive, change direction, but she did not. We just observed each other, the seer and the seen. She was being courted from a distance; males were singing to her to attract her attention. Meanwhile, in the foreground, there was the sound of the calf rubbing on the whale; it sounded like balloons being rubbed together. The small outboard motor of Victor's old wooden boat could be heard approaching; his younger brother was at the wheel; it was time to say goodbye.

For a moment in time, I was allowed to become part of another world, an undersea world. This personal sketch of swimming with whales includes an emotional response. For artists, emotion is a mode of gathering data, of measuring the invisible but experiential. In his article "Embodied Understanding", Mark Johnson states that

> It is in this broad sense that emotions are just as much a crucial part of understanding as concepts and propositions are. Emotions are one of our primary and most important ways of taking the measure of our situation. They are appraisal processes that help us to orient ourselves meaningfully within a certain context and to grasp various possibilities for meaning and action. (Johnson 2015)

My empathy evolved from swimming with humpback whales and their calves in a Tongan sanctuary and discovering that their swim back to Antarctica would involve travelling through parts of Aotearoa where active oil exploration occurs. What happens to sound in the ocean and the force it gathers was explained by Goetz and Giroli. It was through these conversations that facts became expressive and took a visual form in my drawing research through its particular focus on pressure. I will now describe the process whereby translation of sensation turns into visual form.

> *I had recorded my swim with Victor, the whale and her calf on my own very simple hydrophone (a GoPro). Back in my studio in New Zealand I listened to the recording. With eyes closed to enable heightened senses, I drew what I perceived as the contours of the sound in chalk on black ground. Next, I played the recording of a small boat with a large motor from one of Goetz's files from Cook Strait. It is a piercing sharp sound. With eyes still closed and a wet sponge in hand, I violently wiped into the rough, black ground erasing any marks in my way; my gesture following the intensity of the sound. Goetz's analogy came to mind, and I could imagine myself in a loud bar or concert, not able to be understood over the noise. In-between, I walked to the other end of the studio, turned, and let the drawing tell me what should happen next. The dance between the non-biological and biological audio would continue until the drawing became quiet.*

I draw from my intimate self-styled chiasm as I work towards establishing drawing processes that allow me to be present with other species, in this case whales.

Through the development of a phenomenological listening/drawing process that aligns with my environmental concerns I have found a way to become-with and stay-current on unseen happenings occurring in the ocean; in particular, the effects of human behaviour on other species, in this instance whales. The research toward this method is multifaceted and gathers knowledge from science as well as from my body. I argue that drawing processes like the one described here create new layers of knowledge through creatively weaving the body, including the senses—in-between scientific fact and lived experience—to give visibility to the complexities of undersea sound.

In Chapter 4 I will describe the practical applications of this newly developed mode of investigation through the use of materials. I have been guided by artist William Kentridge and his

experimental practical mode of enquiry. Elements of his drawing process will now be combined with the conceptual and theoretical frameworks I have introduced so far. Taking risks and letting meaning evolve in the process is my attempt to find ways of not just responding but also becoming-with.

Figure 31. M. OToole, How Loud Is Too Loud? Sea Baby*, 2019. Chalks on mixed wet media.*

CHAPTER 4: Embodied Pressure and the Creation of New Embodied Drawing Methods Responsive to Environmental Concerns

This artist's embodied speculation on how sound is received as pressure from a whale's perspective sits at the heart of this enquiry. I argue that through the creation of a new embodied drawing process, I have created a space for interspecies sensory mingling. Although I enjoy words, my concern is creating new form. This drawing process creates a visual form that speaks to us in a language derived from the source, from first-hand experience. It is a bodily primal experience. Hence, I am calling my investigative processual method embodied pressure, as discussed in Chapter 1.

Affective language for the "climate emergency" and extinction is still evolving. I see this space as a gap where drawing processes can be effective in giving ecological pressure visual form. My methodology, unfolding within the space of the chiasm, invents a new way of holding a mirror up to ourselves, or of representing ourselves to ourselves by reflecting back the effects of ecological pressures on non-humans.

In this chapter I will lay out the studio process, including the materials used and procedures undertaken, in the context of the methods applied at the experimental stage of this research. I will unpack "drawing at the periphery", the playful, intuitive process proposed by artist William Kentridge. I will then relate how I have interpreted his ideas within my own processes. I will also reiterate the importance of Merleau-Ponty's theory of the chiasm, which underpins my methodological strategy, and will discuss how the chiasm provides the space in which my exploratory embodied drawing methods are nested.

For this research, I have adapted this chiasmic space as an imaginary drawing room. It is a space in which to play, speculate, observe and tune into another world and another species in pursuit of kinship, understanding and broader knowledge. The studio methods I developed in response to the experience of pressure inform the exhibited artworks I will introduce in Chapter 5. In this research I developed a visual language that speaks of the force experienced by whales in compromised conditions and which captures pressure as it is manifested during an experimental process. In developing these methods, I focused on the verbs associated with pressure: each gathers an aspect of an experimental process evolved through responding to an embodied understanding of sound and noise.

Figure 32. M. OToole, experiments for How Loud Is Too Loud?*, 2017. Ground chalks and graphite.*

Observations: Listening

I began the practical part of my research by developing a process of listening and responding through drawing, an example of which I describe in this section. The practical explorations detailed later in the chapter are all based on this original method of listening.

My response to sound is evident through the physical force or pressure applied on the surface in wet and dry materials, including charcoal, acrylic paint, chalks and pastel, conté and printing inks. Sound is made tangible through a sensory translation that entwines listening and touch. I listen to the contours of the rhythms and slowly respond through mark-making to how they feel in my body: I listen, draw, listen, draw, repeat.

These processes work best if carried out blind; that is, not looking at the paper. In this way all the senses are focused on the subject: the sound. Through my headphones, I responded to the sound recorded in Tonga. I was also able to listen to sound recordings I received from NIWA, as Goetz has shared her sound files with me for this experimental drawing process and

expressed an interest in her knowledge and sound data becoming intertwined with a drawing process. She was willing to engage in interdisciplinary sharing because she speculated that my methodology would tease out a different understanding of the whale's experience of anthropogenic noise. She was also interested in exploring ways for her research to reach new audiences.

Listening to the sound recordings triggered memories of swimming with the whale and calf. I poured silvery graphite powder into my hand and rubbed it onto the fleshy underside of my forearm while the sound of the whale and her calf communicating by rubbing on each other played through my headphones; it sounded like children's party balloons being rubbed together. I gently pressed my forearm, which was loaded with graphite, onto cotton rag paper the width of my arms outstretched (and thus also my height). I began on the left side, working across the page. When I reached the end of the paper, I went back to the left and started again. I varied the pressure applied to the surface depending on the tone and duration of the sounds. The deeper and longer the sound, the harder I pushed against the paper's surface. Between us, the paper and I, was the push and pull, the sensitivity.

The second part of the process focused on integrating; this was a response to the shipping noises in order to simulate the whales' exposure to anthropogenic sound in the oceans. Their own sound spheres are overlaid with embodied language drawn through a sensory translation. I hung a string bob loaded with graphite, and when it settled down to stillness and decided it was flush, I pinged the string, leaving behind on the paper a ghostly, uneven print of the vibrating string. The graphite appeared to float, intermingling with the delicate rubbing beneath, and as I stood looking, I wondered in how many ways I could explore pressure? With a variety of inks—ranging from Indian to lithographic, acrylics, pastels and watercolours, acrylic and screen-print medium—and a variety of papers—ranging from Japanese to cotton rag—my experiments began.

Materials: Charcoal, Inks, Chalk Pastels, Oil Stick, Oil Paint, Acrylic Medium, Paper, Canvas

My studio process was initially activated by a mind-map that began with the central word "pressure" written on paper. Multiple verbs related to drawing and pressure were printed at the tips of lines radiating away from the centre in all directions. These verbs influenced my approach to making work and the choice of materials that I took with me into the studio. Verbs for pressure included: press, print, push, pull, pour, drag, drop, flood, fold, erase, spray, stamp, wipe,

wash. Considering these actions, I investigated and chose materials that I felt would allow me to express these verbs in the drawing processes.

Properties of Each Material

Charcoal slides easily on a paper's surface. It enables quick mark-making and responds well to large gestural movements where the whole body is engaged in a gesture or action. Willow charcoal can be erased with the body, fingers, hands or a kneadable rubber. In contrast, hard-pressed charcoals produce a denser line and don't rub away as easily. Charcoal mixes with other mediums. Charcoal and oil paint are good partners; they slip and slide well together. Charcoal is an effective material when working in layers.

Liquid inks can be sprayed, poured, printed, stamped or brushed onto a surface. They dilute into veils of transparent colour. They coalesce with other mediums, sometimes resisting and sometimes dissolving. Printers ink catches on the roller; it is sticky and shiny. It can be stamped or mono-printed, allowing for the multiple creation of texture and density, doing so quickly.

Chalk pastels are temporal: they allow for quick application, are responsive and, again, the whole body can be engaged in the drawing act. They can also be erased or partially erased just as easily. They dissolve and blur when washed with water. They resist inks and gouache allowing for partial exposure. They can be ground up to a powder and applied with the body. They have certain fragile properties, probably due to their impermanence.

An oil stick slides along the surface easily; it is greasy and slippery. It is particularly suited to large drawings as the whole body can act out a gesture. It can be rubbed, erased and diluted with linseed oil to create space, depth and movement in layers. It also creates a solid line when needed.

Oil paint can be brushed, scraped away and diluted. It shares some of the qualities of the oil stick. It is greasy and slides on the surface. It is slow drying, allowing for manipulation and erasure.

Acrylic medium can be watered down and poured. It has quick drying properties which lend it to layering and multi-media work. It is soluble in water and can be washed away with a sponge. It can be applied with brushes or fingers, hands, rollers and the body.

Three-hundred-gsm cotton rag paper is thick and absorbent. Water can be added without it losing its strength. The width of the paper is as wide as my arms when both are outstretched from my shoulders: 1.47 metres. It comes in 10-metre rolls, which can be cut to any length. It has a tooth to it, which grips and catches dry media. Wet media dissolves into it and pools in

patches when dry. Paper has fragile qualities. It also has a memory: it remembers how it was rolled, folded and touched.

Canvas can be large, and can be stretched tight like a drum or loose and raw. Its cotton and linen fabric has absorbent qualities. It can be primed and layered with various mediums or left unprimed to soak up wet media. The weave provides a tooth and texture for drawing mediums to catch on.

Establishing a Studio Framework: William Kentridge's "Drawing at the Periphery"

For artist William Kentridge, the meaning of the work emerges in the making. He employs what he describes as "play" as a way to arrive at a drawing method. Kentridge's notion of play as a generative process underpins my practical research. He states that while absorbed in the seriousness of play new things emerge in his work.

Kentridge "acts" out physical movement in his process for a deeper understanding of what he is translating. His involvement in stage performance is evident in his physical/embodied approach to drawing, relating to his previous study of both art and performance, and he states that he "learnt more about drawing from acting" (Kentridge 2015). He employs an embodied method of drawing to address historical and political concerns in his work.

https://news.harvard.edu/gazette/story/2012/03/artist-touts-primacy-of-images/

Figure 33. Artist touts "primacy" of images.

My adaptation of Kentridge's method is based on listening to his 2015 Yale lecture "Peripheral Thinking". In this lecture, Kentridge tells us that he begins by creating lists from what is at the margins or the rim of his thoughts while working in the studio. He then tracks a series of ideas wherever they go, all the while resisting making sense of them. His process allows for the meaning to emerge through the making.

Like Kentridge, my process is open-ended. A whale swim led me to a study of human-made sound in the sea. Conversations with scientists revealed that sound moves as pressure in the ocean. My own walks near the ocean confronted me with rising sea levels and issues around climate change, global warming and ocean acidification and extinction. I played with materials in

response to sound; however, sometimes it was human-made, sometimes natural, sometimes in response to my conversations with scientists. I let things come and go in the work.

Kentridge's lecture includes a slide with a photograph of his studio where his collected items are pinned on the walls; he said they hover at the edges of his thoughts. He makes lists from his thoughts, focusing on just one image, for example that of a tree, and a list of the ideas that arise for him. He recalls the memory of the roughness of bark on a tree experienced when he was a child, and the list goes on. He describes his focus as being porous and notes that he allows himself to be easily distracted. In Kentridge's view our encounters with the world are a mixture of what we notice, or what comes toward us, and that which we project on it. The artist describes the studio as "a membrane containing echoes of the world we enter" (Kentridge 2015). It captures the inner and the outer—what we notice and what we encounter. He says that he fills the gaps with memories and surprises. Kentridge states that he is not focused on one thing; instead, he allows for many ideas to come and go. This methodological framework provides him freedom in the studio.

While Kentridge's process departs from visual stimuli, I apply a similar process to sound. Human-made sound masks communication between groups of whales, and in an act of interspecies connectedness I am speculating on this effect through the creation of a visual language for unseen sound pressure. Echoes of human-made and natural sounds move in and out from my peripheral sound collection, which includes my recordings. What I hear entwines with my memories and the NIWA sound files.

My method unfolds through the development of haptic drawing experiments in response to sound. When a sense is removed—for example, when drawing blind (not looking at the page)—listening senses are heightened, and so is touch. The experimental processes presented in this chapter involve the creation of sensory games in order to learn more about the engagement between observer and observed. An embodied mingling of sensory modalities was acted out in experimental drawing processes as a way to understand sound pressure. I respond to how sound vibrates in the tissue of the world; how it feels in my flesh and bones and on my skin. This process is open-ended, without me knowing what the outcome will be.

Figure 34. M. OToole, experiments for How Loud Is Too Loud?*, sound score series, 2018. Charcoals and chalks on Fabriano paper.*

Reimagining Merleau-Ponty's "The Intertwining—The Chiasm" as an Intuitive, Imaginary Drawing Space

The chiasm, as unpacked in Chapter 1, is the theoretical, conceptual framework for my sensory exploration of pressure. This space between perceiver and perceived is where my methodology evolved through sensory responses to sound. This embodied process is intuitive, involving listening and responding with marks on paper. In this thesis, knowledge is acquired through the body actively *being-in-the-world*; multiple drawn experimental processual investigations explore how sound-pressure feels.

In my processual interpretation, the space of the chiasm is a body. I interpret the notion of the "flesh of the world", as earlier mentioned, to contain layers of tissue that are related to both humans and non-humans. It is the "secret" to our "connection", our "kinship". Sound felt in this vibrating tissue of the world is also felt by the whale—we are of the same flesh of the world. The chiasm is the space where I record and map the experience of looking, of tactile looking and palpable hearing within the entanglement of the perceiver and perceived. I inhabit the object I am looking at with my senses, "the sleek and the rough", and my body understands and records it accurately with materials, marked on a surface (Merleau-Ponty 1968, 131).

Like Kentridge, my multi-layered thoughts and processes collect together fragments of personal and political questions, environmental concerns, lived experiences, memory, theory and knowledge, all of which find their way into the work. It is an intuitive process. Through acts of listening, empathy, speculation and imagination, a creative process for an embodied visual language that is concerned with the complexities of the anthropogenic sound experienced underwater as pressure emerged.

If we limit our bodily data collection to the intellect, we only know a small section of the whole picture. Our entire body is intelligent; our senses also contain valuable knowledge. Embodied knowledge research is an expression of what it is to-be-in-the-world, and is not limited to one way of understanding or perceiving. Furthermore, observations collected by the body as it moves through the world can contribute a rich layer of understanding. The body contains primordial, unexplored and untapped technology.

I wish to signpost here that I'm aware drawing has its own history of artists who draw with their body or with others' bodies, as did Yves Klein. Famous images from performances come to mind in relation to drawing with the body. Many of those artists are testing the limits of the body, such as Mathew Barney, Trisha Brown, Rebecca Horn and Carolee Schneemann. Although I have explored this way of working in my MFA research, this is not what this project is

concerned with. I do draw with my body in this research, however, this work has an additional and particular focus on whales and understanding the impact of human sound on their environment through the creation of drawing methods.

The next section outlines my invention of action drawing processes developed in response to sound. These experimental processes evolve from verbs for pressure. These verbs were at the edges of my thoughts and provided a playful jumping-off point to my open-ended experimentation.

Figure 35. M. OToole, experiments for How Loud Is Too Loud?*, sound score series, 2018. Charcoals and chalks on Fabriano paper.*

Action Drawing: The Invention of Experimental Embodied Drawing Processes in Response to Sound

Press, print, push, pull, stamp, drag, drop, erase, pour, flood, fold, spray, wipe, wash.

Figure 36. M. OToole, experiments for How Loud Is Too Loud?*, from a monoprint series, 2018. Mixed inks.*

Press, Print, Push, Pull, Stamp

With etching ink drawn onto baking paper, I responded to the rhythm of waves surging in and out of rock pools bordering the Wellington South Coast and Cook Strait. A sheet of moist Japanese sumi paper was laid over the baking paper, and with a roller, I pressed the sandwiched paper together tightly with my body weight, then peeled the papers apart. In response to that experiment, I dropped ink onto paper dampened with water and in places with white spirit; the dispersion varied depending on whether it was carried by oil or water, as did the density. Then another etching was rolled out over the murky water, before acrylic and medium were dragged through a silkscreen. I became absorbed with building a drawing that travels through every value of sound from silence to full noise, building in pressure and density toward a crescendo (figures 35 and 36).

These first experimental monoprints were created with black etching ink, paper and a coarse flat brush in response to sound and video being played through my laptop and amplified via a UE boom speaker throughout the underground space I was working in. I created marks from a meditation on how the sound felt in my body.

Canadian-born artist Agnes Martin (1912–2004) also used a meditative approach to evoke emotion. In a Tateshots video, Martin described her meditative drawing process related to trees; stating that she waited for inspiration to strike—in the case of the tree, innocence—and emphasised the importance of keeping an empty mind. The time and meditation that goes into each line evokes purity; her result is affective (Morris and Glimcher 2015).

https://www.tate.org.uk/art/artworks/martin-happy-holiday-ar00179

Figure 37. Agnes Martin, Happy Holiday*, 1999. Image from the Collection of the Tate and National Galleries Scotland.*

As the sound looped, I repeated my meditative process focused on pressure and density over and over. Between each loop the drawing was printed onto another damp sheet of paper using just a roller and my body weight to transfer the picture, pressing it between both pages. The thick printing paper was wet. I repeated the process multiple times until a 3D image appeared on the 2D surface.

Figure 38. M. OToole, experiments for How Loud Is Too Loud?*, from a monoprint series, 2018.*

The outcome was unforeseeable. There was no way of knowing how the inks would take to the wet ground. In the work shown in figure 36, the repeated printing and pressure also lifted some of the ink, altering the values, adding to the depth in field. My bodily response to sound activates the memory of my movement within the space. A horizon line appears on a downward lean to the right, creating a dynamic composition indicating action or activity. The body is present in the surface through the dragged brush strokes and my sensory responses to sound. The weight of the marks is dependent on the force or bodily pressure applied in the printing process. The memory of my lived experience, of my body encountering nature, shifts into the present moment. The crescendo builds layers on the surface, a palimpsest. Working intuitively, I let the drawing tell me what should come next, hoping that this approach will uncover something new and unexpected.

Figure 39. M. OToole, experiments for How Loud Is Too Loud?*, from a monoprint series, 2018.*

Figure 40. M. OToole, experiments for How Loud Is Too Loud?*, from a monoprint series, 2018.*

Continuing on this theme, I began using my body weight or pressure (see figure 40) to draw with; however, this time, my forearm became the drawing implement. I loaded it with acrylic combined with a retarder medium. I drew on mylar before transferring that drawing onto wet printing paper in the same printing process explained earlier (using the weight of the body or pressure to transfer from the mylar to the paper).

Drag, Drop

In the drag series, paint was dragged across the surface following the rhythm of the sound recordings until the brush became dry. The pressure applied to the brush varied depending on how the sound felt in my body, producing bands of pressure. I wanted my presence to remain on the page in the pressure of the brush marks as they dragged the chalky medium across the surface. Sometimes I would draw into this ground with chalks or pastels and drag the ink across the work multiple times. When the brush became dry, I would reload and start again in the same place. As the wet mediums transgressed the dry chalk/pastel mediums, they distorted and erased the dry medium. The erasure created movement. The drawn language that was left on the page floated and moved at the same time (see figure 41).

Figure 41. M. O'Toole, experiments for How Loud Is Too Loud?*, from the drag series, 2018. Chalks on mixed wet media, ink and gouache.*

Erase

Erasure is a mode of drawing; it is also a form of pressure. Dragging a broad brush across the surface in a horizontal direction loaded with ink or gouache in response to human-generated sound creates the effect of movement (see figure 41). The chalks resist the ink and gouache and bubble through the thin liquid layers. Kentridge's animation process involves drawing, then taking a photo, then erasing and redrawing; the process is then repeated. I adopted parts of his erasure process.

Figure 42. M. OToole, experiments for How Loud Is Too Loud?*, from the drag series, 2018. Flashe acrylic and ink.*

My research has embraced erasure to confront and question reality, and to provide a way to create space for a new narrative. Through embodied erasure, I speculate on the disruption created through sound disturbance felt—like a pressure in the ocean—and imagine its effect on whales while listening to the sound files of human-generated noise supplied by NIWA.

Erasure forms an essential aspect of German artist Gerhard Richter's process. Curator Dieter Schwarz describes Richter's *November* drawings as "criticizing gesture through erasure" (2009). This experimental work with ink and white spirit influenced my choice of materials. I began playing with the density of inks and their absorbency on a variety of papers, as in the drop and pour works shown in figures 44, 45 and 46.

Schwarz (2009) further explains that Richter juxtaposes an act of will and an act of decision in his process; the outcome is unforeseeable. This is how I came to see the development of my actions. Pictured in figure 43 is one of Richter's six 2006 *Cage* paintings, named after the American avant-garde composer John Cage. They are the result of a process of layering paint then achieving erasure by dragging paint away with a squeegee. Richter listened to Cage's compositions while painting them. Both artists shared an interest in ambient sound and silence. Richter structures his process in a way that allows for chance happenings.

https://www.metmuseum.org/art/collection/search/789681

Figure 43. Gerhard Richter, Cage*, 2006. From the collection of the Metropolitan Museum of Art.*

Pour, Flood, Fold

Pressure is explored in figure 46 by pouring medium then dropping inks onto the surface. Ink was dripped onto a wet gouache pour, which dissolved and dispersed in a variety of ways. They were left to dry, not knowing what the outcome might be.

The approach of American post-war painter Helen Frankenthaler (1928–2011) influenced the pouring stage of this process. Critic Jerry Saltz has said of Frankenthaler that

> it's easy to forget how radical it was for an artist to let go of structure, forsake known geometries, stop using the sides of the painting to define the image, move away from enclosed forms, and meld background and image, all while enthralling the eye, enticing the mind, and allowing others to use the work as a passage to a not-quite known imaginary place. (Saltz 2011)

Figure 44. M. OToole, experiments for How Loud Is Too Loud?*, from the drop series, 2017. Watercolour.*

Figure 45. M. OToole, experiments for How Loud Is Too Loud?*, from the drop series, 2018. Inks and white spirit.*

Figure 46. M. OToole, experiments for How Loud Is Too Loud?*, from the pour series, 2017. Ink and gouache on mixed wet media on paper.*

https://www.gettyimages.co.nz/detail/news-photo/american-abstract-expressionist-painter-helen-frankenthaler-news-photo/181937566

Figure 47. Helen Frankenthaler in the studio c. 1969. Photograph by Ernst Haas. Source, Getty Images.

At the age of twenty-three, Frankenthaler developed her soak-stain painting method (see figure 47), whereby she poured thinned oil paint directly onto the canvas and let it soak in. Although her initial pour experiments in oil floated over her drawing, leaving it visible, in later experiments she used acrylic, which dissolved the drawing beneath. Her mentor was Abstract Expressionist artist Jackson Pollock. Like Pollock, Frankenthaler worked on the floor; however, she worked with painterly fields of colour and Pollock's was a dripped painting process. Experimentation was the driving force in her process and she described her artistic motivation as taking risks and enjoying the surprise, explaining it as follows: "There are no rules. That is how art is born, how breakthroughs happen. Go against the rules or ignore the rules. That is what invention is about".[17] I adopted her attitude in order to invent new meaning through making.

https://www.frankenthalerfoundation.org/artworks/sesame/details/all

Figure 48. Helen Frankenthaler, Sesame*, 1970. Acrylic on canvas. Source, Helen Frankenthaler Foundation*

On Frankenthaler's process, art historian Carol Armstrong states that the artist emphasised the drawing aspect of practice in a colourist way. Her work is underpinned by a drawing process: there is a give and take between idea, mood and risk. As Armstrong explains, this "adds up to the colourists' non-linear form of decision making: such that a painting unfolds in a process that is at once indicative and contingent, and a composition emerges over time 'in relation to everything else that is going on'" (Armstrong 2016, 16). Like Frankenthaler, I am interested in taking risks through an open-ended playful process in the hope that I find something new. Frankenthaler's process has a relationship to Kentridge's "at the periphery" as their processes are both haptic—they allow room for chance happenings.

Curator John Elderfield tells us in his preface to *Line into Color, Color into Line* that Frankenthaler "was continually absorbed with the relationship of drawing to painting: of drawing in painting; and, therefore, of line and color" (Elderfield 2016, 5). Furthermore, the novelist Francine Prose points out in her essay in the same book that Frankenthaler herself states that she

[17] *See the Helen Frankenthaler foundation website: https://www.frankenthalerfoundation.org/.*

"often returned to the delicate balance between rigor and spontaneity, between improvisation and conscious design, between maintaining control and letting the painting go where it needs to go" (Prose 2016, 7). Prose claims that while Frankenthaler is always original, the handling of materials and her mark-making evokes artists "ranging from Turner to Corot, from Miro to Pollock, from Arshile Gorky to Morris Louis to Jean-Michel Basquiat" (Prose 2016, 8).

In the same way as Frankenthaler looked to Pollock, my experiments with the pour works shown in figure 47 adopt both Frankenthaler's and Pollock's methods in my attempts to depict sound. I began by pouring; however, while the paint was still wet, I dropped inks into the gouache and let them disperse and dissolve. I made these works while listening to a soundtrack of underwater seismic explosions.

How do the properties of another paper stock change the feeling of the pour and flood experimental works? Experiments with Japanese rice paper sucked up the liquid mediums dropped onto it. This lighter paper was put under more pressure by distressing through folding (see figures 49 and 50). In another attempt to distress the paper I began cutting up the composition and rearranging it, which created another form of pressure, as shown in figure 52.

Figure 49. M. OToole, experiments for How Loud Is Too Loud?*, from the fold experiments, 2018.*

Figure 50. M. OToole, *experiments for* How Loud is Too Loud?*, from the fold experiments, 2018. Mixed media.*

Figure 51. M. OToole, experiments for How Loud Is Too Loud?*, from the drop, fold series, 2018. Chalks and ink.*

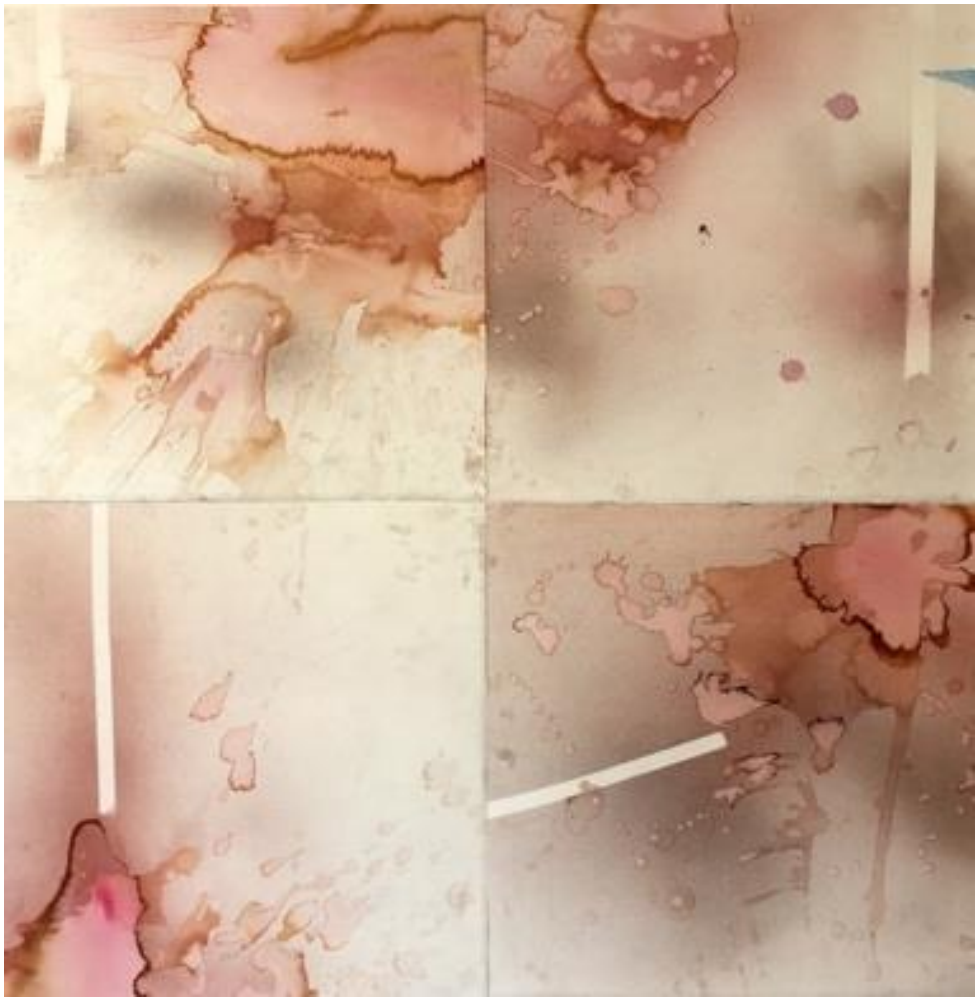

Figure 52. M. OToole, experiments for How Loud Is Too Loud?*, from the drop, fold series, 2017. Ink.*

Figure 53. M. OToole, experiments for How Loud Is Too Loud?*, 2019. Chalk on mixed wet media on paper.*

Figure 54. M. OToole, experiments for How Loud Is Too Loud?*, 2019. Chalks and flashe on Fabriano paper.*

Figure 55. M. OToole, experiments for How Loud Is Too Loud?*, 2018. Inks on Fabriano paper.*

Spray, Wipe, Wash

Spraying was another response to sound explored in the studio. I looked to German/French painter Hans Hartung (1904–89) and contemporary German artist Katharina Grosse (1961–), both of whom use an industrial spray gun. I responded to their practices by attempting to create sprayed atmospheres. However, the process of spraying was not working; I felt that the body's sensory engagement was missing. The pressure became vague, and what this work between human and non-human demanded was intimate pressure. The sensitivity or range of expression was missing for me. There was a distance between human-applied force and the surface.

Figure 56. M. OToole, experiments for How Loud Is Too Loud?*, 2018. Inks and charcoal.*

I decided to revisit the floor as a working space—this time on banners of Fabriano. I wet the surface and began to respond to sound and video recordings of my multiple perspectives, my energetic body swimming with whales. With my hands, brushes and sponges, I drew my response, erased with a wet cloth and re-drew. Water and medium dripped from my fingers and formed Pollock-esque marks amongst my own. I let the work dry and then with French chalk, I

responded to human-made sound, motors and sonar in ruled lines that intersect the push and pull of the sometimes quiet and sometimes violent ocean, as shown in figures 53, 54, 57 and 58.

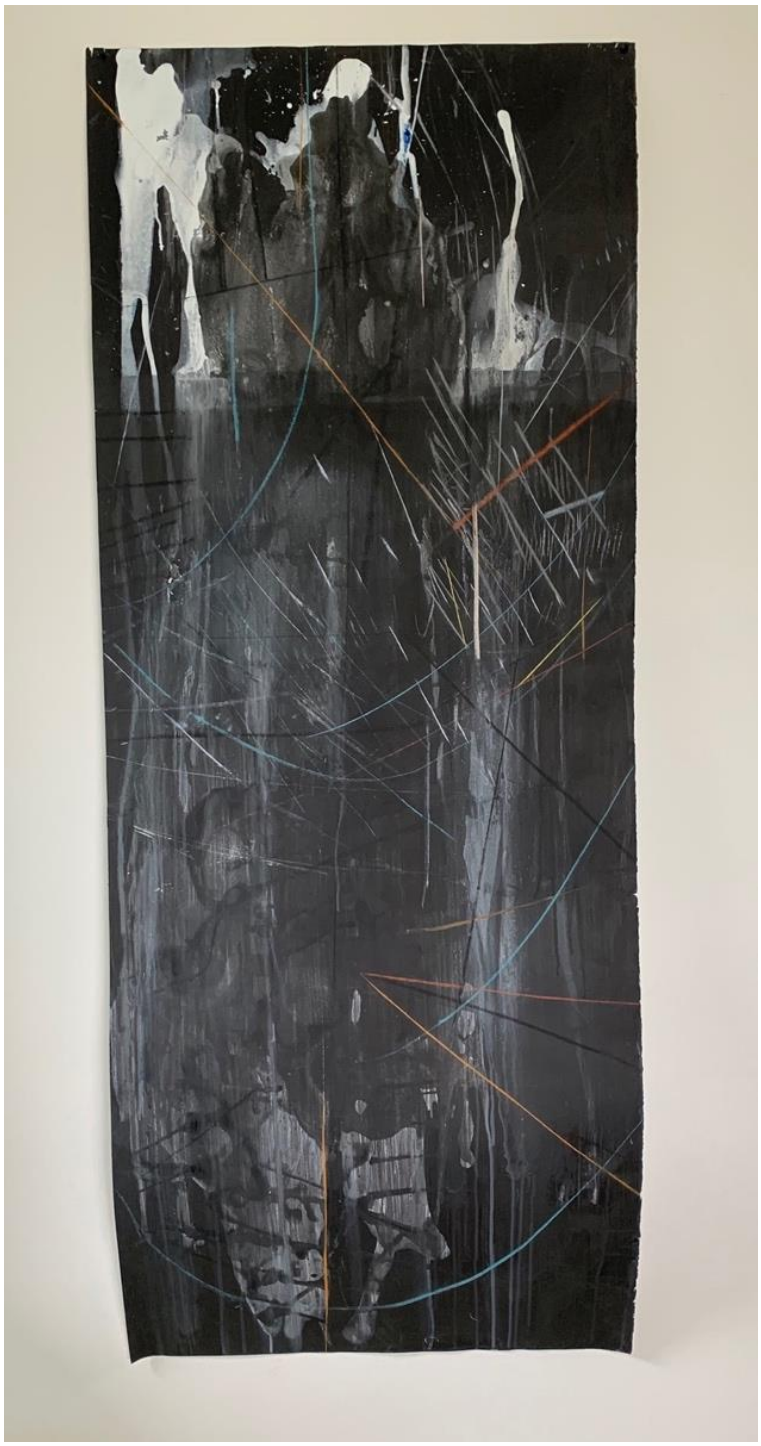

Figure 57. M. OToole, experiments for How Loud Is Too Loud?*, 2019. Chalks, ink, gouache and white and black primer on Fabriano paper.*

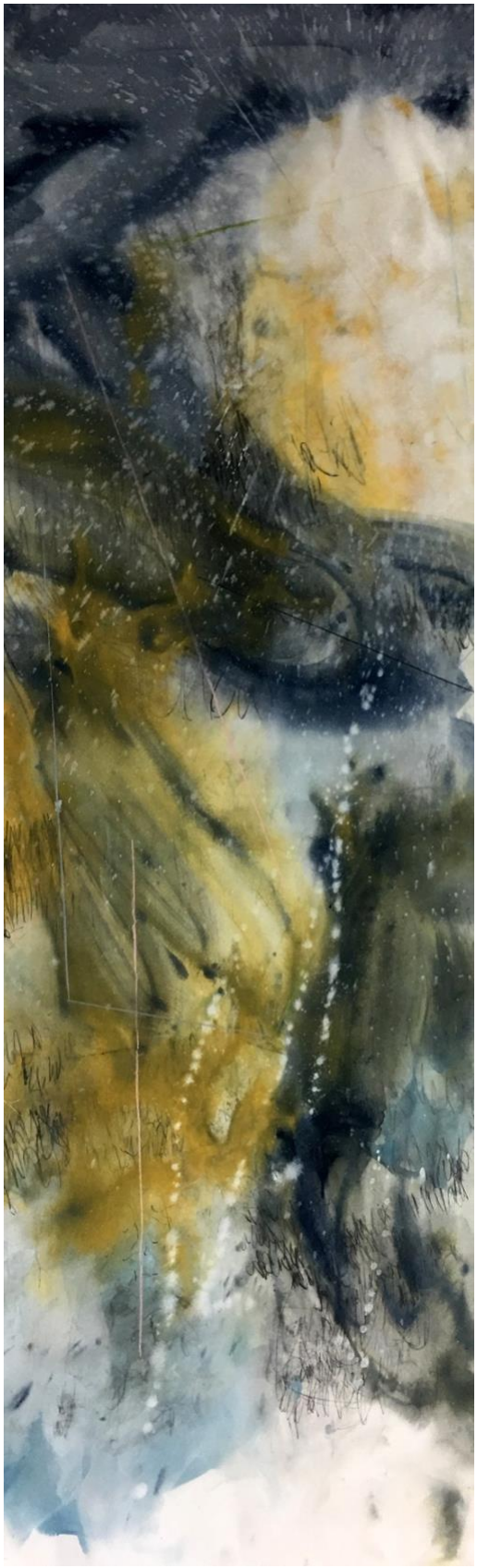

Figure 58. M. OToole, experiments for How Loud Is Too Loud?*, 2019. Chalks, inks, flashe, graphite and charcoal on Fabriano paper.*

Chalk Drawings

On reflection, in my eagerness to take risks with wet materials, like Frankenthaler and Richter had done, I had forgotten that it is drawing that connects my body to the work. I began to build a drawing on top of the inky language of sound (figures 57 and 58). In a large basement studio space, I hung some recently completed work. Reflecting on the chalk drawings on the black ground, I became most interested in the areas where the density of the black ground varied due to more water being added. The dark ground is slippery in appearance here, resembling oil. The chalk lines that transgress the black ground and plot the coordinates of where I have been float between memory and imagination, intermingling with but not dependent on the grid, and it became clear to me that it belongs to the language of geography (figures 59 and 60).

Figure 59. M. OToole, experiments for How Loud Is Too Loud?*, 2018. Chalk on wet mixed media on paper.*

Figure 60. M. OToole, experiments for How Loud Is Too Loud?*, 2017. Chalk on mixed wet media on paper.*

Maps make obvious how "colonising" is effecting the ocean. The map from NIWA's audio recordings confirmed mammals migrating from the Taranaki Bight through to the Wairarapa coast (sites of oil and gas exploration). It alarmed me that the ocean is being appropriated for fossil fuel extraction in these spaces without consideration for its rightful inhabitants. Whales have a tradition of travelling through these waters. I meditated on these thoughts as they arose in the studio process. I had made a video that combines my experiences in Tonga, the Wellington South Coast and the coastal road near my home. In response I began by ruling a grid. I drew a sensory response to my experiences in white chalk as the video sound played nearby. I worked from left to right, mapping each experience over the grid. As my hand moved over the gritty surface, some of the marks were erased. This palimpsest of drawings created a depth of field; they created space filled with a trace of geometric forms and ghostly movement through a watery space.

Figure 61. M. OToole, Floor Work*, 2019. Chalk on mixed wet media on canvas.*

The chalk drawing method shown in figures 57, 59, 60 and 61 evolved into a sensory visual map; its contents are distorted in the process of its mapping. The application of chalks and charcoal was influenced by the blackboard scores of American painter Cy Twombly (1928–2011), and the homage to his work by the British artist Idris Khan (1978–) shown in figure 63. In that work, Khan uses Twombly's 1966 *Blackboard* drawing as a point of departure.

https://www.tate.org.uk/tate-etc/issue-13-summer-2008/lingering-threshold-between-word-and-image

Figure 62. Cy Twombly, Poems To The Sea*, 1959. Oil-based house paint, pencil and wax crayon on paper, in twenty-four parts.*

https://www.galeriethomasschulte.de/exhibition/photographs-and-drawings/

Figure 63. Idris Khan, Church Walk Studio 1*, 2012. Digital bromide on ragboard.*

The chalk work shown at *Documenta 13* in 2012 by British artist Tacita Dean (1965–) (figure 64), was also in my peripheral thoughts. I had experienced Dean's installation first-hand at *Documenta*, along with Kentridge's *Refusal of Time*. I also experienced Twombly's work first-hand at the *Paradise* exhibition at the Ca'Pesaro Gallery of Modern Art in Venice, 2015.

https://www.documenta.de/en/retrospective/documenta_13

Figure 64. Tacita Dean, Fatigues *installation, Documenta 13, Kassel, Germany, 2012.*

Dean and Kentridge share a connection between their drawing processes and particular ways of thinking; they are both influenced by analogue technologies, particularly film. Drawing is fundamental to both their practices, which are expressed through figurative and realist styles and focus on the phenomenology of duration (time). What attracts me to both of their practices is their interest in exploring drawing through cultural, environmental and social tipping points.

Dean's body is present in the scale of her contribution to *Documenta 13*, her work *Fatigues* (2012). Large blackboard drawings of scenes from videos filmed in Afghanistan are drawn in white chalk and cover the interior of the multi-level space (see figure 64). Deans has responded to film shot in Afghanistan, which she commissioned from someone else. Her lived experience in this work is not entwined in the drawing process, as mine is. However, her knowledge of the terrain appears in the drawings as notation; a mapping of thought.

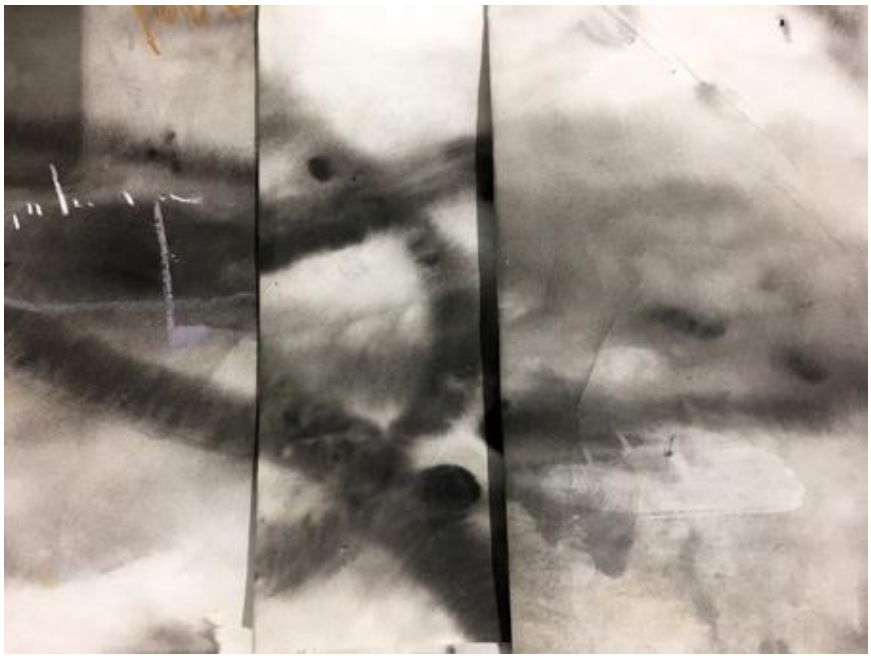

Figure 65. M. OToole, experiments for How Loud Is Too Loud?*, 2018. Ink, charcoal and chalks.*

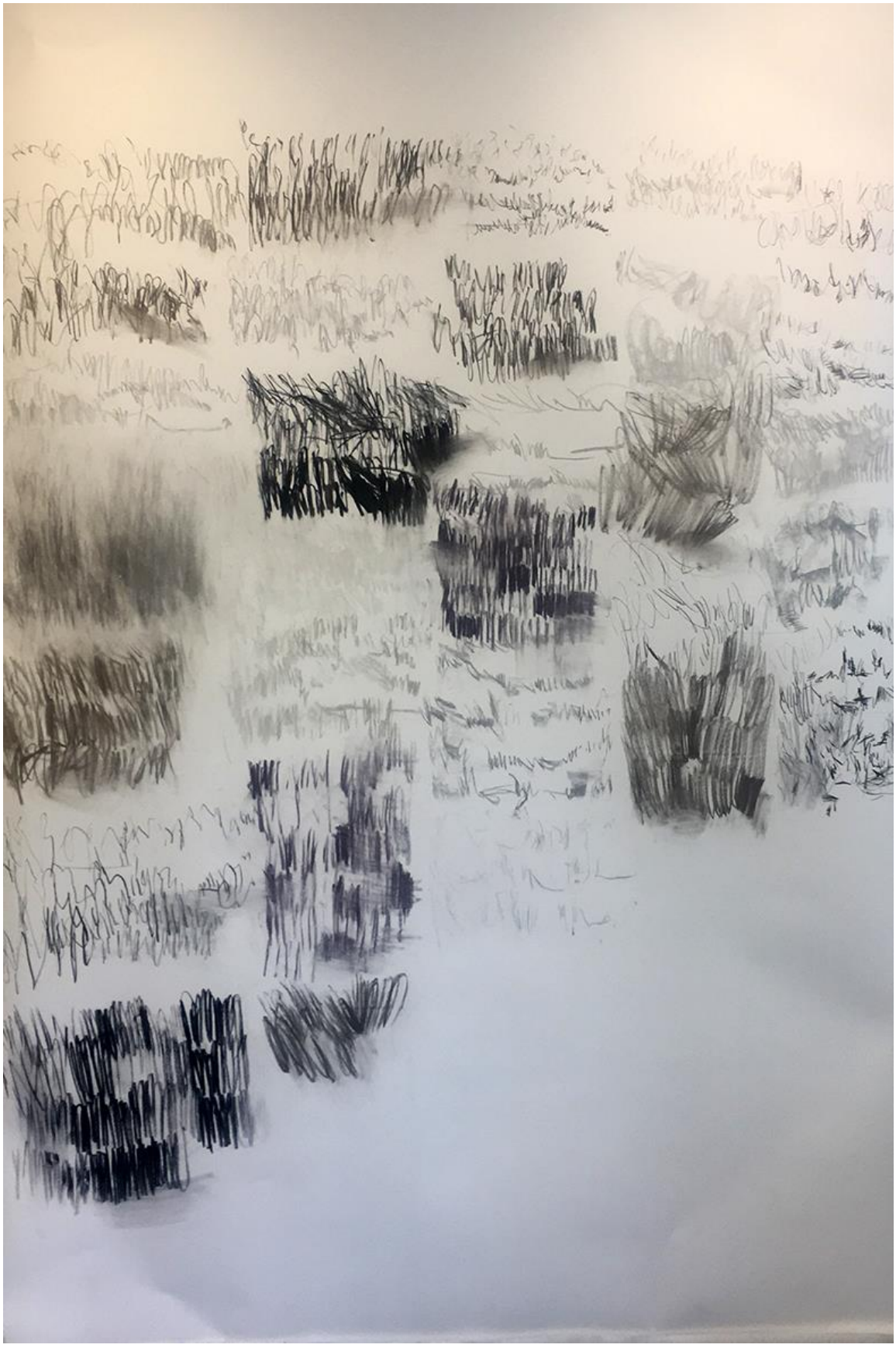

Figure 66. M. OToole, experiments for How Loud Is Too Loud?*, 2019. Charcoal and chalks.*

A return to simple chalk or charcoal drawing as a way to analyse and translate my experience of the chiasm (between perceiver and perceived) continued throughout this investigation. Slippery mediums such as charcoal and chalks allow for speed of movement and gesture and are suited to taking notation. However, there are not always words to fully describe experience; they need a visual language or code of their own. Twombly (figure 62), along with the artists mentioned above, make experiences of the body and emotions visible in their work.

Summary

From all of these experiments I carried forward that which was working. Thus, I selected the processes that I considered the most successful in expressing the layered experience of natural and anthropogenic sound in the ocean and applied them in the final body of work.

- Chalks on a toothy black ground
- Pouring of wet medium
- Erasure: wiping, washing, rubbing away wet and dry medium
- Scale
- Gesture, Notation, Score

The sense of erasure and emergence, impermanence and ephemerality, was achieved with the application and erasure of the chalks. This way of working creates a sense of chaos and change. Erasure gives the sense of information not always understood. Pouring creates its own pressure. There is no control over what might happen. It is a haptic process open to chance. Working at a human scale brings the whole body to the drawing. My narrative is acted out in the gestures and actions on the ground, paper or canvas surface.

What experiments were less successful?

- Spray
- Grid
- Cutting and Folding

Spraying, cutting and folding were interesting ways to create pressure. However, there was a connection missing for me: my narrative was missing. They became very general. The grid

became too obvious and literal and I preferred the works where my hand had removed most of it in the drawing process. This felt more like an act of decolonisation.

These experimental modes of enquiry allowed for a visual language for underwater sound to evolve through play. Playing is scary, it involves risk. The outcome is unknown. However, feeling the fear and doing it anyway also allows for the new, something you have never seen before. Something that represents where we are at this moment. It is my way of being present with the environment and other species. It is how I give visual form to what is unseen in our environment, the process unfolds from my experience of listening and drawing.

Erasure became the most dominant element to evolve in the experiments with process. The drawings of natural sound were washed out by pouring or using sponges and brushes loaded with wet medium or water, applied in active bodily responses to anthropogenic sound. Dry mediums were distorted by the movement of my own body in some cases. The scale is important: apart from creating immersive pieces I have also found it to be crucial for the whole body to be actively involved in the process.

Mediums such as charcoal, chalks and oil sticks were most effective to respond to sound quickly. Chalks were effective as they could be wiped away with a sponge and water. The vibration of sound built up in the residue that was left on the surface after each drawing was washed away. Furthermore, the layers of residue build on each other and depth is created. Oil stick responded in a similar manner when wiped away with linseed oil.

The experimental processual framework created for this research took me closer to a visual language that successfully expresses my research investigation. In Chapter 5 I will discuss the final works that followed from the experimental process, why they were selected for the exhibition and the choices made when hanging them within the gallery space.

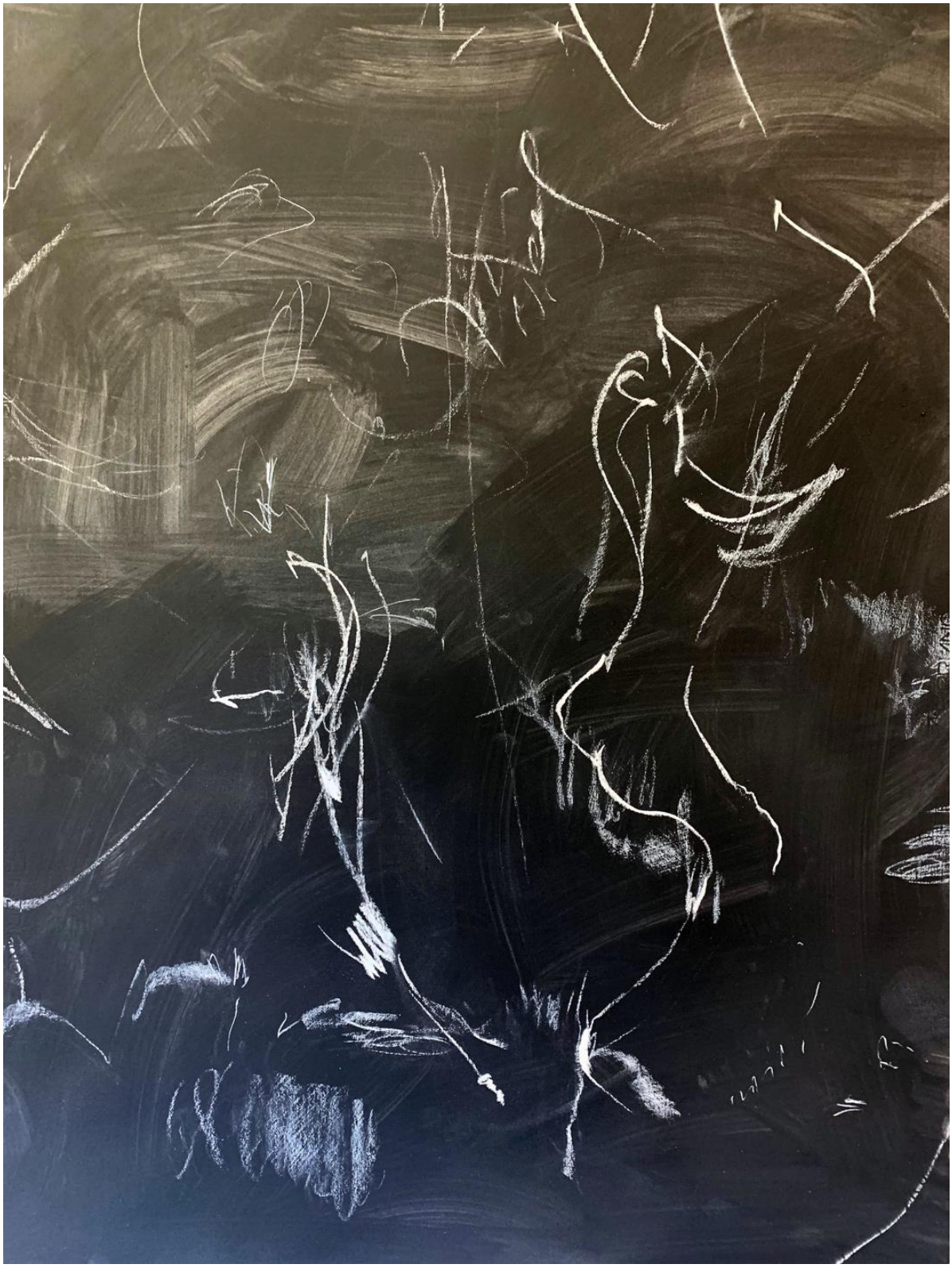

Figure 67. M. OToole, from the Score *series, 2019.*

CHAPTER 5: The *Drawn Chorus* Exhibition

In Chapter 4 I unpacked the embodied drawing methods that evolved during this research. A study of artists who have developed methods that give abstract visual form to unseen ecological, political and social issues through embodied practice (Chapter 2) influenced my shift toward contemporary eco-aesthetic practice.[18] In particular, this includes the ecological art projects undertaken by TBA21-Academy, as discussed in relation to Tschäpe's work in Chapter 2. Here in Chapter 5, I will provide a critical analysis of the work in the exhibition *Drawn Chrorus*. I will share my reflections on the immersive experience of the installation and give examples of where the pressure explored in my experimental methods—as discussed in Chapter 4—were present and felt in the final selection of work installed in The Engine Room gallery, at Massey University in September 2020.

My intention for this research was to create an exhibition of contemporary drawing methods that make the speculated sound pressure experienced by ocean mammals tangible for an audience. Thus, I sought to create a public platform to encourage a dialogue around compromised ecologies via lyrically abstract visual language. The exhibition was also intended to provide a wider testing space (broader than the University) to gauge audience engagement; sadly, due to the Covid 19 pandemic this was not possible.[19]

Ironically, on the upside for marine mammals, the forced pandemic lockdown also created a drop in human activity and made the world a quieter place. An article by Karen McVeigh that was published in the *Guardian* in April 2020, highlights experts who have predicted that the crisis could be good news for whales. She points to a significant drop in real-time underwater signals from seabed observatories run by Ocean Networks Canada. McVeigh shares the views of Michelle Fournet, a marine acoustician at Cornell University, whose research has confirmed that whales are changing their calling behaviour in response to a noisy ocean. Fournet

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[18] T. J. Demos has explained eco-aesthetics as follows: "The term 'political ecology', as employed herein, identifies multiple competing approaches to the environment, agency and social composition. These approaches nonetheless share the common ground of a scientific-cultural interdisciplinarity and a philosophical criticality, which, when brought together with contemporary art, indicates an eco-aesthetic rethinking of politics as much as a politicization of art's relation to the biosphere and of nature's inextricable links to the human world of economics, technology, culture and law" (2013, 2).

[19] My examination exhibition took place on the cusp of Covid 19 levels 2 and 3 (2020); thus, without an audience or examiners. As examiners could not attend, the work needed to be experienced digitally. There is no precedent for this type of examination documentation. A visual presentation, including video and photography, was developed and a few weeks before Christmas, my thesis was uploaded for examination. The Covid pandemic has presented barriers to the way we, humans, usually do things; however, our quieter earth presents artists with new opportunities to reimagine the future. See https://vimeo.com/483847169.

states that "we have an opportunity to listen—and that opportunity to listen will not appear again in our lifetime" (McVeigh 2020).

I was not able to survey the public on their experience of my installation; however, the feedback of my peers on-site who could attend individually will be conveyed here. It was my intention that the exhibition would make tangible for an audience the whales' experience of human-generated undersea sound pressure. I sought to create new ways to tell stories of compromised ecologies for an audience through the creation of a new, sometimes experimental methodology. The resulting exhibition was an installation of works selected for their aesthetic qualities and for the fact they are descriptive of pressure achieved through building depth in the drawing; they therefore create spaces to consider pressure as experienced by whales due to human-generated underwater noise.

Figure 68. Installation view, Drawn Chorus. *The Engine Room, Massey University, September 2020.*

Figure 69. Installation view, Drawn Chorus. The Engine Room, Massey University, September 2020.

Results: Works Chosen for Exhibition

In selecting work, I was interested in how the careful placement of certain works might further enhance feelings of pressure for a viewer during their visit. The shape of the gallery has its own pressure: it is narrow with a very high ceiling and sky light. My installation process took this narrow deep space into consideration. I imagined it being similar to the Cook Strait canyon when selecting the large works for the main gallery.

From the broad range of listening/drawing experiments outlined in Chapter 4, an entire body of additional works was created for this exhibition. These works focused, layered and refined the previous explorations. The works chosen for the exhibition were selected over two days. All of the work was laid on the gallery floor and shuffled to see which works were in conversation with each other. It was my intention that as the audience moved through the space they would feel immersed in tactile qualities of pressure. Furthermore, the scale of each work is designed to contribute to an immersive and sometimes intimate experience. I attempted to create a rhythm in the space through juxtaposing works with differing scales, shapes and colours, and by considering their placement (including on the floor).

In support of my claims of immersive tactile qualities of pressure being present in the work, I will focus on one work in particular, reflecting on the process of making *How Loud Is Too Loud? No. 6* (figures 77 and 78; work 6). In this large work, black primer has been applied to the stretched linen. Over the course of many months marks were made, then, at the end of each day, these drawings were washed off the surface. At the end, a palimpsest of marks remained faintly on the surface as a trace reminder of each drawing.

This work was not the largest in the exhibition, and yet at 1830 mm by 2130 mm, my whole body had been engaged in the drawing process as I am only 1.63 metres tall. When working on the canvas with arms outstretched, the memories of swimming flooded back into my body as the sound I recorded when swimming with whales played through the speakers in my studio. I began with a continuous line, a blind contour drawing, beginning on the left and working my way across the canvas—I was continually asking myself, where do I press harder, where do I pull back in response to the sound. Slowly, I followed each sound, so that each unique chalky curve was caught in the tooth of the black primer.

The next medium used was water; the drawing was here made with a wet sponge. I was responding to the noisy recordings of marine vessels in Cook Strait shared with me by NIWA. I imagined the pressure on my own body (as outlined in Chapter 3). The continuous line chalk drawing was disturbed and erased in parts—the chalk melts and drips. The small vessel with a large outboard motor produced a high-pitched whining noise; I responded with the same intensity and pressure. Executed over a period of months, embodied drawing processes of both application and erasure were repeated daily.

Eventually a 3D palimpsest of pressure formed on the 2D surface. The mediums—chalk and water—were chosen for their immediacy and their affective response to pressure. The remnants of marks remaining on the surface joined together and made new visual forms depitcting an abstract sea of chaotic energy and movement. This was the last work undertaken and it contains the most successful elements of all the experimental methods of erasure. I noticed that viewers spent the most time with this work and it was singled out by many who visited as the piece they wanted to return to and spend time with.

As a second close-reading of an exhibited work, this time not in terms of the process of creation but the experience for the viewer, the floor work *How Loud Is Too Loud? No. 9* (figures 85, 86 and 87; work 9) demonstrates the success of my experimental embodied methods. It was identified by viewers as the work that allowed them to imagine themselves in the being of the whale, immersed in the pressure created through undersea noise. In some ways it offered a more intimate experience for the audience in relation to their own bodies. Standing at the edge of the

work and looking down into the deep pool-like space, cool washes of colour recede on the unprimed canvas; this is in contrast to the chaotic thick and thin mark-making created with oil stick, which appears to come toward the viewer.

Like work *No. 6*, it too was made over time. The repeated push and pull between layers of watery and oily medium has created a 3D experience on a 2D surface. I made this work on the floor and it was always my intention that it would be experienced in this manner. As described in relation to *No. 6*, I listened to sound recordings and responded, in this instance with oil stick, by asking where do I press harder and where do I pull back to describe qualiltes of noise through varieties of tonal value. I then poured wet medium over the marks and let it settle in pools. The wet medium resisted the oil stick and the pressure of the oily marks remained in places as the wash soaked into the unprimed canvas and dried. I imagined the raw canvas support as a skin on which I speculate through pressure applied in the drawing process on how sound pressure might feel for the whale.

I believe the installation achieved my intention that a visual language for underwater natural and human-made sound comes together in an original way. The research undertaken has allowed me to successfully transfer the experience of oceanic soundscapes, both natural and compromised, and of the past, present and future, into the speculative experimental space of the exhibition. It has thus been made tangible for an audience.

Key theoretical research "The Intertwining—The Chiasm" has revealed a speculative, intuitive, imaginative space in which to transfer the experience of oceanic soundscapes into visual form for the viewer. The seer and the seen are no longer separate entities in this intertwined sensory space, they become "flesh-of-the-world", and the tissue between them is analysed through an embodied drawing process not just reliant on sight. The senses of listening and touch play a significant role in the analysis of vibration (sound) between the fleshy thickness of observer and observed as outlined in Chapter 1. I am arguing for the body as a unique site of cognition from which to create new methodologies to broaden our understanding of other species, to think and live differently and ultimately to survive together.

The methodology developed in this research is my attempt at inhabiting as Haraway would say "troubled contact zones" (unfair patterns where human exceptionalism reigns) as a way to strengthen the arts of living on a damaged planet through a process of composing and decomposing (2016). In making kin with multiple species, Haraway is concerned with inventive processes of making kin, non-biogenetically. Haraway employs an interpretation of making kin that is not reliant on bio-genetics, but instead proposes string figures, a game played by one, two or more players as an imaginative way of working together, of fabulating, thinking, sharing and

making. She describes string games as analogous to connecting across space and species (2016). Merleau Ponty and Haraway have both contributed to my inventive methodology. Through my interpretation of the chiasm I was able to enter the troubled contact zone and analyse vibration (sound) between the fleshy thickness of observer and observed.

Similar to thinkers Merleau Ponty and Haraway I am concerned with making kin. Braidotti also expresses her thoughts on the need for research that operates in-between: "subjectivity is a trans-species effort that takes place transversally, in-between; nature/technology; male/female; black/white; local/global; present/past as assemblages that flow across and displace binaries" (2018, 33). However, my intention differs from these thinkers as I set out to create a primal visual language to tell the story of the whale's experience of anthropogenic sound-pressure through my immersion in the space of the chiasm and the generation of patterns that flowed from this speculative experience. I have been experimenting with embodied relational and affective forces in the generation of drawing processes.

The artists discussed in Chapter 2 and the knowledge they share on giving visibility to unseen trauma have influenced my outcomes. These artists uniquely embodied their subject matter as a way to give visual form to issues that were/are troubling them. Through their embodied process they have each created an affective visual language to engage an audience. Similarly, through the unique embodied drawing methods developed in this research I have interpretated sound with my own body, then translated it into qualities of pressure through layers of lyrically abstract mark-making. The installation of original works create a depth of experiences where viewers could imagine and immerse their own bodies in the pressure human-generated sound creates for ocean mammals.

List of Works Exhibited

Small entrance gallery:

1. *How Loud Is Too Loud? Sea baby I*, 2019
   1000 x 710 mm, chalks and wet media on Fabriano paper

Main gallery:

2. *How Loud Is Too Loud? Sea baby 2*, 2019
   1040 x 760 mm, chalks and wet media on Fabriano paper

3. *How Loud Is Too Loud? No. 3*, 2019
   2130 x 1830 mm, chalk on black primer on canvas

4. *How Loud Is Too Loud? No. 4*, 2019
   1530 x 1200 mm, chalk on black primer on canvas

5. *How Loud Is Too Loud? No. 5*, 2019
   2400 x 1350mm w, chalks and wet media on Fabriano paper

6. *How Loud Is Too Loud? No. 6*, 2020
   1830 x 2130 mm, chalks and water

7. *How Loud Is Too Loud? No. 7*, 2020
   1700 x 1450 mm, willow charcoal and oil paint on Fabriano paper

8. *How Loud Is Too Loud? No. 12*, 2018
   750 x 1050 mm, chalks and wet media on Fabriano paper

Floor work:

9. *How Loud Is Too Loud? No. 9*, 2019
   2100 x 1910 mm, chalks and mixed media on loose canvas

The Engine Room Gallery, Massey University; 7–18 September 2020.

Figure 70. M. OToole, How Loud Is Too Loud? Sea baby I*, 2019. Exhibition view of The Engine Room, Massey University, September 2020.*

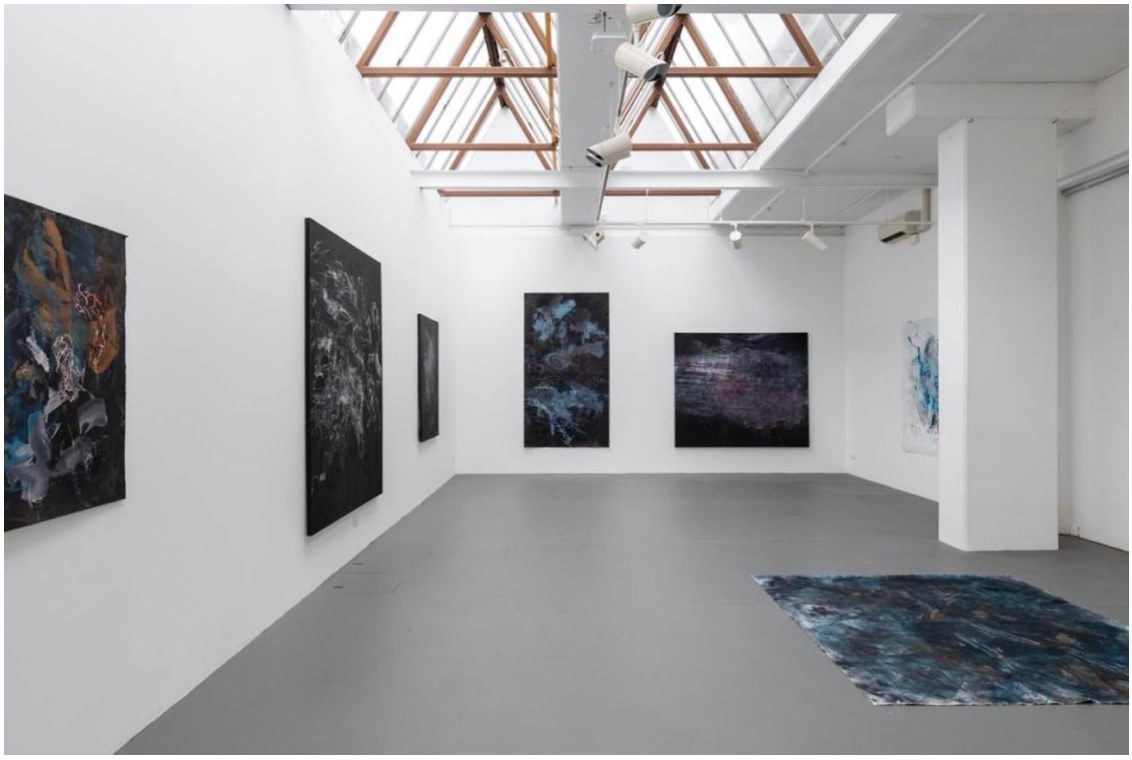

Figure 71. Installation view of the main gallery, Drawn Chorus. *The Engine Room, Massey University, September 2020.*

Figure 72. Installation view, Drawn Chorus. *The Engine Room, Massey University, September 2020.*

Figure 73. Installation view, Drawn Chorus. *The Engine Room, Massey University, September 2020.*

Figure 74. Installation view, Drawn Chorus. *The Engine Room, Massey University, September 2020.*

Figure 75. M. OToole, How Loud Is Too Loud? No. 5*, 2019. Exhibition view of The Engine Room, Massey University, September 2020.*

Figure 76. M. OToole, How Loud Is Too Loud? No. 5*, 2019. The Engine Room, Massey University, September 2020.*

Figure 77. M. OToole, How Loud Is Too Loud? No. 6*, 2020 The Engine Room, Massey University, September 2020.*

Figure 78. M. OToole, How Loud Is Too Loud? No. 6*, 2020. The Engine Room, Massey University, September 2020.*

Figure 79. M. O'Toole, How Loud Is Too Loud? No. 7*, 2020. The Engine Room, Massey University, September 2020.*

Figure 80. M. O'Toole, How Loud Is Too Loud? No. 4*, 2019. The Engine Room, Massey University, September 2020.*

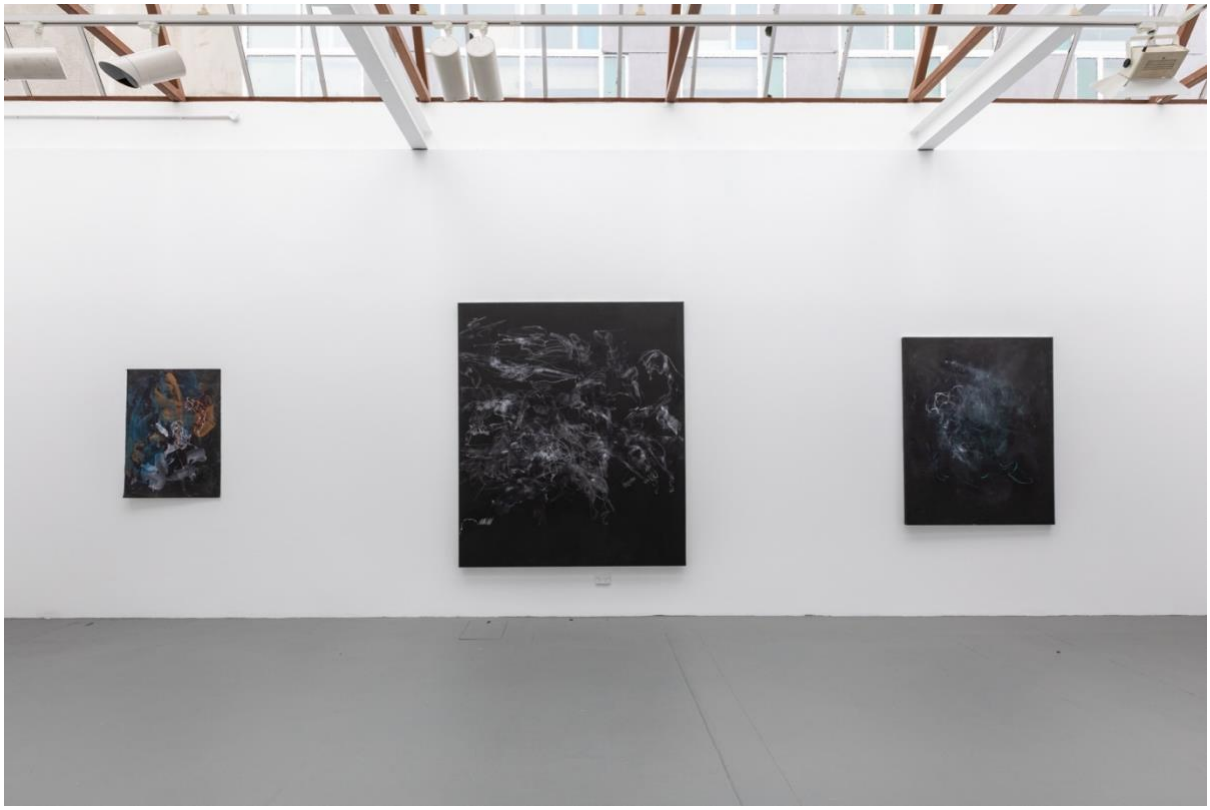

Figure 81. Installation view, Drawn Chorus. *The Engine Room, Massey University, September 2020.*

Figure 82. M. OToole, How Loud Is Too Loud? No. 3*, 2019. The Engine Room, Massey University, September 2020.*

Figure 83. M. OToole, How Loud Is Too Loud? No. 2*, 2019. The Engine Room, Massey University, September 2020.*

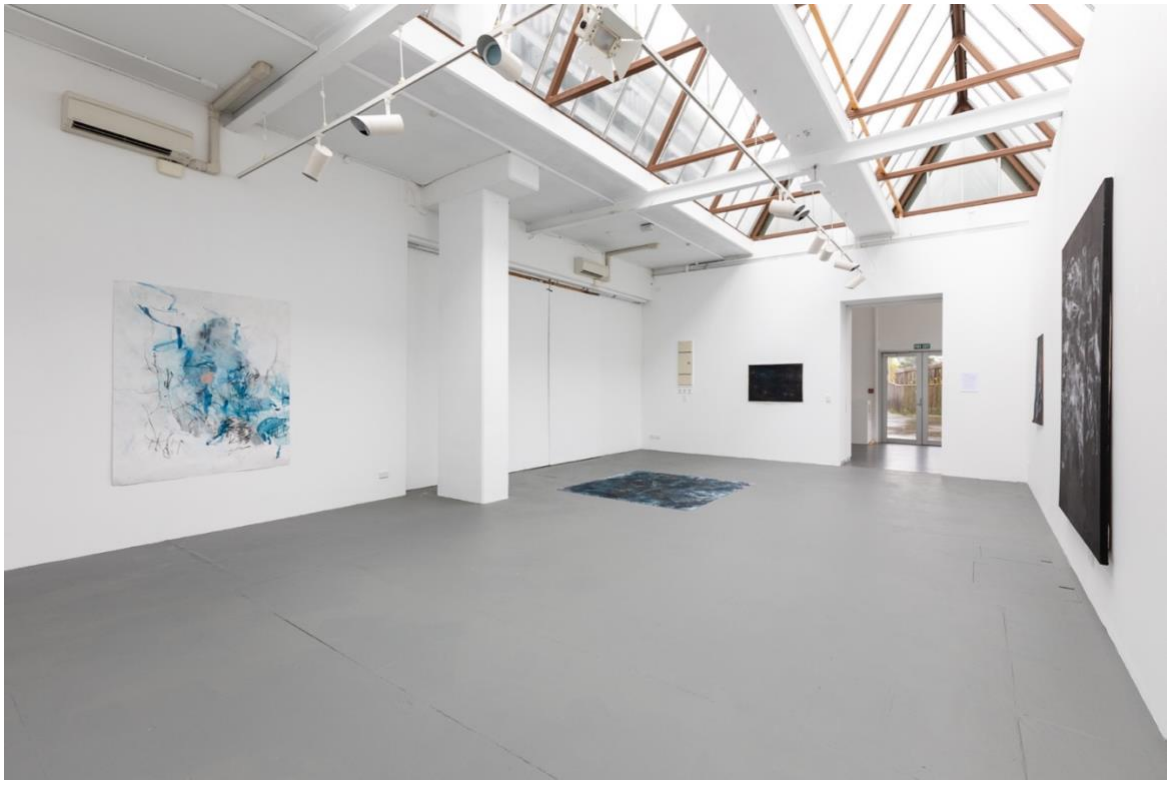

Figure 84. Installation view, Drawn Chorus. *The Engine Room, Massey University, September 2020.*

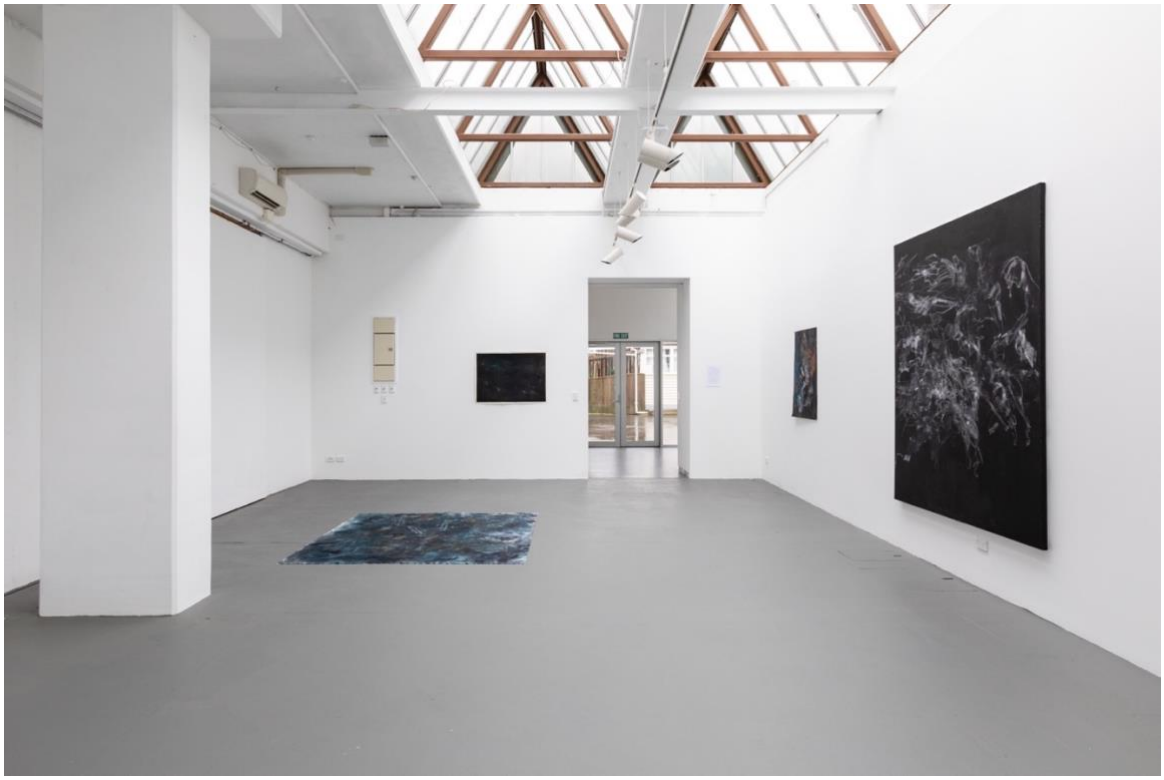

Figure 85. Installation view, Drawn Chorus. *The Engine Room, Massey University, September 2020.*

Figure 86. Installation view, Drawn Chorus. *The Engine Room, Massey University, September 2020.*

Figure 87. M. OToole, How Loud Is Too Loud? No. 9*, 2019. The Engine Room, Massey University, September 2020.*

Figure 88. M. OToole, How Loud Is Too Loud? No. 8*, 2018. The Engine Room, Massey University, September 2020.*

Figure 89. M. OToole, How Loud Is Too Loud? No. 8*, 2018. The Engine Room, Massey University, September 2020.*

Figure 90. M. OToole, How Loud Is Too Loud? No. 1*, 2019. The Engine Room, Massey University, September 2020.*

CONCLUSION

I had been searching for ways to locate my drawing practice within contemporary modes of ecological art practice. The adoption of the key theoretical concept of "The Chiasm—The Intertwining" opened up a new potential body of space in which to speculate, imagine and draw. I reimagined this body of space between the whale and myself as the flesh of the world, from where we both originated. Thus, we are kin and what happens in this body of space affects us both. My speculation allows for a connection between species, a connection that for this particular research came through sound. The methodology that evolved in this research is my contribution to contemporary drawing within the field of eco-aesthetics.

My concerns regarding whale communication being masked by anthropogenic undersea sound led me to this listening/drawing project. Threads of listening and drawing have been woven together to give a visual form to the exchange between me and the undersea world—me and the whale. This exchange or crisscrossing of information and speculation happens in the imagined body of space (chiasm) that I have adapted for the purposes of this research. Embodied pressure is the name I have given to the drawing methods nested within my methodology.

Engagement with NIWA scientists enabled me to understand the potential impact of the whale's communication. Sound travels as pressure in the ocean. I made the link between pressure on the skin (touch) and the varieties of pressure I apply when drawing. Sound and touch are inextricably linked in the undersea world, just as they are in my enquiry. I have argued that embodied understanding explored through drawing research is a way of "intertwining" with whales and, in Haraway's (2016) terms, of "staying with the trouble" of undersea sound.

From the perspective of an intertwined world I am attempting to understand through the whales' experience. I am responding to natural and human-generated sound in drawn scores. Intertwined worlding, as suggested in Merleau-Ponty's theory, offers us the chance to partner with all species and therefore live and die well together, as Haraway conceptualises.

As I reflect on the investigative process between the seer and seen, which meditates on pressure, there are certain conceptual frameworks that have been instrumental in discovering new ways to tell stories of the other, to give visual form to the unseen pressure experienced by whales. Firstly, William Kentridge's drawing process of "thinking at the periphery" was integral to the development of an open-ended approach, where the discovery was able to unfold in the studio through play and experimentation. Secondly, Haraway's "playing string figures with companion species" involves the discussion of companion knotting as a way to tell real stories

that are also speculative realisms. This has been a conceptual framework of interest as I also try to find ways of tuning in to the other to address a partial and flawed translation of difference between human and non-human.

Merleau-Ponty has been a constant force in the development of this sensory embodied method. The chiasm is pivotal to my methodology, for it is within this flesh of the world, my experience of the seer and the seen, that I have expanded his framework to incorporate the listener and the listened. It is here that I record and map the experience of tactile palpable hearing, for it is reflecting the entanglement of the seer and the seen. I inhabit the object I am looking at with my senses; my body understands and maps the experience with materials, marked on a surface.

In conclusion, these emergent, open-ended research methods have relevance in this moment of posthuman convergence as they are analytical and generate new knowledge and ways to think about a fast-changing world. The drawing process developed captured what Cook Strait is in the process of becoming by responding to NIWA scientist Kim Goetz's question "How loud is too loud?" It critiques human-generated undersea sound through erasure and gives visual form to this unseen pressure. Finally, The installation of nine specifically chosen original works created a space where unseen undersea pressure becomes tangible for an audience through the abstract visual language created in this research.

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APPENDIX 1: List of Exhibitions and Awards, Other Research Projects and Conferences

Exhibitions and Awards

Upstream Art Trail, 2017.
Sound Sculpture—Consonance.
Curator - Gabby O'Conner.
Central Park, Brooklyn, Wellington. *https://www.upstream.org.nz/art-trail/artists-2017/*

Parkin Drawing Prize, 2017.
Drawn Chorus and Slow Birds.
Two scores were chosen as finalists and exhibited at the Academy of Fine Arts Gallery, Wellington. See figures 12 and 91
https://parkinprize.nz/finalists%20announced%20for%202017

Not Standing Still, 2018.
How loud is too loud?—Experiment.
Curator Raewyn Martyn.
Group exhibition at Blue Oyster Art Project Space, Dunedin.
http://blueoyster.org.nz/assets/Online-Publications/Not-Standing-Still-Publication-DIGITAL.pdf

Parkin Drawing Prize, 2020.
Tukorehe Wetland—Sound Score.
Chosen as finalist and received a Merit Award.
Exhibited at the Academy of Fine Arts Gallery, Wellington. *https://parkinprize.nz/2020-finalist*

Figure 91. M. OToole, Slow-birds 1*, 2017. Mixed Media. Finalist, Parkin Drawing Prize, 2017.*

Other Research Projects

Te Waituhi ā Nuku: Drawing Ecologies

The Drawing Open Research Collaborative, founded by Emma Febvre Richards (Massey University) and Monique Jansen (Auckland University of Technology) in 2016, have been working alongside the Deep South Climate Change National Science Challenge since 2017. The Phase 2 Deep South National Science Challenge research, *Risk Management Planning for Climate Change Impacts on Māori Coastal Ecosystems and Economies*, is led by Professors Huhana Smith and Murray Patterson. This Māori-led climate change project is also supported by Māori researchers Aroha Spinks and Moira Poutama.
See *https://www.drawingopen.com/te-waituhi-a-nuku-drawing-ecologies.*

Conference Paper

AAANZ 2019: Nga Tutaki, Encounters. Embodiment/Agency/Exchange/Ecologies

Paper presented: "Maria OToole - An Interplay between Art and Science". For the session: Encounters with and within the Anthropocene: Speculating on Particular- Planetary Aesthetics 2 (Louise Boscacci, Perdita Phillips, Sally Ann McIntyre).
See *http://aaanz.info/wp-content/uploads/2019/11/2019-AAANZ-Conference-Schedule_Nga-Tutaki.pdf.*