

THE THIRD SEASCAPE:

A DEEP NARRATIVE OF THE CALIFORNIA COAST

by

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ABSTRACT

Twenty-seven offshore oil platforms line the coast of Southern California from Point Conception to Huntington Beach. They are some of the oldest in the world and are scheduled for complete decommissioning by 2033. Overtime, the rigs have adapted to the surrounding ecosystems, unintentionally creating habitat for fouling communities. The subsurface provides a vertical skeleton for coral reefs that support an abundance of marine life.

This thesis reflects on kinship studies, deep time and the philosophies of Gilles Clément to inform its theoretical positioning on design. Making the depths of the ocean visible fundamentally alters our relationship to the living and non-living entities that occupy it. This, in turn, re-positions ourselves as kin in place, space, and site, prompting a re-evaluation of our actions, thoughts, and design motivations in the process. Structured as five stories, the Ecologist, Mussel, Fish, Oil Particle, and Gardener create a circular journey through time and space.

ACKNOWLEDGMENTS

I would like to thank my thesis advisors Ozayr Saloogie and Lisa Moffit for inspiring me throughout the year. Their knowledge, encouragement, and advice has guided me throughout this process. I would also like to thank my family with a special thanks given to my dad for his continuous support and interest in my academic pursuits.

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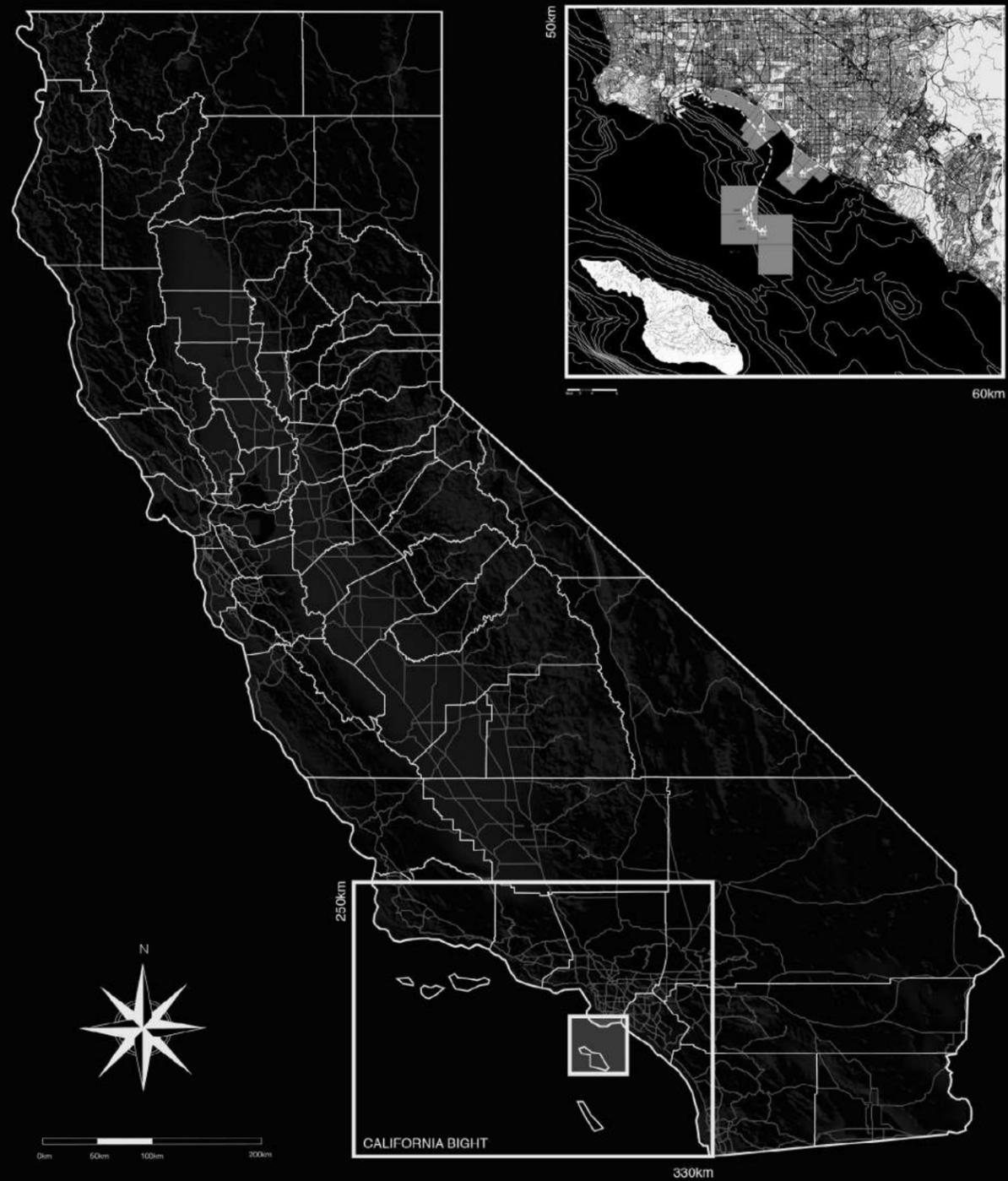


FIGURE 1: LOCATION MAP

PART 1: INTRODUCTION

Description of Methods, Site Context and Characters

METHOD

Drawing insights from theories about the third landscape, kin studies, and deep time, this thesis is structured as five narratives that will weave together to tell the story of the site. First, a description of the site context will be given to provide background information regarding Platform Elly and the offshore oil industry in the California Bight. The next section will reflect on three theoretical frameworks that influence the ways in which this thesis thinks about site, design and the earth. These reflections will explain the philosophies of Gilles Clément, including his thoughts on the 'Third Landscape' and the 'Planetary Garden' as well as kinship studies and deep time. The subsequent sections follow first species perspectives of the oil platform, from the points of view of an Ecologist, Mussel, Fish, Oil Particle, and Gardener. Drawing upon the theories of Gilles Clément, the gardener was selected to demonstrate the future, since they position themselves as a steward of the sea. They interact and weave together with all previous characters, viewing them as kin, acknowledging and respecting their existence.

The primary investigative method this thesis uses to explore the site are written and visual narratives. Stories have the ability to shape how we understand the world, our place at the moment and how we can change it. We can paint compelling visions of alternative futures to illicit emotional responses that can transform systems, processes and beliefs. Narratives connect groups, organizations and movements together to facilitate collaboration by providing a space to discuss shared values.¹

Before writing and drawing the narratives, extensive research of the site was

¹ Ella Saltmarsh. "Using Story to Change Systems." *Stanford Social Innovation Review*, February 20, 2018

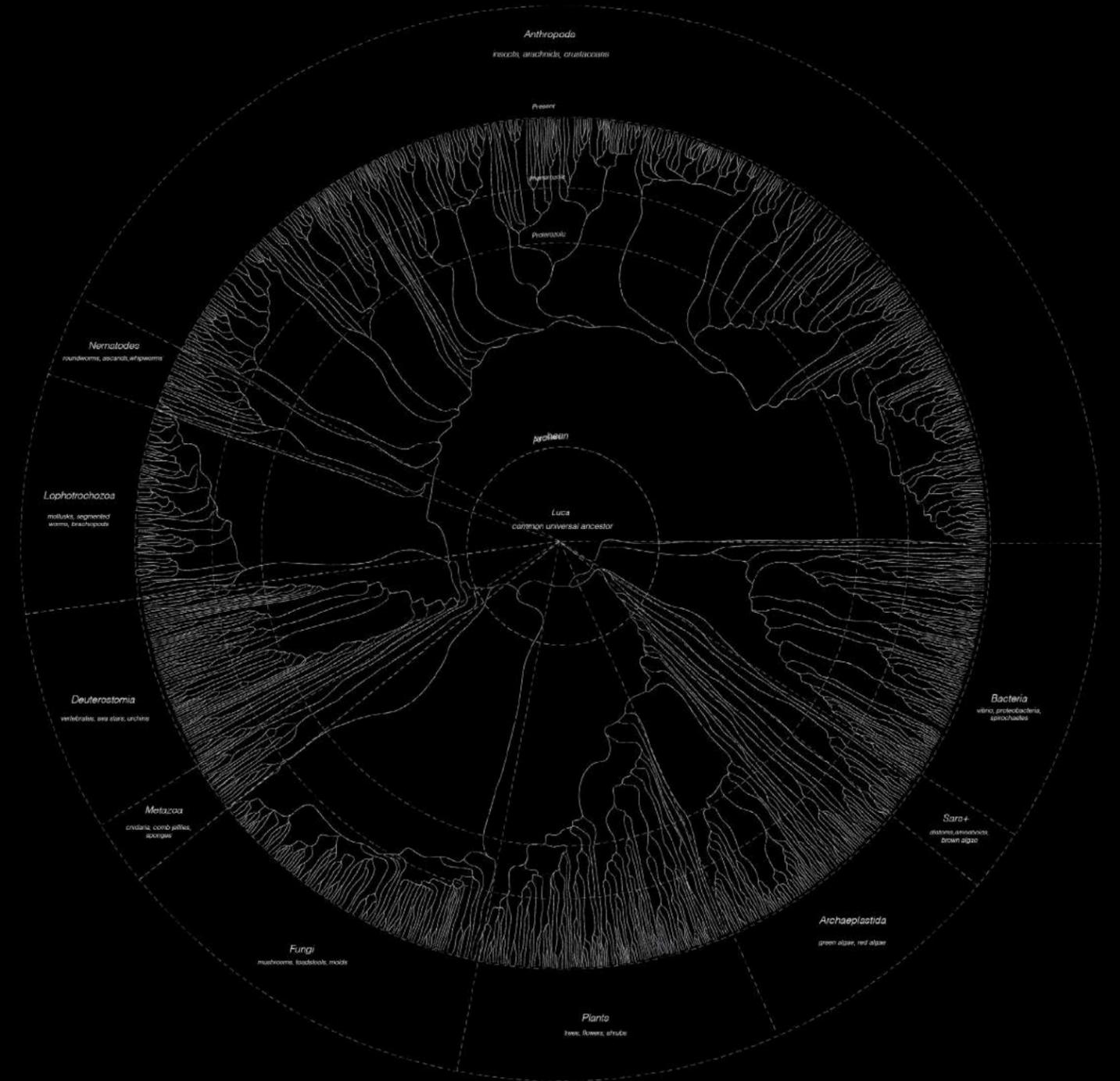


FIGURE 2: DEEP TIME MAP

conducted. I was drawn to certain occupations and species, researching their worlds, before, during and after life. From the formation of oil particles, to the start of a mussel's life as larvae, developing a data base of information surrounding each character was essential. Nothing disappears, elements just transition, transform, and evolve through biological and chemical processes. The particles in the mussel transfer into the fish or the fossilized organisms transform into kerogen with heat. Although nothing ends, elements take new forms, thus the narratives were developed as a cycle of relations.

Originally more characters were incorporated including an Oil Executive, Engineer, Water Particle and Archaeologist, etc. A process of narrowing and editing occurred when relationships between them were beginning to develop. Some characters had more connections, therefore these were further expanded. A focus was also placed on including non-human and non-living elements at different scales. I included a human perspective, an invertebrate (mussel), a vertebrae (fish), and narrowed my scope to a particle. The oil particle formed both the origin and the conclusion to all of the narratives. By varying scales, the narratives were able to span different time frames and touch on a variety of different environmental issues.

Initially, word mapping was a strategic tool to create a web of relations between the characters. Next short biographies were produced to develop their traits, interests, values and priorities. Once these were established, writing the narratives began.

It should be noted that there are challenges that arise when trying to write and draw from radically alternative perspectives. Through research, a strong attempt was made to be as accurate as possible. Although, due to a variety of unknowns as well as the biases of a human writing narratives from non-human perspectives, there is

still a high level of imagination that weaves into the process. The act, exercise and process of attempting to write and draw from a non-human perspective elevates them as a companion and ally in the environment.

To re-enforce equality within the narratives, all characters are referred to as "they" with no indication of gender, sexuality, or origin. It refrains from referring to living or non-living beings as 'it'. Through this process a deeper connection of respect can be made when we begin to view and acknowledge the inhabitants of earth as having individual lives rather than as abstract generalizations.

We perceive other species intelligences in human ways of knowing, disregarding their uniqueness and individuality. By writing, drawing, and organizing through narrative, this thesis strives to develop new ways of thinking about site that does not solely focus on human values. As Robert Macfarlane writes "Our present grammar militates against animacy; our metaphors by habit and reflex subordinate and anthropomorphize the more-than-human world."² This thesis is aware of the challenges of anthropomorphism, and the skepticism that accompanies imagining what others are feeling, thinking and communicating. Although controversial, portraying human-like characteristics onto the non-human, is better than assuming that they do not have any thoughts or feelings at all.³ First species perspectives are attempted because it is important, the stories that are told, the choice of words and language that is spoken, and the actors that are portrayed.

² Robert Macfarlane, *Underland*. (London: Penguin 2019) 110.

³ Brooke Williams, "Four Turtles" in *Persons: Kinship Belonging in a World of Relations Vol. 4*. 63-69, ed. Gavin Van Horn, Robin Wall Kimmerer and John Hausdoerffer. Illinois: Center for Humans and Nature Press. 2021, 69.

SITE CONTEXT

The site is located in the California Bight, a geographical concave curve that forms an open bay along the Los Angeles and Santa Barbara coastlines. The area is unique in its shallow coastal shelves and easy formation of circular currents and eddies. The seafloor has complex topography, characterized by basins, steep shelves, islands, ridges, troughs and submarine canyons. This variety and complexity, along with the circular currents, and nutrients create diverse ecosystems for over 85 species of fish, 80 species of seabirds, and an abundance of marine mammals.⁴

Oil has been a part of the California Bight's history for millions of years. In the past, it was harvested from natural oil seeps and used by the Chumash as an adhesive for their Tomols canoes, hunting weapons and baskets.⁵ For European settlers in this region, there was little interest in the substance until after the 1850's when it was discovered kerosene could be distilled from crude oil. Thus began the oil industry and for over 100 years, production escalated, new fields were explored, and infrastructure was developed. It was a time of economic prosperity and production.

Within the past 30 years, development has stopped with no new platforms having been built since 1989.⁶ Currently, twenty-seven federal and state offshore oil platforms line the coast of the California Bight and are currently scheduled for complete decommissioning within the next 5 to 10 years.⁷

⁴ G.J Bakus, *The Marine Biology of Southern California*. Allan Hancock Foundation: Los Angeles, California. 1989.

⁵ Milton S. Love, "An Overview of Ecological Research Associated with Oil and Gas Platforms Offshore California." *US Department of the Interior, Bureau of Ocean Energy Management*. Camarillo California, OCS Study BOEM 2019-052.

⁶ Milton S. Love. "A Brief History of Oil Development in Southern California." in *The Ecological Role of Oil and Gas Production Platforms and Natural Outcrops on Fishes in Southern and Central California: A Synthesis of Information*. Marine Science Institute, university of California: Santa Barbara, 2003. 2-1.

⁷ Donna M. Schroeder and Milton S. Love, "Ecological and Political Issues Surrounding Decommissioning of Offshore Oil Facilities in the Southern California Bight." *Ocean & Coastal Management* 47, no. 1-2 (May 2004): 27.

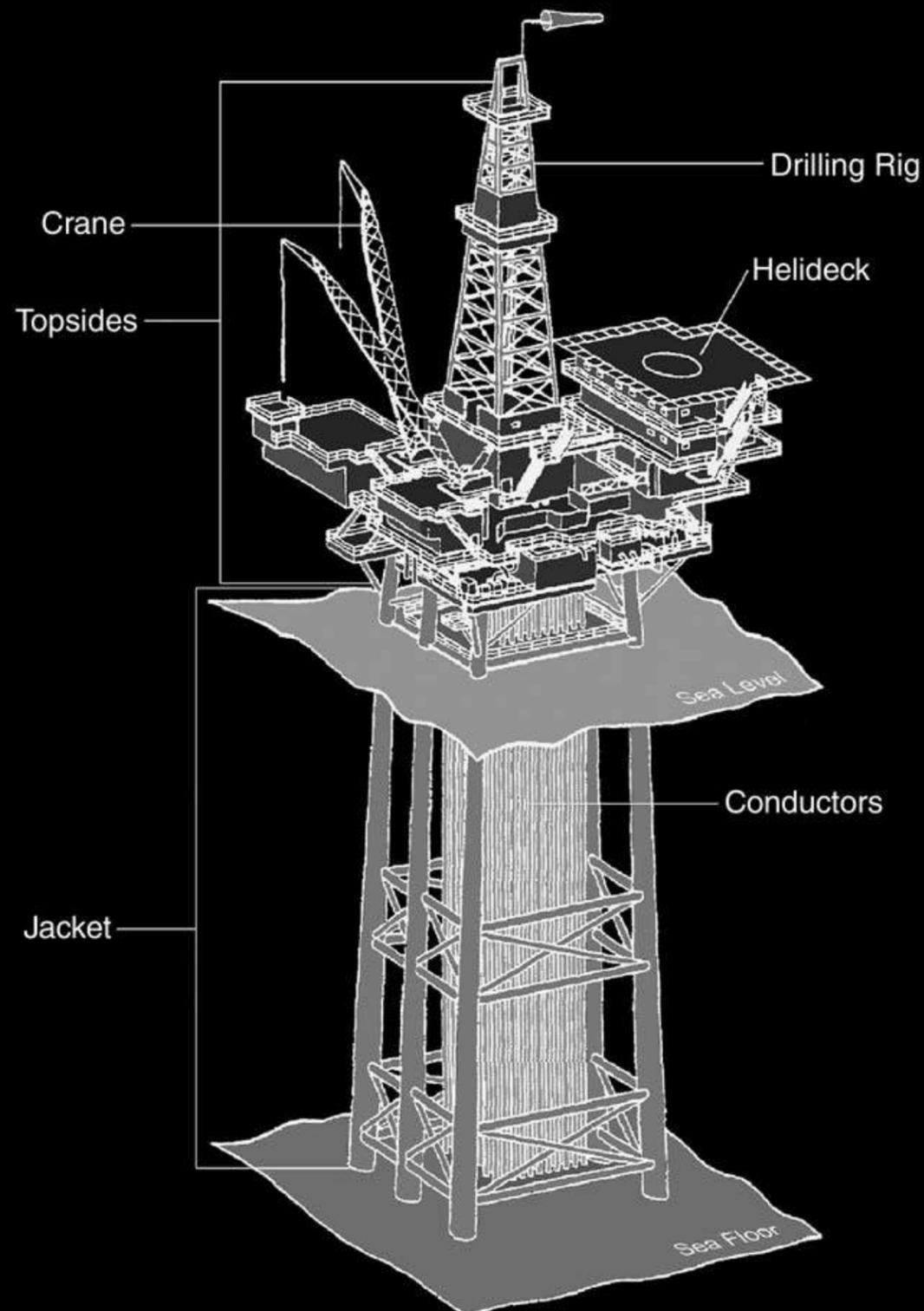


FIGURE 3: TYPICAL CALIFORNIA OFFSHORE OIL RIG, Milton S. Love and Schroeder, Donna M. A typical Oil/Gas Production Platform in the Southern California Bight, (Santa Barbara: University of California's Marine Science Institute, 2004), 23, fig. 1.

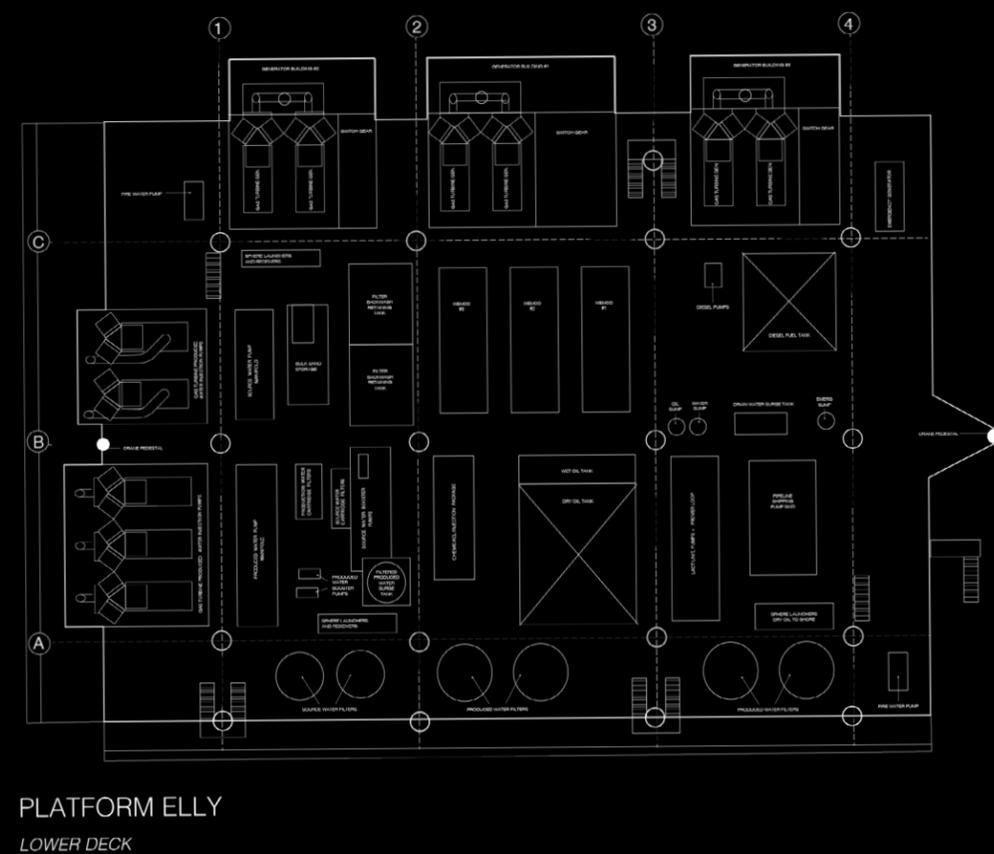
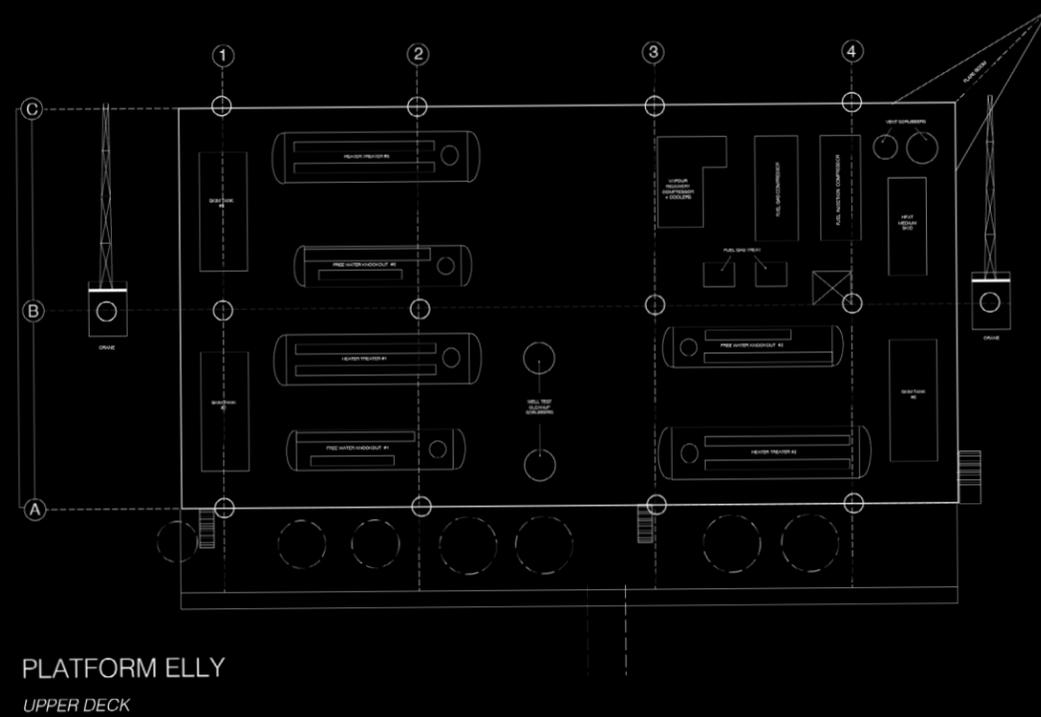


FIGURE 4: PLATFORM ELLY DECK PLANS

The combination of the offshore oil platform's steel structures with the California Bight's ecological, geological and climatic conditions, enable the formation of incredible artificial reefs that support marine life. Here, there is an blurring of elements, everything is intertwined. Hard and soft, living and non-living, natural and built form work together to create a hybrid ecosystem.

A typical California offshore oil platform is a metal structure comprising of 2-3 levels of decking above water, and a jacket with conductors, beams and trusses under water (Figure 3). Wells descend from the topside, through the substructure of the jacket and into the earth. Depths vary depending on the platform, but wells have the ability to descend thousands of metres below the surface of the water and rock to access fields at various depths.⁸ This thesis specifically looks at Platform Elly, which differs slightly from a typical extraction rig since it is a processing platform. It has 12 jackets and is located in 78m of water, 13.8km from the Port of Long Beach.⁹ It weighs a total of 11,300 tons and is one of three rigs run by Beta Operating Company LLC.

Elly does not extract the oil, but processes the particles through collection, separation, heat, and dehydration. Additionally it cleans, and injects both the produced water and source water for flooding operations. The platform is also in charge of generating the power for artificial lift, injection, compression, and transport of the oil. Electric power is generated by dual-fueled turbine-driven generators and distributed from Platform Elly to Platform Eureka and Ellen via two 34.5 kv subsea pipelines.¹⁰ Another 27.8km pipeline extends along the bottom of the San Pedro Bay seafloor, becoming buried

⁸ Donna M. Schroeder and Milton S. Love, "Ecological and Political Issues Surrounding Decommissioning of Offshore Oil Facilities in the Southern California Bight." *Ocean & Coastal Management* 47, no. 1-2 (May 2004): 27.

⁹ Shell Oil Company, *Plan of Development Beta Unit Complex*. Los Angeles, 1977.

¹⁰ Shell Oil Company, *Plan of Development Beta Unit Complex*. Los Angeles, 1977.

3-4.5m in the ground to reach a Beta pumping station then refinery in Long Beach.¹¹

Elly has lower deck dimensions of 45.72m by 64.08m and upper deck of 30.5m by 60.0m (Figure 4). A 61.00m bridge links Platform Elly to Platform Ellen, its drilling companion (Figure 5). The platforms' main legs under the surface of the water have diagonal and horizontal bracing, which provides structural redundancy and adds substantially to its integrity. The legs are secured to the ocean bottom with piles driven through and welded to the jackets.¹² Although built well, the platforms are reaching the end of their usefulness.

According to a 2020 report conducted by the U.S. Bureau of Safety and Environmental Enforcement it would cost more than \$1.6 billion to decommission the platforms, with platform Elly, the site of the 2021 oil spill, costing \$34.4 million.¹³ With California's aging oil infrastructure increasing spill frequency, debate and research into decommissioning processes has been a primary concern. In 2010, California passed Assembly Bill 2503 (AB 2503), allowing for oil platforms to be transitioned into reefs, making leave-in-place a viable option for oil companies to pursue.¹⁴ Currently, there are four potential strategies that have been used for decommissioning efforts; complete removal, partial-removal, leave-in-place or topping (Figure 6).

Total removal involves filling the well bores with cement, removal of pipelines, as well as the severing of the topside, conductors and piles through the use of explosives. A derrick barge then lifts the jacket out of the water and onto a transport barge which

¹¹ Shell Oil Company, *Plan of Development Beta Unit Complex*. Los Angeles, 1977.

¹² Shell Oil Company, *Plan of Development Beta Unit Complex*. Los Angeles, 1977.

¹³ InterAct PMTI, Inc., *Decommissioning Cost Update for Pacific Outer Continental Shelf Region (POCSR) Facilities, A Study for: The Bureau of Safety and Environmental Enforcement (BSEE)*. California: Bureau of Safety and Environmental Enforcement, September 2020.

¹⁴ Lindsey Glasgow, "Decommissioning California's Oil Platforms: 3 choices, an Undecided Future." *The Log*, April 9, 2020.

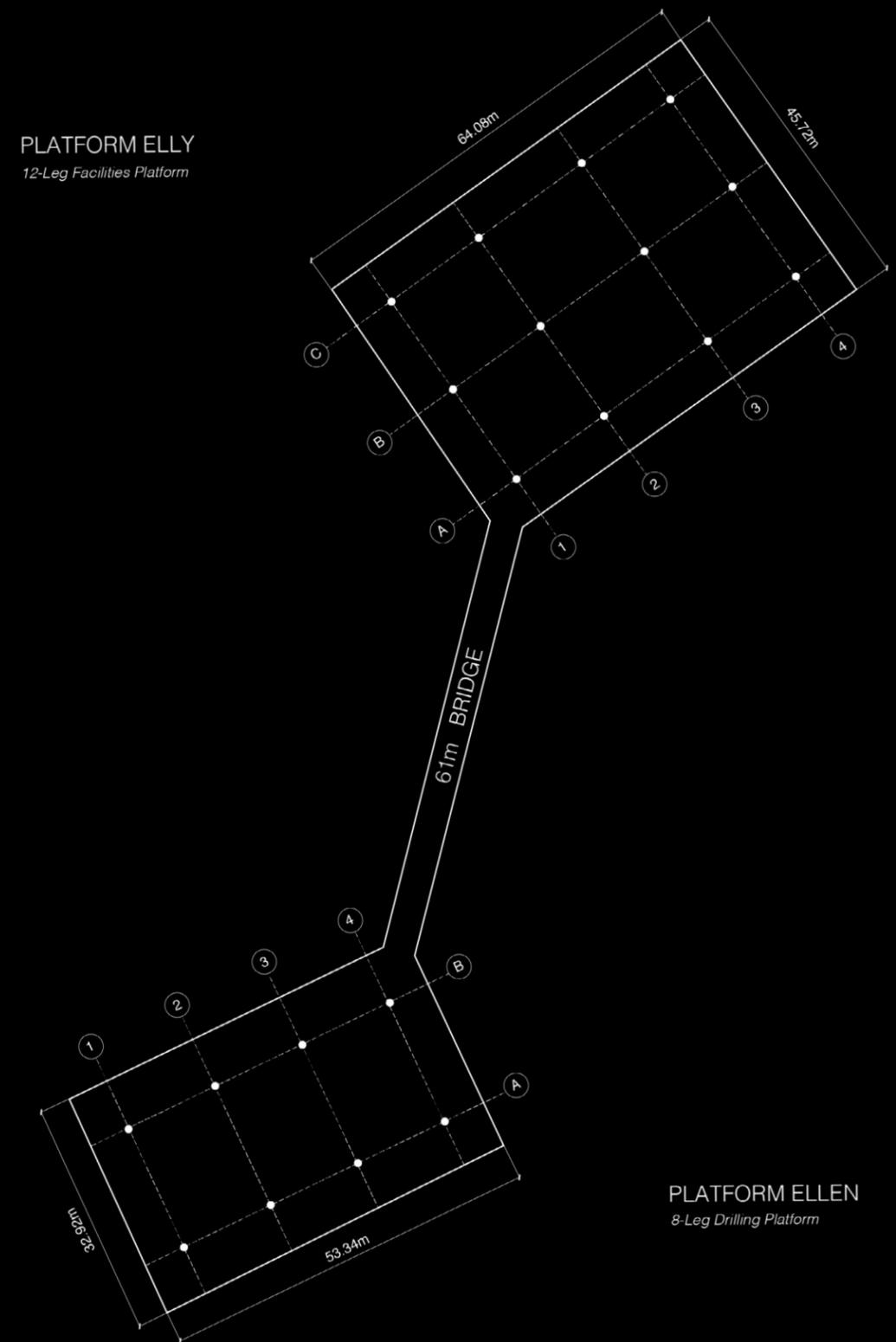


FIGURE 5: PLAN OF PLATFORM ELLY AND ELLEN

takes it to shore. After disassembly the platform's metal is recycled, discarded in landfills or re-conditioned for re-use at another location (Figure 6).¹⁵

With partial removal the wells are also filled with cement and the topside is removed. The substructure conductors can either be left in place or disassembled. Removing them requires explosives, which can destroy surrounding ecosystems, inhibiting it's use as a artificial reef in the short term. The substructure is left in place with the shell mound at the bottom and the topside is either recycled, re-used or sent to a landfill. In the past, certain components of the topside have been re-located in shallow water to form artificial reefs. Toppling is similar to partial removal with the main difference being that it requires explosives to sever the jacket from the seabed and uses a barge to topple it over, where it rests on the ocean floor (Figure 6).¹⁶

The last option is leave in place, where the oil platform is left as an artificial reef. All components below the surface of the water are left and the topside is stripped, cleaned and removed.¹⁷ This thesis explores this option when thinking about the future of Platform Ely. The strategy of transitioning oil rigs to reefs is a potential decommissioning solution that can satisfy multiple interests. From the oil executive who prioritizes economics, to the environmental activist who values sustainability, informing people about what is unseen below the surface can have an impact that reaches further then one project, site or design.

The characters are connected spatially through the oil platform where they will interact

¹⁵ Donna M. Schroeder and Milton S. Love, "Ecological and Political Issues Surrounding Decommissioning of Offshore Oil Facilities in the Southern California Bight." *Ocean & Coastal Management* 47, no. 1-2 (May 2004): 26.

¹⁶ Donna M. Schroeder and Milton S. Love, "Ecological and Political Issues Surrounding Decommissioning of Offshore Oil Facilities in the Southern California Bight." *Ocean & Coastal Management* 47, no. 1-2 (May 2004): 26 - 27.

¹⁷ Donna M. Schroeder and Milton S. Love, "Ecological and Political Issues Surrounding Decommissioning of Offshore Oil Facilities in the Southern California Bight." *Ocean & Coastal Management* 47, no. 1-2 (May 2004): 27.

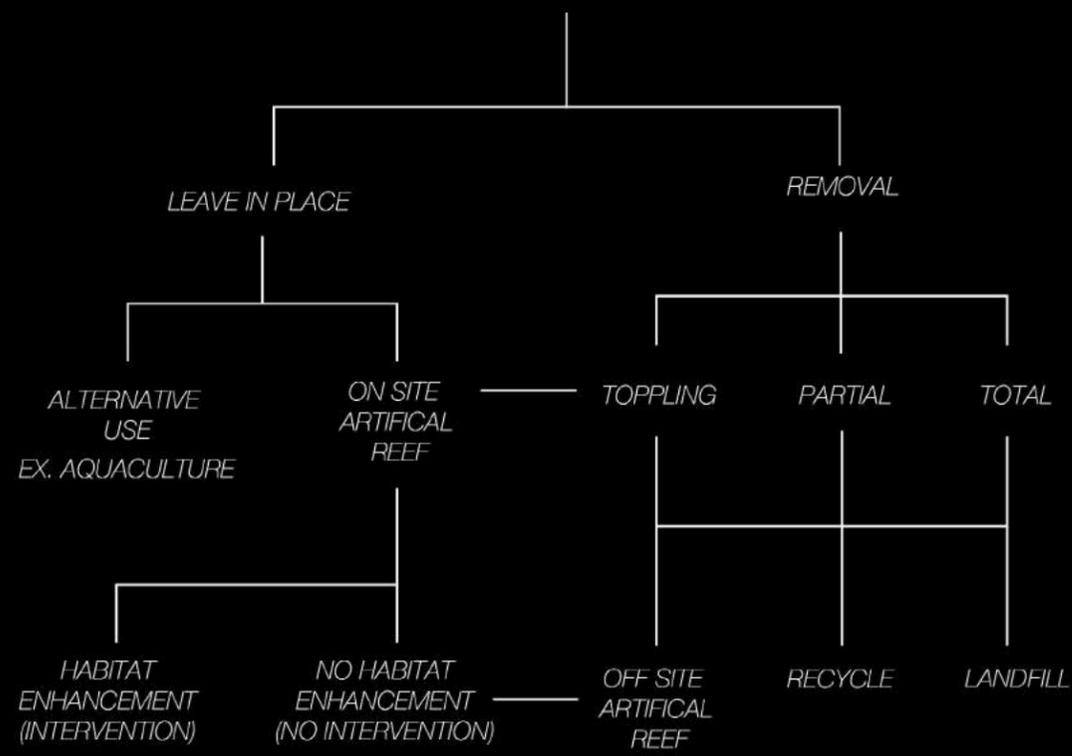
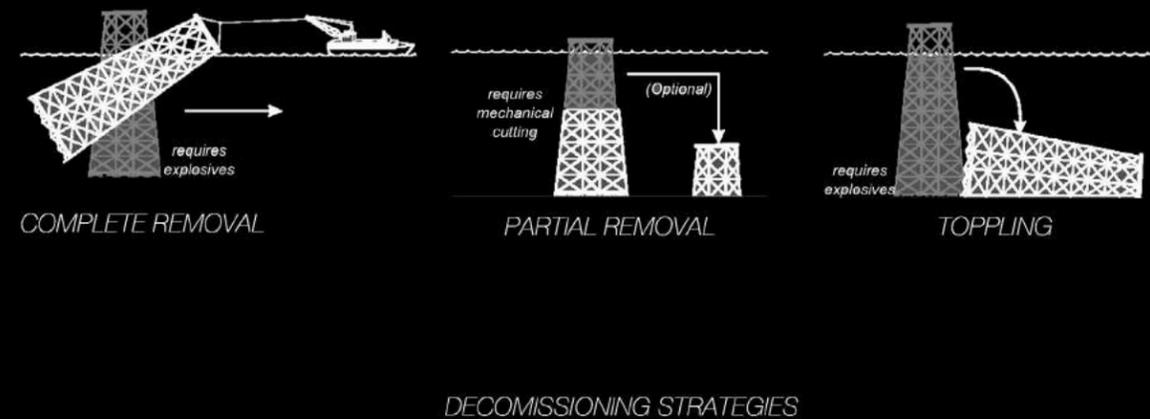


FIGURE 6: DECOMMISSIONING STRATEGIES
 Milton S. Love and Schroeder, Donna M. A typical Oil/Gas Production Platform in the Southern California Bight, (Santa Barbara: University of California's Marine Science Institute, 2004), 25, fig. 2.

with the structure as well as each other throughout the different narratives. Through the lens of an ocean gardener, Platform Ely weaves together all of the individual stories to inform its function and program after oil. The purpose is to integrate each character's values, needs and perspectives into its future. This thesis begins to think about designing for others including the non-human and the non-living, by attempting to view the site from their perspective.

CHARACTERS

ECOLOGIST

The ecologist is a certified scuba diver that has worked for a variety of jobs relating to the ocean. Currently, they are a researcher at NOAA, studying and documenting the foodchains surrounding offshore oil platforms. Although middle aged, they appear through their dress, mannerisms and personality as if they were years younger. The ecologist is an activist and environmentalist with a strong presence on social media, producing content and short documentaries to inform the public about the environmental struggles of the ocean. Although people gravitate towards their childish enthusiasm for learning and discovering, the ecologist enjoys spending their time with animals more than people.

MUSSEL

The mussel is an ecosystem engineer. They are food, filter, measure, archive, and habitat. Chronicling time in their shell rings, they are a storyteller of climatic history.

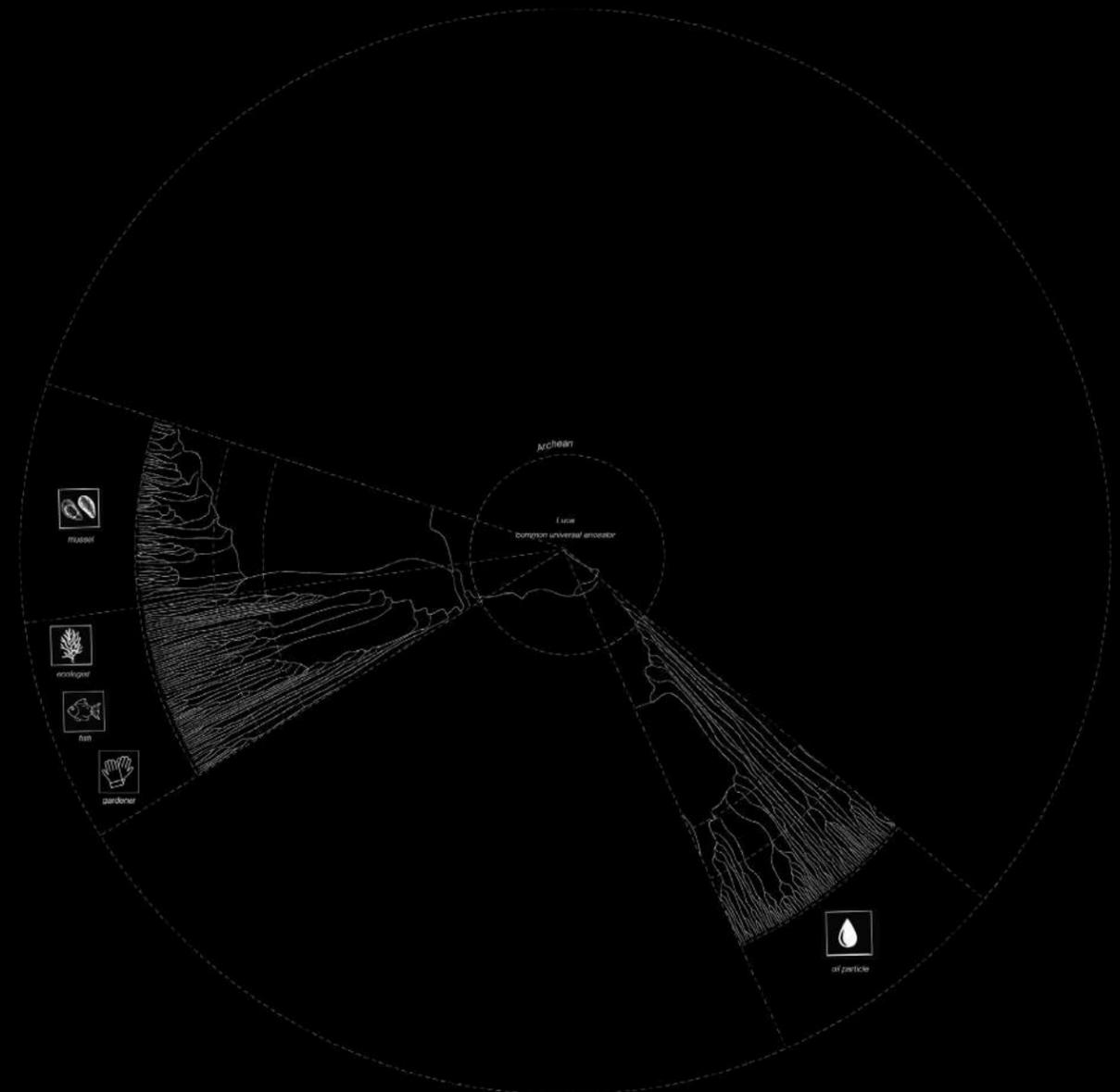
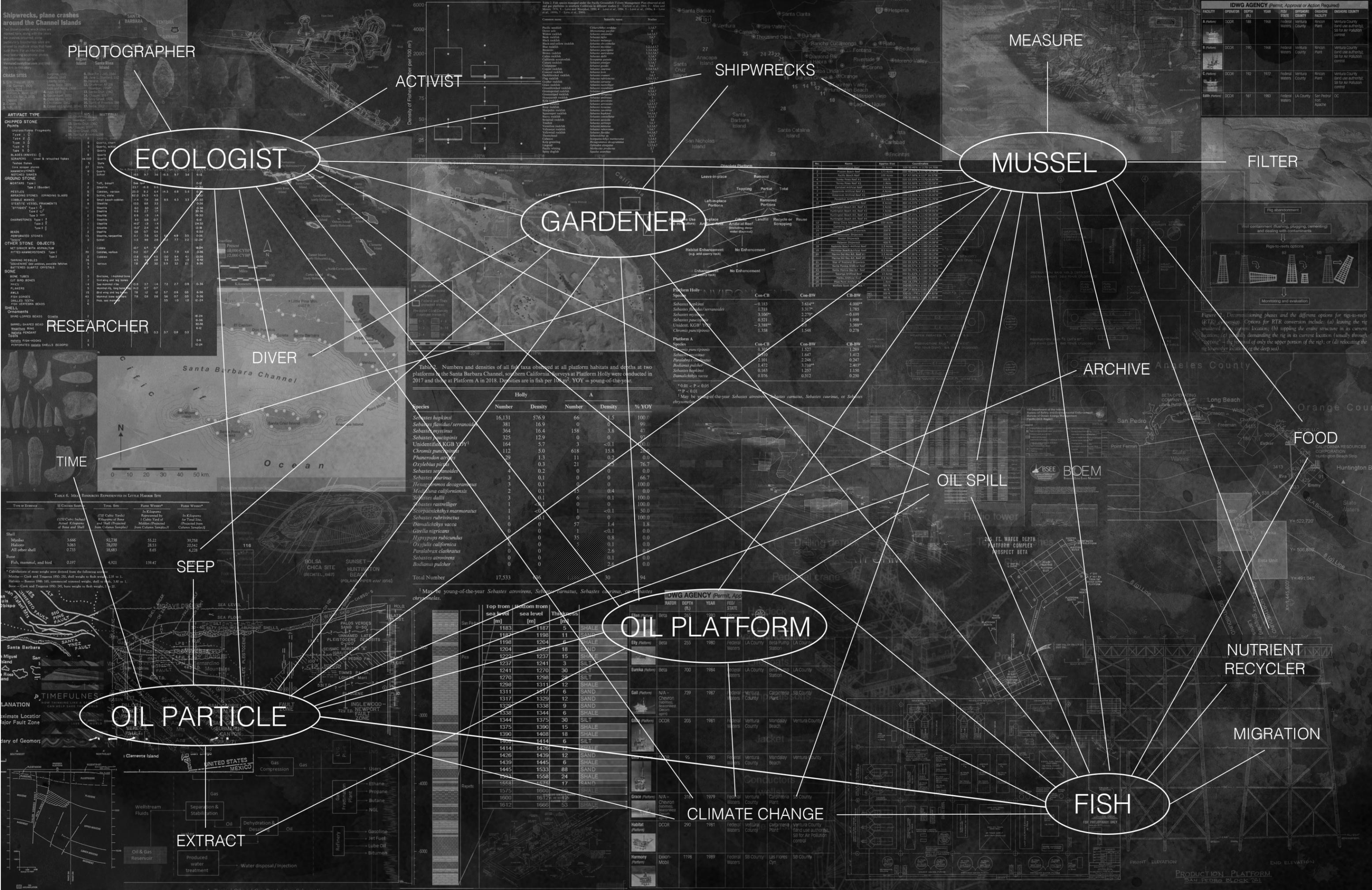


FIGURE 7: CONNECTING CHARACTERS THROUGH DEEP TIME

FIGURE 8 (NEXT PAGE): CHARACTERS CONNECTIONS



PHOTOGRAPHER

ACTIVIST

SHIPWRECKS

MEASURE

MUSSEL

FILTER

GARDENER

ECOLOGIST

RESEARCHER

DIVER

ARCHIVE

FOOD

OIL SPILL

OIL PLATFORM

NUTRIENT RECYCLER

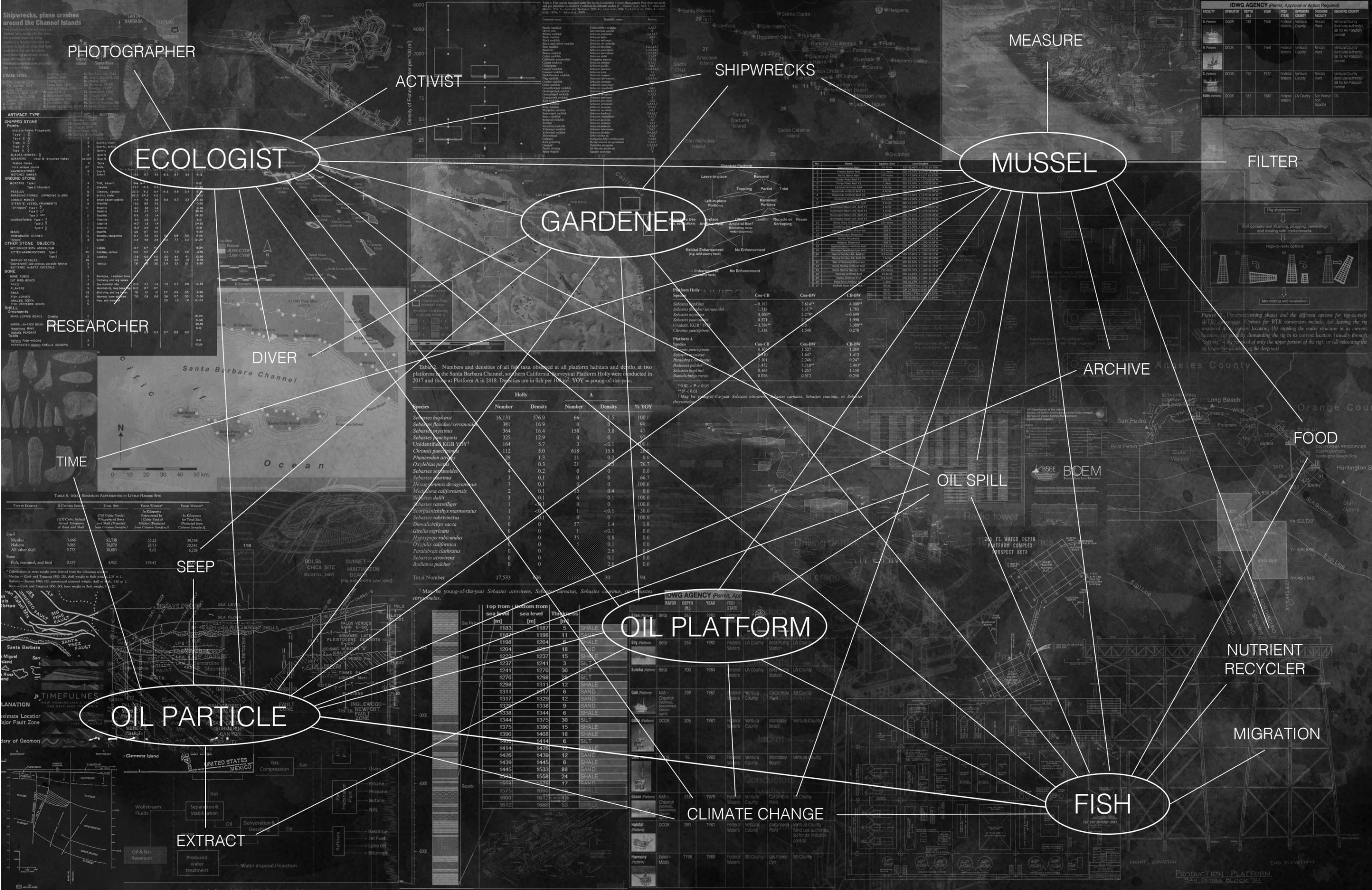
MIGRATION

FISH

CLIMATE CHANGE

EXTRACT

OIL PARTICLE



The mussel's body is soft with a hard shell and a muscular 'foot', that enables them to move by latching onto surrounding material and substrate. The shell is elongated and asymmetrical, reaching 250mm with blue colouring on the outside and a heavy brown periostracum. For nutrients, they feed almost exclusively upon fine particles of detritus and the smaller planktonic organisms.¹⁸

FISH

The fish is a species of rockfish, specifically *Sebastes serriceps* (treefish) that thrives approximately 30m below sea level surrounding Platform Elly. They have a robust rectangular body, with small eyes and a pointed snout. Their colouring is yellow with six black vertical stripes and additional white dashes with the distinguishing feature of bright red lips. They are territorial, solitary, defensive and an ambush predator species, feeding primarily on smaller fishes as well as benthic invertebrates including crabs, mussels, shrimp, and other crustaceans.¹⁹ Traumatized by a previous hook and seal incidents, the fish has become wary, highly anxious, cautious and calculated.

Although unable to control the amount of light that filters into their retina, the fish can focus and zoom their eyesight. They are better equipped to detect movement and contrast over detail and can see farther into the violet range than humans. Additionally, they are capable of seeing particles dissolved in water as well as electromagnetic frequencies. In terms of memory, the fish can remember locations associated with food ²⁰, although it is unknown whether it is spatial recognition, instinct or another

¹⁸ Denis L. Fox. *The Habitat and Food of the California Sea Mussel*. (Berkeley, California: University of California Press, 1936) 2.

¹⁹ Madhavi A. Colton and Ralph J. Larson. "Aspects of the Life History of Treefish, *Sebastes serriceps* (Sebastidae)." *CalCOFI Rep* 48, (2007), 117.

²⁰ Society for Experimental Biology. "Smarter Than You Think: Fish can Remember Where They Were Fed 12 Days Later." *ScienceDaily*. 2014.

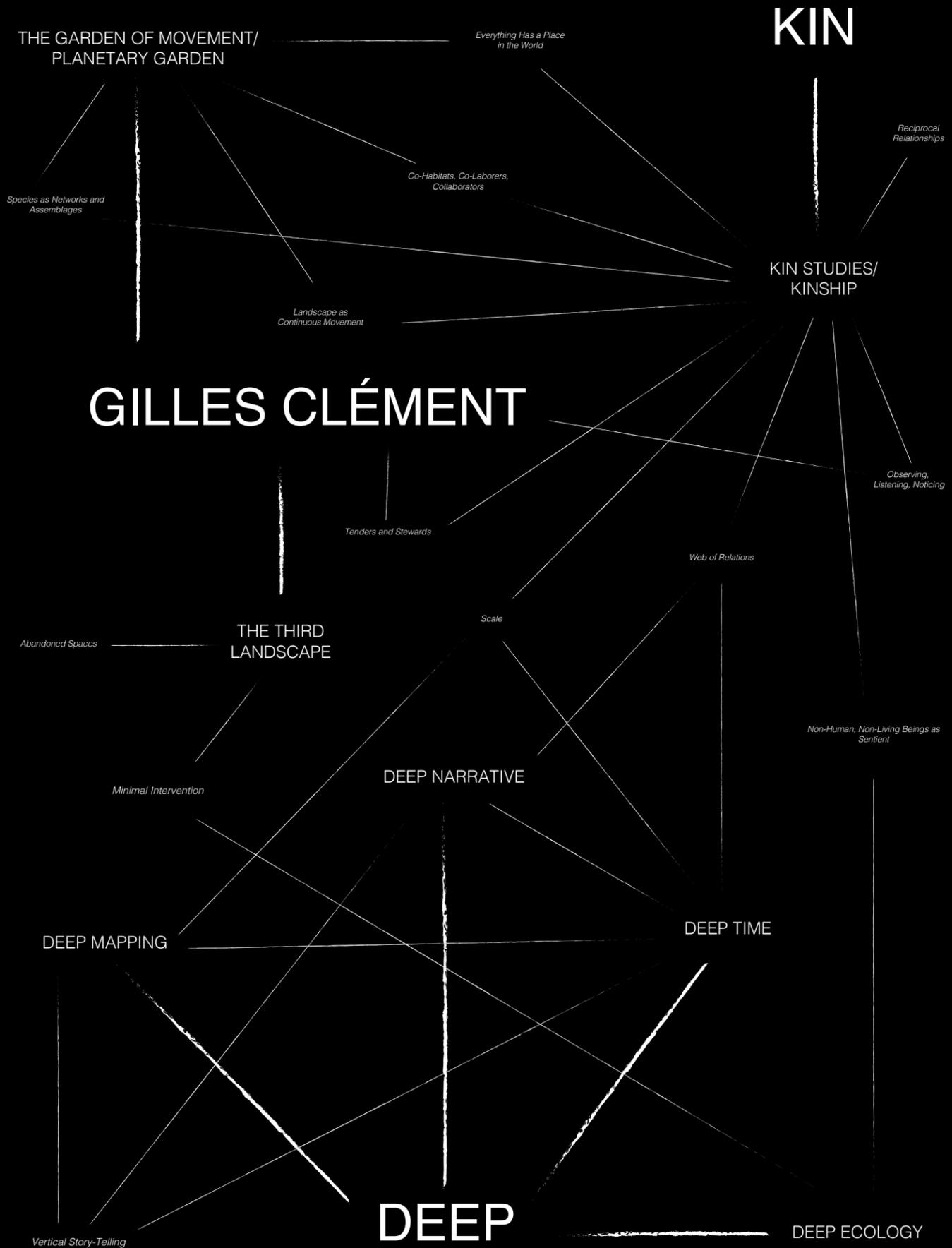
form of intelligence that is beyond human comprehension.

OIL PARTICLE

An oil particle is not inherently corrupt or evil. They begin as living organisms - zooplankton, phytoplankton, algae or bacteria and have transformed and evolved over time. The life of an oil particle maps it's being through deep time to acknowledge it's many previous forms and possible narratives. Three paths are explored highlighting the seeping, spilling and extracting processes that the particle can follow. They are wise with a deep knowledge and understanding of the earth that spans many forms and many lives. With an excellent memory, the oil particle can recount details, information and stories with vivid clarity.

GARDENER

The ocean gardener lives in the future and highlights the program and function of the oil platform, focusing on it's continuous evolution and maintenance. They work with other non-human, non-living species as collaborators, and co-labourers in the site, noticing and explaining the roles and positioning of each character, weaving together the previous narratives. Characteristics include quiet, caring, nurturing and above all patient. The gardener is deeply thoughtful, and reflective, feeling strong emotions and a sense of responsibility towards both the human and non-human elements in their life. They are contemplative and enjoy caring for and observing the land and ocean they are responsible for. With a tendency to get lost in their head- they can be considered a day dreamer.



PART 2: THEORIES

Philosophical Ponderings and Reflections

FIGURE 9 (PREVIOUS PAGE): THEORY CONNECTION MAP

GILLES CLÉMENT

Gilles Clément is a French landscape architect whose theoretical views about the third landscape have challenged the role of authorship in the design process. He considered himself first and foremost a gardener, but he was also a landscape architect, botanist, entomologist, and horticultural engineer. The theories centre around a hybridity between naturalism and technological civilization, influenced by a combination of human-made and ecological processes.²¹ He implores us to view the planet as a garden and us as ‘gardeners’, harnessing, utilizing and maintaining its biological diversity. With few areas untouched by humans and in times of climate uncertainty and unpredictability, his theories have the potential to inform spaces of the future.

This thesis draws inspiration from his reflections on the ‘Third Landscape’ as well as ‘The Planetary Garden’ to influence its philosophies surrounding site and design. Since his theories heavily prioritize patient, steady and continuous observation, the site will be viewed from five perspectives. The Ecologist, Fish, Oil Particle, Gardener and Mussel all have varying values, opinions, experiences and knowledge that allows them to observe, use, encompass and perceive the site differently. The observations and knowledge of the site are highlighted through narratives that weave together to form a cohesive story.

Clément described the Third Landscape as the land leftover by man to the evolution of nature. He viewed abandoned or overlooked spaces not as ‘brownfield sites’ or ‘waste ground’ in the conventional sense but rather as a ‘paradise of weeds’

²¹ T. Chang, “Third Landscape of Clément: Re-naturalization or Re-appropriation?.” Proceedings of the 22nd IPSAPA/ ISPALEM International Scientific Conference, (Aversa/Caserta Italy: University of Udine, 2018). 167

marked by unexpected assemblages of species and new aesthetic formations. They are intermediary and void spaces that cannot be defined as the first landscape of preservation nor the second landscape of cultivation.²² The name refers to the third estate and expresses a space with neither power nor submission to power.²³ The theories follow a relinquishment of control to earth’s processes, allowing plants to grow, seeds to blow, sediment to erode and water to flood.

For Clément, there are three types of spaces that can be classified as Third Landscapes. The first is the *délaissé* space that is characterized by having previous agricultural or industrial uses. This can include industrial sites, ruins, or abandoned buildings as well as brownfield sites. The second is the *réserve* spaces that have had limited human modification, either by chance or inaccessibility such as uncultivable land, mountain summits, swamps, and deserts. Lastly, *ensemble primaires* are spaces with a form of legal protection, which can encompass nature reserves and national parks.²⁴

His theories emphasize a concept of ‘re-wilding’, which is a conservation strategy that aims to restore natural processes and wilderness areas. In design it can be described as functional re-naturalization, meaning the abandonment of control and programming, leaving space to unpredictable anthropic activities with a level of uncertainty, both temporal and economic.²⁵ There is focus on time and movement as much as space. Allowing species to move and evolve with minimal intervention and control. The designer or ‘gardener’ chooses to move with the landscape, acting as a companion, and working in collaboration.²⁶ He challenges us to live with species,

²² Matthew Gandy, “Entropy By Design: Gilles Clément, Parc Henri Matisse and the Limits to Avant-garde Urbanism.” *International Journal of Urban and Regional Research*, (2012): 6.

²³ Jonathan Skinner, “Gardens of Resistance: Gilles Clément, New Poetics, and Future Landscapes.” *Qui Parle* 19, no. 2 (2011): 265.

²⁴ Gandy, “Entropy By Design,” 7.

²⁵ T. Chang, “Third Landscape of Clément: Re-naturalization or Re-appropriation?.” 176.

²⁶ Skinner, “Gardens of Resistance.” 263.

not to fear their unpredictable nature and to aid or guide them in their path. Everything from birds, bees, butterflies, wind, water, seeds, and people communicates and interacts with each other, lives together and influences one another.

With its current industrial uses, this thesis's site in the California Bight can be considered a space *délaissé*. Although the topside of the oil platforms are within use by humans, the substructure underneath the surface of the water is left unattended. They provide a vertical framework for coral and invertebrates to attach to, becoming overtaken by organisms, and surrounded by fauna to create a thriving marine ecosystem.

This philosophy allows designers to re-examine how we interpret overlooked spaces and our role as designers. The traditional perception that artificial structures and invasive vegetation must be transformed, revitalized or removed simply because it does not "belong", is beginning to be challenged by environmental assessments of optimization. To practice the theories of the Third Landscape, one must flow with, not against nature. Viewing landscape and the environment as a continuous process of fluid movement and a powerful flux of life.²⁷ It emphasizes observation and minimal interventions, imposing on natural processes as little as possible, placing the designer as tenders and guardians of the environment rather than as influencer.

His design philosophy does not condemn early colonizing plants or 'invasive species', reflecting that every species has a place in a larger network, and a purpose in the world. It points out that some species occupy niches in time rather than space.²⁸

I can acknowledge that there are some challenges with these reflections, as invasive

²⁷ Skinner, "Gardens of Resistance: Gilles Clément," 260.

²⁸ Skinner, "Gardens of Resistance." 265.

species are known to inhibit biodiversity, disrupt essential ecosystem functions, and reduce soil productivity. Although there are problems, rapidly colonizing species can also begin a process of regeneration and re-habitation, when tended and monitored. They can survive and thrive when others cannot, cleaning degraded soil and water, allowing others to flourish later in succession. It can be speculated that this is perhaps the intention behind the thought of species occupying places in time. The thesis practices this frame of thinking by not privileging certain beings over others. It attempts to prioritize a reciprocal relationship and a knowledge with the living and non-living, no matter their origin.

An emphasis will be placed on the concept of being tenders or stewards of the site. The platform's future function stresses the importance of time, unpredictability, uncontrollability and continuous maintenance, prioritizing evolution over immediate benefits of construction. It will follow the theory of the Third Seascape as placing the role of the designer as tenders of coral, of mussels, of water, of fish of particles. Human occupation of the site will work alongside the environment as collaborators and partners to progress the space overtime.

KINSHIP

"These words may come to life, recalling and revealing shared relations with our fellow Earthlings - our kinfolk - who come in all shapes and sizes from the bacterium swimming in your belly or lying on the tip of your tongue to the vibrant collective breath that sweeps across your face and into your lungs. Worth thinking about - and perhaps thanking about - are the shared threads between kinfolk, especially plantfolk, that make this breath exchange possible. Your life, my life, all our lives depend on the quality of relations between us - the air we breathe, the water we drink, the food we eat and the food we become - within an exuberant, life generating planetary tangle capable of nurturing intelligences that can spin webs and words." - Gavin Van Horn, Planet (2)

Inspiration is drawn from Zoe Todd, Anja Kanngieser and Donna Haraway and their work on kin studies as well as the book series *Kinship: Belonging in a World of Relations*, co-edited by Gavin Van Horn, Robin Wall Kimmerer, and John Hausdoerffer. It is a series of five books; *Planet, Place, Partners, Persons and Practice* with essays and poems from varying academics, authors, professionals and artists. Each book is connected to a scale, weaving threads between them to view everything in this world as a web of relations.

This thesis emphasizes kinship in its methods, thinking and process. It strives to practice the belief that kin are a group of beings connected to each other not by genetics, ancestry, genealogy or blood, but rather through shared commitments and relationships. Robin Wall Kimmerer views kin as a verb. Through this perception of the term, it is alive, moving and requiring action or intention. To practice 'kinning' is to give attention, listen, and notice the world at diverse scales. This will allow us to begin to refer to other beings as earthly relatives, building stronger reciprocal resilient relationships.²⁹

Donna Haraway describes kinship as a process where nothing acts alone, in a sense no species can be considered singular and are rather series of species-assemblages, that create networks that cross time and space.³⁰ Lands, waters and atmospheres and everything in them are connected complex forms that have a kinship with humans.³¹ Kinship is to understand, to know, to learn of reciprocal relationships with non-humans, and view them as our biotic and abiotic sym-poietic co-inhabitants,

²⁹ Robin Wall Kimmerer, "Epilogue - Attention, Curiosity, Play, Gratitude, Practices of Kinship." in *Practice: Kinship A Web of Relations*, edited by Gavin Van Horn, Robin Wall Kimmerer, and John Hausdoerffer. 127-147. Illinois: Center for Humans and Nature Press. 2021, 130.

³⁰ Donna Haraway, "Anthropocene, Capitalocene, Plantationocene, Chthulucene: Making Kin." *Environmental Humanities* 6, no. 1 (2015), 159.

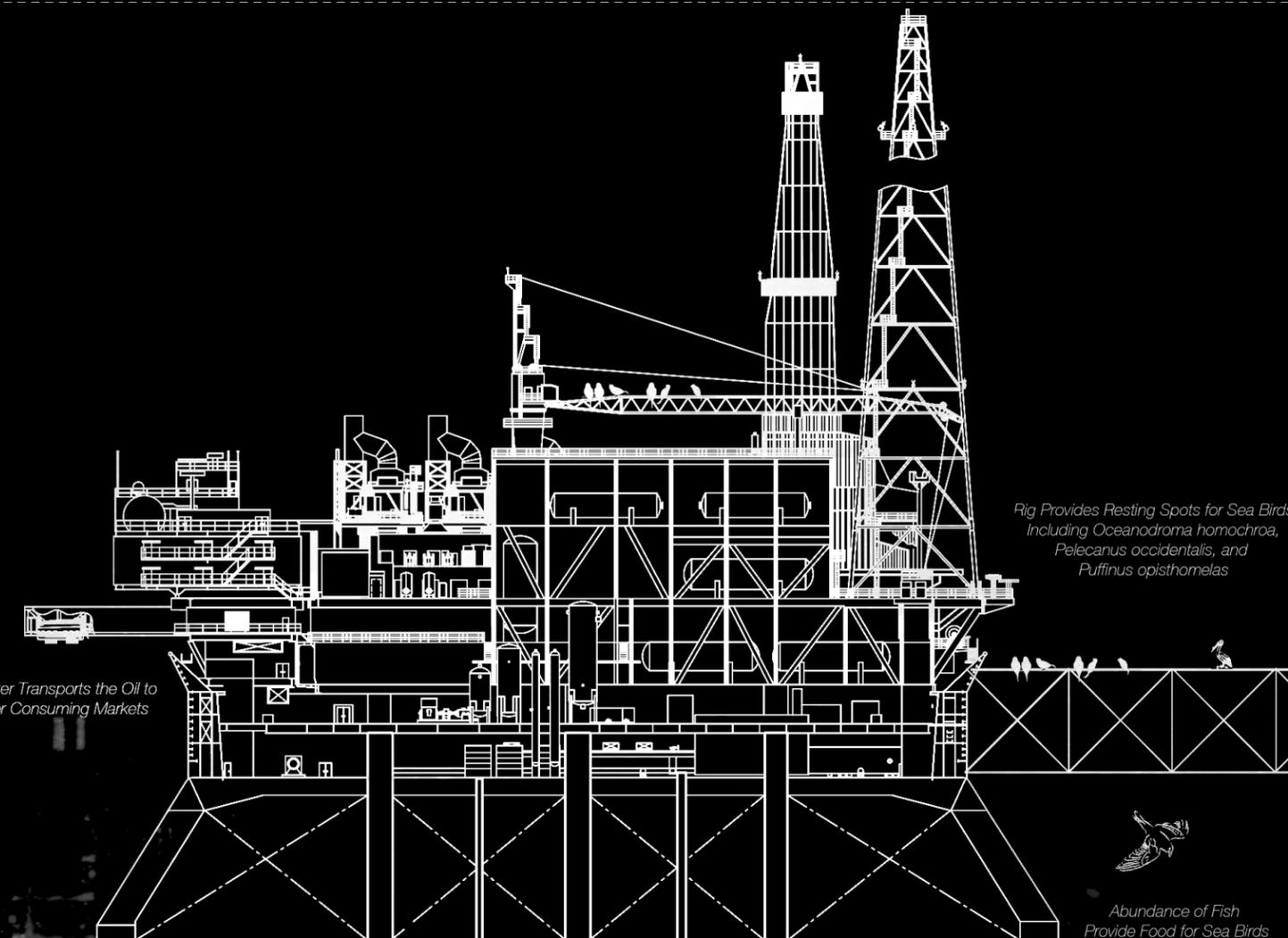
³¹ Anja Kanngieser and Zoe Todd, "From Environmental Case Study to Environmental Kin Study." *History and Theory* 59, no. 3 (2020). 387-389.



Helicopters Transport Cargo, Employees, and Parts as well as Conduct Salvaging Missions

PLATFORM ELLY

100m - Typical Oil Platform Height



Rig Provides Resting Spots for Sea Birds including *Oceanodroma homochroa*, *Pelecanus occidentalis*, and *Puffinus opisthomelas*

An Oil Tanker Transports the Oil to Refineries or Consuming Markets

Abundance of Fish Provide Food for Sea Birds

collaborators, and co-laborers.

In reference to deep time and from an evolutionary point-of-view, earthling's can be seen as kin, with the last common ancestor Luca, living 4 billion years ago.³² When committing to thinking in this way, it re-positions material extraction, environmental destruction and pollution as an act against instead of with our relations. To think, work and learn as place as kin, is to emphasize community in creating shared lives that nurture each other. It's a cycle of balance with feelings of gratitude, appreciation, responsibility, respect and exchange.

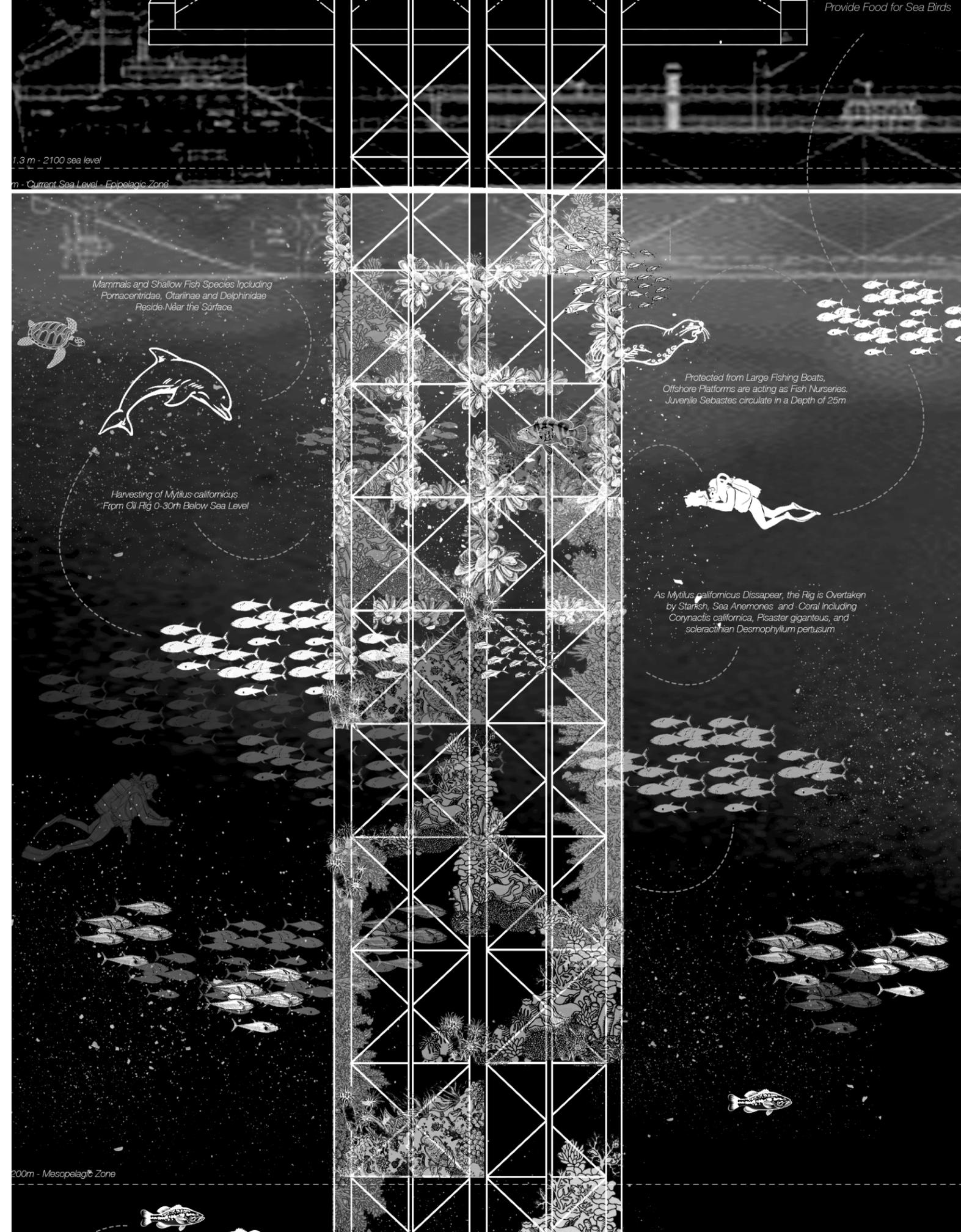
Through narrative representations, both visual and written, this thesis strives to practice kin studies by featuring the non-human species of a fish, mussel and oil particle as central characters. It positions their standing in the place, space and site as co-inhabitants, collaborators, and co-laborers. The stories will bring both the author and readers to give attention, listen and notice the environmental, political, and social complexities of a space. Furthermore, it will embrace examining the site from varying scales- looking at the California Bight as an ecosystem to a single oil platform, to an oil particle. It draws connections between them, weaving threads to create a network, system and future that invokes reciprocal relationships between beings.

DEEP

"Timefullness could transform our relationships with nature, our fellow humans, and ourselves.

Recognizing that our personal and cultural stories have always been embedded in larger, longer and still elapsing Earth stories might save us from environmental hubris. - Timefullness, Marcia Bjornerud (179)

³² Keith Cooper. "Looking for LUCA, the Last Universal Common Ancestor." *Astrobiology at NASA; Life in the Universe*, March 30, 2017.



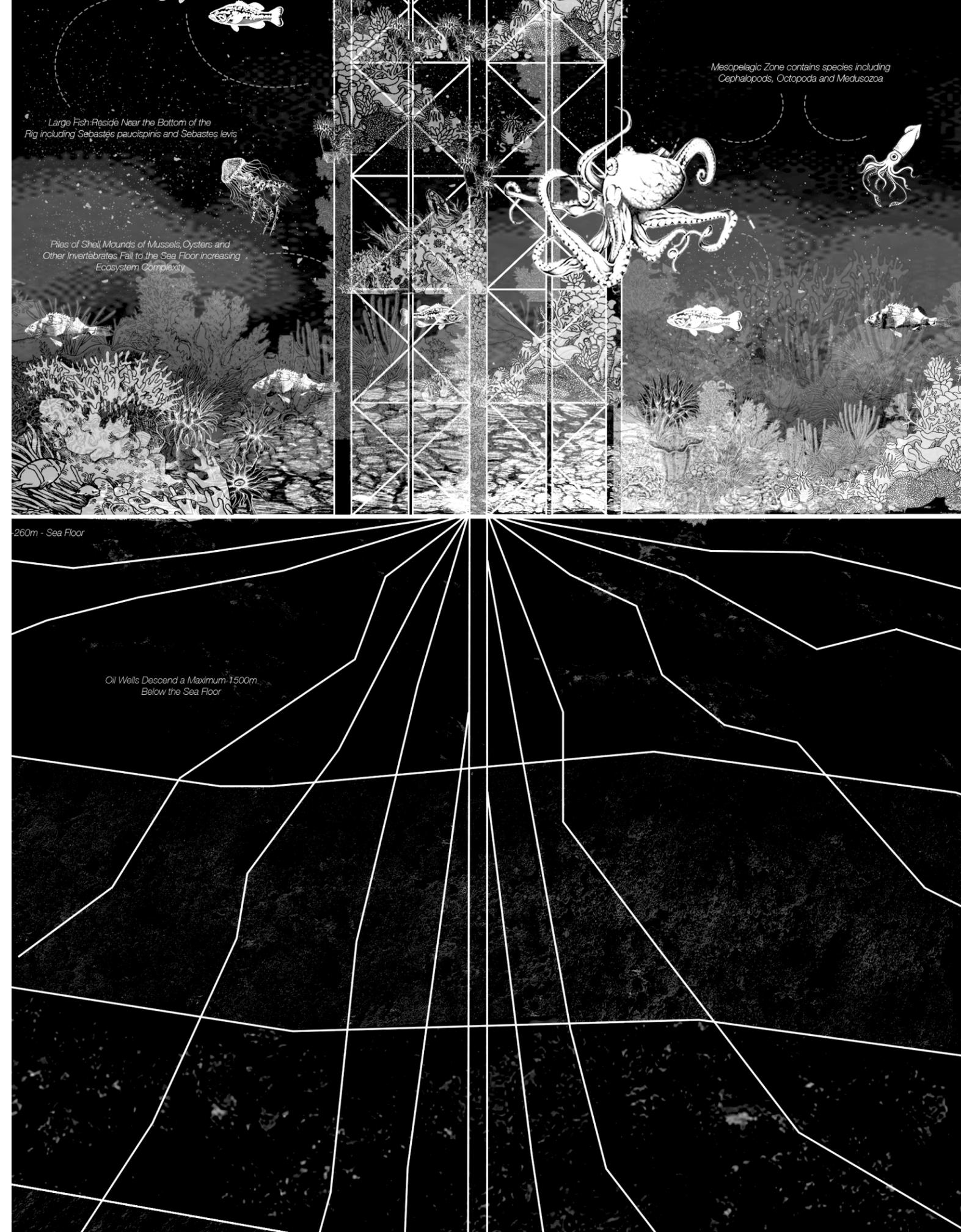
This thesis highlights the term deep in it's methods, thinking and process. By definition deep time refers to the time scale of geologic events, which is vastly, almost unimaginably greater than the time scale of human lives and human plans. Deep time can appear beyond comprehension, prompting questions billions of years in the past or billions of years in the future. It can animate the static, highlighting the slow processes of the ground in relation to the fast transformations of its destruction, exposing our vulnerability and culpability as a species. It allows us to ponder evolution which can lead to a new appreciation of the earth as well as a felt kinship with other beings and elements. We can think about how we have evolved from a bacterium that lived 4 billion years ago, a universal common ancestor that ties and unifies the life on earth.³³ We are all related through the past story of the earth.

Marcia Bjornerud's book *Timefulness: How Thinking Like a Geologist Can Help Save the World* explains the earth's deep past, highlighting its rhythms and processes to inspire a more sustainable future. She defines the term 'timefulness' as a poly-temporal outlook on the world that acknowledges how the earth is made by and of time.³⁴ With the current accelerating planetary changes, thinking in deep time is vital to change how we position ourselves within the earth.

This thesis emphasizes deep time and the concept of timefulness through it's exploration of site by highlighting an oil particle as a principle character. It maps it's progression through space and time to inform about earth systems and processes. By thinking across geological timescales, we can re-frame how we view the earth, including the beings and elements it sustains.

³³ Keith Cooper. "Looking for LUCA, the Last Universal Common Ancestor." *Astrobiology at NASA; Life in the Universe*, March 30, 2017.

³⁴ Marcia Bjornerud, *Timefulness: How Thinking Like a Geologist Can Help Save the World*. New Jersey: Princeton University Press, 2018.



To think, draw and write in deep time, this thesis expands upon the idea of deep maps. Deep maps are a process of probing, that combines archaeology and cartography. A form of vertical travel writing that weaves together elements of spaces histories, stories, memories, climates, sciences, and intuitions.³⁵ It blends human and geological history, combining social and cultural information with geographical, geological and scientific data. It emphasizes verticality, where the deeper it goes, the more layers are discovered and unraveled.

Drawings are described as projects rather than products, since it is open-ended and continues to evolve. The process creates a form of palimpsest, where information, events and data overlap and erases, being layered over each other to create ongoing development of a places identity. It prioritizes both real and imaginary networks, moving away from privileging certain types of knowledge and certain types of viewers.³⁶ It allows readers to immerse themselves or 'dive within', placing them into the world of a space, capturing its essence by navigating between times, scales, and methods of representation.

This thesis uses deep drawings and writings as an exploratory speculative process to prob, analyze, collect and represent the multiple layers and perspectives that shape the site in the California Bight. The deep drawings and writings tell stories in order to articulate information in a way that is understandable, relatable and influential to a variety of viewers and readers.

³⁵ Les Roberts, "Deep Mapping and Spatial Anthropology." *Humanities* 5, no. 5 (2016): 3.

³⁶ Shelly Fishkin, "Deep Maps: A Brief for Digital Palimpsest Mapping Projects." *Journal of Transnational American Studies* 3, no. 2.(2011) 4.

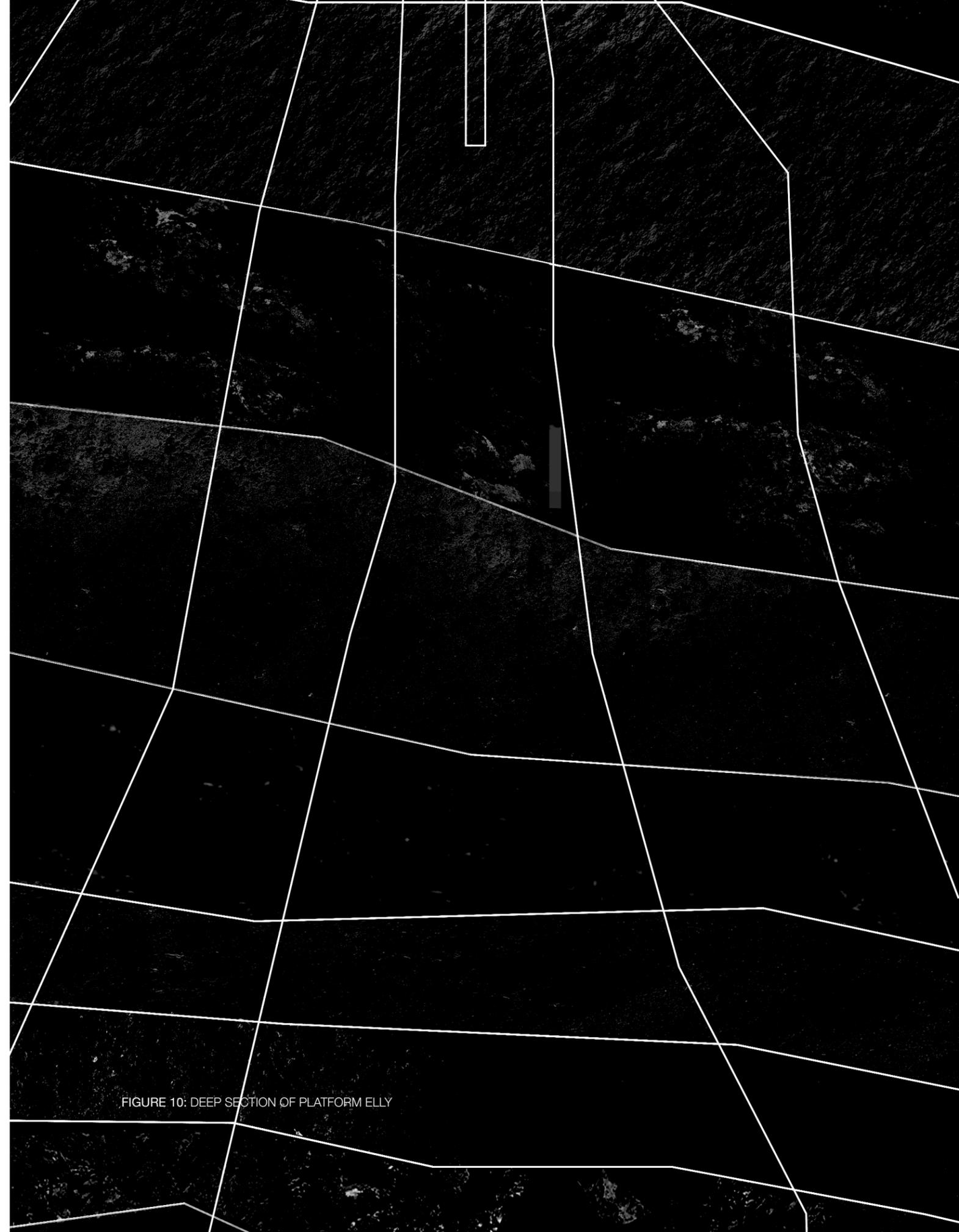


FIGURE 10: DEEP SECTION OF PLATFORM ELLY

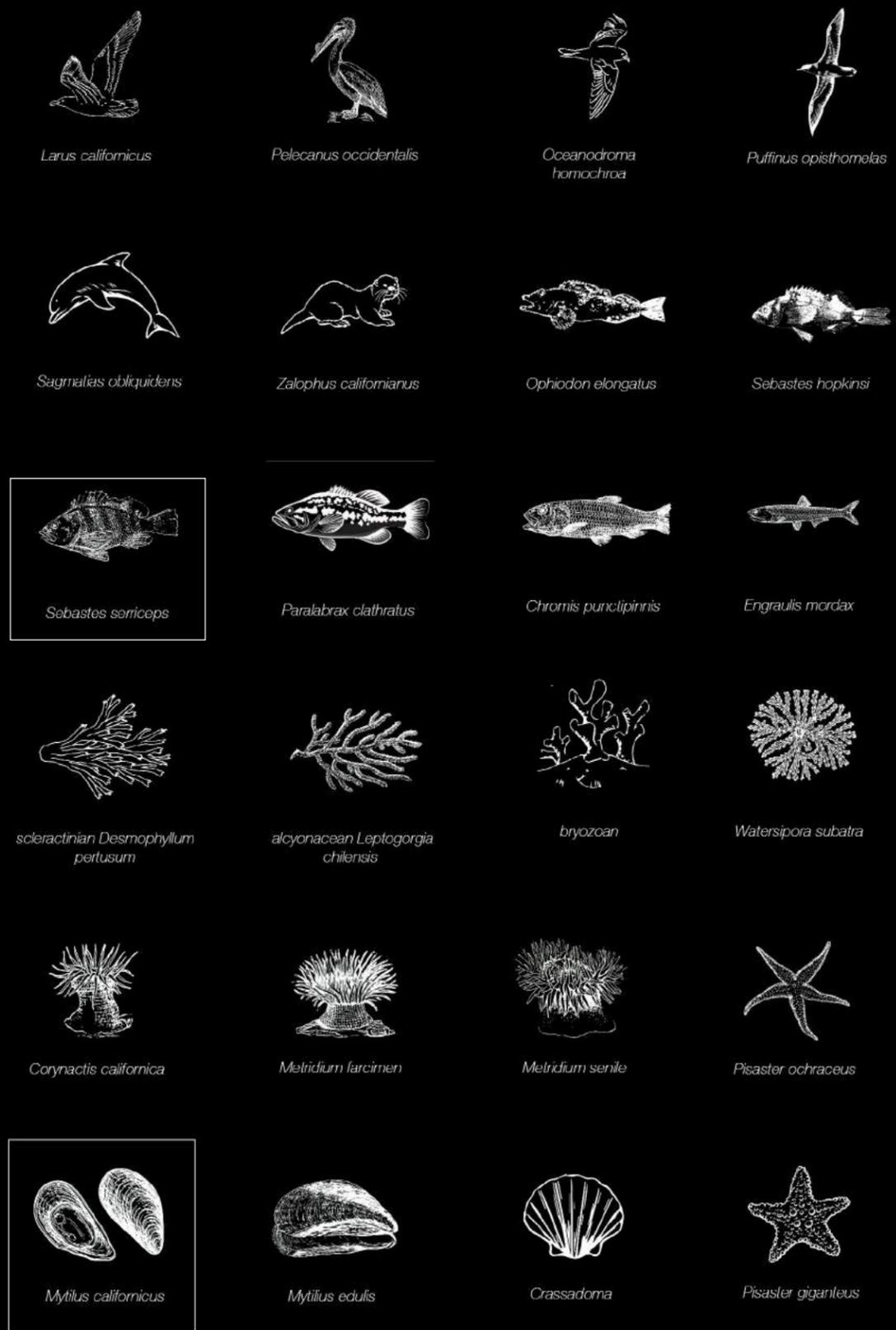


FIGURE 11: OIL PLATFORM SPECIES

PART 3: ECOLOGIST

"In nature nothing exists alone."

- Rachel Carson, Silent Spring

I grew up around the ocean, always swimming, snorkeling, surfing, playing, splashing and discovering. As soon as I was old enough to dive, I got my certification and have been entering the submerged world of the ocean every day since. Coveted diving locations in southern California are the oil rigs. A vertical jungle gym or should I say ocean obstacle course, that is every divers dream come true. The dives around these structures are considered to be advanced due to the currents strength and ability to rapidly change. Because of the unpredictability of conditions and the “bottomless” structure, considerable experience is needed. I’ve dived these rigs before and it requires adequate buoyancy control and a comfortability with performing free descents and ascents in the open ocean. In these waters it is critical to remain aware of depth, air consumption, and NDL or decompression obligations. Compasses are useless underneath these massive steel structures. Large surface signaling devices are a necessity.

As the boat pulls close to the huge structure, it disturbs the sea lions draped lazily across the moorings and illicit a series of crying protests. We slowly approach the entry point for our dive and I start to put on my last pieces of gear. The captain stops the boat and indicates for us to begin. No explanation or safety precautions are needed, this dive is only for the advanced. Six other strangers will be diving with me today, most are photographers and similarly to me are there to document the unusual underwater world around the platforms. We enter with coordinated precision and as I begin to descend below the surface of the water, the light starts to filter out, being blocked by the huge oil rig structure above. My nerves escalate. No matter how at home I feel below the ocean’s surface or how many hours I spend diving, there is an inherent feeling of anxiousness that accompanies entering a world where we as humans are the guests.

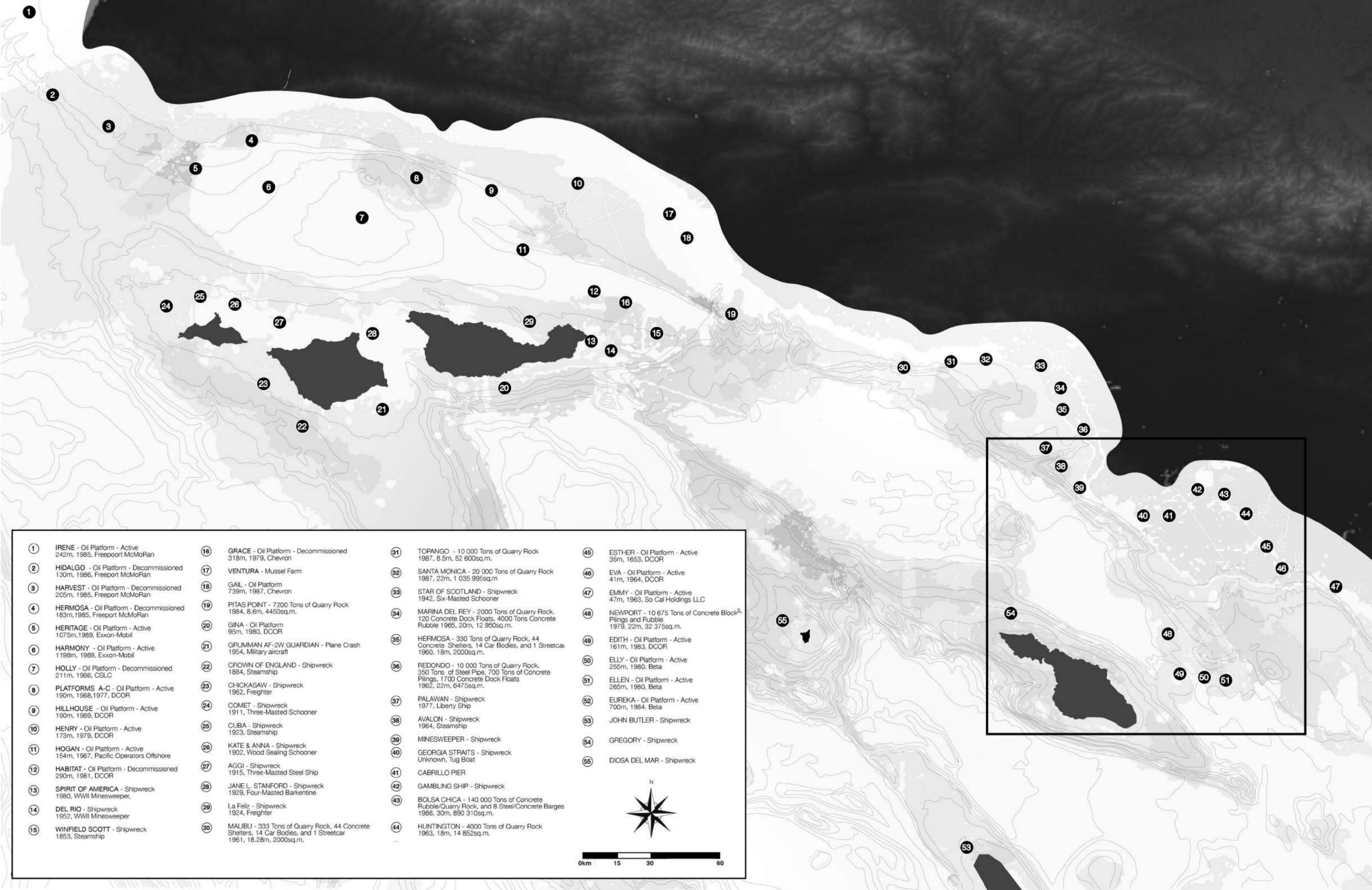
Currently I am a researcher at NOAA, attempting to document and develop foodchain analysis of these offshore hybrid reef systems. Of specific interest are the offshore oil platforms. Their level of productivity came as a shock to us. In 2014, we were approached to develop a research team to complete a study on the ecological benefits of oil platforms off the California coast. We found that they were among the most productive fish habitats anywhere in the world. Surprisingly, fish are even more abundant on platforms than on natural reefs nearby, likely because there tends to be less commercial fishing.³⁷ Fishing boats cannot get within close proximity to the oil platforms, therefore the structure acts as an oasis for the surrounding fish populations from certain anthropogenic forces. Unintentionally, these platforms have provided both food and habitat for fish in an area where these would otherwise be absent.

The platform foodwebs have not been well studied; however, we seek to change that. By studying the unintentional habitat artificial coral reefs create, we can gain knowledge to begin to develop intentional infrastructure that can benefit marine ecosystems. Therefore, I am here collecting data and experience in order to fully understand the ecological benefits and unique ecosystems of the offshore oil platforms.

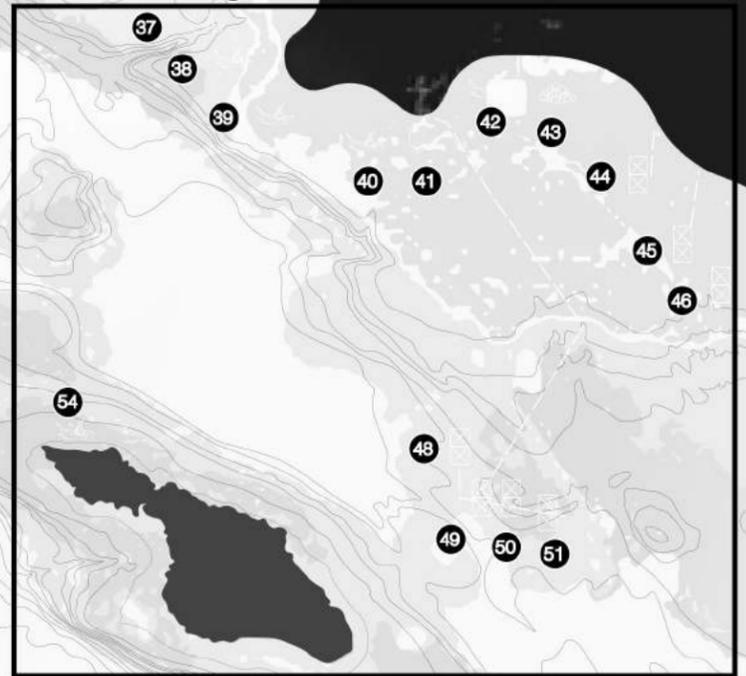
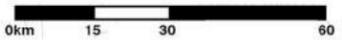
Surface noises begin to be muffled and replaced by the eerie ambiance of the creaking of the steel structure. It takes a minute for my eyes to adjust to the dark water, before a world that appears alien reveals itself. We are lucky, visibility is good today.

As I descend, I start to see the steel become covered by a thick biotic layer. In some

³⁷ Katharine Gammon, “Oil Rigs May Get Second Lives as Fish Habitat.” *Inside Science*. June 4, 2019.



- | | | | | | |
|---|---|--|--|--|--|
| ① IRENE - Oil Platform - Active
242m, 1985, Freeport McMoRan | ⑩ HENRY - Oil Platform - Active
173m, 1979, DCOR | ⑲ PITAS POINT - 7200 Tons of Quarry Rock
1984, 8.6m, 4450sq.m. | ⑳ GINA - Oil Platform
95m, 1980, DCOR | ⑳ TOPANGO - 10 000 Tons of Quarry Rock
1987, 8.5m, 52 600sq.m. | ④⑤ ESTHER - Oil Platform - Active
35m, 1653, DCOR |
| ② HIDALGO - Oil Platform - Decommissioned
130m, 1986, Freeport McMoRan | ⑪ HOGAN - Oil Platform - Active
154m, 1967, Pacific Operators Offshore | ㉑ GRUMMAN AF-2W GUARDIAN - Plane Crash
1954, Military aircraft | ㉒ CROWN OF ENGLAND - Shipwreck
1884, Steamship | ㉑ SANTA MONICA - 20 000 Tons of Quarry Rock
1987, 22m, 1 035 995sq.m. | ④⑥ EVA - Oil Platform - Active
41m, 1964, DCOR |
| ③ HARVEST - Oil Platform - Decommissioned
205m, 1985, Freeport McMoRan | ⑫ HABITAT - Oil Platform - Decommissioned
290m, 1981, DCOR | ㉓ CHICKASAW - Shipwreck
1962, Freighter | ㉔ COMET - Shipwreck
1911, Three-Masted Schooner | ㉒ STAR OF SCOTLAND - Shipwreck
1942, Six-Masted Schooner | ④⑦ EMMY - Oil Platform - Active
47m, 1963, So Cal Holdings LLC |
| ④ HERMOSA - Oil Platform - Decommissioned
183m, 1985, Freeport McMoRan | ⑬ SPIRIT OF AMERICA - Shipwreck
1980, WWII Minesweeper, | ㉕ CUBA - Shipwreck
1923, Steamship | ㉕ CUBA - Shipwreck
1923, Steamship | ㉓ MARINA DEL REY - 2000 Tons of Quarry Rock,
120 Concrete Dock Floats, 4000 Tons Concrete
Rubble 1965, 20m, 12 950sq.m. | ④⑧ NEWPORT - 10 675 Tons of Concrete Block,
Pillings and Rubble
1979, 22m, 32 375sq.m. |
| ⑤ HERITAGE - Oil Platform - Active
1075m, 1989, Exxon-Mobil | ⑭ DEL RIO - Shipwreck
1952, WWII Minesweeper | ㉖ KATE & ANNA - Shipwreck
1902, Wood Sealing Schooner | ㉖ KATE & ANNA - Shipwreck
1902, Wood Sealing Schooner | ㉔ HERMOSA - 330 Tons of Quarry Rock, 44
Concrete Shelters, 14 Car Bodies, and 1 Streetcar
1960, 18m, 2000sq.m. | ④⑨ EDITH - Oil Platform - Active
161m, 1983, DCOR |
| ⑥ HARMONY - Oil Platform - Active
1198m, 1989, Exxon-Mobil | ⑮ WINFIELD SCOTT - Shipwreck
1853, Steamship | ㉗ AGGI - Shipwreck
1915, Three-Masted Steel Ship | ㉗ AGGI - Shipwreck
1915, Three-Masted Steel Ship | ㉔ REDONDO - 10 000 Tons of Quarry Rock,
350 Tons of Steel Pipe, 700 Tons of Concrete
Pillings, 1700 Concrete Dock Floats
1962, 22m, 6475sq.m. | ⑤① ELLY - Oil Platform - Active
255m, 1980, Beta |
| ⑦ HOLLY - Oil Platform - Decommissioned
211m, 1966, CSLC | | ㉘ JANE L. STANFORD - Shipwreck
1929, Four-Masted Barkentine | ㉘ JANE L. STANFORD - Shipwreck
1929, Four-Masted Barkentine | ㉕ PALAWAN - Shipwreck
1977, Liberty Ship | ⑤② EUREKA - Oil Platform - Active
700m, 1984, Beta |
| ⑧ PLATFORMS A-C - Oil Platform - Active
190m, 1968, 1977, DCOR | | ㉙ La Feliz - Shipwreck
1924, Freighter | ㉙ La Feliz - Shipwreck
1924, Freighter | ㉕ AVALON - Shipwreck
1964, Steamship | ⑤③ JOHN BUTLER - Shipwreck |
| ⑨ HILLHOUSE - Oil Platform - Active
190m, 1969, DCOR | | ㉚ MALIBU - 333 Tons of Quarry Rock, 44 Concrete
Shelters, 14 Car Bodies, and 1 Streetcar
1961, 18.28m, 2000sq.m. | ㉚ MALIBU - 333 Tons of Quarry Rock, 44 Concrete
Shelters, 14 Car Bodies, and 1 Streetcar
1961, 18.28m, 2000sq.m. | ㉕ MINESWEEPER - Shipwreck | ⑤④ GREGORY - Shipwreck |
| | | | | ㉕ GEORGIA STRAITS - Shipwreck
Unknown, Tug Boat | ⑤⑤ DIOSA DEL MAR - Shipwreck |
| | | | | ㉕ CABRILLO PIER | |
| | | | | ㉕ GAMBLING SHIP - Shipwreck | |
| | | | | ㉕ BOLSA CHICA - 140 000 Tons of Concrete
Rubble/Quarry Rock, and 8 Steel/Concrete Barges
1986, 30m, 890 310sq.m. | |
| | | | | ㉕ HUNTINGTON - 4000 Tons of Quarry Rock
1963, 18m, 14 852sq.m. | |



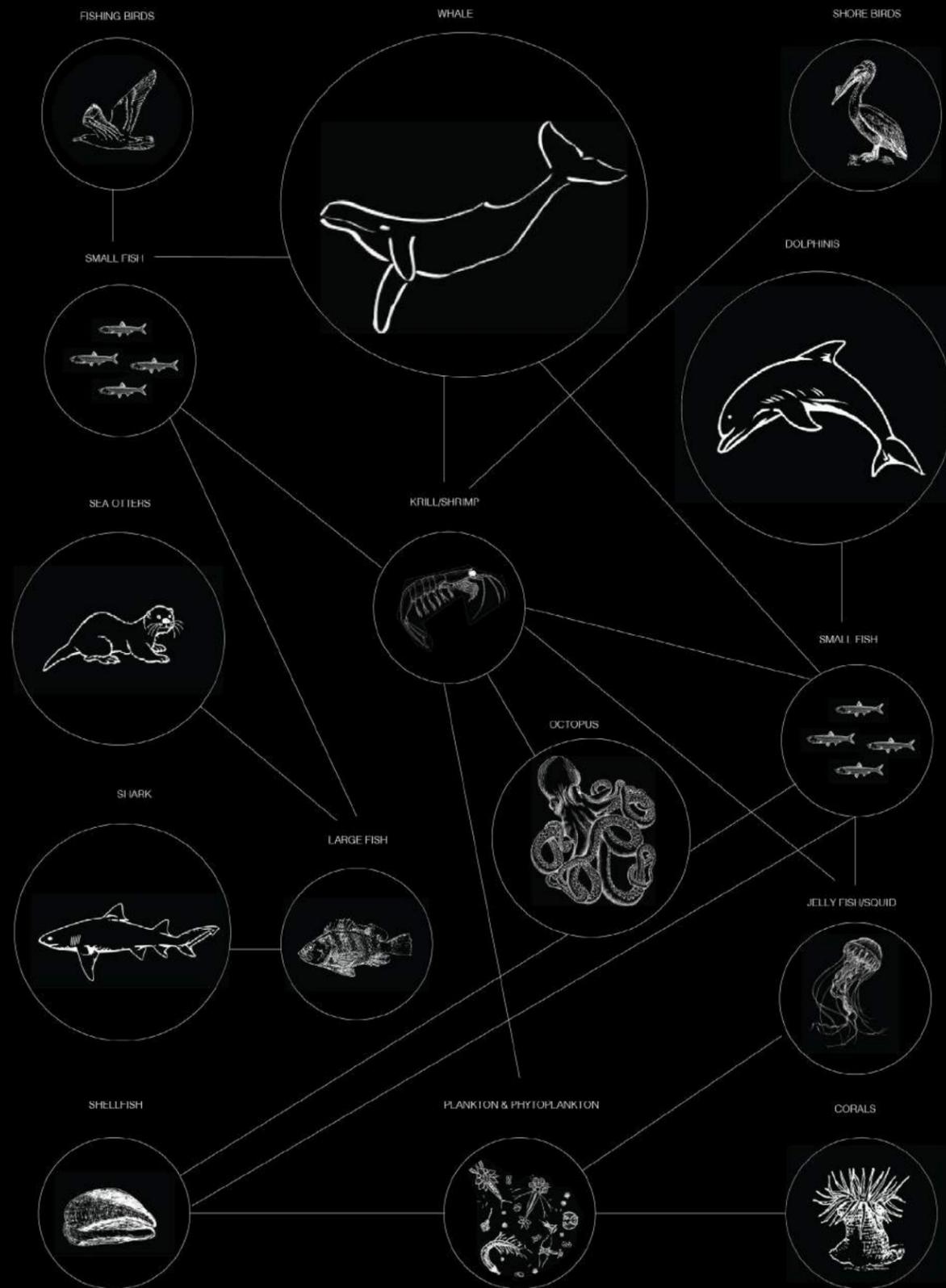


FIGURE 13: OIL PLATFORM NUTRIENT WEB

instances it can reach over 0.5m.³⁸ All that life squeezed onto the steel beams makes the structure slower to rust, adding to its longevity.

I'm less than 12m deep, and the girders are encrusted with glossy black mussels. In the 90's I used to work for an ecological organization that harvested the mussels for maintenance. I pluck a few mussels from the surface of the steel for a fellow colleague at NOAA. They run a mussel watch program that uses mussels as bio-indicators for water toxin levels.

As I continue my dive, I see that the open ocean is filled with glowing pelagic invertebrates including salp chains, graceful sea butterflies, and pulsing comb jellies. The structure includes habitats for both settlement and growth. At depths of 15m - 25m, pink, lavender and peach-tinted corynactis occupy the jackets with bright yellow sponges, purple urchins, and ochre sea stars. It's labyrinth, a maze of massive beams, pillars and pipes made of steel and overtaken by nature.

At this depth, I start to see an abundance of fish species. Offshore platforms maintain highly diverse communities of fish and invertebrates, with the fish community dominated by rockfish species. Smaller fish appear, wedged between the corals and sea anenomes. In addition I see greenlings (*Hexagrammidae*), damselfishes (*Pomacentridae*), seaperches (*Embiotocidae*), and several others.

As I continue to descend, the temperature begins to drop, becoming colder and darker. I'm happy I wore my additional heated vest on top of my suit. The life on the beams becomes even more abundant with no steel left exposed. Small juvenile

³⁸ Donna M. Schroeder and Milton S. Love, "Ecological and Political Issues Surrounding Decommissioning of Offshore Oil Facilities in the Southern California Bight." *Ocean & Coastal Management* 47, no. 1-2 (May 2004): 27.

fishes, transition into larger predator species and there are layer upon layers of sponges, scallops and brittle stars encrusting the platform jackets. I see a treefish nestled between the sponges with just its head peaking out, waiting in anticipation for a smaller fish to swim by. Sadness flows through me as I notice their fins eroding and an abundance of skin lesions on their body. No doubt these are impacts from the oil spill that occurred not too long ago. I snap a photograph and continue on in my descent.

It occurs to me the contradictory and ironic nature of the environment that I am in. A structure that has been used to exploit resources from the earth, and has had oil spills resulting in ecosystem degradation and loss of marine life, is creating this world like none other. As an ecologist, I've documented the effects of the recent 2021 Platform Elly oil spill. I've researched as well as volunteered to aid clean up efforts, seeing first hand the impact that oil has on the surrounding wildlife. Viewing the structure in this light provides an alternative perspective that is awe-inspiring. Oil platforms in addition to shipwrecks are full of contradictions and new beginnings. Events that destroyed human and non-human life can find new beginnings within these structures. The species colonize around the sunken boats and steel beams, spreading new ecological growth.

I've dived an abundance of artificial reefs in the California Bight (Figure 12). It's the verticality that is so fascinating to me. Most dives hold interest in the horizontal plane, where we stick close to the ocean floor, weaving through the fish, corals, and rocks. Traditionally coral reefs are limited to the ocean floor, but the steel jackets of the oil platform allow the invertebrates to ascend to varying depths, creating unique layers of habitat.

My timer beeps, indicating that its time to start my ascent. It's not safe to reach the bottom of the structure, but eventually further research will need to be conducted to fully examine this particular area. As the fouling species die, they are dislodged, perhaps by cleaning, storms, predation, or other causes, and their remains fall to the seafloor. This rain of organic material joins rock cuttings and drilling muds produced during operations. We found that the heights of these shell mounds vary and may be 7m or more above the seafloor, and cover over 6 km². The size depends upon the age of platform, seafloor depth, and bio-geographic area.³⁹ Cryptic fishes, crabs and other creatures occupy the empty shells and crevices both on the jacket structure and in the shell mound below.⁴⁰

I've dedicated my life to the ocean. As a ecologist and diver, I've had many opportunities to see and document the effects that climate change has had on the ocean. I've spent time producing videos, short documentaries and content to inform and educate people about what is unseen below the surface of the water. I'll post some of the content I collect today on my social media in attempt to raise awareness for the ocean through imagery. Most of the population do not engage with the ocean and water everyday, as I do. I've learned that people care about only what they can see and they tend to care even more if it is beautiful.

White coral are eerily beautiful. The large seascapes of dead organisms that cover the ocean floor for many kilometres. These places are silent with no movement - it's haunting to be in. A stark contrast to what an ocean view should be. Through my imagery I've attempted to raise awareness surrounding ocean pollution, and acidification and their effects on wildlife. CO₂ emissions are absorbed by the ocean

³⁹ Donna M Schroeder, "Ecological and Political Issues Surrounding Decommissioning of Offshore Oil Facilities in the Southern California Bight." *Ocean & Coastal Management* 47, no. 1 (2004), 24.

⁴⁰ Brock B. Bernstein. "Evaluating Alternatives for Decommissioning California's Offshore Oil and Gas Platforms: A Technical Analysis to Inform State Policy." *California Ocean Science Trust*. (2015), 84.

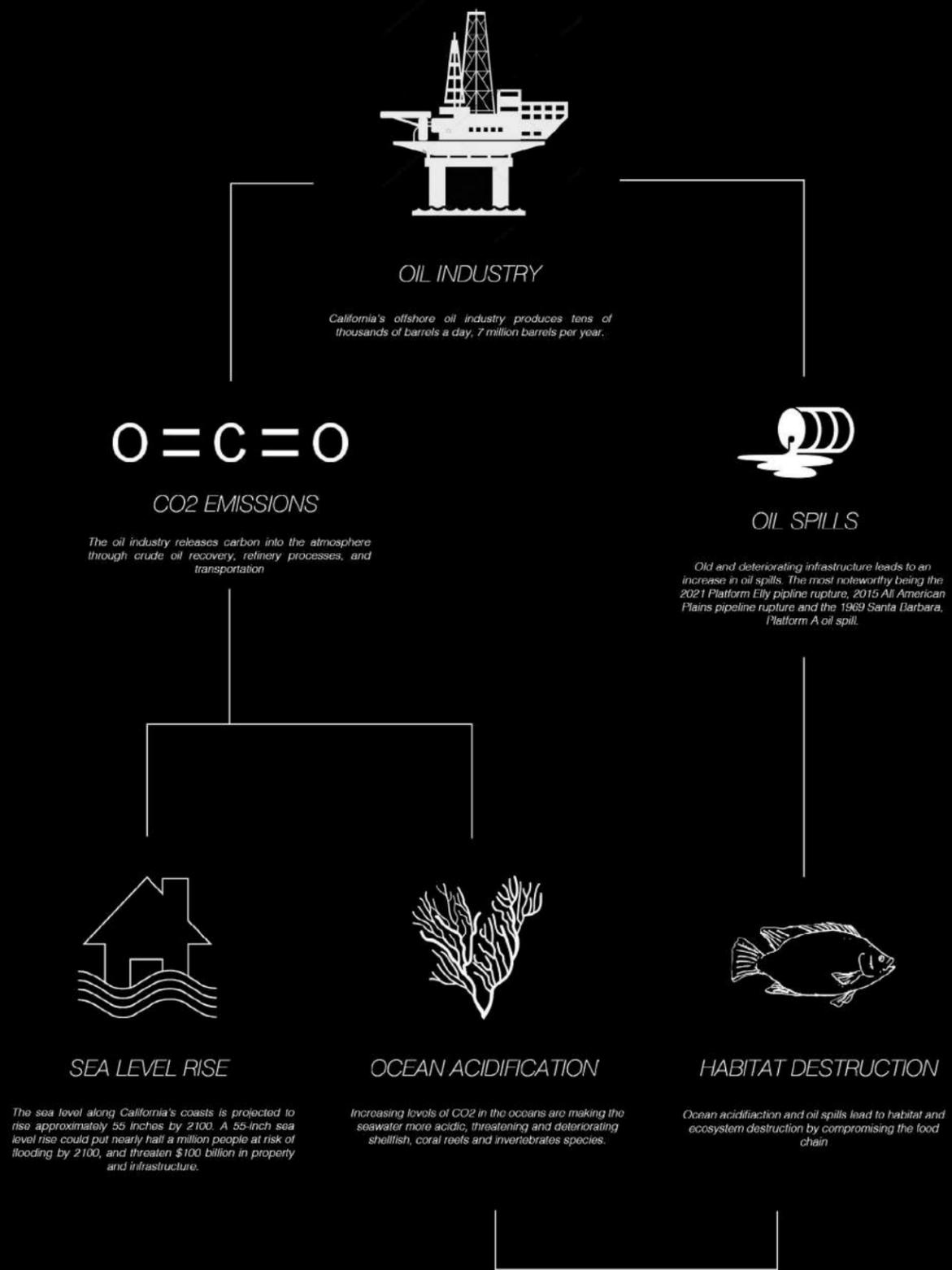


FIGURE 14: OFFSHORE OIL ENVIRONMENTAL IMPACTS

leading to a warming water temperatures. This slows the rate of climate warming, but lowers the sea's ph overtime leading to ocean acidification. Approximately a third of the CO₂ that has been emitted has dissolved into seawater and this process is continuing through anthropogenic activities.⁴¹ From 1900 to 2016, California's coastal oceans have warmed by 1.26 °F, ⁴² which has contributed to the deterioration of surrounding coral reefs, negatively affecting marine habitats and ecosystems. Because of the unique combination of upwelling currents and abundance of anthropogenic processes, California waters are already experiencing above average pH levels.⁴³

It's interesting to me - how the oil industry creates CO₂ emissions through crude oil recovery, refinery processes and transportation, which then leads to ocean acidification. This deteriorates and degrades shellfish, coral reef and invertebrate populations, compromising aquatic ecosystems. At the same time the oil platform structure is aiding shellfish, coral reef and invertebrate populations by creating a surface for these fouling communities to adhere to. It's both leading to the destruction and aiding in the development of a new hybrid ocean ecosystem (Figure 14).

I reach the surface of the water and clamber awkwardly onto the boat. As I begin the long process of pulling off my diving equipment, I think to myself of all the possibilities and opportunities the structure creates. Glancing at the steel giant from the surface, you would never know the hidden world of life that lies beneath.

Later on in the week, I sit at a favorite restaurant with my family. I glance down over at others plates and wonder what it contains? Most people would say fish and chips,

⁴¹ Brian Gaylord et al. *California Mussels as Bio-Indicators of Ocean Acidification, A Report for: California's Fourth Climate Change Assessment.* (California: California Natural Resrouce Agency, 2018)

⁴² "California's Changing Climate 2018" *California's Fourth Climate Change Assessment,* (California Natural Resources Agency and California Energy Commission, Los Angeles, 2018), 15.

⁴³ Brian Gaylord et al. *California Mussels as Bio-Indicators of Ocean Acidification, A Report for: California's Fourth Climate Change Assessment.* (California: California Natural Resrouce Agency, 2018)

but I see phosphorous and nitrogen, maybe even microplastics or oil particles. In their life, these locally sourced fish were exposed to runoff pollution, as well as plastics that have been broken down by the oceans currents (Figure 15). They sucked them in through their gills or consumed them through other organisms. The fish might even contain oil particles having been impacted by the spill in October 2021.

When we impact the earth we have to remember the circularity of all beings on this planet. Some effects are visible, while others are not. Our health, our life is tied to this planet and those within it. Our stories are woven together in a web of relations.

PART 4: FISH

(Sebastes serriceps)

"The fish has been around, think about it, way before the dinosaurs, way before the neanderthals, way before our time. The fish is still around. I wonder what scientific formula the fish has discovered, we should ask the fish, they've survived." - Zoe Todd

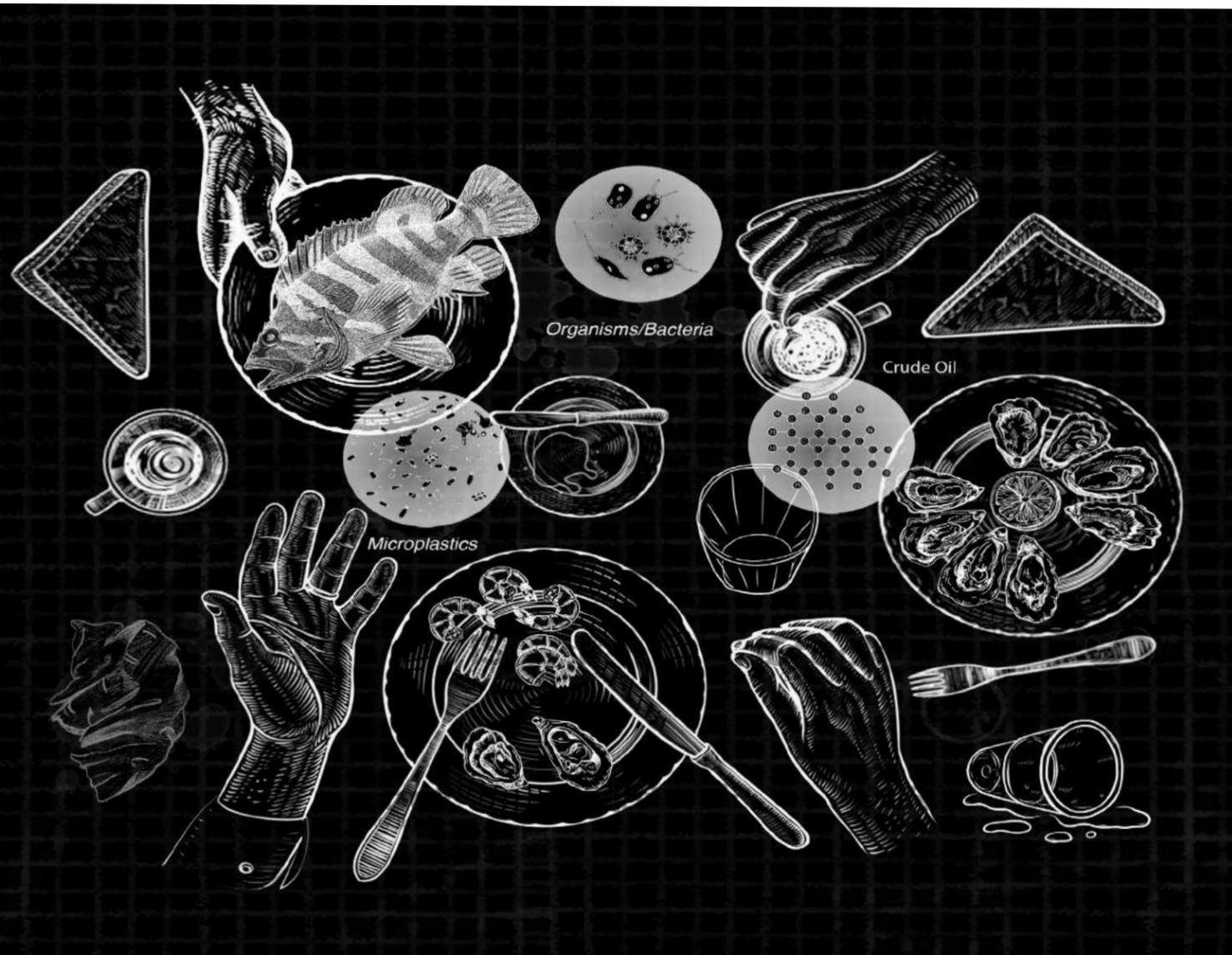


FIGURE 15 (PREVIOUS PAGE): DINNER TABLE

FIGURE 16 (NEXT PAGE): THROUGH THE LENS OF A FISH



My head pokes through between the sponges that are growing on the steel jackets surrounding me. I'm undetectable, perfectly camouflaged and waiting in anticipation for some smaller fish to swim by. Patience is my virtue, where I only leave my shelter for the best opportunities that arise. I fought hard for this prime area, beating out fellow black-and yellow rockfishes. I've labeled it my spot since I remember being successful here in the past, I consistently return to it when I can. Although I've spent time in a variety of other habitats including kelp forests, underwater caves and rocky areas, this has to be my favorite spot.

My gaze zooms in on the amount of life that envelopes the structure surrounding me. The high relief surfaces provided by the abundance of corals, starfish, invertebrates and sea anemones, creating crevices and cavities that produce ample opportunities to hide from surrounding prey and predators. It's an ideal habitat.

I'm careful, constantly scanning for sharks, dolphins, seals and anything else that can be perceived as a threat. I remember a narrow escape that I once had from a seal in this area. They like to hang out here, constantly swimming and twirling, playing and hunting. Although there are ocean predators in the area, I haven't seen any hooks or nets in these waters. It is part of the reason I return here, I feel safer than elsewhere, surrounded by my fellow ocean kin.

Overtime, I've noticed less of my species. Although, I live and hunt alone, it's unnerving to me the decline in populations. I'm aware that there are more of us here in these waters than in other places. The competition for space is fierce, since food is so abundant. We all gravitate here, to this unique space, a vertical oasis in an ocean desert.



FIGURE 17: OIL IMPACT ON FISH

My gaze zero's in on a cryptic fish that is inhabiting the space between mussel shells on the jacket structure. Similar to me it is waiting to feed on a school of small fish that we know will eventually swim by. If I succeed to obtain one, it would keep me sated and satisfied for a while.

I recognize, mussel larvae sticking to me, becoming embedded in my gills. It's unavoidable as they surround me on the platform structure. They release their larvae onto us, and we carry them until the mussels can survive and attach to surfaces on their own.⁴⁴ I don't mind, since I largely do not notice they are there and I acknowledge the benefits that they provide for me in my habitat.

In a moment, chaos seems to erupt. Something hovers in layers, suspended in mid water. It spans in all directions, flowing fast. Most of it floats upwards, but some settles on corals, anemones and on the sea floor. It clings to everything it touches. Every rock and grain of sand, every organism, every plant. Large and small, nothing can escape it's grasp. Although my vision cannot make out the details, I can smell it. It's different from anything I've encountered and I'm immediately weary of the substance, swimming away. Others are attracted to it, thinking it could potentially be food. I see them, my kin, belly-up in brown sludge, slowing flowing to the surface, their breathing having been inhibited by the foreign substance. I stay away from them, thinking their fate will become mine if I stray too close.

Even if I wanted to assist, I can't. I can't control the substance or help others who have become immersed in it. My self preservation has become my priority. My instinct for survival has driven me to flee.

⁴⁴ Aanila Kishwar Tarannum, "Discovering the Hidden World of Freshwater Mussels with Immersive Technology." Phys.Org, December, 26 2021.

I don't remain to watch the rest of the impact of the unknown substance. I don't remain to watch the dolphins, my predator species, swim unaware into the leaking liquid, becoming enclosed and coated in the sticky particles. It's toxicity seeps into their bodies, damaging their brains and vital organs. I don't remain to see the sea otters refuse to leave their home. Their fur becoming slicked back by the substance, inhibiting their ability to move, to keep warm and to breath. I don't remain to view the sea turtles mistaking the particles for food, ingesting it's contents and poisoning themselves in the processes.

This area was perceived as a sanctuary, a nursery for breeding and laying eggs. There was an abundance of juvenile fish, since it was a perfect spawning ground for our larvae. The liquid substance that traveled through the water effected those most vulnerable of our population. I saw juvenile fish and larvae become lethally effected, immediately departing from this world.

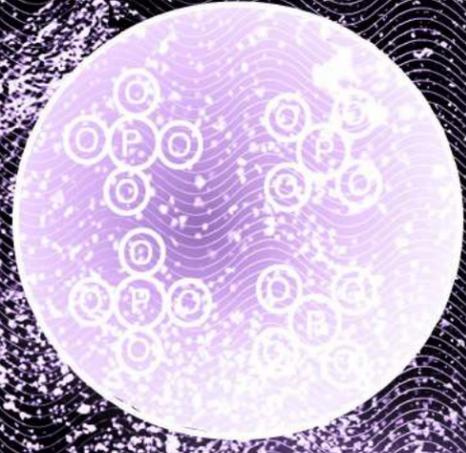
I return long after the substance is gone, there is still a sense of sadness in the water. Although we have largely recovered from the event, some things have fundamentally changed. With our larvae effected, there are fewer of our population in the surrounding waters.

My heart is strained, contracting less, beating in an uncoordinated rhythm that feels odd. Something is not right, it's starting to become difficult to breathe and my lungs as well as my heart feel as though they are filled with fluid that cannot be dispelled.⁴⁵

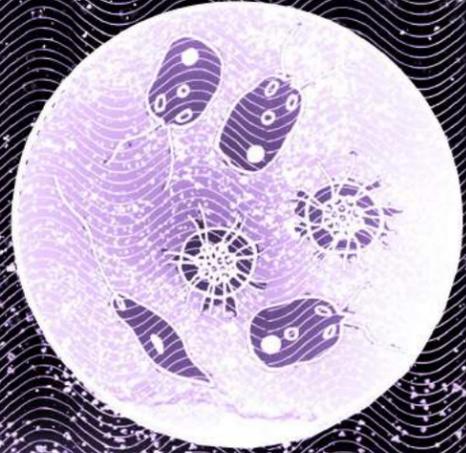
Something has changed overtime and my organs are slowly shutting down. Skin

⁴⁵ John Incardona et al. "Oil Spills and Fish Health: Exposing the Heart of the Matter." *Journal of Exposure Science & Environmental Epidemiology* 21, no. 1 (2010): 3

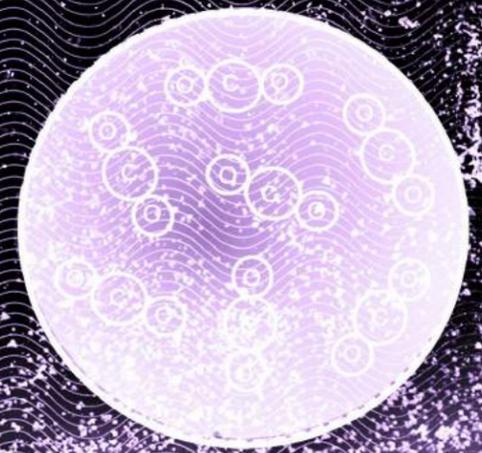
Phosphate



Platonic Organisms



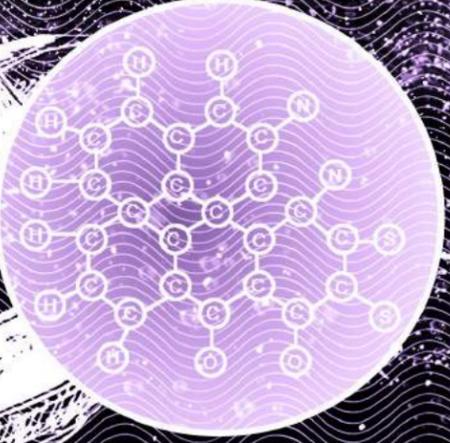
CO2



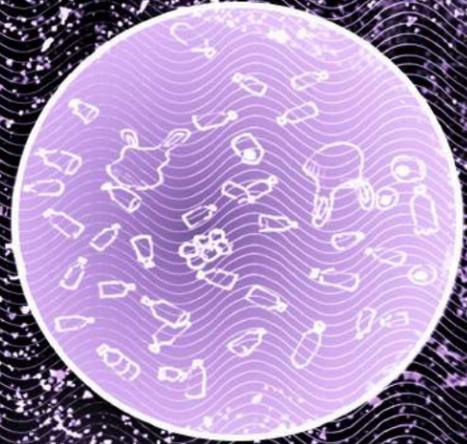
Mussel



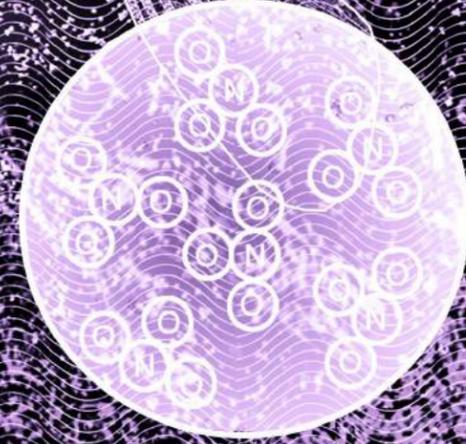
Crude Oil



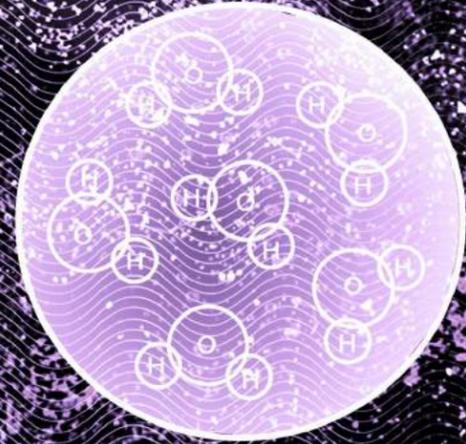
Microplastic



Nitrogen



H2O

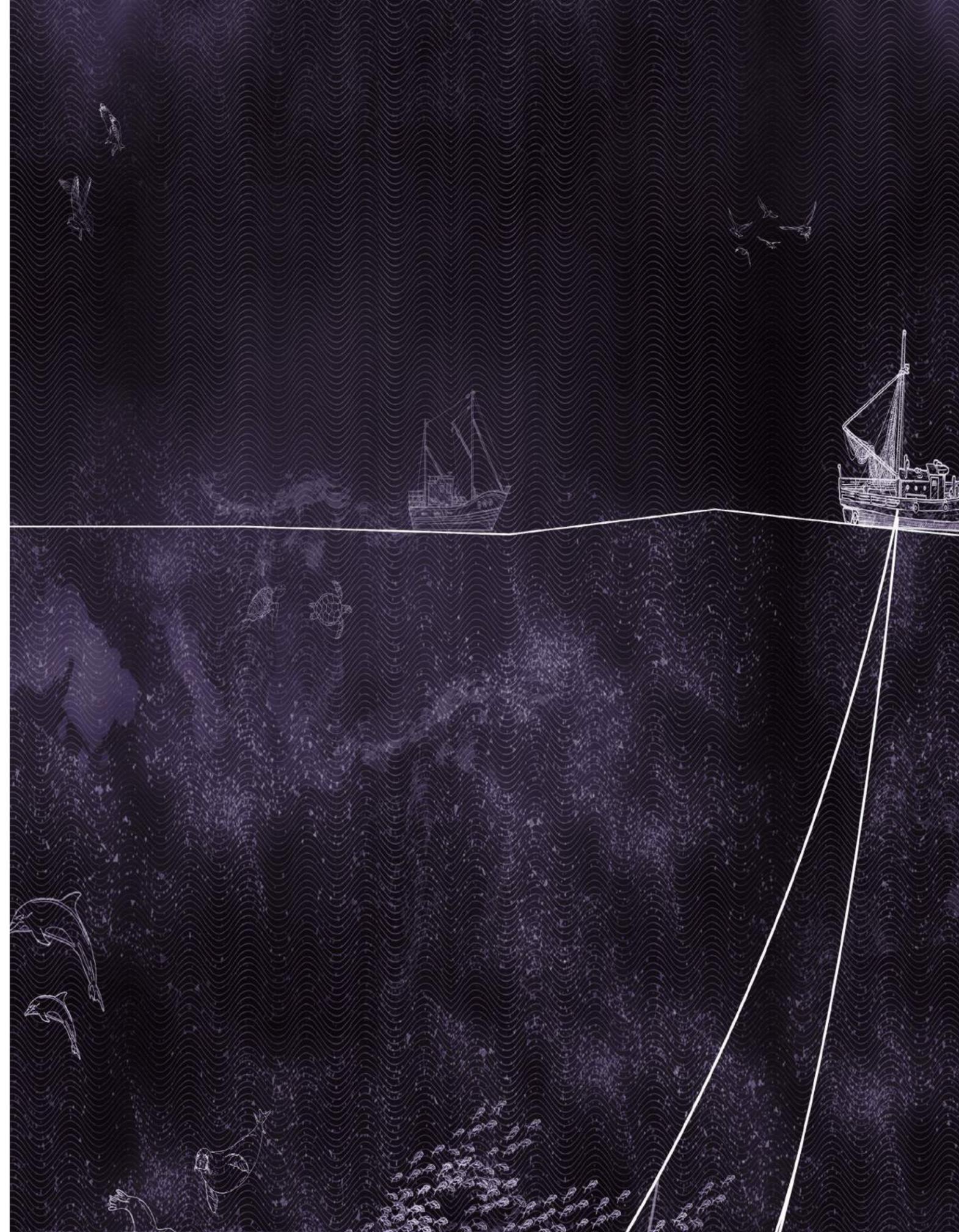


lesions are becoming abundant on my body and my fins are beginning to erode. My swimming patterns seem slower and I am weak. I was stronger, faster, better. Now I am exhausted, tired and slow, my motivation deteriorating along with my energy. (Figure 17).

The contrast in the surrounding water changes for a moment and when my vision clears I see something unusual swimming oddly towards me. I focus in on their fins, there are two of them located at the end of their body instead of towards the middle. Something clicks and I retreat quickly into my shelter, nervous and wary of the unknown entity in front of me. Is it a predator? I can never relax, constantly worrying, and stressing, always on guard, poised and ready to move. I observe more through listening, the sounds a better indication of my surrounding environment.

I wait a long time and then carefully stick my head out again, the need for food outweighing my anxiety over the alien creature. They are gone. I can now focus on finding food again for survival. I swim out of my shelter in an attempt to grab a nearby smaller fish, I do not succeed and the hunger is starting to become extreme. I recede into my crevice, but I do not think I can wait for a second attempt. Instead I notice mussels nearby, providing easily accessible energy for the moment. The need to eat outweighs the risk of leaving my position. I inhale deeply, preparing myself for the trek. I dark out to consume the protein as fast as I can and then retreat back to my shelter. Slightly satisfied, but still hungry and on edge (Figure 18).

The seals are back. I can hear them calling to each other, the vibrations in the water indicating they are swirling and diving above me. Although I am safe in my crevice since their faces cannot fit into its small opening, I still feel tense. I will need to feed again soon, and their presence creates an added layer of difficulty and risk.



A group of small fish swim close to my shelter and I position myself to quickly dart out too see if I can grab one. With the location of my eyes on the side of my face, my frontal view is inhibited, so I do not see that the cluster of fish is being chased by a pair of seals. I panic and quickly change direction in an attempt to evade them. I started as predator, but now I join the smaller fish as prey. The seals are close, but I have assimilated into the group and they have plenty of food to choose from. Once satisfied they leave us be.

Although I have escaped, in this open water, I am more vulnerable, constantly scanning for threats. I stay close to the bottom of the ocean, looking for a place to rest, to hide, to feel safe. The area here is different, it's flat and open, not my usual habitat. Suddenly, the water becomes murky, and my vision is limited. Something is being dragged along the ocean floor behind me, disturbing the sand, rocks and coral along the way. I try to swim away from it, but it is too fast and I am confined within its grasps. Other fish are trapped with me. I see fellow bocaccio, cowcod, and greenspotted rockfish⁴⁶ all swimming panicked in every direction in an attempt to break free. It is a useless effort. We collide with each other, getting tangled within the netting (Figure 19).

We are lifted up and out of the water. I gasp for breath, and for a moment I can't breath until we are thrown into mass buckets to be brought to shore. I will be kept alive and fresh for as long as possible. I swim in circles, there is limited room and I am constantly hitting the sides of the bucket and my fellow kin. We are caught, trapped, and confined, our future determined. Soon my life will come to an end, but my particles will continue on. Just like the mussel sustained me, I will sustain the human. We are a cycle of relations, all of us helping each other survive.

⁴⁶ Northwest Fisheries Science Center "U.S. West Coast Groundfish Bottom Trawl Survey." *National Oceanic and Atmospheric Administration. (California: 2022).*

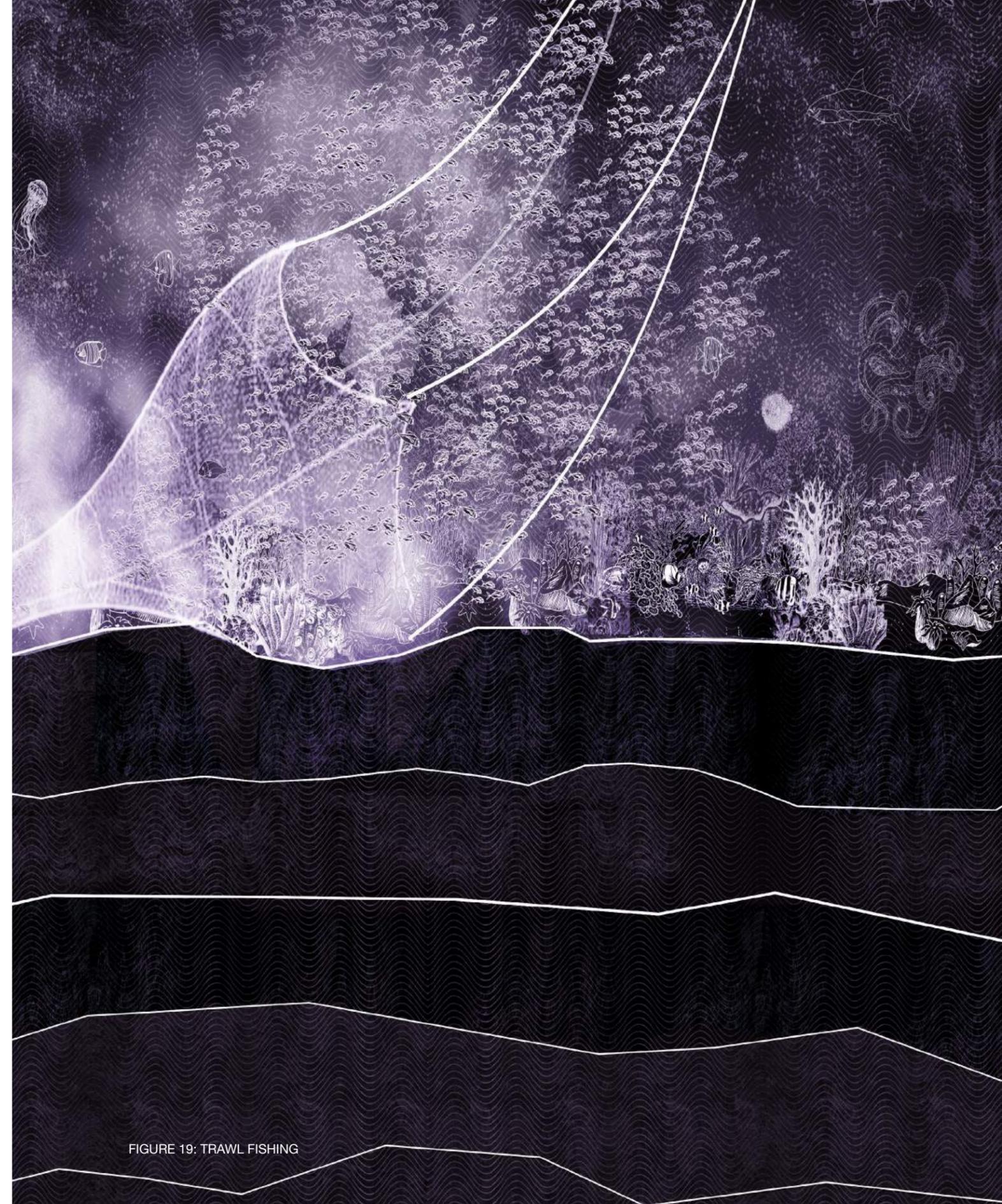


FIGURE 19: TRAWL FISHING

PART 5: MUSSEL

(Mytilus californianus)

*And spent from larval drifting,
our bodies made a wall.
Open-anchored, we learned to trust our stillness
about the sea's revolving:
abundantly filled, abundantly empty,
and dreamed inside our nacreous bed,
slick with the fat spilled in our thriving;
our softest parts, the parts that hold us here.
- Summer Block, "Mussels", Levelheaded*

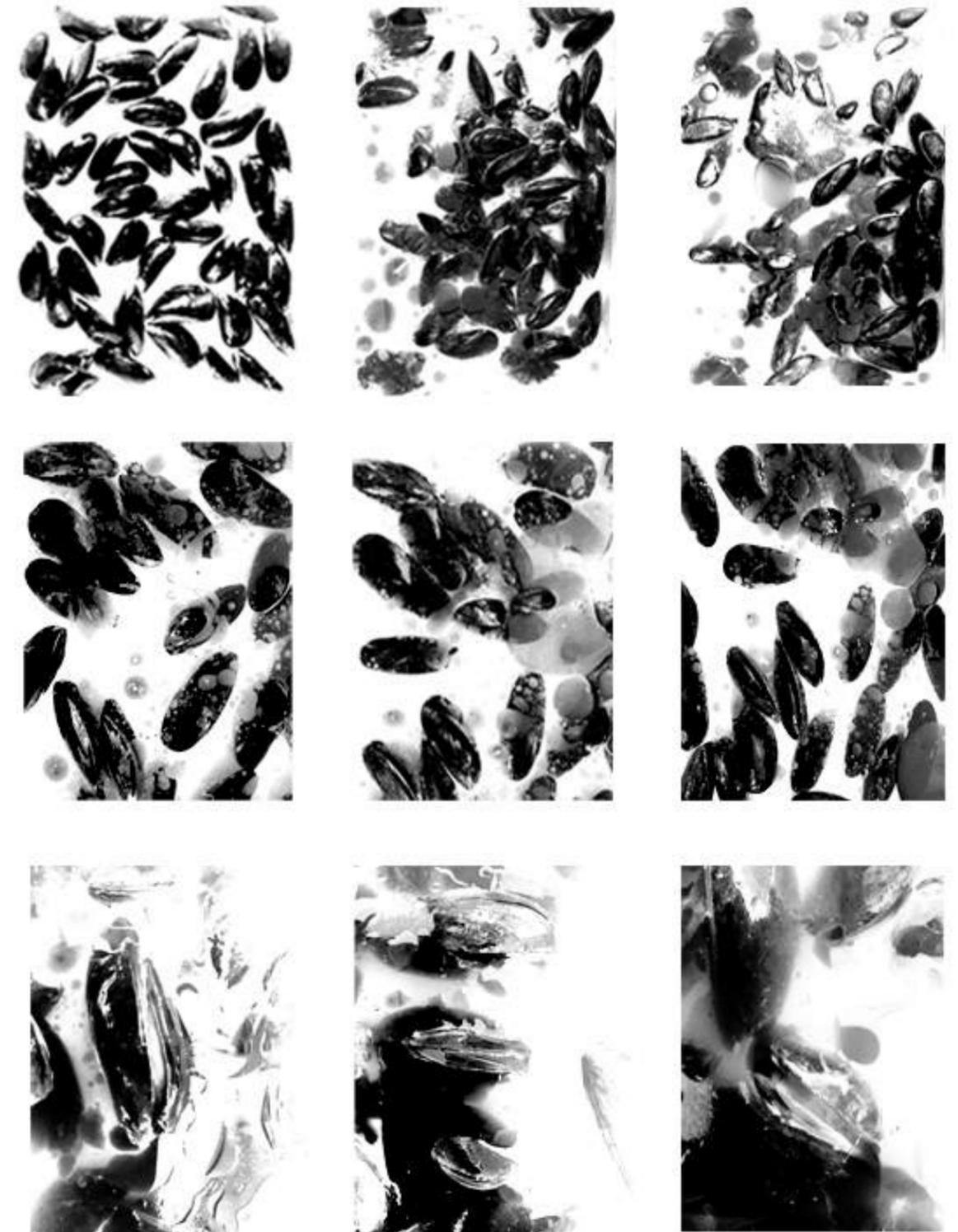


FIGURE 17 (PREVIOUS PAGE): FISH CONSUMING MUSSEL PARTICLES

FIGURE 20: OIL + WATER + MUSSELS
FIGURE 21 (NEXT PAGE): MUSSEL AS FILTER



Platonic Organisms

I form in the gill's of a california mussel, becoming larvae as I am continuously flushed with oxygen-rich water. Once ready, I am released into the open ocean where I attach to a nearby fish,⁴⁷ becoming embedded in their gills, a temporary parasite. I live symbiotically with the treefish, using them as a transitional vessel. There is trust between us, they trust that I will not inhibit their growth, and health, while I believe they will carry me safely. The connection will eventually become reciprocal in nature, but at the moment, they are gifting me with mobility, an ability of transportation, where they help me to traverse and flow through the ocean waters. In return, I will eventually provide them with food and clean water, returning the favour.

Overtime, I develop and metamorphose into a juvenile mussel, slowly becoming ready to live on my own, away from my host fish. I use my byssal thread to attach to a nearby structure adhering strongly to the steel and to my fellow species. We attract and build off eachother for strength, accumulating in clumps on the steel between other corals, anemones and starfish, holding firm against the ocean current and waves. As a collective and assemblage, we are stronger together then as individuals. The structure provides a perfect habitat, ideal conditions for us to thrive. When adhered together we can fight forceful waves in difficult weather conditions.

I rest, breathing in, opening my valve and filling my mantle cavity with the surrounding ocean water. Ingesting fine particles of detritus, smaller planktonic organisms, and microscopic sea creatures, digesting the needed nutrients to survive and disposing of those I do not (Figure 21). Selective ingestion and selective rejection. I collect and sort the desired particles, siphoning material in and filter it out. Repetitively. Continuously. Endlessly cleaning and accumulating material, particles, and elements, increasing the surrounding water quality and clarity.

47 Bernard E. Sietman and Mike Davis, "Mussel Life Cycle" *Minnesota Department of Natural Resources*, Mankato, Minnesota: Minnesota State University.

I breathe in an abundance of different particles. Some are wanted and needed, while others are not. Hydrogen, oxygen, carbon, nitrogen, and phosphorus travel through my body (Figure 23).⁴⁸ This process continues, until there is a new material that inhabits the water around me, it's particles flowing and seeping at a consistency that is unfamiliar to me. I suck it into my siphon and through my gill's. It's unavoidable, I don't choose to, but I cannot control what I breathe in and I cannot flee the area, so I attempt to filter it, but the particles will not break down. I try again but it's foreign form differs from what I normally consume and instead it seeps into my tissues. Normally, I can reject certain particles, but these are different. I cannot eject them from my system. From big to small the substance has effected everyone from fish, to the seals, the coral, and even the community of parasites that live in my tissues.

As time passes, the ecosystem seems to have recovered and adapted. We are resilient and continue to survive. Although, it does feel different, long-term impacts that may not be visible at the moment are lurking in the background. Waiting to be passed down from generation to generation, or from species to species. These subtle differences to our composition, can have lasting effects.

The mussel beside me is plucked from the steel and taken away, leaving an empty space that will not take long to become occupied again. They could have been harvested for a variety of reasons. Maybe for food or research? My species can be a type of an alarm and measurement system. Used as an indicator of surrounding bio-toxin levels, providing knowledge of the biological and chemical processes altering the ocean.⁴⁹ While I filter water, I accumulate surrounding chemicals and since I rest in one spot, with limited movement, I can be used as an environmental indicator to

48 Kristen M. Reifel et al. "Impacts of Stormwater runoff in the Southern California Bight: Relationships Among Plume Constituents." *Continental Shelf Research* 29, no. 15 (2009), 1821.

49 "California's Changing Climate 2018" *California's Fourth Climate Change Assessment* (California Natural Resources Agency and California Energy Commission, Los Angeles, 2018), 17.

AS FLOOD MITIGATION



Mussels firmly anchor themselves to the sea bed, serving as barriers to storms and tides, protecting local communities from flooding

AS ARCHIVE

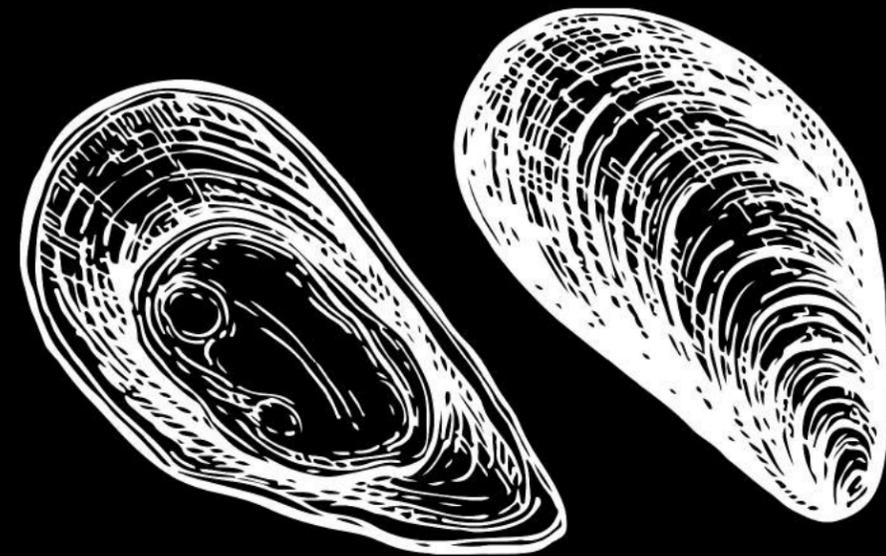


Like a modern palimpsest, mussels record time and events. Their rings encase past environmental conditions, painting narratives of human and natural history

AS FOOD



Mussels are an incredibly nutrient dense food containing protein, Vitamin A and B12, Selenium, and Omega-3



CALIFORNIA MUSSEL

Mytilus Californicus

AS HABITAT



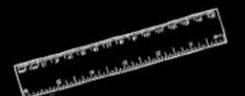
Mussels provide food and habitat for a variety of species including starfish, seabirds, fish, and crabs

AS FILTER



Mussels are effective filter feeders, improving their surrounding water quality and clarity, further enhancing the health of the environment in which they reside

AS MEASUREMENT



Mussels are used by the California Department of Health Services as bio-toxin indicators in a statewide monitoring program

FIGURE 22: MUSSEL AS.....

monitor stormwater pollution and micro-contaminants.⁵⁰

When I inhale again, I ingest surrounding micro-plastics. They travel through my system affecting my internal processes. Most of them I can eject from my body, while others I cannot and the fibers accumulate in my tissues and organs.⁵¹ Polystyrene beads, polyamide fragments, and polyester fibers adhere and fuse to the surface of my byssal, inhibiting my movement.⁵² I begin to realize I'm not producing as many threads and my ability to connect with other mussels and the steel is becoming difficult. My kin are my strength and without them I might be swept away with the ocean current. I am weaker alone. As my elastic hinge begins to deteriorate and the strength of my abductor mussels wains, my shell slightly opens. I am fragile and vulnerable to predators

In a moment, I am consumed by a treefish, providing them with food for their survival. It is my gift to them, reciprocating the favour of mobility that they gave to me earlier in my life. As I transfer into this being, all the nutrients, particles, bacteria, parasites and organisms that were once inside me, transition into them. Those that both help or deter their life. They accumulate the benefits of protein, along with the micro-plastics and foreign substance that previously seeped into my tissues.

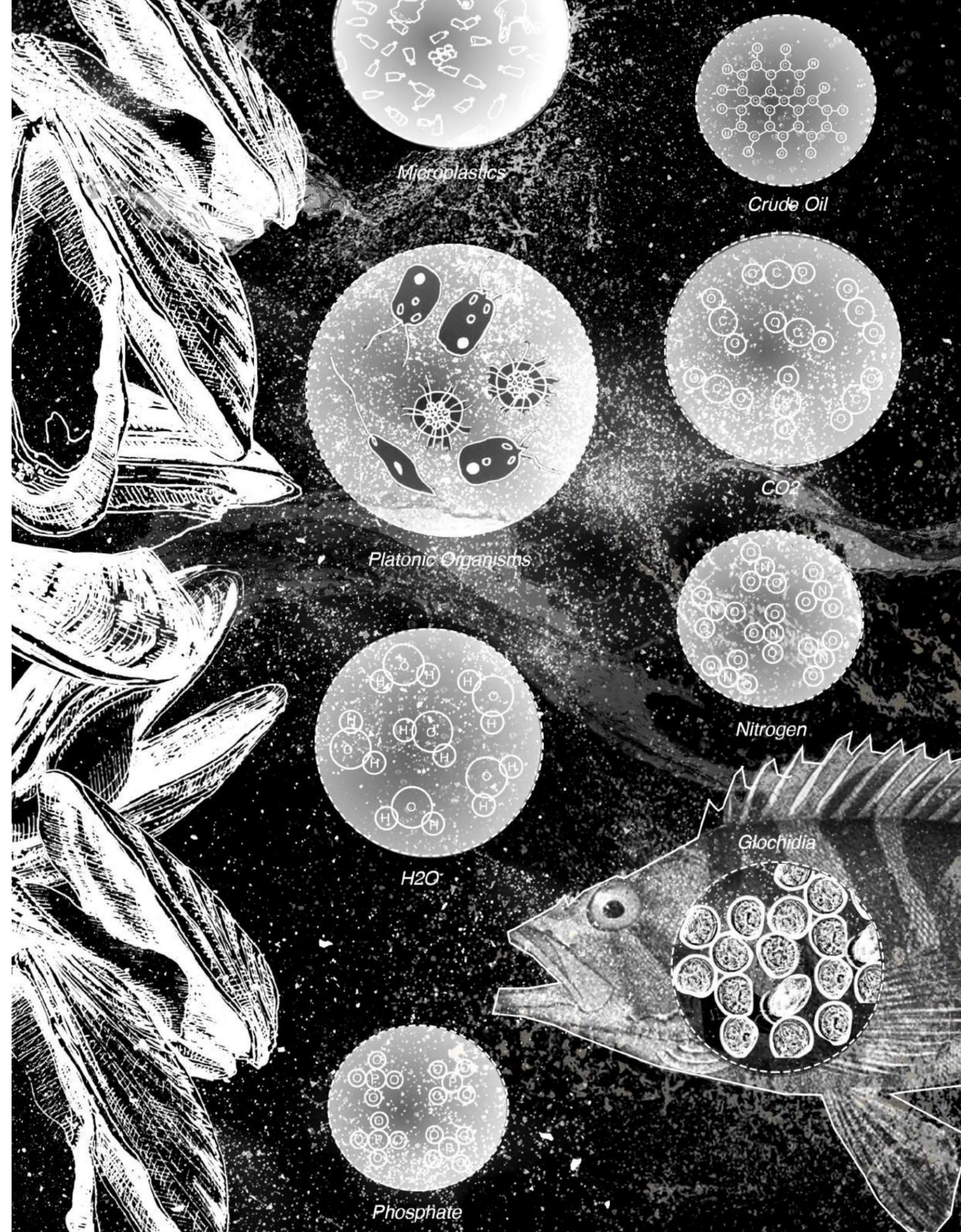
Without my internal body and muscle footing to adhere to the steel, my shell falls to the ocean floor. I become a part of the large accumulation of organic material that

50 A. Ponnurangam et al. "Mussel Shells of *Mytilus Edulis* as Bioarchives of the Distribution of Rare Earth Elements and Yttrium in Seawater and the Potential Impact of pH and Temperature on their Partitioning Behavior." *Biogeosciences* 13,(2016), 752.

51 Madelyn N.Woods et al., "Microplastic Fiber Uptake, Ingestion, and Egestion Rates in the Blue Mussel (*Mytilus edulis*)." *Marine Pollution Bulletin* 137, (December 2018).

52 Madelyn N.Woods et al., "Microplastic Fiber Uptake, Ingestion, and Egestion Rates in the Blue Mussel (*Mytilus edulis*)." *Marine Pollution Bulletin* 137, (December 2018).

FIGURE 23: MUSSEL AS FILTER OF CONTAMINANTS



mounds itself at the bottom of the platform. A crawfish is swimming nearby and darts into my shell to make a home for them-self. I protect them from larger predators. Even after life, I continue to provide, to give and gift.

Time passes and before I can decompose sediment starts to build up over top of me. I become embedded in the rock, chronicling time and recording environmental conditions. A bio-archive where similar to my kin the tree, my shells record time, providing important information surrounding natural and human history.⁵³ Fine sediment and particles become trapped inside me. The sediments slowly form into rock, encasing my shell. Together, the rock and I become a library of information (Figure 24).

What stories do my shells hold? Will it tell a narrative of ocean acidification, increased sea temperatures or sea level rising? Or maybe it will spin a tale of oil spills, micro-plastics and pollution? I am an archive of a specific time period in earth's history, characterized by accelerating and rapidly changing earth systems. Here I stay, representing these stories of the world.

Even as my narrative appears to be over, it can continue. Overtime, my fossilized shell descends into the earth, becoming buried deeply below. Layers upon layers of strata builds up overtop of me and I become hotter as the surrounding pressure and temperatures increases. My particles that once were composed of a mussel shell are undergoing a transition into kerogen.⁵⁴ Earth stories are circular, never ending cycles of evolution. Although this is the end of my life as a mussel, it signifies a new beginning as a life of an oil particle.

53 A. Ponnurangam et al. "Mussel Shells of *Mytilus Edulis* as Bioarchives of the Distribution of Rare Earth Elements and Yttrium in Seawater and the Potential Impact of pH and Temperature on their Partitioning Behavior." *Biogeosciences* 13,(2016), 751.

54 Donev et al. "Oil Formation." *Energy Education*. January 4, 2019.

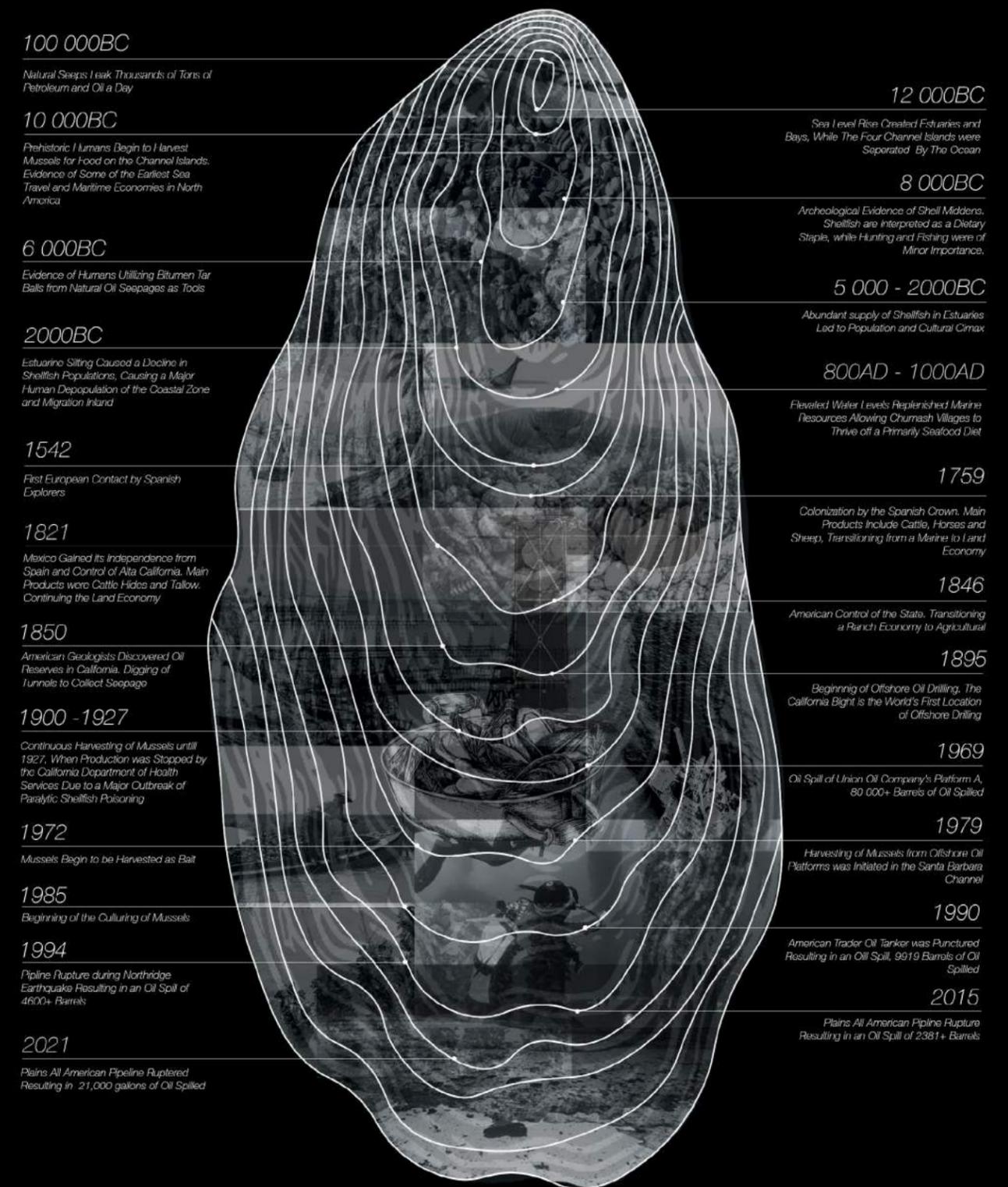


FIGURE 24: MUSSEL AS ARCHIVE

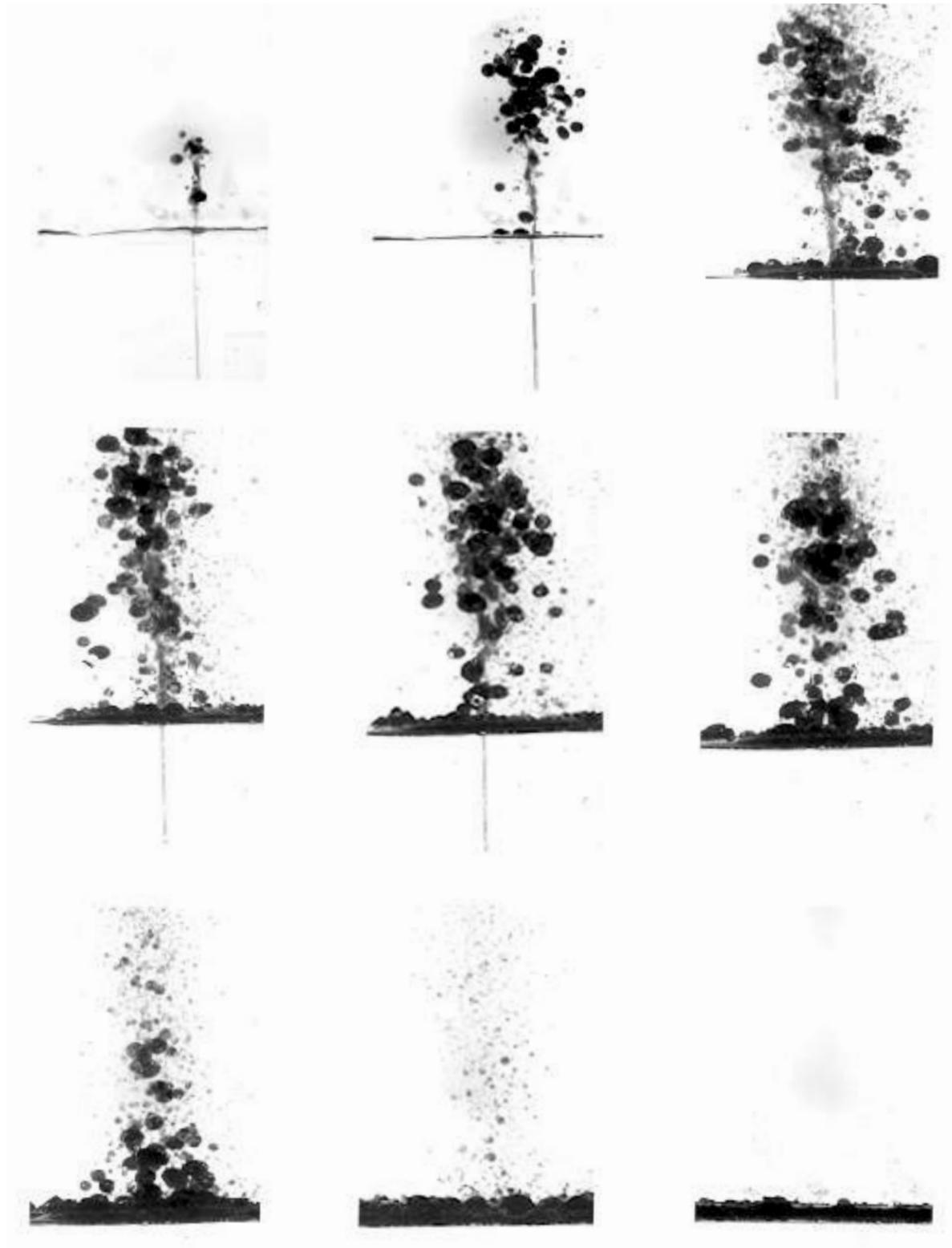


FIGURE 25: OIL SPILL, SECTION VIEW (OIL + WATER)

PART 6: OIL PARTICLE

"It is not this material drawn from deep in the earth that is violent. It is the machinations of human political-ideological entanglements that deem it appropriate to carry this oil through pipelines running along vital waterways, that make this oily progeny a weapon against fish, humans, water and more-than-human worlds." - Zoe Todd

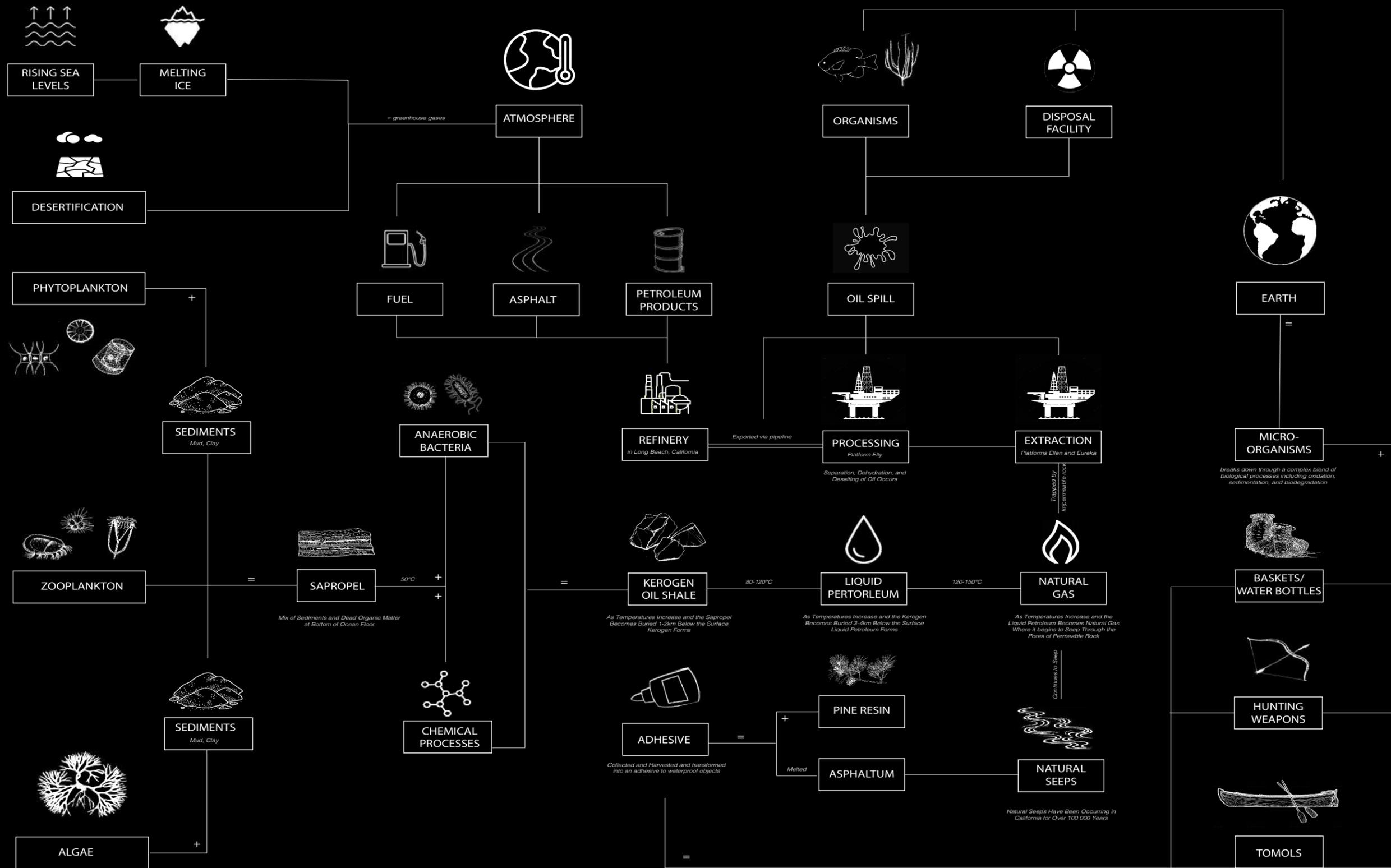


FIGURE 26: MAP OF THE LIFE OF AN OIL PARTICLE

My form is continuously evolving and changing. I'm a minuscule particle, an invisible thread weaving through time, touching, impacting and effecting those that I come in contact with. My formation began millions of years ago in warm, shallow oceans that encompassed the Earth. The region was characterized by marine sedimentary rocks along the seafloor with no land in sight.⁵⁵ In these shallow waters, I was organic matter consisting of fauna called zooplankton or flora called phytoplankton. I stored energy from the sun and once passed, I fell to the floor of the ocean.

Layers upon layers of organic material including mud, ooze and sand settles over top of me, having entered the ocean by means of nearby streams and rivers.⁵⁶ As the terrestrial sediments and lithifies accumulate, I can feel the pressure increasing, working to compress me into organic shale. The still water and limited oxygen mitigates my decomposition.⁵⁷

Overtime, I descend through the earth, becoming buried deeply below the surface. It gets hotter and hotter as I get closer to the proximity of the earth's interior. The increased temperature and pressure enables my transformation into kerogen or oil shale. This process occurs with specific temperatures greater than 90°C but lower than 160°C.⁵⁸ Since my alteration into oil, I am lighter than water and begin to escape from the shale and rise through pores, seeping upwards into younger layers of rock.

My composition is unique, not all of us looking or behaving the same. Although formed under similar conditions our particles are created under varying circumstances. Differing organisms and biomasses as well as levels of heat and pressure contribute

⁵⁵ Frank DeCourten, *Geology of Southern California* (Rocklin, California: Department of Earth Science Sierra College), 6.

⁵⁶ Frank DeCourten, *Geology of Southern California* (Rocklin, California: Department of Earth Science Sierra College), 25.

⁵⁷ Donev et al. "Oil Formation." *Energy Education*. January 4, 2019.

⁵⁸ Donev et al. "Oil Formation." *Energy Education*. January 4, 2019.

to our individuality. Specific developments allowed for my formation. Suitable organic matter, deep burial, porous sandstones and natural structural traps, combine to create ideal conditions.⁵⁹ Here my narrative diverts, following three separate paths, and telling three different stories. One of seeping, one of extracting and one of spilling (Figure 26).

EXTRACT

Since my formation into oil, I am light and rise through the layers of shale, escaping through their pores. I progress upwards until I hit an impermeable layer that seals me in place.⁶⁰ I'm trapped in a reservoir rock with no way out.....until I am sucked up fast and extracted by oil wells from Platform Eureka and Ellen. Involuntarily disturbed, disrupted and pried out from beneath the surface of the earth.

I am transferred and processed at Platform Elly, where I enter a separation train becoming divided into crude oil, gas, and water particles. After filtration and stabilization I am further processed in a dehydration and desalting unit to reduce the water content to a value that is acceptable for transportation or sales.⁶¹ Transportation occurs through a pipeline to a pump station and then a refinery in a Long Beach. As a hydrocarbon, I contain a vast amount of energy, and when my particles are disentangled and augmented, they can be used efficiently, effectively and specifically.

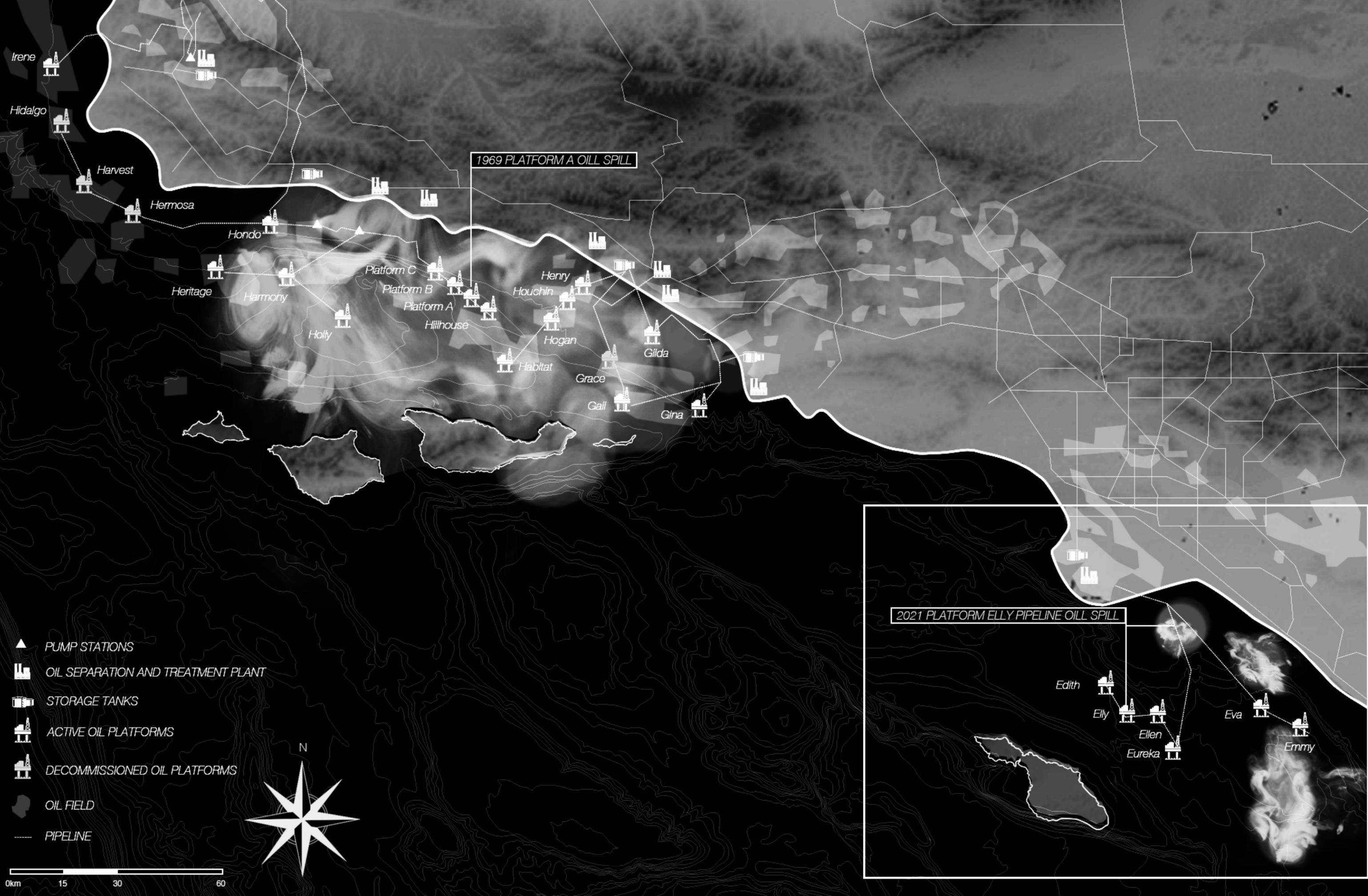
At the refinery, I am further processed yet again. This time, through distillation,

⁵⁹ Frank DeCourten, *Geology of Southern California* (Rocklin, California: Department of Earth Science Sierra College), 26.

⁶⁰ James G. Speight, *Handbook of Offshore Oil and Gas Operations*. (Elsevier, 2014), 10

⁶¹ Shell Oil Company, *Plan of Development Beta Unit Complex*. Los Angeles, 1977.

FIGURE 27 (NEXT PAGE): OFFSHORE OIL INDUSTRY IN THE CALIFORNIA BIGHT



Irene
Hidalgo
Harvest
Hermosa
Hondo
Heritage
Harmony
Holy
Platform C
Platform B
Platform A
Hillhouse
Henry
Houchin
Hogan
Habitat
Grace
Gilda
Gail
Gina

1969 PLATFORM A OIL SPILL

2021 PLATFORM ELLY PIPELINE OIL SPILL

Edith
Ely
Elen
Eureka
Eva
Emmy

0km 15 30 60

N

conversion, and alkylation. I am de-sulfurized, to remove the perceived unwanted chemical from my composition. Through distillation, I become hot again, rising to temperatures between 150 °C- 400°C in a furnace. The differing boiling temperatures allows my various components to break up into specific products.

At 150 °C I'm converted into gasoline,

At 200°C I'm transformed into jet fuel & kerosene,

At 300°C I transition into heating & diesel fuels,

At 370°C I form to create industrial fuel oil,

At 400°C I can be used as lubricating oil, paraffin wax, and asphalt ⁶²

As I enter a conversion procedure, chemicals, catalysts, pressure and heat are used to change my chemical makeup. It's a blur of movement, of transformation, of supplementation. These transitions occur quick and fast in relation to my previous much slower evolutions. It's processes of accelerated change, where efficiency and speed is wanted and praised.

After these refining processes I can be merged with other compounds to create consumer products, including various grades of gasoline.⁶³ The process is tiring, and exhausting, my form having been continuously manipulated to suit the needs of others.

My gaseous state is taken to a terminal where I am sold to a distributor and tested again to ensure I meet rigid and specific California standards. Railcars, barges and trucks transport me to retail stations, marinas, or truckstops, where I rest until a

⁶² "Oil to Car," *California Energy Commission*, CEC-180-2008-008, July 2008. 7.

⁶³ "Oil to Car," *California Energy Commission*, CEC-180-2008-008, July 2008. 6.

motorized vehicle injects me into their fuel pump. I race through the fuel lines, passing a filter and into the engine where I am mixed with air and sprayed into the combustion chambers to power the vehicle.⁶⁴ It propels forward, facilitating and enabling fast and efficient human movement through the landscape.

Once used, I am released into the atmosphere with other particles including nitrogen oxides, and carbon dioxide. I flow up and up, proceeding through the air until I reach a height where I become trapped. There is nowhere to go and I accumulate here with my fellow particles, encompassing the planet in a layer that continues to grow. I become hot, trapping heat from the sun and warming the surface of the earth, causing desertification, melting icecaps, and rising sea levels. Although, not intended these are the impacts of my control and management by the hands of others (Figure 28).

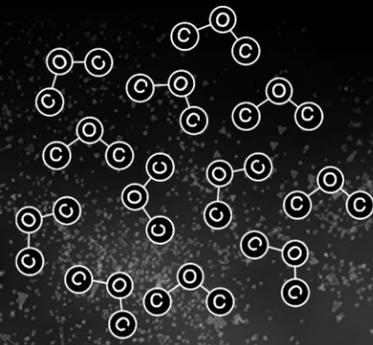
In this story my composition has been heavily and rapidly changed, augmented and used. Although, my particles are not inherently evil, the actions that have been taken and the environmental, economic and social impacts that have occurred have resulted from involuntary manipulation.

SPILL

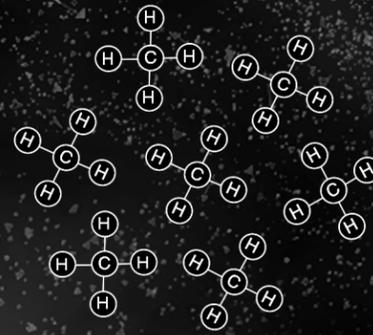
I travel through a pipeline, my destination an onshore processing plant in Long Beach. Before I can get there a sudden change in my path occurs. A 1200m section of the pipeline has been displaced 32m from it's original positioning, forming a semi-circular shape. This has caused an opening and I progress through a 33cm hole.⁶⁵ I am

⁶⁴ Ian Swan, "How Does the Fuel System Work in a Modern Car?." *Modern Mechanic*. November 24, 2015.

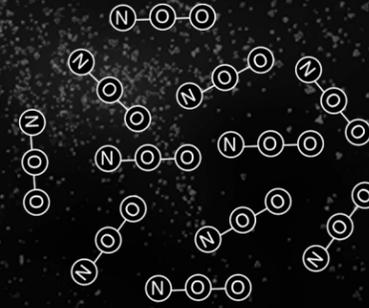
⁶⁵ Eric Levenson, "A Timeline of the California Oil Spill, From the First Report to the Clean-Up." *CNN*, October 10, 2021.



CO₂



CH₄



N₂O

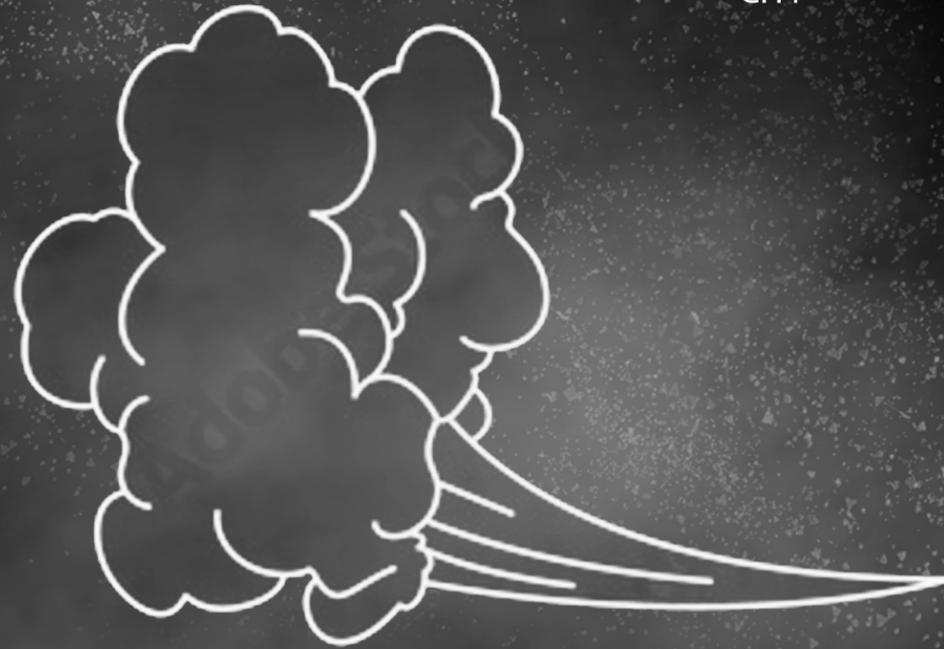


FIGURE 28: GREENHOUSE GAS EMISSIONS

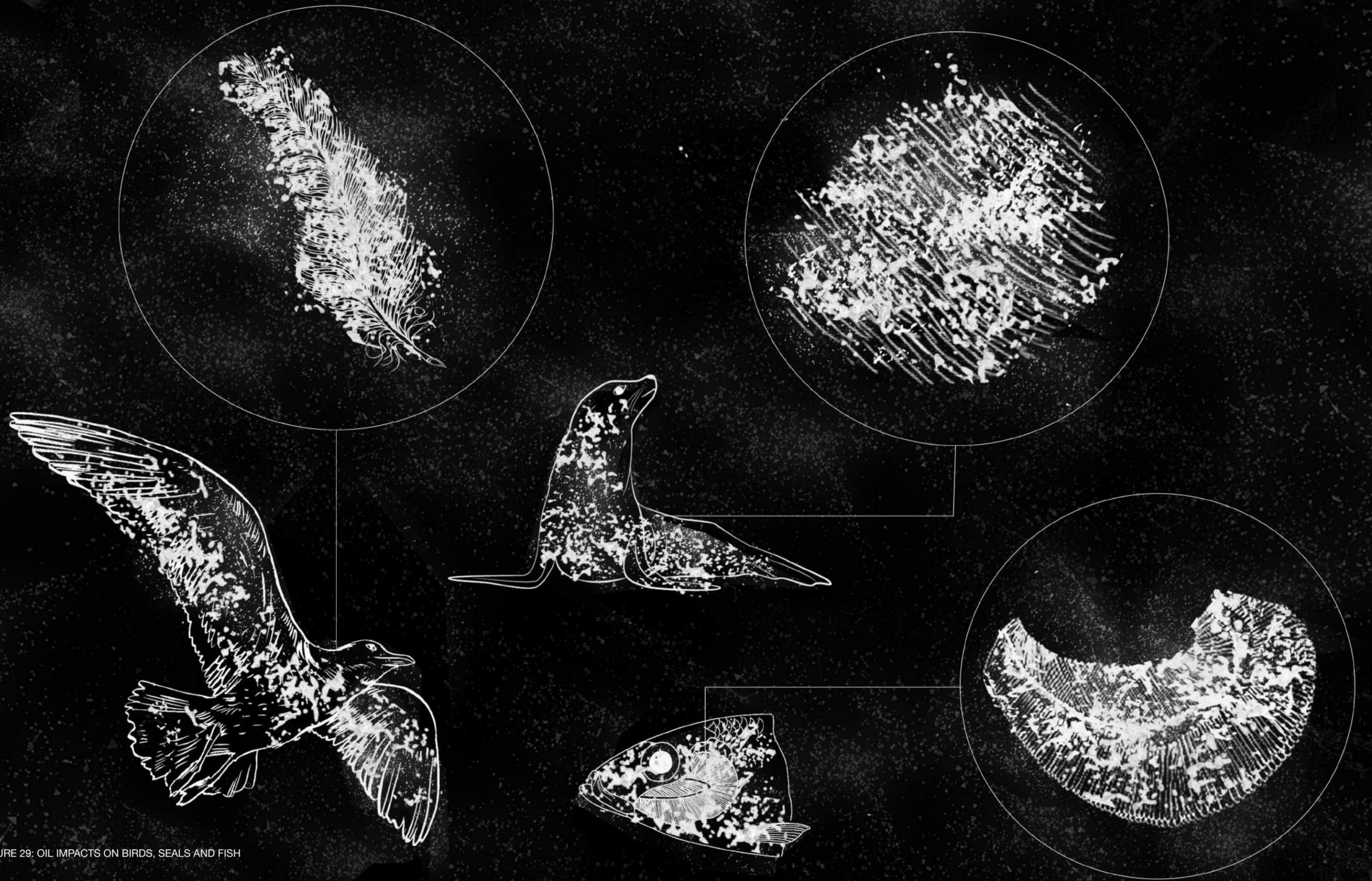


FIGURE 29: OIL IMPACTS ON BIRDS, SEALS AND FISH

sucked up and into the ocean, rising through the water, flowing fast. The current, tides, weather and wind blow me in different directions. My paths vary, floating to the surface, sinking to the seafloor, or clinging to sand creating balls of tar. As I spread across the water, I gain momentum, increasing my viscosity and adhesiveness.⁶⁶ My properties are changing and I'm stickier than ever before.

I cannot be ignored. Even if undetected visually, my odour is distinguishable and distinct. My smell travels through the wind, carried by its currents to places far from here. I feel a sense of panic throughout the surrounding species populations. I am a new, unexpected guest in these waters that they did not anticipate.

I accumulate in slicks, sticking to fish gills, bird feathers and seal furs, inhibiting their movement, their breath and their life (Figure 29). Some of my impacts are immediate, visible, noticeable. Others are not. In certain cases I can instantly cease the existence of surrounding living organisms. I do not choose to but my altered form is more harmful to surrounding organisms. I've been heated, distilled, converted, compressed, separated, mixed, blended and added to. The highly controlled environments I was once in have dissipated and now I move freely through the ocean. At the moment I'm difficult to stop, hard to control, and tough to manipulate.

I cannot control my travel, and I flow through the ocean on the whims of the currents and wind. Although, in a previous life I was once phytoplankton, my ancestral kin still cannot escape my impact. A valuable food source for a variety of species, their population has been harmed and depleted. Fish and turtles mistake me for food, ingesting my contents and poisoning their bodies. I stick to seabird feathers, and their wings become pinned down, they cannot fly, they cannot get warm.

⁶⁶ Jenna Bardroff, "The Scary Facts About Oil Spills, Animals and our Food Chain." *One Green Planet*, 2015.

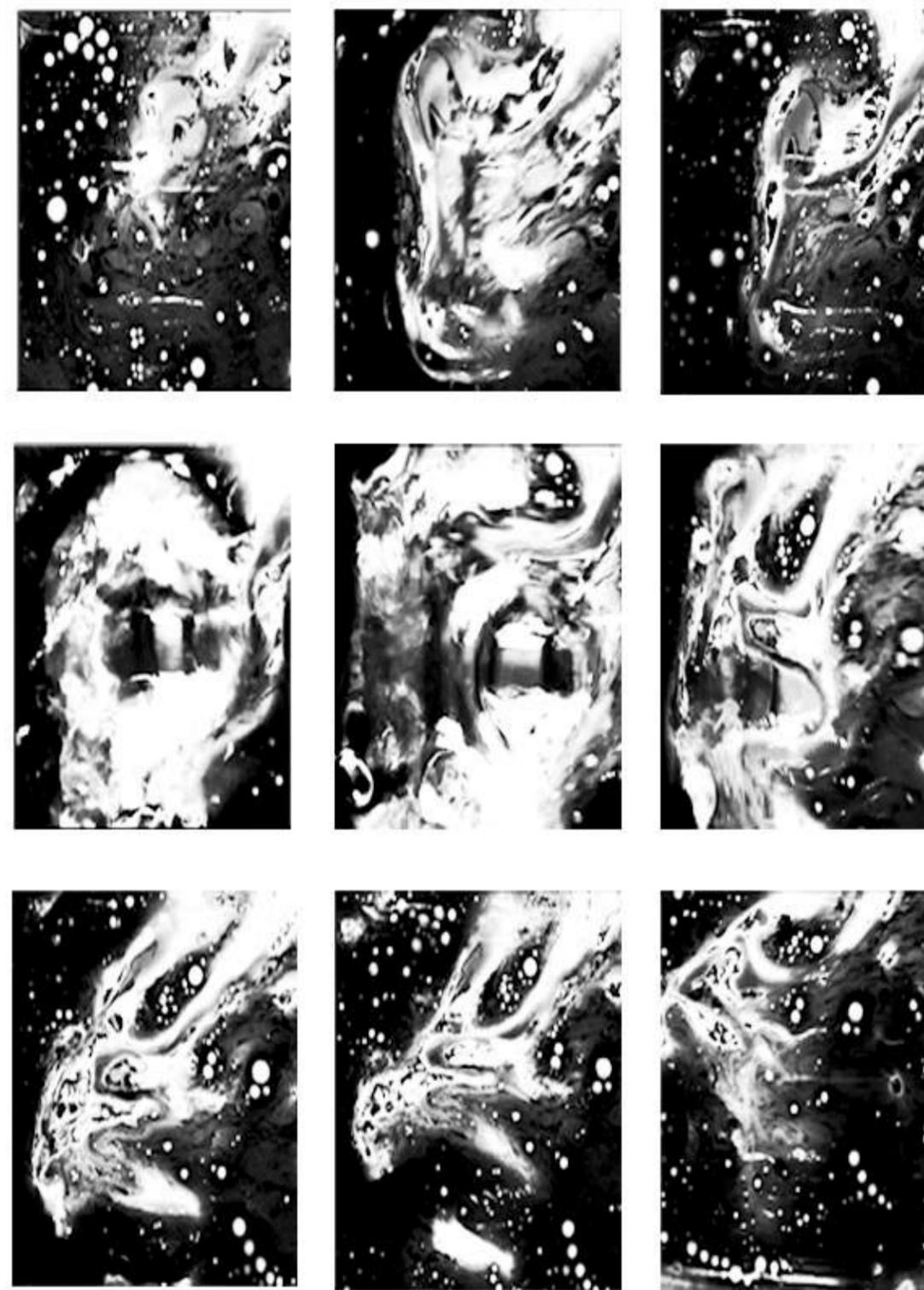


FIGURE 30: OIL SPILL, PLAN VIEW, (OIL + WATER + CO2)

In other instances my effect lurks unnoticeable and invisible. In low doses, I can accumulate in their bodies and travel through the food chain, subtly effecting their offspring. It is a spiraling effect that spans space and time, crossing species and generations.

I get ingested- sucked in by a mussels' siphon and into their gill's to be filtered. Instead of passing through their body, I accumulate in their tissues. They are unable to break down the constituents of my particles and I rest there, staying in their body. I've reduced their development, inhibiting their nutritional value, and impacting their DNA.⁶⁷

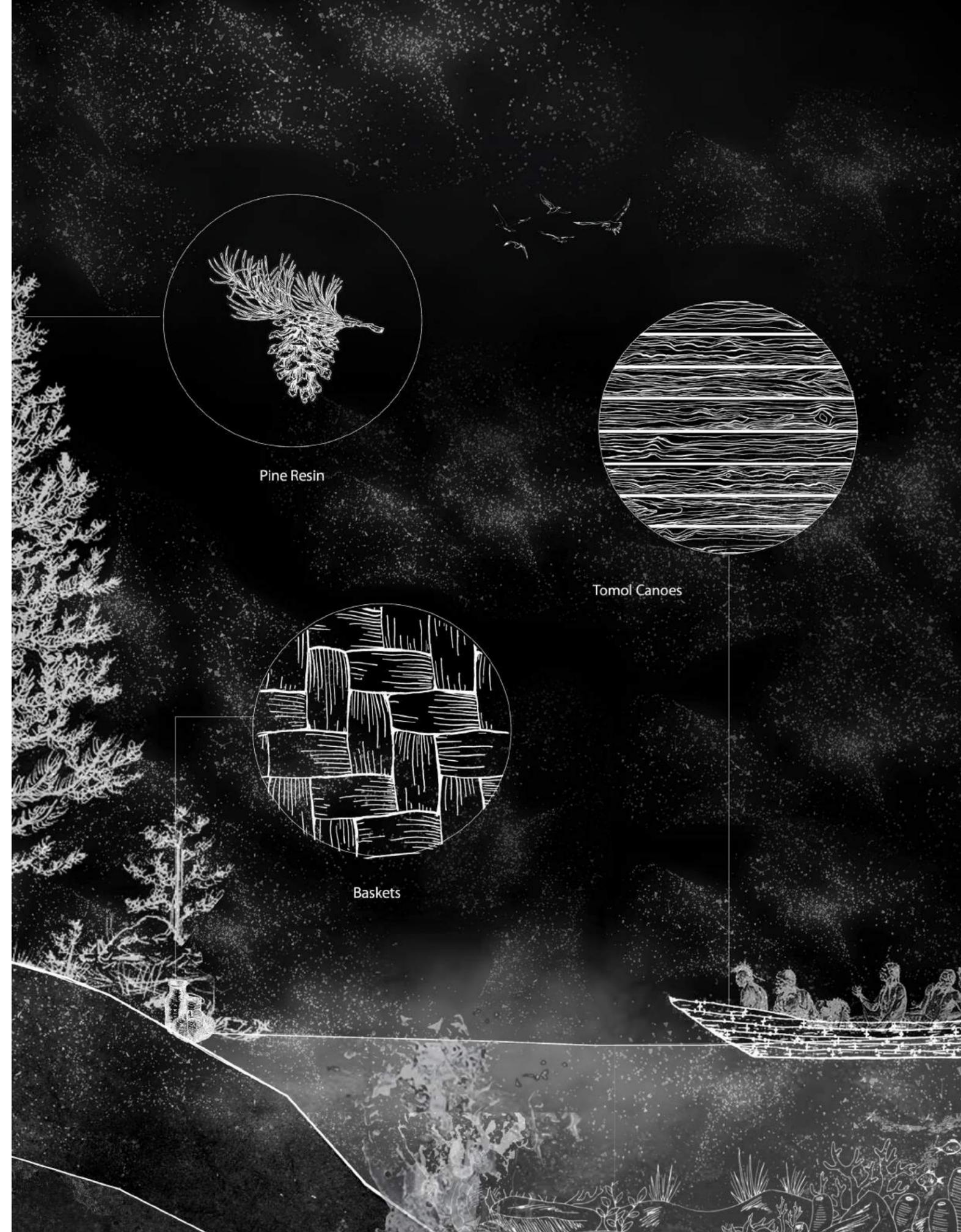
A treefish darts by and consumes the mussel that I am inhabiting. My particles now spill into the fishes body, absorbing into their fatty tissues.⁶⁸ Here I rest until the fish is eaten by a human and I become part of this being, effecting their body in small ways that they do not even notice. I travel through the ecosystem. From being to being, species to species. We are all related through a web of relations, it makes us stronger to work together, but also sometimes more vulnerable.

In attempt to control and isolate my spread through the ocean, temporary floating barriers are used. It catches my particles that have accumulated on the surface, but disregards those that have sunk or have adhered to other surfaces. I am contained and scooped, or scrapped off sand, or washed from bird feathers, and brought to special disposal facilities, where I am discarded as hazardous waste.

In an attempt at neutralization, my particles undergo further inflicted physical,

⁶⁷ Linda Adzibli, "Assessing the Impact of Oil Spills on Marine Organisms." *Journal of Oceanography and Marine Research* 6, no. 1 (2018), 4.

⁶⁸ Jenna Bardroff, "The Scary Facts About Oil Spills, Animals and our Food Chain." *One Green Planet*, 2015.



chemical, and biological processes. I am disposed, discharged, deposited, injected, and dumped back in the land or water.³ This time it is intentional and not an accident, I am placed at a specific location to rest. There is an irony to this. An immense effort was used to clean me from areas of the earth only to be re-deposited back. I am sequestered in this area, out of sight and becoming out of mind.

It has been a journey, one that I couldn't control. Although my presence here is largely unwanted, I would not have been here if I wasn't initially taken, and extracted from my resting place. I've been unwillingly manipulated, forcibly used, and involuntarily transformed.

My initial impact was visible, but now I am largely forgotten. If those cannot see me then they do not seem to care. I am still here, my particles living with you, alongside you, and within you. Here I rest, holding stories of the earth and telling its forgotten tales.

SEEP

I migrate through the rock, rising through porous stones, until I break free and strike water. I appear through fractured stone, out of one of the many oil seeps in the California Bight. I ooze and seep slowly, following a continuous path that has been flowing for a hundred thousand years. The currents and wind, move me and I flow, spreading through the ocean. Fish and other sea creatures have adapted to the seep and know to swim away from me, avoiding the foreign substance. I'm less volatile, and manifest as thick and viscous tar deposits that cluster on the surrounding coastal

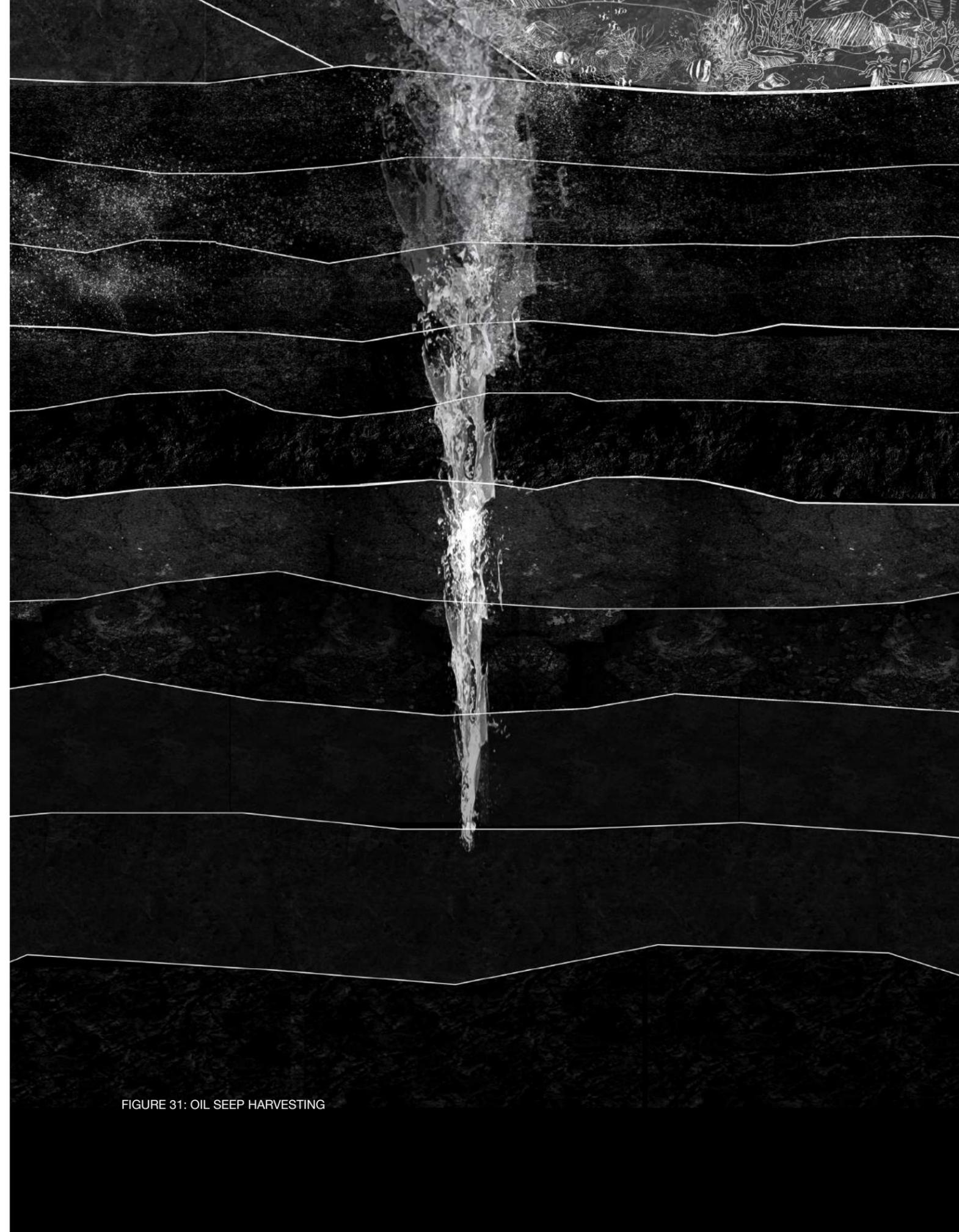


FIGURE 31: OIL SEEP HARVESTING

sands.⁶⁹

After coming to shore, I am collected from the beach and transported to a place where I am melted and combined with pine resin to create a strong sticky substance. My new form can be applied to woven waterbottles and baskets, and Tomol Canoes.⁷⁰ I give the gift of protection by storing and securing contents through a waterproofing technique that has been used for hundreds of years. Repetitively, I am carried to the river to collect water, or used to traverse the open ocean, allowing humans to migrate from one place to the next, exchanging resources, ideas, and methods (Figure 31).

Eventually the canoe, water bottle, or basket has outlived their usefulness to humans and are neglected, abandoned, and forgotten. The materials I was adhered to slowly degrade overtime, becoming embedded in the soil, restoring needed nutrients to the ground. I begin to break down through a complex blend of biological processes including oxidation, sedimentation, and bio-degradation. Another transform occurs, this time through the micro-organisms that consume me. It is a slow, tedious process, where eventually they convert my particles to simpler, alternative compounds. It's a reciprocal exchange, I gift the micro-organisms with energy through their metabolization of my particles and they allow me the opportunity to return to the earth.

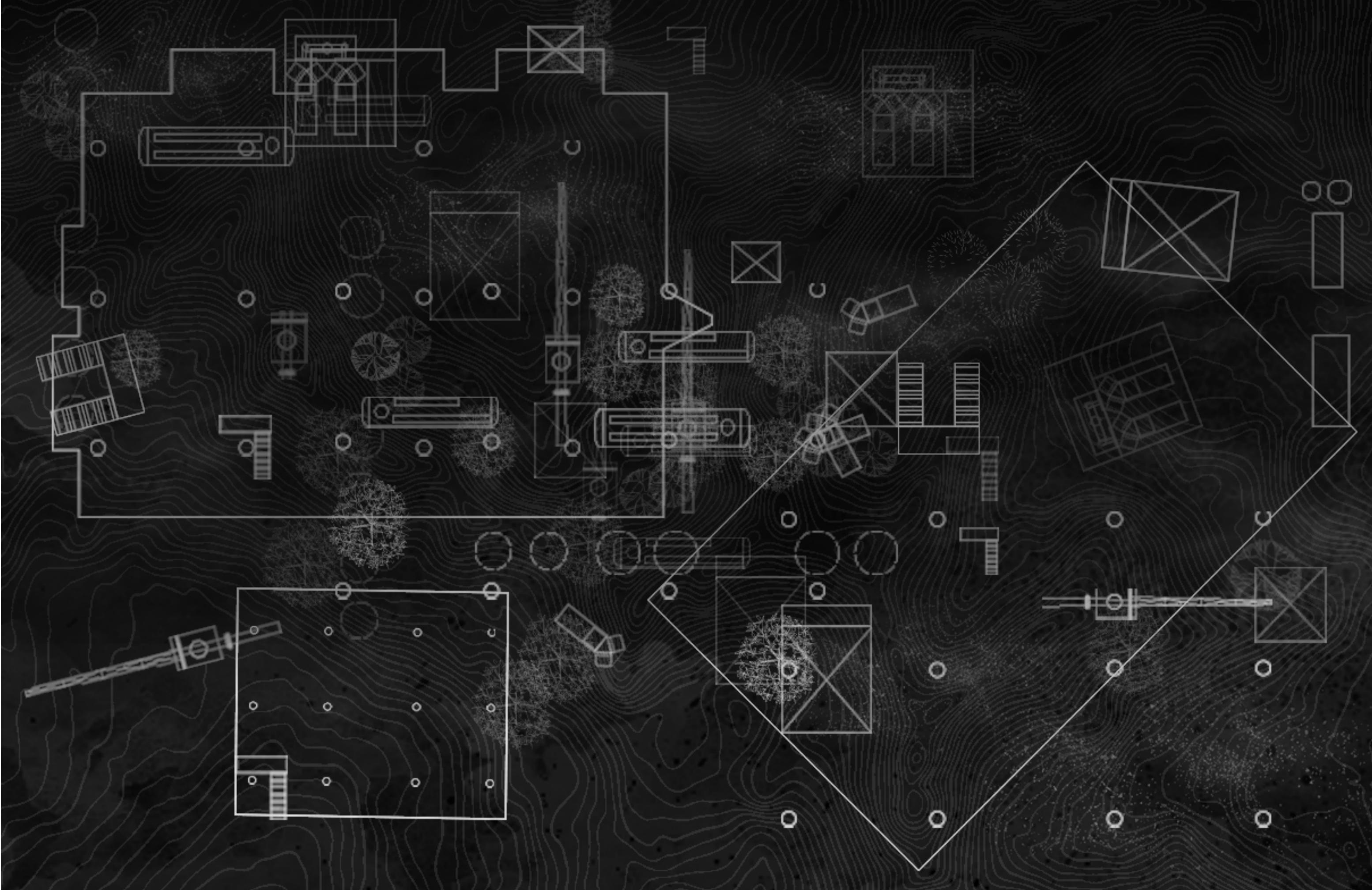
⁶⁹ Frank DeCourten, *Geology of Southern California* (Rocklin, California: Department of Earth Science Sierra College), 26.

⁷⁰ Milton S. Love, "An Overview of Ecological Research Associated with Oil and Gas Platforms Offshore California." *US Department of the Interior, Bureau of Ocean Energy Management*. Camarillo California, OCS Study BOEM 2019-052.

PART 7: GARDENER

"If the planet is a garden, we are all gardeners- perhaps not aware of it, yet the choices and lifestyles of each of us have an impact on the biosphere and on our collective, vital space."- Gilles Clément

FIGURE 32 (NEXT PAGE): OIL PLATFORM AT DISASSEMBLY



As I swim along the ocean floor, dodging steel, corals and fish, I marvel at the sheer abundance and diversity of life. There is a dichotomy between elements, the site blurring hard and soft, living and non-living, artificial and natural. Everything is woven together, integrated within each other.

It's incredible how a place that was once used to exploit, extract and disrupt the earth's resources is now maintained, cultivated and cared for by us. Many years ago the oil platforms along the California Coast were intentionally dismantled into the ocean to create artificial reefs. The idea sprung from observations that were made of the ecological benefits from historical shipwrecks. With the oil platform, they created an intentional shipwreck by disassembling it into the ocean, allowing it to become overtaken by nature. The result of this effort was a network of small sea sanctuaries dotted along the coastline (Figure 32).

Now we work alongside the non-human elements, both the living and non-living. I consider myself a gardener, a tender of the landscape. Over the years, we have been periodically swimming out to the site to tend to the reefs, working alongside them to cultivate an ecosystem that provides a variety of services to the living and non-living, human and, non-humans. The area can now be considered a sanctuary that practices a reciprocal relationship of giving. We help the sea and in return the sea life gifts us with organisms and elements that sustain us, giving us air, food, and medicine.

In the past environmental effects caused a deterioration and acceleration of the earth's systems and processes, resulting in a needed shift around how we view the planet. Although we have worked to lower pH values in the ocean, it is still a concern that we are dealing with today. Helping kelp, eelgrass, and other sea plants grow,

aids in lowering the acidity of the ocean. We help them and they help us.

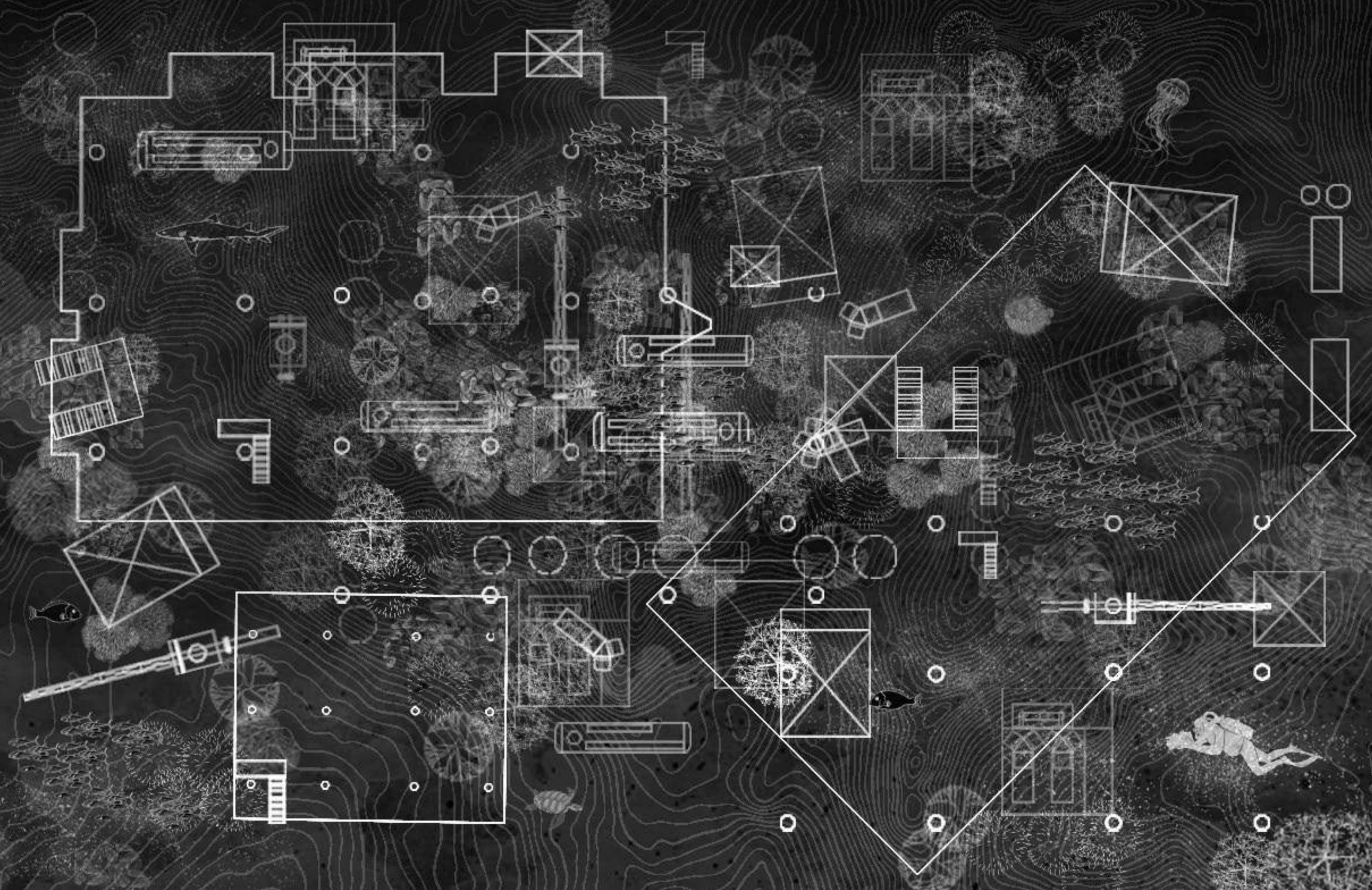
As I swim between the jackets, I notice an abundance of mussels growing on the jackets. I harvest and gather a few from the steel. My daughter loves them, they are her favorite food and I smile at how her face will light up when I make them for dinner tonight.

I swim everyday. It is a time of meditation for me, therapeutic. My relationship with the earth and those within it continues to grow through this daily practice. Over the past few hundred years as the ocean has changed, an attempt is being made to recover a sense of place and community through a re-built connection to the sea. The ocean is old and resilient. We can learn many lessons from it's long history, by just being surrounded by it and immersing ourselves within it. Noticing, observing, guiding and gardening.

Towards the east of the site, I notice coral starting to bleach due to heat stress. It's white form standing out, a stark contrast to the surrounding ecosystem's bright colours. The coral is expelling the algae living in their tissues, straining this symbiotic relationship. Some species survive better in the warming temperatures and I've observed this specific coral beginning to die.

I swim towards the ecologist who is documenting and studying the various species that surround the industrial relic. They are making sure that balance is maintained, that we are not taking too much or too little. Beckoning them over, I enlist their help to attach wire meshing between the old steel platform jackets. This area needs some extra help and the mesh will provide holes and fissures to allow coral and invertebrates

FIGURE 33 (NEXT PAGE): OIL PLATFORM AT 25 YEARS



to attach quickly. We work together fastening the wiring and then harvest healthy coral to adhere to the new reef.

We chisel and cut no more than 10% of a reef located towards the west of the site. To ensure its survival, we do not take much. I swim back to the struggling coral and netting to attach the healthy fragments using a strong adhesive. We repeat this process until we are satisfied that there is enough coral on the structure to facilitate adequate growth, but still leaving lots of space on the mesh for the ecosystem to naturally progress. The corals will eventually adhere themselves to the reef and the adhesives will slowly dissolve. I make a mental note to come back in a few weeks to monitor its progress. Hopefully in a couple years this reef will be thriving. We intervene and influence to make the ecosystem more resilient in the unstable environment in which we created.

There are different methods and structures that we can add to the ecosystem to promote the reef's growth and biodiversity (Figure 34). We observe and analyze the area and select the typology that will function the best for the surrounding species. Wire netting was chosen since colonies of mussels are nearby. The netting provides an ideal surface for mussel larvae to adhere to. Selecting this typology will limit our intervention into the environment since fish will do most of the work. They act as a vessel for the larvae, unintentionally transporting them through the water. Although we cannot control if mussels will grow, due to the proximity of the mussel culture the likelihood of the larvae settling on the mesh is high.

I'm amazed by the sea life that surrounds me. There is continuous movement everywhere. Nothing is static. Particles are flowing, fish are darting, seals are circling, mussels are filtering and everything is breathing. I see invisible threads, linking species

to each other. We help the coral and mussels grow, the fish eat the mussels, the coral provides habitat for the fish, we eat the fish, fish feces provides nutrients that help the coral thrive. The cycles and connections are endless.

At the bottom of the jackets there are mounds of shells that have accumulated overtime, having fallen from the steel. They support crawfish and other small creatures that crawl over, under and within their shells.

I spot a mussel shell at the top of the mound and wonder what stories it holds. The earth's climate has changed rapidly over the past one-hundred years. These shells would record that information through its chemicals, particles and matter. It will eventually fossilize, disintegrate and become transformed into oil.

Towards the north of the site, I find a continuous oil seep that has been flowing for over one hundred thousand years. I stop and collect the bubbles that are settling along the bottom of the sea floor. Nature has adapted to these flows, the slow rate of the seep does not threaten the stability of the ecosystem. The particles are not a danger to me as I am adequately protected with proper equipment. Once taken to shore, the oil will be later combined with pine resin and used to coat and waterproof objects. I only take what I need, leaving the rest to be broken down by microbes, evaporated by sunlight or buried in sediment.

As I flow up towards the surface, I notice a treefish settled between the corals, awaiting its next meal. I nod to them in passing, acknowledging their existence and contribution in the ecosystem.

I'm almost finished my dive, having collected, and harvested what I need for the

moment. Later today, I will continue on to the other sites we maintain. These include old shipwrecks and other dismantled oil platforms.

As I look around at the environment around me it is difficult to imagine and know what humans, non-humans, living and non-living beings might be feeling, seeing, communicating and thinking, but reflecting on it re-frames our relationships with them. It is now difficult to continue our extractive and exploitive practices. We are starting to form a new appreciation of the planet as well as a felt kinship with other beings and elements.

The steel platform will eventually disappear, eroding into the ocean or becoming buried in sediment (Figure 35). It endlessly evolves and changes, and will never be the same as this current moment. Oil seeps, mussels filter, fish swim and beings will continue to transition, transform and evolve. I take one last look around before I reach the surface. Although it is the end to this story, there is no 'end' or final conclusion when thinking about the earth in deep time, there is only a continuous process of evolution.

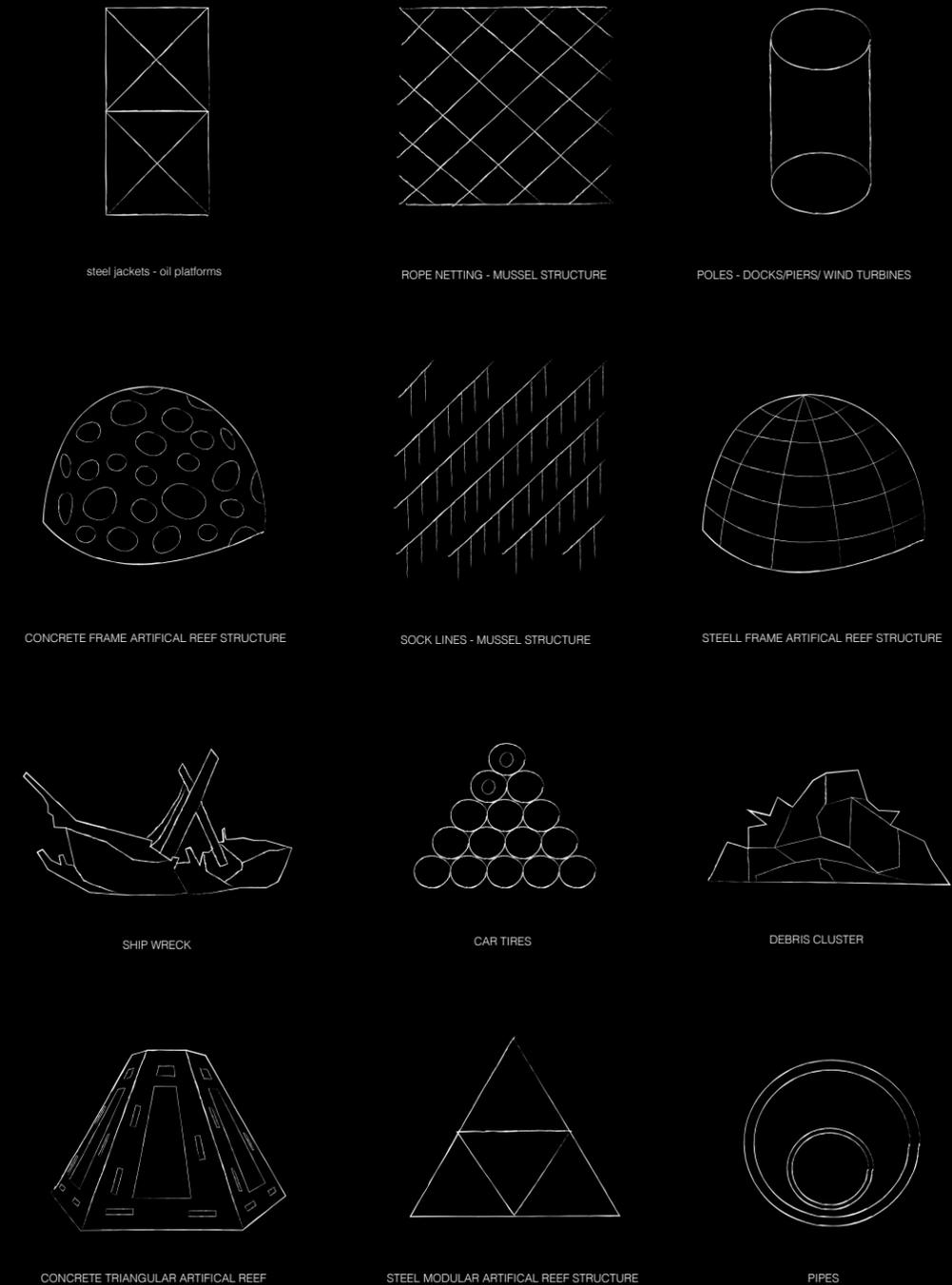
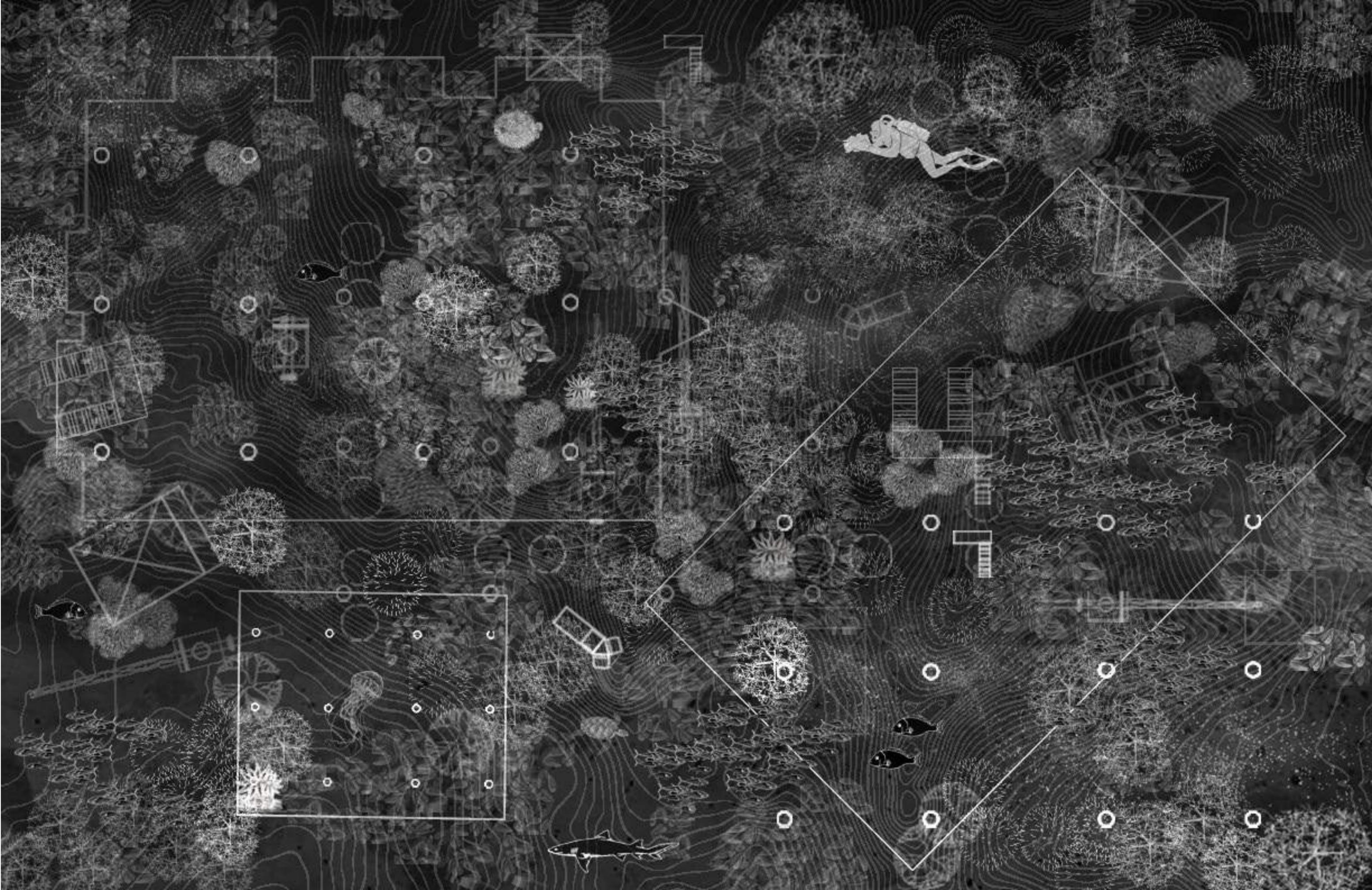


FIGURE 34: ARTIFICIAL REEF TYPOLOGIES

FIGURE 35 (NEXT PAGE): OIL PLATFORM AT 200 YEARS



PART 8: ENDNOTES

Reflections, Film Series, Additional Drawings, and Bibliography

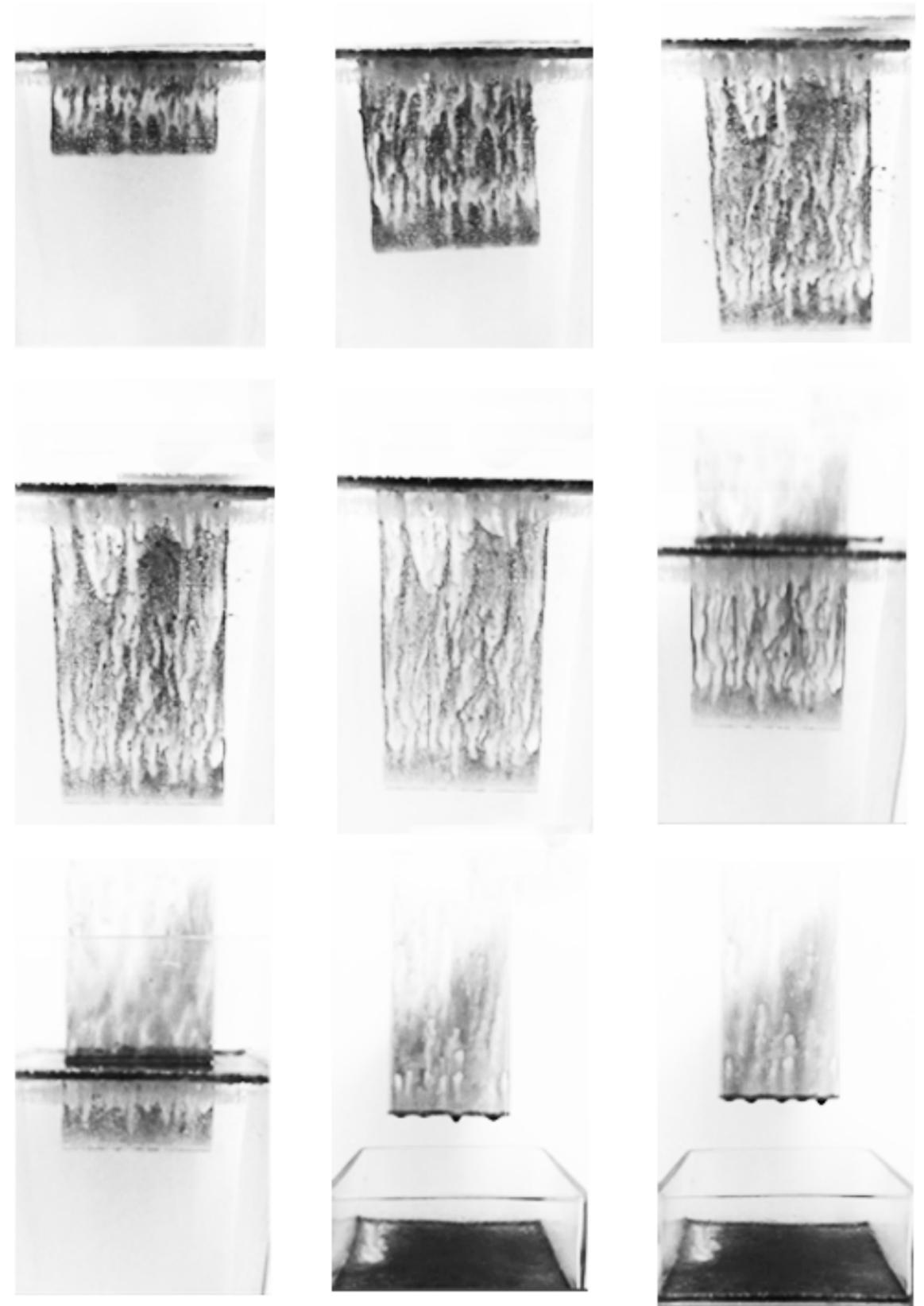


FIGURE 36: STICK (OIL + WATER + PLASTIC)

REFLECTION

This thesis reflects on kinship studies, deep time and the philosophies of Gilles Clément to develop a theoretical position about site and design. Informing people about what is unseen below the surface fundamentally alters our relationship with its occupants. Representing elements that are often overlooked or unseen to the human eye shifts our place in the world, prompting a re-evaluation of our actions, thoughts, and design motivations in the process.

The gardener's narrative re-positions our role as designers. It emphasizes only intervening where required and when needed. We aid or guide the site in its path, tending and maintaining. Living with species, and not fearing their unpredictable nature. The site itself is an entity, a network where its occupants work together as co-inhabitants, collaborators, and co-laborers in the world.

This framework can begin to inform how we investigate and design for other sites. The overall concepts can be applied to proposals, expanding beyond the scope of the California Coast. Instead of designing for the environment, begin to design with it. Where appropriate, we can let rivers flood, plants grow, matter decompose and cliffs erode. Learn to work with biological processes and species, rather than control them. As designers, our inclination is to preserve, to build for it to last, but in doing so we disregard the fact that nothing is static. In an attempt to control and contain, we inhibit growth and progress.

By attempting to view the world from alternative perspectives, this thesis portrays non-human and non-living beings as equal collaborators in the design process. It

highlights their individuality, the services they provide, the connection between them and our environmental impact. By acknowledging the earth and its occupants as kin, we raise our awareness that we have for them in our world and in our designs.

Throughout this process, I have learned to explore, to follow my interests, and trust my intuition. I've learned that my creativity can be inspired and take many forms from drawing to writing, researching, animating, and modeling. Each book I read, narrative I wrote, drawing I produced and conversation I had, created a new knowledge and understanding. This thesis has made me re-position my place in the earth and my relationship with it. I hope it has influenced your world as well.

Maybe these writings will prompt you to explore, to go for a walk, a run, a bike ride and start to acknowledge the beings surrounding us and notice the invisible threads that connect all.

I view this thesis as a continuous work in progress. Similar to the earth, it can evolve and grow, adding different characters and longer narratives. When thinking in deep time, there is an endless story. Nothing disappears or ends, but rather transitions, transforms, and evolves.

"And there are never really endings, happy or otherwise. Things keep going on, they overlap and blur, your story is part of your sister's story is part of many other stories, and there is no telling where any of them may lead." - Erin Morgenstern,

THIRD SEASCAPE FILM SERIES

A DEEP NARRATIVE OF THE CALIFORNIA COAST

The short film weaves together the narratives of the Ecologist, Oil Particle, Fish and Mussel to tell the story of the site. It flips between perspectives, highlighting the circularity and relationships between all beings. Link: <https://youtu.be/qGnM6yi0xCA>

A MUSSEL NARRATIVE OF THE CALIFORNIA COAST

This narrative tells the story of the life of a Mussel, focusing on it's position in the ecosystem as filter, food, habitat, and archive. Link: <https://youtu.be/yOzN-hX4e7o>

AN ECOLOGIST NARRATIVE OF THE CALIFORNIA COAST

The film recalls the thoughts, reflections and experiences of an Ecologist. It highlights the vertical dive off of Platform Elly, noting species and habitats along the way.

Link: <https://youtu.be/cjTDHsXrvdw>

AN OIL NARRATIVE OF THE CALIFORNIA COAST

This story weaves through deep time, beginning with the formation of an oil particle and then progressing through three narratives. One of extracting, spilling and seeping.

Link: <https://youtu.be/BmnBN6vczh4>

A FISH NARRATIVE OF THE CALIFORNIA COAST

The film tells the story of a life of a fish, displaying their attempt to survive through oil spills, trawl fish nets and predator species.

Link: <https://youtu.be/M6aX2epZZ4w>

FIGURE 37: FILM STILL, CONNECTING NARRATIVES

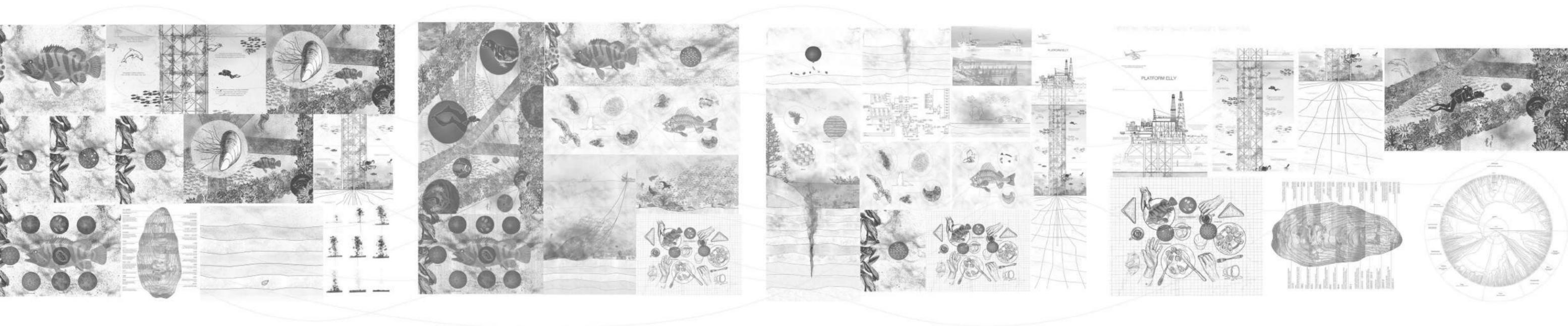






FIGURE 40: SHIPWRECK PLAN VIEW, CUBA

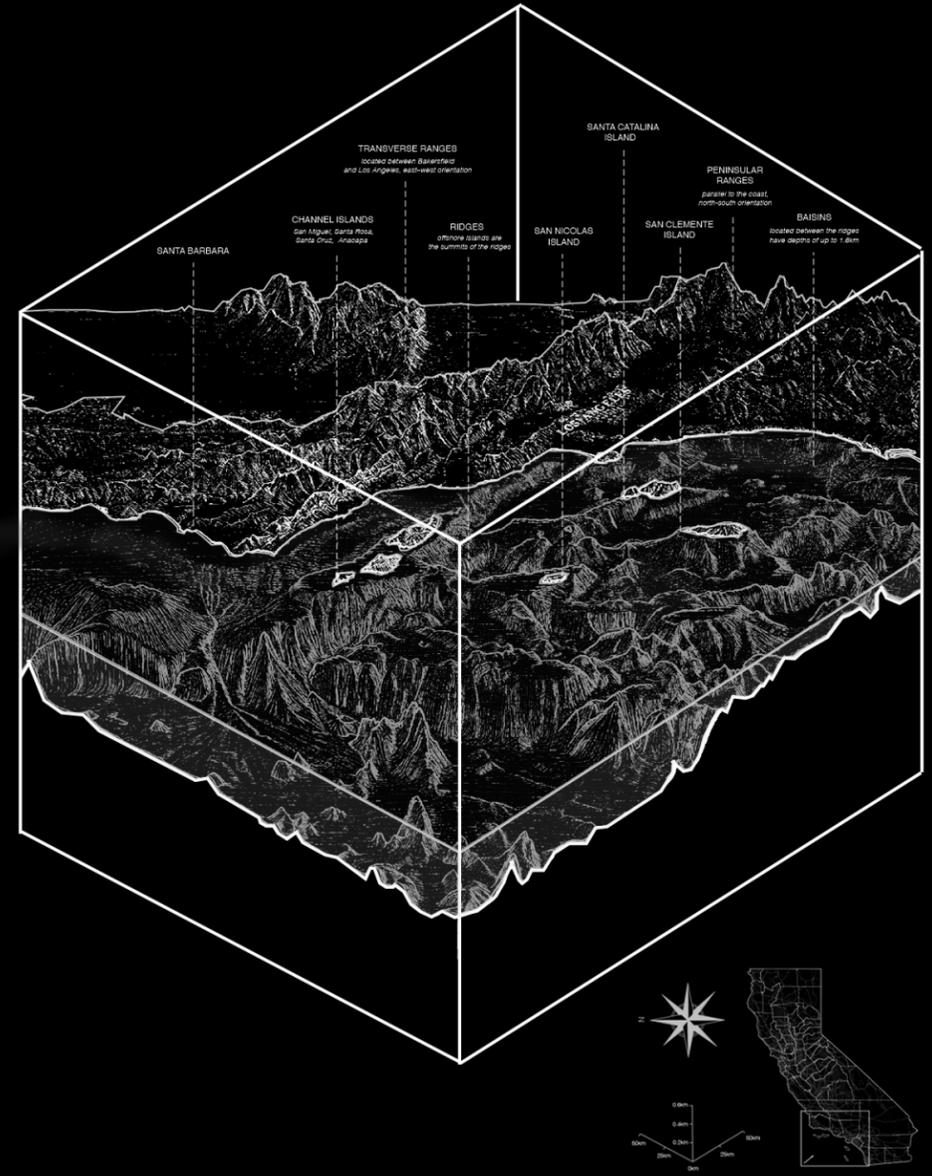
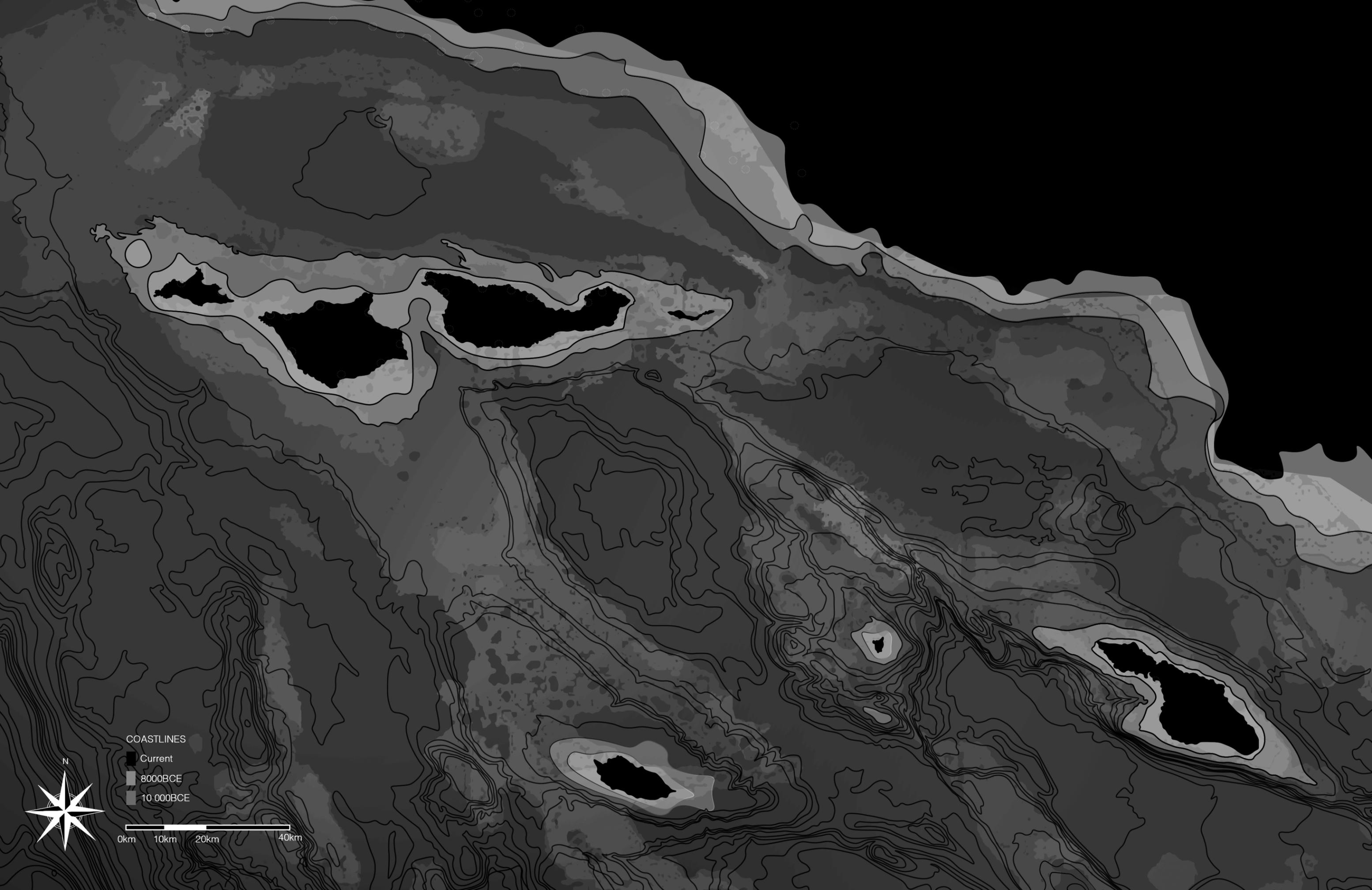


FIGURE 41: TOPOGRAPHIC AXONOMETRIC OF THE CALIFORNIA BIGHT

FIGURE 42 (NEXT PAGE): HISTORIC COASTLINES OF THE CALIFORNIA BIGHT



COASTLINES

- Current
- 8000BCE
- 10 000BCE

0km 10km 20km 40km



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