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After MOSE

working lagoonscapes + living with sea level rise

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Preface

The acronym MOSE appears 565 times in this text, but I've seen the thing it describes in action only twice. Like a physicist who studies particle collisions, I look for traces and signs of this thing to understand its nature, and in this case what concerns me is its story. Who tells it, how it can be told, and how it ends. The story of MOSE does not yet have an ending, but it needs one, and that ending will be part of the future of Venice.

MOSE stands for *Modulo Sperimentale Elettromeccanico* and consists of many mobile barriers that can be activated to separate the Venetian lagoon from the sea. Originally designed to protect the city from exceptional storm surges, it is now used to keep Venice dry during ever-higher tides in a world experiencing global sea level rise. When not activated, the iconic yellow panels rest under the water, out of sight. When they do raise up, the event is literally a division of the waters, like the old testament story of Moses (Italian: *Mosè*) from whom the project gets its strange name. It is not uncommon to hear the story of Moses repeated when the story of MOSE is told, yet not many MOSE narratives tell what came next in the tale. After Moses parted the waters of the Red Sea, allowing the Israelites to escape Pharaoh's army, they then wandered in the desert for forty years, looking for a promised land. Though the analogy is a poor one, it suggests that after MOSE is the time to wander and look ahead, though hopefully determining what comes next will not take forty years.

This thesis is the result of my attempts to follow MOSE around Venice and ask people involved working within or near it about their experiences and concerns. Most of the learnings from the conversations that inspired these chapters can be summarized in two claims. First, lagoon decisions should be accountable to those who they impact, transparent to the public, and respectful of its workers and their working environmental knowledge; MOSE so far has mostly not lived up to these criteria. Second, mobile barriers work for now, but they won't last very long. Both statements leave high uncertainty for lagoon futures.

In the final section of this thesis, I work with speculative thinking practices to explore possibilities now that MOSE is here to stay in Venice. My hope is that these stories call for expansive anti-colonial thinking and foster practices based on social trust. Alarming changes are here; do inhabitants have foresight and wisdom to adapt?

Introduction

Working on MOSE

This thesis takes MOSE workers' perspectives as a starting point for building livable lagoon futures. I use methods of anthropological and historical analysis, first to define the experiences that have shaped working knowledge of and narratives around MOSE, and second to ask if MOSE as a working space may be a site from which it is possible to rework and reimagine human relations to the lagoon. The central claim of this thesis is that working experiences of MOSE are perspectives essential to assembling a viable transition to livable futures, where the mobile barrier project may be part of adaptive transformation practices rather than remaining a symbol of rigid defense. Bottom-up participation in lagoon futures relies on conditions of trust built between institutions and the many divergent realities that inhabit the lagoonscape, but social trust is currently very low. What models, proposals, and opportunities for futures of abundant trust exist in the Venetian lagoon?

On 3 October 2020, the mobile barriers around Venice were a site of anxious preparations. For the first time, the large yellow panels of the MOSE system would be raised for a high water event, cutting off the Venetian lagoon from the Adriatic Sea. An engineer remembers that his team of workers didn't know what would happen that day. He called a colleague to express his nerves about the coming tide that could reach 180 cm above the local datum: "look, I don't trust it, I don't trust it, I don't trust it..." The colleague reassured him it would go well. With long hours and triple-checks, sometimes going down from their computers to literally touch the equipment that would raise each panel, the MOSE workers that day used their knowledge about a complex system to activate the mobile barriers and keep the city dry. Curious Venetians watched from the jetties as the barrier successfully went up, standing three stories tall. On the seaward side were rough and high waters, while on the lagoon side they were flat and calm, and seagulls were floating by, unimpressed. "It gave me goosebumps," an administrator says. "Satisfaction," says a technician. 'Relief,' says an engineer.

The first mobile barrier activation events mark the start of the period that I call *after-MOSE*, adapting the phrase from those who work on the project. Its ability to block high water events from the lagoon brings a fundamental change to the rhythms of activity across the *working lagoonscape*, an assemblage of all the buzzing human and nonhuman interactions that

take place within the Venetian lagoon and connect with other socio-ecological spaces beyond it (cf. Ostrom 2011).¹ I play on the word ‘working’ in its double sense of ‘active labor’ and ‘temporary, likely to change.’ Understanding Venice as a working lagoonscape implies that it is always-already transforming from below. The after-MOSE period is a particularly dramatic shift, however. Real estate prices for ground-floor apartments have shot up since late 2020, and now anyone who travels across or works in the watery spaces of the lagoon must know whether the inlets to the sea are open or closed.

The label ‘after-MOSE’ also points to a curious new conceptual formation about what might come next for *lagoon futures*, or possible rearrangements of the working lagoonscape. As the opening description shows, MOSE breaks down into many different realities depending on how one is positioned relative to it (cf. Bubandt 2017). From the workers’ computers, MOSE was tangled with uncertainties and open-endedness during the first activation event. From the spectators, it was an evocative spectacle contributing to a civic narrative of hope and/or fear. For the seagulls, it was the arrival of a new being into the cacophonous lagoon. The after-MOSE period raises questions about how to make sense of this entity and its presence in the wider lagoon context, with particular attention to its role in adaptive transformation.

Situated at the three inlets connecting lagoon and sea, MOSE is already a piece of lagoon futures. The decisions that have been and will be made about its operations impact the entire working lagoonscape. However, deliberations about when to activate the mobile barriers and who gets to have a say in the process happen mostly away from the lagoon inlets. The group of people who I refer to as *MOSE workers* are engineers, technicians, and administrators who monitor the mobile barrier system and its relations to larger social, ecological, and political realities of the lagoon. They have a deep working knowledge not only of the infrastructure and environments that they are tasked with “safeguarding,” but also of the unfolding tensions around governance of a project that is loaded with a history of corruption, opacity, and uncertainty.² Because of their roles in trying to maintain the working lagoonscape and analyze the impacts of the project, MOSE workers are at the center of my research. The narratives presented in this thesis are based on conversations with some of these people in an attempt to understand what lagoon futures are being imagined from the work spaces around MOSE.

¹ Similar to what Tim Ingold (1993) calls the “taskscape,” the sum of active embodied experiences beings woven into and partially synonymous with the lagoon. See also Hayward 2012 for “assemblage” in the Venetian context.

² For a comprehensive history of this project and the applied legal concept of “*salvaguardia*,” see Mencini 1996.

The heart of MOSE operations is located at Arsenale Nord, in the north-eastern tip of the historical center of Venice, where three main firms have their offices. In 1984, the Italian state granted exclusive rights to build and operate MOSE to a consortium of private companies, Consorzio Venezia Nuova (CVN). Since the beginning of construction in 2003, CVN has given sub-contracts for specialized works to private firms, while most of its in-house employees coordinate the operations. At the outset of my research I had expected to be speaking with workers wearing orange vests and operating heavy machinery, but the unusual public-private arrangement around CVN made a strong divide between workers with coordination duties and construction duties, and I opted to focus on the former on account of their availability and willingness to host my research. Most conversations took place with workers from CVN and two connected firms, Thetis s.p.a. and Comar, which are responsible for monitoring and operating MOSE. On the several occasions that I made a visit to Arsenale Nord, I first checked in at a heavy blue gate strung with flags for local unions. Then walking past a verdant garden filled with sculptures, I would wait in the courtyard for my contact to swipe me into their office building, where we sat and talked at a conference table under large windows that let the sunlight in.

Beyond Arsenale Nord, city offices and workers' union headquarters have been other arenas for high-level decisions from the beginning of MOSE, and they will continue to be sites of intense discussion going forward. The administrative offices housed in historic buildings at city center represent the *ex-Magistrato alle acque* (ex-Water Magistrate), dissolved after the MOSE scandal of 2014 and now nominally part of the *Provveditorato interregionale per le opere pubbliche* (Interregional Superintendency of Public Works), but still involved in the project. Because the national government is in charge of "safeguarding" Venice, local offices are now limited to receiving and distributing national funding, as well as approving the nominations for the *Autorità per la Laguna*, discussed below.³ When I visited my contacts there, I walked through rooms with marble floors and grand wooden desks overflowing with papers.

At other times, I went to meet local union leaders at their offices on the mainland. For over two decades now, workers' unions have followed MOSE's politics because of their broad implications for issues across the working lagoonscape. Union leaders have been especially concerned that interventions at the lagoon mouths will affect shipping traffic and jeopardize long-term port viability. Confederated unions CGIL, CISL, and UIL historically support port

³ Thanks to a *Provveditorato* employee for clarifying this point.

activities for how they bring economic benefits to working families, and so they tend to oppose projects that endanger port operations. However, the same unions also represent MOSE workers. Thus, some local branches take a strange position: criticizing aspects of the MOSE project while working hard to protect the rights of its workers. In these spaces, functional office furniture filled the rooms where we sat and talked, and plain windows looked out onto the adjacent overpass.

All these workspaces, from CVN offices to union headquarters, will be highly affected by the arrival of the *Autorità per la Laguna* (Authority for the Lagoon), a public entity now expected to be formed in 2025. The *Autorità* was decreed by national law in August 2020 as a means to consolidate the lagoon governance system, which is currently fragmented and changing rapidly with the addition of MOSE. It is expected that the *Autorità* will bring a new governance arrangement to the lagoon, but no one knows exactly what it will do. As of this writing, the *Autorità* is experiencing four years of delay, and many Venetians are grumbling about the choice of Roberto Rosetto, a retired urban planner with no lagoon management experience, as the president of this new entity.⁴ MOSE workers whom I spoke with, however, are largely hopeful that the *Autorità* can step into its duties as soon as possible to overcome the chronic state of uncertainty that has plagued their workspaces in this transitional period.

The remainder of this introduction sketches the relationship between MOSE operations and the rest of the working lagoonscape in a period of rapid socio-geological change. I use a framework of moral ecology to map divergent claims about MOSE's impacts, then dive into a brief overview of MOSE as remembered in local memory, from the 1966 *aqua grande* to the first activation in 2020.⁵ The mobile barrier system, I argue, is an infrastructure whose dominant relation to Venice has followed a protection narrative that perversely makes the city downplay future risk. Sea-level rise, in particular, haunts what comes next for the working lagoonscape. I then describe how I have combined interviews, participant observation, and speculative writing practices in my attempt to make good research relations and offer a possibilistic vision of the future of MOSE. During community peer review, one of my contacts remarked he enjoyed my optimistic tone but was not convinced that Venice would or could turn to a participatory model of making lagoon relations. Perhaps now it seems improbable. This thesis is an invitation to wrestle with rigid structures so that one might walk away covered in hope.

⁴ See *Venezia Today*. 30 May 2024. "Via Libera Della Corte Dei Conti a Rossetto..."

⁵ I use the Venetian spelling of *aqua alta* (high water, or 'king tide') and *aqua grande* (exceptional flood event).

A moral ecology of MOSE

One critical concept for discussing MOSE is the *moral ecology of infrastructure*. At the root of the concept is the word “ecology,” from the Greek word *oikos* for “home” (cf. Cohen and Duckert 2017). Here, “ecology” refers to the innumerable relations between beings that inhabit the Venetian lagoon. A moral ecology, then, is a sort of swirling basin in which are collected diverse claims for what constitutes good relations: these claims may agree or disagree with each other, but they still sit together in the moral ecology space. Therefore, a moral ecology of infrastructure, as theorized by Caterina Scaramelli through her fieldwork in the Gediz Delta, Türkiye, is “people’s notions of just relations between people, land, water, and nonhuman animals, plants, buildings, technologies, and infrastructures” (2019, 389). It gives particular attention to how ecological relations with infrastructures may be not always be just oriented toward toxic outcomes, or else to “living in the ruins” (Tsing 2015), but also how infrastructures and the beings around them can co-exist without falling apart (Scaramelli 2019, 390).

In this way, a moral ecology of infrastructure provides a theoretical framework that overcomes reductive narratives (e.g. MOSE is good, MOSE is bad) and also looks ahead to what could come next. Scaramelli works to bring forward her collaborators’ “assessments of justice and motivations for action” based in their lived realities, which are “embedded in capitalist, corporate, and neoliberal transformations of environmental relations” (*ibid* 396). In the Gediz Delta, a shallow tidal ecosystem, recent infrastructure changes such as dams, walls, and bridges are differently perceived as increasing or decreasing the livability of the place (405). These are only understood, however, in relation to previous infrastructural practices: for instance, some scientists wanted a small fishing lagoon to be “brought up to code,” while for local fishers the scientists’ interventions led them to write complaints and take legal action (403). In a moral ecology of infrastructure there is no return to a pure and ‘natural’ environment, but only negotiations within place-specific power relations and material transformations.

So too, moral ecologies in the shallow waters of the Venice lagoon are contingent on a specific history and set of relations. Universal ‘solutions’ to the Venice ‘problem’ get stuck in the mud. One must be familiar with particular interactions between humans, nonhumans, and the waterscape to begin to glean learnings from place. I call the familiarity with these particular interactions and their moral implications *lagoon relations*, adapting the term from what Max

Liboiron calls “Land relations.”⁶ They write from Newfoundland and Labrador that “Land is fundamentally relational and is *specific* to those relations” (2021, 45). Writing from Hawai’i, Candace Fukikane argues that using expertise to map specificity against the grain of exploitation is the normative orientation that drives active research, “enabling us to unblock interlocking systems of power” (Fujikane 2021, 17-18). As Liboiron would say, making good lagoon relations “requires critique but mostly it requires action,” and does not universalize (2021, 6). Thinking this way has clarified some of my obligations, which are to my adopted community’s well-being before any individual gain. Obligations, Liboiron adds, preclude or discourage colonial relations including extraction and land (or lagoon) occupation (2021, 24).⁷

Attempts to make good relations out of the moral ecology of infrastructure in the Venetian lagoon stretch back through its multi-millennial history. In the lagoon, a plurality of beings collaborate, together making the territory undergo slow geologic change (Iovino 2015, 52). Its body is formed of an archipelago of salt marshes and mudflats, modulated by tides and river flows, and inscribed by waterways winding and splitting themselves in all directions. As many Venetians would say, it’s a unique place formed by the ingenuity of ‘man.’ One should also fill in the labor that goes unsaid, the interactions between plants, nonhuman animals, and invisible humans like women and forced workers that have made the infrastructures of the working lagoonscape (Porzionato 2021; Calaon 2015). Humans have reinforced the banks and dredged the bottoms over time to make habitable islands and navigable canals, at times through consensus-building processes and at times under dominating land ethics. One of the most notable examples concerns the *Magistrato alle acque* (Water Magistrate), an institution formed in the early 15th century to address the silting problem at the lagoon mouths (Luzzini, in Baldacci et al 2022, 29). Over nearly two centuries, they enacted a process to deliberate about and perform, through trial and error, a river diversion of the Brenta River in 1610, which generated much

⁶ Note that Liboiron (2021, 6n19) uses the capitalized “Land” to denote a complex of moral, spiritual, and physical obligations to place, inclusive of all social-ecological entities therein. While I cite Liboiron out of deep respect and gratitude for their work, in my own words I do not write “Land” or “Lagoon” because I am not entitled to it. However, where I use ‘land’ or ‘lagoon’ it always gestures to my possibilistic, multi-layered way of understanding place, unless denoted otherwise, e.g. ‘colonized land.’ Emphasis in the original.

⁷ This is the reason why I avoid the universal “we” in this thesis; I do not assume that your obligations to place are the same as mine, because they’re probably not. That said, many of the guides for this anti-colonial land relations work are adopted (with gratitude and humility) from Black or Indigenous analytics of place, and when adapting these ideas to the Venetian lagoon I want to embrace the awkward fit. It is an invitation to reflect on which general principles of intersectionality work in this place and which its inhabitants must build together rather than stealing.

controversy at the time and now forms the basis of socio-geological arrangements in the Venetian lagoon (Omodeo 2022).

MOSE, therefore, is just the most recent crisis point within the lagoon's moral ecology of infrastructure, though it is an especially critical site of world-breaking lagoon relations given trends of sea-level rise, changing species compositions, lagoon depopulation, increasing water temperatures, and more frequent extreme weather events, just to name a few of the many factors flowing through this place. As the chapters of this thesis show, inhabitants make multiple, often diverging claims about MOSE: sabotage to heavy machinery, mutterings about changing currents, and barrier island compensation projects all enact moral stances relative to the mobile barrier system and push narratives about what constitutes right action in ongoing relation with the lagoonscape.

MOSE, a brief overview

The mobile barrier project called MOSE came into being over the course of several decades. To understand why the moral ecology of MOSE has been so contested, I offer a brief summary of the main debates that have shaped its trajectory and made a lasting impact in Venice's collective memory.

An exceptional flood came to the lagoon in 1966, eventually prompting the Italian state to decree that protecting Venice from future flooding was a project of national interest. It's difficult to attribute clear causes of the flood, but at the time local activists blamed the recent creation of the *Canale dei Petroli*, a deep passage cut through the center of the lagoon in the mid-1960s to let cargo ships reach Porto Marghera, Venice's newly-created industrial area on the mainland. The highway-like channel, activists claimed, allowed storm surge to rapidly enter the lagoon and cover the city streets with water up to a meter deep.⁸ In response to this and other concerns, the national government issued the first special law for Venice in 1973:

The Republic of Italy guarantees the safeguarding [*salvaguardia*] of the landscape [*ambiente paesistico*] and historical, archaeological, and artistic environment of the city of Venice and its lagoon, protects [*tutela*] its hydraulic equilibrium, and preserves its environment from atmospheric pollution and from water and assures it of socioeconomic vitality in the context of its general development and of the territorial resources of the Region. (117/1973, 1.1; author's translation)

⁸ See later chapter "Protest around MOSE" in Lagoon Talk for more on this debate.

As the First Republic worked to steady the nation after World War II, the state took greater part in regional management. Under the 1973 special law, the national government required a comprehensive regional plan that would stop land reclamation, cap industrial development, and encourage maintenance practices like salt marsh preservation (Mencini 1996, 11).

The question of how to “protect hydraulic equilibrium,” however, was divided into two camps, each interpreting the special law differently. On one side were those who favored diffuse maintenance practices that could sustain the lagunar characteristics of Venice. They pointed out that the national mandate clearly states that any intervention must to be “gradual, experimental, reversible,” three famous criteria for low-impact actions (*ibid*, 35). In their analysis, industrial projects like the *Canale dei Petroli* were responsible for floods and therefore reduced livability. On the other side of the debate were those who favored barriers at the mouths of the lagoon to block high water events. They pointed to the key word *salvaguardia*, or “safeguarding,” and argued that diffuse interventions alone would not protect Venice from exceptional flooding. Their analysis instead held that increased flooding was a natural event unrelated to industrial development (*ibid*, 62). Both camps were responding to a singular traumatic event rather than focusing on long-term climate adaptation. Over the 1970s and 80s, the camp in favor of interventions at the mouths of the lagoon prevailed over those supporting diffuse maintenance projects, and the latter group became increasingly marginalized under state-driven plans for lagoon protection.

Once “safeguarding” became the dominant strategy, the state made a second special law in 1984 to execute the project through a “sole concessionary” body. This controversial decision gave all responsibilities for lagoon safeguarding interventions to the aforementioned Consorzio Venezia Nuova (CVN), a special-interests consortium of private firm. The arrangement allowed executives of CVN and its clients to make enormous financial accumulations from government funds. To maintain their lucrative position, CVN consistently argued that Venice needed a large project at the lagoon mouths, citing scientists who gave evidence that diffuse interventions would not be enough to avoid catastrophic floods (*ibid*, 30). Various designs were proposed, and industrial interests voiced their support to lagoon mouth interventions as long as the project could maintain port operations (*ibid*, 26).

From the late 1980s to the early 2000s, political interests pushed through the contested proposal known as MOSE (*Modulo Sperimentale Elettromeccanico*), overriding any remaining opposition. Despite its shortcomings, the design was highly favored by the technical committee and after a long series of debates was approved by the city council in 1990. Giannandrea Mencini writes that local leaders voted for MOSE with a sense of urgency, realizing that “if the greenhouse effect made an increase in sea-level, in the future *acque alte* might become practically an everyday phenomenon” (1996, 84). Yet many critics continued to point out that MOSE was not “gradual, experimental, or reversible” in any way. During his two terms as mayor, philosopher and politician Massimo Cacciari tried to roll back plans for the “project to the maximum” and advocate for low-tech maintenance approaches, or at least alternative designs to MOSE (*ibid*, 39; Benzoni and Scaglione 2020, 52).⁹ However, the Berlusconi government had a firm interest in building MOSE and other large projects of national interest, even if it meant overriding local concerns. The first stone for MOSE was laid by prime minister Silvio Berlusconi on 14 May 2003, symbolically confirming a dominant state presence in lagoon relations (Benzoni and Scaglione 2020, 83).

In the larger picture of Italian politics, MOSE was at one time seen as a way to create livable futures based on the promises made to citizens in the late 20th century. The project came of age in a time of increasing prosperity in northern Italy, and the 1966 flood represented a major rupture to the sense of increasing quality-of-life. The flood and the ‘years of lead’ immediately after were growing pains for citizens newly recovering from deep divisions in their home territory during World War II. For a national government to take on a safeguarding project in the 1970s was largely celebrated and trusted in a way that no big construction work is trusted in Italy today.¹⁰ Only the *Tangentopoli* scandal of the early 1990s awakened an Italian public to how public works contracts often diverted large kickbacks to politicians and industry leaders. In the wake of these crimes, media mogul Silvio Berlusconi rose to power in a center-right coalition. The Berlusconi era, argues Noelle Molé Liston, tried to patch over ruptures to progress by turning politics into spectacle. She writes: “What citizens have witnessed is a crisis in how facts are authenticated, how certain propositions come to be verified as true and false, and how the multiplicity of propositions leaves that process open for political manipulation and exploitation”

⁹ See also document by Gabinetto del Sindaco, Città di Venezia, “Proposte progettuali alternative...” 2005.

¹⁰ Personal communication with Giannandrea Mencini.

(2020, 17). This readiness to exploit misinformation and to ride the tides of populist opinion allowed politicians to cement MOSE as an important national project with “no alternatives” (Benzoni and Scaglione 2020, 33).

Now in the early 2020s, made-for-media populist opinions continue to dominate the official narrative, celebrating MOSE for its ability to safeguard Venice. A *Fortune Italia* magazine issue devoted to MOSE is an unparalleled source of praise for the project. Prime Minister Giorgia Meloni writes that MOSE is a “state-of-the-art engineering marvel designed to protect Venice from detrimental tides” and adds that “the history of MOSE serves as a valuable lesson for the future, underscoring one of the many virtues of our people. When faced with ambitious objectives, Italians innovate and find solutions with an explorer’s spirit.”¹¹ Contributions from former Deputy Prime Minister Matteo Salvini, President of the Veneto Region Luca Zaia, and Mayor of Venice Luigi Brugnaro all praise the “Italian triumph” represented by MOSE, constructing a narrative where “Venice ‘mastered’ the waters, demonstrating to the world that we can protect the frailty and fragility of a city that is at the forefront of the consequences of climate change.”¹²

However, the political claims about MOSE’s success are not altogether representative of its actual function. The system was not designed to be easily maintained, operated many times each year, or completely stop a sustained high water level. MOSE is a set of mobile barriers, and like a trapdoor, each of the seventy-eight panels that make up the barriers usually sits flat in a concrete unit on the bottom of the lagoon. When activated, they all swing upward and emerge from the water to make what looks like a long yellow line when seen from afar. This floating wall blocks the incoming seawater, creating a temporary height differential between lagoon and sea.¹³ While effective, this design has a few peculiar features. First, the hinged panels were designed to remain out of sight when not active.¹⁴ ‘Out of sight, out of mind’ also makes them out of reach. They are invisible to the public and inaccessible to maintenance workers while resting under water. Each panel is a custom piece of machinery that for maintenance must be detached from the lagoon floor, ferried to dry land, and repaired by another set of skilled workers. Second, the panels are ballasted: pumps fill them with air to raise them and with

¹¹ In *Fortune Italia* magazine, “MOSE ingegno italiano,” 2023, English in the original.

¹² *Ibid.*

¹³ Consorzio Venezia Nuova, *Venezia / MOSE: Tecnologia, sviluppo e innovazione per la difesa ambientale e costiera*, pamphlet, 2017. See also Vianello 2021.

¹⁴ This seems to have been a design compromise between environmentalists and engineers in the 1980s.

seawater to lower them down. It works, but the system requires a very specialized knowledge to operate. Ballasting seventy-eight panels at once is quite different than activating a few motor-operated gates. They need complex supporting systems that must be constantly checked by technicians to guarantee smooth operations. Third, the seventy-eight panels are detached from each other, leaving a small gap of around ten centimeters between one and the next. MOSE, therefore, is not watertight. The water level in the lagoon still rises when MOSE is closed, just at a much slower rate. If closed for several days, the water level in the lagoon would eventually match the sea level outside (Umgeisser 2020).

During the early years of debates, several alternatives to MOSE sought to overcome the drawbacks named above. At various times, engineers suggested designs like inflatable barriers, side-closing barriers, fixed removable barriers, gravity-driven mobile barriers, and offshore port relocation.¹⁵ All of these seem to have been rejected because of political influence in favor of MOSE. In recent years, the strongest voice for MOSE alternatives has come from hydrologist Luigi D'Alpaos (2019), who suggests reconstructing salt marshes, changing the shape of the jetties, and raising the foundations of the city, instead of a single ineffective project. His writings continue a long line of critiques of MOSE that favor holistic lagoon management. The lack of consideration given to alternatives is part of the lagoon's moral ecology of infrastructure. Wherever large projects take attention away from necessary maintenance practices, a care-less lagoon relation comes into play.

The MOSE-driven moral ecology of infrastructure continued to sustain some promises and break others. From 2003 and still ongoing, MOSE has been constructed at the three lagoon mouths – Lido, Malamocco, and Chioggia – even though it was originally intended to be finished within a decade. At the peak of construction, CVN contracted with hundreds of workers from many firms all across Italy, and even a few abroad (cf. Costantini 2005). In 2014 the 'MOSE system' of kickbacks and corruption at CVN was exposed to the public. A massive reorganization ensued, with more state control at CVN and the nominal dissolution of the centuries-old *Magistrato alle Acque*, which failed to provide oversight on the project (Benzoni and Scaglioni 2020). Since 2014, most of the firms that remained were local contractors, and funds were diverted from other lagoon projects to complete MOSE rapidly.¹⁶ After the November

¹⁵ See note 7.

¹⁶ Interview with CVN administrator.

2019 *aqua grande*, CVN was under enormous pressure to activate MOSE, which it did a year later on 3 October 2020, with a successful test during a high-tide event (Vianello 2021).

To the Venetian public, MOSE is a political event that still evokes pain, whether because of its hydrological impact, the way the process overrode local interests, or the ring of corruption that smeared Venice's global reputation. Even though it works, few residents or workers fully trust the politics around MOSE. Venice has not yet healed from the traumatic process of *salvanguardia* and the exceptional floods. Most of the workers who I spoke with maintained scientific cool-headedness about high water events but were nevertheless challenged by the controversy swirling around this project, and administrators complained to me about the internal chaos caused by the 2014 blitz that slowed down restoration projects. Under current political arrangements, MOSE continues to trouble ways of knowing what is going on in the lagoon.

Now that the project is functioning, there are at least three major implications for the 'after-MOSE' period. First, MOSE workers use this phrase – *il dopo Mose* – to describe a major context change. The *Decreto Agosto* of 2020 will reshuffle the working lagoonscape under the *Autorità per la Laguna*, and the October 2020 activation of MOSE has dramatically changed everyday life in the city. Second, MOSE has raised a major socio-environmental question: 'Is this a big change or a small change?' It will be answered only once MOSE has started to function regularly for a long time. Answering 'a small change' would mean that the Venetian lagoon has only been momentarily unbalanced and that inhabitants can still hold good lagoon relations with and despite MOSE. However, answering 'a big change' would suggest that MOSE fundamentally upsets sustaining dynamics of the pluralistic lagoon system and has catalyzed a major socio-ecological rupture slowly unfolding across space and time whose effects are not yet understood (cf. Magnason 2021, 155). Third, 'after-MOSE' suggests a narrative imaginary that anticipates the end and afterlife of this large intervention (a formulation from Buck [2019] that also inspired the title of this thesis). As climate adaptation infrastructure, MOSE will be a temporary measure that will inevitably be superceded by some future choice about what comes next, even if that choice is non-action.

Lagoon relations in the after-MOSE period is a lasting matter of concern. Holly Jean Buck uses the following question to evaluate large climate interventions: "Is this proposed program or project likely to produce a livable world 200 years from now?" (*ibid*, 48) The people who decide what comes after MOSE will have to answer that question. In doing so, my hope is

that they will enact good lagoon relations, such that in a thousand years people will be proud of the history that is being made now.

Meta-infrastructure and flood risk

The mobile barrier project lies in a contentious relationship with the working lagoonscape. Key sites for local livelihoods are Porto Marghera's industries, the historical center and its tourist economy, and the wider lagoon's tapestry of fishing, recreation, and habitat restoration. In theory, MOSE represents a *meta-infrastructure* that can safeguard Venice's productive industries from climate change (Buck 2019, 45). This is the capital-centered framework that tends to drive most economic analysis of MOSE (e.g. Giupponi et al. 2024). Sea-level rise, if left unchecked, threatens to disrupt the current business-as-usual arrangement of port and city economic activities (Magnan et al 2022). Massive investments in low-lying areas in Marghera and Venice have given rise to the sunk-cost fallacy, or a situation in which further investment to protect one's assets seems like the only viable option. Buck indicates that similar path-dependency is also driving extreme interest in climate geoengineering, which promises to act as "a blanket infrastructure preserver" for the 13 trillion USD sunk into fossil fuel infrastructure across the globe (2019, 45; cf. Wissen and Brand 2021). MOSE enacts this relationship on a smaller scale, largely shielding the historical center's cultural heritage from high water. However, workers' unions and business leaders raise debates about how much it actually protects port operations, since ships cannot easily pass in and out of the lagoon when MOSE is activated; and fishers have long argued that MOSE completely disrupts their livelihoods because of its impact on lagoon currents and tidal cycles.¹⁷

At a first level of analysis, then, MOSE appears to mostly serve the interests of the historic center. Venice is often treated as a fragile piece of cultural heritage to be seen and saved, but this narrative is being challenged by insistences that it is part of the working lagoonscape. Shaul Bassi (2011) writes that re-narrating Venice's ongoing labor relations figures the city as a transformative place rather than plastering it with easy tropes of decline, techno-salvation, or artistic transcendence. Two famous literary descriptions of Venice, he point out, are based in everyday labor: Dante's appraisal of the Arsenal's shipbuilding industry ("some hammer at the prow, some at the stern") and Shakespeare's mercantile intrigue ("what news on the Rialto?")

¹⁷ See essays "Fishing in Changing Currents" in Lagoon Talk and "Consenting to MOSE" in Lagoon Trust.

both signify work spaces (7). Currently, Venice's economy is dominated by the tourism industry and associated services, which under a neoliberal approach is leading to urban depopulation. Ecologists and economists have put forward strong evidence that, despite rhetoric implying that MOSE has saved Venice and overwhelmingly benefits Venetians, the mobile barriers help to stabilize overtourism as dominant practice and draw attention away from other important provisions for a livable city-lagoon matrix (Rova et al 2019; Giupponi 2022).

In the cracks of the state of affairs consolidated by MOSE as meta-infrastructure, inhabitants of the working lagoonscape are re-negotiating their relations to water. While the neoliberal policies encouraging depopulation are occasionally countered by bottom-up activism from student and citizen groups with slogans like "here we live and here we stay!", a longer-term problem for residents is what living in the after-MOSE period means. Before 2020, the phenomenon of *aqua alta*, or nuisance flooding, was a particularly visible sign of sea-level rise that residents adapted to with low-tech infrastructure (Snedeker, in Baldacci et al. 2022, 77). For example, my neighbor's door has a removable wooden panel meant to keep the water from coming in, on which is hand-painted "SUPER-MOSE."¹⁸ Pre-MOSE flooding was something annoying but expected among residents. "Excess water temporarily in the city is not necessarily a concern if people are prepared for it, do not become casualties, do not lose property, and can easily clean up afterwards with limited disruption," observes Ilan Kelman (2021, 82). Though exceptional flooding has caused loss of life and property, many fishermen and naturalists also know that periodic flooding is often a sign of renewal in a balanced lagoonscape, adds Rita Vianello (2021), and a team of scientists even point out that storm surges are crucial for healthy salt marsh growth (Tognin et al, 2021).

Since the mobile barriers have been regularly activated to stop high tides, however, water is treated not as much a element of the place as it is a force that can be controlled (cf. Luisetti 2019). In this way, MOSE resonates with large infrastructure designs from the Fascist period, during which leaders believed that "nature must be tamed, bent to the needs of modernity, literally harnessed by technology and science. But it does not lose its beauty because of this" (Armiero et al. 2022, 66). Beyond simply carrying a nationalistic tone, MOSE reenacts a narratological desire to reclaim zones of managed production (in this case, mostly for tourism)

¹⁸ A similar moment occurs in *Città delle Sirene* (Pellegrini, 2020): a man steps out of his home with some mortar and applies it to the barriers around his door. "This is the only MOSE that works, and it costs six euros" (22:00).

from unruly and threatening earth forces. Such political ecologies underpinned dam-building projects on the Italian peninsula as well as in its 20th century colonial land claims in present-day Libya, Ethiopia, and Somalia (*ibid*, 99). Current operations of MOSE, carrying forward an imperial relation to water, are able to control short-term flooding.

Living with water, however, always carries a *flood risk* that grows or shrinks depending on adaptation practices. MOSE has the peculiar effect of transferring Venice's flood risk to the future, writes Ilan Kelman (2021, 84). In the after-MOSE period, an average resident does not need to be attuned to the tides to go to school or pick up groceries. On a collective level, "the presence of water in a docile, pleasing manner, now fully controlled by MOSE, rather than it potentially causing harm and damage through vulnerabilities" means that city residents are not adapting to face long-term changes (85). Kelman adds that MOSE's "long-term costs are underemphasized, because Venice must flood at some point in the future at which time it will have a much lower level of flood-resistant properties, flood preparedness, and flood awareness" (84). For this lack of foresight, Serenella Iovino calls MOSE "the latest misreading of the city's material textuality" (2015, 55). One main effect of MOSE is to let residents ignore sea-level rise, allowing the Italian state to kick the Venice 'problem' down the road.

I encounter signs of Venice's reduced flood risk almost every day. The conversations retold in this thesis attest to how, since MOSE was first activated in October 2020, there has been a state change in city life. It is now taken for granted that the lagoon will not rise over 110 cm above the local datum, even in the worst storm, thanks to MOSE and the workers who operate it. Before October 2020, many residents were afraid that the panels would not work or would create a tidal wave when activated (Vianello 2021, 109). Now it's normal that my feet are always dry (though kiosks continue to sell single-use plastic boots to tourists). Several people told me the current general opinion is that MOSE was a mess and probably shouldn't have been built, but that few are complaining now that it's working. Venice now lives with MOSE.

Sea-level rise methods

To begin to study lagoon futures, it has been necessary to bring many methods together around sea-level rise in Venice. Since the center of my analysis is working lagoonscapes and good land relations, I have mostly focused on *how* futures are made rather than bemoaning *how much* the water will rise (cf. Rush 2019). This is an anti-colonial research practice, attempting to step

outside a paradigm fixed on scientific control to also consider other ways that humans and nonhumans make their many social worlds (Fujikane 2021; Liboiron 2021). Still, a brief review of the scientific literature is in order.

Sea-level rise happens differently in each part of the world owing to differences in local geology, reinforcing specificity in coastal land relations (Magnan et al 2022). It is hard to say exactly how fast waters will rise at each place, but what is indisputable is that it will happen. Venice is subsiding over time at a rate of 2-3 millimeters per year largely because of groundwater extraction for industrial purposes in the late 20th century, making it a particularly rapid site of sea-level rise (Ferrarin et al. 2013). Meanwhile, warming events, caused by industrial carbon emissions, locally symbolized by the smokestacks of Porto Marghera, have been causing non-linear phases of rapid glacial melt, causing Elizabeth Rush (2024) to say that “Antarctica’s going to pieces has the power to rewrite even our most personal maps.” A single particularly warm period could trigger a sudden pulse of sea-level rise, or it could proceed slowly and relatively steadily for years. The technologies used by groups like the IPCC to forecast carbon-emissions pathways are able to give fairly precise scenarios, indicating that Venice will likely experience an additional sea-level rise between 40 and 150 cm by 2100 (IPCC WGII 2022, 1828). However, it is dangerous to reduce lagoon futures to these numbers. Scenarios allow inhabitants to create and even design for – but not determine or control – what will happen (Simimian-Darash 2022, 17).

Anthropogenic climate change and sea-level rise are dominating the lagoon’s future, layering global earth systems transformations on top of local ones. For several centuries the lagoon has been in a state of net erosion, meaning that it tends to lose more sediment than it gains, and MOSE has continued this trend (Ghezzi et al. 2010; Ferritin et al. 2015). Without direct intervention, the lagoon will become less like an estuary and more like the open sea. Sea-level rise accelerates the transformation to a more marine environment, upsetting a stable sense of place (cf. Porzionato 2021). For this reason, loss haunts the narrative of the working lagoonscapes under sea-level rise (cf. Iovino 2015, 107). Seeing no coordinated multilateral emissions reduction plan on the global scale, local institutions are more oriented to adapting to rising waters (Hinkel et al 2018). Land relations, whether based in domination or care, influence choices of which adaptation actions should be taken and whose interests they should serve.

Adaptation choices shape trajectories for futures of the Venetian lagoon. A sketch of some possible lagoon futures can be seen in a general framework of six adaptation pathways for coastal cities, proposed by scholars Katherine J. Mach and A.R. Siders (2021):

- Walled: resisting sea-level rise via strong separation between water and land
- Elevated: accommodating sea-level rise via technologies that raise living structures
- Living with: accommodating sea-level rise via strategies that permit regular flooding
- Floating: accommodating sea-level rise via designs for water-based structures
- Consolidated: retreating from sea-level rise via managed relocation of structures
- Hybrid: using a variety of the above strategies in tandem to adapt to sea-level rise

Mach and Siders write that the wide range of adaptation strategies has not often been considered “because the motivation in most cases has been to avoid transformation: to enable people to continue living where and how they have in the past” (2021, 1295). Lagoon futures in Venice must be built in relations that confront sea-level rise rather than avoiding it. Learning from Mach and Siders, my research is grounded in a possibilistic framework, where all adaptation options and their ethical considerations are up for discussion, and I am especially attentive where *retreat* or *accommodation* strategies might help residents re-imagine lagoon relations.

Rather than pursuing a suite of adaptation strategies, coastal cities are now facing sea-level rise mostly through narratives of protection and risk-management.¹⁹ Dams, levees, and floodgates, while all part of ancient coastal architectures, are currently seen as best practices. New York, London, Shanghai, and New Orleans are all low-lying sites of dense cultural and capital investment that are now protected by defensive structures. The trend to protect at all costs obscures other strategies that may make more livable futures in the long run (Mach and Siders 2021; DeSilvey 2017). In this light, writes Sarah E. Vaughn, climate change must be understood as “a lived reality of settlement rather than as an abstract risk” (2022, 2). In other words, sea-level rise brings an inescapable paradigm shift to coastal urban life, and understanding it as something that cities must be defended from misses the larger point of making future livability (Siders et al 2019). With climate adaptation’s overtones of security-state rhetoric in major global

¹⁹ Though not all cities are the same; Dutch cities, for instance, are innovating with accommodation strategies like “making room for the river.” For an excellent review of new approaches tangled with colonialism and development narratives, see Colven 2017.

north cities, water becomes an enemy. It does not have to be this way: those who design cities may look to other living relations with water to refigure and refashion the future.

The larger ethical considerations that have grounded my research are also based on practices of anti-colonial research, which is fitting for a project resonating with neoliberal ethics and connected to Fascist-era dreams of control. Perhaps most importantly, I have avoided centering my analysis on the damages caused by MOSE, instead trying to map sites of livability and abundance where possible (cf. Fujikane 2021, 17). In practice this meant that before starting down some new channel of inquiry I would test the waters: does this research action further good lagoon relations, and does it take this place and its people seriously? (cf. Liboiron 2021; Ingold 2018) If not, it meant my inquiry was invalid. Here, I chose only to include stories that came to me out of non-extractive encounters so that uncritical colonial land relations would have no place in this work, and I hope I have done my best to fulfill that practice. Guided by these protocols, I started to ask around about MOSE, eventually getting to know people involved in the project. Over time, impressions and observations came to me while talking to workers, walking the lagoonscape, and writing about the future. I describe each of these methods in more detail below.

First, the bulk of my ethnographic analysis of MOSE is built on conversations with its workers from October 2023 to April 2024, conducted in Italian. Six of these conversations were recorded and transcribed as formal interviews with full written consent from the interview subjects and their employer, Consorzio Venezia Nuova. Wherever I directly quote from interviews, I put my collaborator's words in double quotation marks (“”). Other conversations were more informal, though they still took place with full verbal disclosure that I was asking questions about MOSE for a master's thesis. Talk from these conversations are based on my handwritten notes and are put in single quotation marks (‘) to indicate that they were not transcribed word-for-word. Most workers who I spoke with were quite curious to see my final report, since some had rarely spoken with colleagues about lagoon futures. Others were simply interested in how their working realities appear to an outsider. In May 2024, I returned a first draft of this thesis to everyone who I had spoken with, inviting them to comment on, dispute, or refuse my conclusions (based on protocols described in Liboiron 2021, 138).²⁰ Several workers

²⁰ The draft was translated into Italian and sent by email to all MOSE workers and lagoon residents involved in my research, indicating what sections our conversations had informed. This was accompanied by an invitation to give any feedback, including refusal to publish relevant sections. Out of fifteen emails sent, I received six responses over a two-week period. One sub-chapter was omitted from the final draft at the request of the people mentioned in it.

were generous enough to review relevant sections and point out where I left out a crucial point or made a misleading conclusion. I have omitted identifying details from my writing except when a source has requested that I use their name, and in these cases I have tried to represent them as best I can in return for their willingness to share their experience with me.

I also entered into dialogue with entities like art pieces, signs, artifacts, and texts. I approached some of them through the fields of visual anthropology and media studies to inquire about how they were produced and how they resonate with larger themes in sea-level rise narratives. When possible, I spoke with their authors to ask about these pieces. Thank you also to those who I was unable to contact who nevertheless added their voices to this research.

Second, I made observations and site visits around the lagoon. My desire to ground-truth what I was hearing in interviews led me listen to place (Fujikane 2021, 13). These visits blurred the line between desk work and fieldwork. I went several times to the barrier islands to get as near as I could to MOSE and observe its effect on the surroundings. The more illuminating visits, however, were invitations to go by boat, whether in a small fiberglass hull or a public vaporetto. In the lagoon space, “fieldwork becomes waterwork, with all the consequences of that switch,” observes Petra Codato (2023, 195). Sea-level rise storytelling is naturally amphibious and must express the blue part of the spectrum as much as it plays with gray, brown, green, and other prismatic ecologies (Cohen 2013). I tried to immerse myself in different settings to practice moving across perspectives and tracking what changed, noticing what has been realized and what may be possible (cf. Povinelli 2015).

Third and finally, I practiced speculative writing as a way to reflect on the lagunar world and its possibilities for divergent coexistence in the near future. I often used reflective writing to gather my thoughts about how I saw people around me building a future, and I occasionally used speculative writing to expand these actions into near-future realities. (Three of these stories are collected in the section “Speculations”.) Writing as ethnographic practice, argues scholar Anand Pandian, makes the area of study not so much an *ethnos* as a *kosmos*, a social world full of transforming pluralistic material formations (2019, 41). The characters in my short and drafty stories are forced to narrate future histories and the ethical choices that made their present *kosmos* come to pass. Pandian adds that “such figures mark the writerly ways that anthropology thinks and works through the world at hand, through concrete images of life and embodied forms of abstraction” (*ibid*). Writing practices, in turn, helped me to understand the future as a

possibilistic rather than probabilistic or deterministic. In other words, writes scholar Arjun Appadurai, the field of anthropology can notice ways that everyday people perform actions that imagine, aspire to, and anticipate a possible future (2013). The *kosmos* of the Venetian lagoon that I explored through writing practices is full of future-building actions that may inspire good land relations.

MOSE as practice offers a reframing of the future. The broader environmental humanities aspire toward the horizon of what to do amid global change on a world we humans don't fully understand. What's out there? What are the limits of the possible? Being a very dense object, MOSE at first felt to me like only a sign of despair for the future of the lagoon. Going deeper into its "ongoingness," however, it became less clear to me what MOSE stands for (Haraway 2015). More clear is how MOSE deflects attitudes and relations into new directions (cf. Morton 2013).²¹ A fluid sense of understanding is needed, I find, to make sense of the situation, even with empirical tools grounded in senses. As Pandian notes, "the here and now of worldly encounters" as empirical method can yield to "an unsteady interplay of presence and absence, a gesture toward what remains invisible yet is somehow present and palpable still" (2019, 33). In this light, I have learned that MOSE is not just disavowal of sea-level rise, but has also been a working effort, at times misguided, to take action in a situation rife with unknowns. This thesis is a gesture to how inhabitants are building possible lagoon futures in the after-MOSE period, a time filled with presences (new connections, lingering structures) and absences (decaying forms, closed-off worlds) of all kinds.

I find myself in Venice as a young researcher amid many transformations. I arrived here in 2022 for a masters degree in Environmental Humanities not long after three watershed events put Venice on the global stage again: the exceptional flooding (*aqua granda*) in November 2019, the COVID lockdown in March 2020, and the first MOSE activation in October 2020. I had no ties to the city except a desire to study in Italy. I had been learning the language for about a decade in school and was keen to know about environmental issues in other coastal areas. My home region is in the eastern United States, in the occupied lands and waters of the Wabanaki people now known as New Hampshire and Maine.²² I claim settler heritage in the US and foreigner status in Italy, and this combined with my passion for rowing and wandering across

²¹ As Timothy Morton (2013) would point out, MOSE does this because it is a hyperobject, a phasing and interobjective entity that 'we' are always-already within. This thesis, in a sense, is an attempt to attune to MOSE.

²² Sherri Mitchell (2018), among others, has been a guide to the history, heritage, and abundance of this region.

watery spaces makes the lagoon feel at once like a home and like an alien land.²³ It's a contradiction of belonging that is never so strong as when I practice *voga alla veneta* with my friends on the unsteady waters. An outsider perspective on a place is a blessing and a curse, and I hope it has given me some ability to be aware of this rapidly-changing place and its adaptation possibilities.

Talk, Time, Trust

I now turn toward three chapters that sketch working lagoon relations after MOSE and present possibilities for livable futures. The structure of the rest of the thesis is based on an aspirational formula for the lagoon:

talk + time → trust

In other words, I propose that participatory and proactive discussion around MOSE, carried over long-term thinking and with attention to multiple overlapping temporalities, can yield greater social trust across divergent lagoon realities. Trust, in turn, can be a starting point for guiding present governance systems to livable futures from below (Ostrom 2009). Models, proposals, and strategies for reinhabiting an adaption-oriented working lagoonscape already exist but have not been collected and stitched together. A robust moral ecology of infrastructure, with special attention to working-class environmental analyses, is necessary to bring these actions from the horizon to become everyday practices in the Venetian lagoon.

Personally, I hope that low-tech adaptive infrastructure – such as floating walkways, connective bridges, and spaces where the water can wash into Venice without causing disruption – will be the built future for a lagunar settlement ready to live with sea-level rise. Already, this future is imagined in the design project *Amphibia* and sprinkled amid local adaptive practices (Fredrick et al. 2021). Such visions, however, will not take place without deep discussion at national, local, and interpersonal levels about design for intergenerational living. MOSE has broken many promises. To repair lagoon relations it may be wise to “move at the speed of trust,”

²³ The term “arrivant,” which complicates the “settler-Native binary” as described in Fujikane (2021, 13), is the most accurate description of my experience that I've found, though I also have a intense privilege as an United States citizen and a native English speaker, which has made me try to avoid practices of “arrivant colonialism” as much as possible in a space that is already fiercely occupied by tourist arrivants, many from the US, each day.

as recommended by the participatory group First Light, working for land conservation and anti-colonial futures in my home lands.

The three chapter sections present a narrative-analytic mosaic of stories about the after-MOSE period, grouped around the three themes of the formula above. In “Lagoon Talk” I collect stories about past and present perspectives on MOSE, from personal reflections to impacts on multispecies worlds. I find that discussions around lagoon infrastructures already contain claims for what good lagoon relations may look like. In “Lagoon Time” I play with the meanings of *tempo* – time, weather, and rhythm – to dive into working perspectives with and around MOSE. Thinking about the futures of MOSE entails being attentive to how it warps focus to short-term politics of the event, while exploring long-term horizons reveal the project as a formation that may be re-thought. In “Lagoon Trust” I survey possible forms of social organization designed from below to address concerns about working and living in the lagoon. Methods for transformative change are available in the present but will remain marginal without broad trust between institutions. Finally, I conclude with three short speculative narratives that recapitulate the main themes of this work and propose a guiding political formation that I call the “Assembly for the Lagoon” that helps to write an end to MOSE’s story. As a hopeful future, it shows one of many possible ways to adapt top-down politics into more participatory and pluralistic arenas where good lagoon relations can be made again.

Lagoon Talk

Many perspectives compose the moral ecology of MOSE. Lagoon talk is the sum of positions and sense-making about the project, echoing across human and nonhuman working spaces. How claims are expressed and where they clash with other ongoing actions are not straightforward discourse patterns, though they do tend to run along lines of historical power. A careful reading of lagoon talk tries to be attentive to which voices are present, which voices are absent, and why. Notions of good lagoon relations from bottom-up work spaces tend to orient claims toward livability and make critiques to special interests that continue to exploit lagoon spaces without attention to working livelihoods. The following essays offer a mosaic of narrative-analysis that together reveal a widespread desire for re-working the terms of MOSE, though there is no firm agreement on how to do so.

This chapter is made of five component essays. First, in ‘A personal diary of MOSE’ I use a form of intimate ethnography to claim that MOSE still troubles Venice’s material textuality. Even if *aqua alta* is no longer a perceived risk in the after-MOSE period, high waters continue to unsettle daily life in Venice. Then casting out to the watery workscape, ‘Fishing in changing currents’ presents what I see as the Venetian fishers’ critique, namely that MOSE increases vulnerability. The third set of stories, ‘Protest around MOSE,’ compares two moments of activism in the late 1960s and early 2000s to draw out some of the legacies of a longstanding tension between mainland (working-class) and lagoon (citizen groups) environmentalism. Reading the current state of working lagoonscape politics, I suggest a strong possibility for talk between divergent-yet-overlapping claims for just lagoon futures. Then ‘MOSE strikes and other union concerns’ tracks union politics during MOSE construction. With an atmosphere of uncertainty in MOSE work spaces, I note how through collective bargaining experiences unions and workers are orienting toward a moral ecology based on solidarity politics. Finally, in ‘Multispecies stories of Ca’ Roman,’ I tune into how nonhuman beings including birds, mosses, and trees on an outlying island of the lagoon are experiencing MOSE. Our interactions indicate world-making possibilities in the shadow of top-down compensation work plans.

A personal diary of MOSE

Castello, Venezia

In late October 2023, high water waded into my everyday routines. During a particularly intense period of stormy weather and MOSE closures, I decided to leave a sketchbook open on my desk so I could jot down impressions, sensations, and images that came to mind. Off-the-cuff entries came from moments I witnessed firsthand or stories that I heard from friends. The turbulence made my experiment last for over two weeks, representing the longest continuous stretch of MOSE activity since its activation. Between 19 October and 12 November, the alerts sent to my phone notified me of seventeen tides above 110 cm and twelve MOSE closure events. From 24 to 31 October, MOSE was closed once per day, an unprecedented event.

I start from my own experience to spiral out into other stories, leaping into a multitude of perspectives only after checking my perceptions on the scale of data points of personal life. Practicing intimate ethnography means analyzing the social structures of one's immediate surroundings, and it tries to make sense of particular "methodological, emotional, and ethical issues" (Walley 2013, 15) that the author encounters each day. Christine Walley suggests "turning [stories] over in my mind's eye, viewing them from a variety of perspectives, trying to discover what could be taken away from them." (15; cf. Ellis and Adams 2014) This diary analysis unpacks stream-of-consciousness stories to understand sea-level rise and MOSE as seen from the historical center of Venice.

Why generate new stories? Serenella Iovino makes an invitation "to read the world as a text [as] a necessary way to create social forms of cognitive justice," what other practitioners might call "ground truths" (Iovino 2016, 75; Fujikane 2021, 3). Stories re-read with an eye toward interrogating their context are portals into questions of power and nonhuman entanglements. The diary shows that I am susceptible to the lagoon waters; it also demonstrates that MOSE has an ever-present effect on the people of this city. The act of re-reading works against the "alienated relationship (and, therefore, the misinterpretation) of reality," says Iovino (76). Reflecting on my experiences has been an exercise in seeing how I am implicated in the dynamics of the place where I live and not, as Sally Weintrobe (2021) would say, living in a state of exception above it.

25.10.23.

Double high tides today, both over 110 cm. MOSE was activated in the morning — all calm, uncanny when the tide appears like a brimming cup and some surface tension shimmers across its face.

MOSE not activated in the evening. I was gathered with some friends down at Zattere when we heard the siren call out one ring for 110 cm. The tide was unruly, waves more talkative and jostling than they were earlier. The number 5 and 6 vaporetto lines were suspended without announcement. Crowd on the platform started swearing and everyone piled onto the slower number 2 line. Strange encounters as we were forced off our normal commutes.²⁴

The evening of 25 October destroyed the possibility for me that MOSE created a state of exception for Venice. MOSE was not activated, despite the forecast, creating wide confusion while I was trying to get home from class. Profanities in my ear signaled a rupture of the expected. MOSE as meta-infrastructure normally supports services like the vaporetto (water bus) lines, which don't run usual routes during extreme high tides. I indirectly rely on MOSE to find transit to the other side of the island. The project was always part of my everyday assumptions, mental organization, and psychic geography.

26.10.23

MOSE activated again for two tides, one of which hit 120 cm — the two siren mark! But no sirens, because the water stayed down. It feels normal to be protected. Imagine how the day would be disrupted... The reports say this level of activity will persist through the end of the month, five more days, so that's a very frequent closure period.

I arrived in Venice in 2022, after MOSE was activated. Never having lived the time before this watershed moment, I know the call of the sirens only from documentaries. Residents don't often hear the siren anymore, and some Venetians recall it, with only some sarcasm, as a sign of 'the days of once upon a time.' So when it rang once on 25 October for the tide of 110 cm, it startled me. How strange that inhabitants could get used to hearing the sound of crisis.

²⁴ Texts have been slightly edited for brevity and to omit identifying details. Numbers expressed in cm represent water levels above the datum at *Punta della Salute*, the historical reference point for mean water level.

Already at this point in the month it was clear that we were in an unusually long period of barrier closures. Phone alerts came every few hours, and I was watching my personal reference point: the steps underneath a bridge not far from my apartment. Rita Vianello's field notes on flooding in Venice confirm that it's a widespread habit among residents to refer to a certain place that translates abstract tide forecasts into a site of water memory that one can touch and swear by, "based on the habitual observation of the phenomenon... these observations are often considered more credible" (Vianello 2021, 102). At such levels, writes Stefano Liberti, "whoever lives in the lagoon has an unconscious map with which they can calculate where they can go and what they can do depending on the centimeters reached by the water" (Baldacci et al. 2022, 193). But those mental maps go unused these days. MOSE bulletins only suggest what the damage *could* have been if the system were not there.

27.10.23

MOSE is up again for a tide of 150 cm, enormously high, over the four-siren system, but the panels will stop it at 85 cm again. Low clouds, fatigue from the rain because my laundry probably won't dry until Halloween...

Last night when MOSE was activated again I was sharing stories with my friends who keep a video blog, and one of them showed me a clip on her phone from when she got stranded in Calle Lunga S. Barnaba two days ago while walking home from work. Her friend brought rain boots. Tonight my flatmates went to San Marco and splashed around for fun, all grins when they got back.

Laundry, video blogs, commutes — all these mundane things take on a new meaning during *aqua alta*. A routine item becomes unfamiliar: what I take for granted has diverged from what has happened. These disruptions fall out in patterned ways according to increasing tidal surges and the flood barrier response. My laundry is disturbed by weeks of wild weather.

Even the humans in Venice who don't follow the tides like I do notice and discuss MOSE. An awareness of barrier closures, winds, and tides helps to anticipate when and where high water could impact the day. A particularly widespread form of collective understanding is sharing photos and videos of high water, though not necessarily for mapping the city in real time. I take out my phone cameras because I feel the urge to document a striking moment, like when water spills over the edge of a canal. Two recent documentary films set in Venice — *Molecole*

and *Città delle Sirene*²⁵ — include scenes where the videographer has chosen to film videos of *aqua alta* shown on phones, a kind of framing of the act of framing water. Photos and videos allow someone to position themselves within a larger civic event, testifying ‘I was there’ and ‘this is important.’ They open an occasion to commiserate about an inconvenience hitting everyone — though not in the same way — and about which everyone has a story to tell. I find that among young people especially there’s a kind of sad enjoyment in playing with (and in) the watery changes to place. It is all-too-possible, they say, to laugh and splash around San Marco while also being fully aware of its implications for global climate change.

28.10.23

Sunny day. MOSE activated for a tide of 135 cm.

It’s easy to form correlations between what we see and what we know is going on outside of our field of vision. I took a stroll to Giardini one morning and saw calm waters; I was rushing out in the evening and saw only turbulence. I project some of my internal temperament onto the water, and lagoon conditions imprint on me when I get around to noticing them.

29.10.23

Today I saw MOSE in action. Yellow beaten-up panels in a long line visible from the Lido-Pellestrina ferry. I didn’t expect it to be part of a morning beach walk, but there it was even when I wasn’t looking for it. Taller than I thought it would be.

In a sense, an autoethnography on MOSE is easy because it comes into daily life even when I think I have time ‘off’. Perhaps the surest sign that the tides are a strong acting agent on this city is that they force noticing (cf. Codato 2023). Everyone in Venice is a quasi-expert on the water when high tide comes.

After all the talk about the barriers, seeing them in person is a shock. I took photos of MOSE from the ferry and showed them at a conference months later. In this diary I wrote that they were taller than I imagined, but a participant’s first reaction was that they looked smaller and less threatening from the photo. One way or another, MOSE as infrastructure doesn’t quite

²⁵ By Andrea Segre (2021) and Giovanni Pellegrini (2022), respectively. This observation was made in Laura di Bianco’s seminar.

match up with MOSE as the character that we hear about, like when you meet someone offline and realize they appear different somehow from their online presence.

30.10.23

MOSE activated again, and the water at Zattere seems to be greeting whoever walks by — ciao! It makes a movement up and over the quayside, then retreats back down like a finger or a tongue.

I personify the water without thinking about it. Their noises become chatter and their jostling is intra-action. There's a sensuality where I wrote that simile: "like a finger or a tongue." My first reaction was to use a bodily metaphor for the body of water. The high-tide's manifestation at Zattere completes the sense that the lagoon's presence there is a particular phenomenon that I can recognize, and a further flash of insight gets me to know its body in an ongoing exchange with my own watery cells. "Bodies of water, as figuration, invite us to amplify a relational aqueous embodiment that we already incorporate, and trans-corporate," writes Astrid Neimanis (2017, 169). The spray dries on my skin.

31.10.23

MOSE activated again. Via Garibaldi is calm, the water strikingly still, even with the swirling winds that broke my umbrella last night.

As October ended, the incessant MOSE alerts stopped. On the first day of November I visited my friend on an outlying island, and on the way I saw many residents going to the cemetery at San Michele to lay flowers for the deceased, the boat taking them across tranquil waters. On that trip I realized that inhabiting the central island meant I was most alert to small watery disruptions outside my apartment and not as aware of the experience held by someone on an outer island, who may see MOSE as a strange and unnecessary project whose operations are largely unrelated to the possibilities of making a good life in the lagoon. Maybe that slight loss of a reference frame was what made me start this diary. I went back to the historical center. The next day there was mayhem on the vaporetto lines again, big swells rocking the crowded ferry platforms.

3.11.23

MOSE at it again today and yesterday. Super high tides but not yet overflowing the banks where I keep my personal eyeball estimate.

5.11.23

MOSE expected to be raised again today in a calmer atmosphere. Newspaper headlines say that MOSE was raised continuously for 32 hours — yikes! What would that do to a lagoon ecosystem?

9.11.23

Evening crisis! My boat was flooded with lagoon water because of a major tidal shift. Very low tide brought her down so far that the lines on her bow were caught on a submerged part of the pole that was decaying, and then a high-ish tide in the evening brought her up again even as one side was caught and pulled way way down to starboard, until the side was nearly level with the lagoon.

I cut the cord and bailed her out. A boat is caught in powerful forces between wind and tides. Barely got it all under control on my own.

Below a certain tide level everything is normal, but above the threshold the city changes face: take the *passerelle* (raised sidewalks) out, shift the vaporetto lines, avoid the flooded parts of the city, and remember to bring your rain boots. The major shift at each high water event makes the decision to raise MOSE an ethical choice with implications across the city, and I see this in my diary entries. Like my rowboat, all lagoon beings are affected by high-level talk about how to govern the tides.

From this diary I see my own mostly passive relation to the water level. Citizens are informed about the barrier closures, but they have no pathway to actually participate in the decision to close the lagoon (cf. Muranetto and Huitema 2012). In other words, water levels act on residents, but residents cannot speak back to the water levels. MOSE, disconnected and hovering above public life, appears like a distant black box that citizens can only react to. I note down how it modulates the tides.

11.11.23

MOSE active on and off for a couple days. Today there was a high tide but no barriers were activated, so some spots in the city were inundated at 100+ cm. The canal was brimming again as I walked over it this morning.

Learning from the experiences of this many-day string of closures, the MOSE protocols were refined and reset to close at a lower level.²⁶ The engineers who I spoke to feel more certain after this period that the forecasting system will be able to avoid last-minute changes, but they also know that they are in constant dialogue with changeable lagoon conditions. High water will likely continue to unsettle the everyday.

²⁶ See the chapter “Countdown protocols” in *Lagoon Time*.

Fishing in changing currents

Palude Maggiore, Northern Lagoon

A wizened fisherman with a checked collared shirt and a far-looking gaze lectures to a group of students from a boat cruising the calm channels north of Burano. ‘Man [*sic*] changes the sea, and the sea changes the fish,’ he says, summarizing the ecological relations known to a fisher’s science. Charged with memories and stories from generations before them, fishers make observations on tidal flows, weather systems, lagoon morphology, marine creatures, and how each element responds to the others.²⁷ This “complex set of technical and naturalistic perceptions” adapted over time, constitutes a systematic, scientific method of understanding place (Vianello 2021, 97). Thanks to their working experiences, they are especially attentive to MOSE and how it affects its surroundings.

I go up to the fisherman after his speech, and in our brief chat he remarks that MOSE is ‘an offense’ to fishing communities. Indeed, fishers put evidence on the table that MOSE is destroying livelihoods and ruining the lagoon itself. Their claim appears almost exactly contrary to what MOSE engineers say, namely that the barrier’s main effect is to safeguard Venice and the lagoon from high water events. I want to linger in the gap between these perspectives, thinking with anthropologist Rita Vianello (2021, 2020) to pull attention away from the dominant MOSE narrative and toward the fishers’ claim of environmental injustice as a contribution to the lagoon’s moral ecology of infrastructure.

On one level, fishers’ qualitative experiences are simply illegible to a bureaucratic system of knowledge production that prizes quantitative systems data. David Dobbs (2000) found this to be the “great gulf” between fishers and scientists in the 1990s in my home region of New England. A national scientific agency “has a better view of the big picture than most fishermen do, while the fishermen, out on the water every day, know any given piece of water in far more

²⁷ In this essay, ‘fishers’ includes the groups of people who are featured in the work of Rita Vianello (2020, 2021), including professional fishers belonging to cooperatives (in the northern artisanal fishery, which included the fisherman I spoke with in this opening vignette, and in the southern industrial fishery) and recreational fishers. As with any ethnographic work, however, one should avoid making sweeping statements. The ‘fisher’s critique’ that I propose here is based on the specific interview material brought forward by Vianello and should not be assumed to represent a view shared by all fishers (even though evidence suggests that many, many fishers feel this way). For another summary of fishing heritage and environmental issues in the lagoon, see Bertolini et al. (in Baldacci et al., 2022, 101-103). Thanks to the Anthropology department at Università Ca’ Foscari di Venezia for hosting this excursion.

detail and under many more conditions and circumstances,” he writes. “In an ideal world, these two views would merge into something richer. But they had not.” (5) On another level, however, this is more than an epistemological divide; fishers and engineers are kept apart by assumptions of authority and power baked into participation processes. “Participatory forums are hardly organized and most arguments brought forward by participants are commonly ignored,” write Stefania Muranetto and Dave Huitema (2012, n.p.). Excluding fishers only perpetuates the view that engineers’ scientific models are “far from comprehensive and fully objective.”

This has not always been the case in Venice. Pietro Omodeo’s archival research shows that fishers’ observations were highly valued in the 15th and 16th centuries in the water management of the Venetian republic. Fishers voted on decisions regarding lagoon infrastructure, lending their expertise to the process of inquiry, assessment, and action for maintaining healthy water flows (Omodeo 2022, 546). In 1536 a decree summoned eight of “the most sensible and practical elderly fishermen” to the *Magistrato alle Acque* “to share their opinions and recollections... for the benefit of our lagoon” (*ibid*). Furthermore, fishers were asked to answer questionnaires about their observations of “unintended consequences” after the diversion of the Brenta River in 1610. As with MOSE, many fishers held a “marked skepticism” about the river diversion project “as they were mostly concerned about the consequences in terms of the quality of the waters, their possible stagnation, and the drop in fish populations in specific areas.” (547) With the addition of flooding, this list is identical to the concerns that fishers have about MOSE. Five hundred years ago, institutional records suggest that fishers and water technicians valued each other’s opinions. These days, dialogue between the two fields has largely vanished, though not for lack of trying on the part of fishers (Vianello, 2021).

Anthropologists like Vianello and other active bridge-builders have tried to listen to what the fishers’ science would tell engineers. Fishers say that construction of MOSE has deepened and hardened the channels at all three lagoon mouths. They consistently report much faster and stronger tidal flows in the lagoon because of the modifications: usual currents have been altered considerably. The increased water flows also make the waters behave like they would in the open sea, one fisherman explains: “here the lagoon is less and less a lagoon.” (2021, 105). This is interpreted as a claim that a place is losing its identity, since the lagoon environment is typically associated with safety and belonging, while the sea is considered a space of uneasiness and unpredictability (*ibid*; Vianello 2017). These well-analyzed pieces of lagoon talk from below can

be called the fishers' critique: MOSE increases vulnerability. The mobile barriers not only attack the inherited characteristics of lagoon livelihoods but also make sea level rise worse. Indeed, many fishers were "not too surprised" by the *aqua granda* of 2019 (Vianello, 113). They raise the ironic claim that MOSE's construction facilitated the very flooding it was meant to stop.

According to Sarah E. Vaughn, vulnerability is "an effort in becoming aware of disturbance" (2022, 12). I take this definition to mean that vulnerability, more than being a quality that is possessed or produced, is something that one notices through one's work. It's something that you don't see until you're in it. Out on the water every day, fishers come upon warning signs earlier than scientists or engineers might. Their working relations offer a claim of a disturbed existence that other workers might share but do not yet see, a claim which, Vaughn says, pokes holes in "persistent forms of technological optimism that frame climate adaptation as a project that has the potential to advance and sustain the settlement of nation-states" (2022, 2).

Disturbed working relations may orient ethical action toward care, amid larger structures of capital logic. Fishers want to remain on good terms with the lagoon and so sometimes choose to "not go fishing for a while, or fish little and only certain things," as one of Vianello's contacts describes (2021, 107). Long-term lagoon thinking sustains the trade across generations. However, fishers also "are aware of the need for exchanges between living beings to continue living in the interstices of capitalism," Vianello writes (*ibid*). And so, economic pressure shapes lagoon relations from afar. In the lagoon's moral ecology, fishers enact relations in the space between reciprocity and extraction, from which they also press for more just lagoon relations.

The fishers' critique shows how some lagoon workers are thinking otherwise from the narrative of capital and technological progress. Not just concerned with an aesthetic of resistance or "living in the ruins" (Tsing 2015) when faced with climate change, what matters for fishers from another part of the Mediterranean basin, in Türkiye's Gadiz Delta, is instead "the contingent and unequal outcomes of particular infrastructural arrangements of organisms, materials, and economics," writes Caterina Scaramelli (2019, 390). With an eye toward contingent outcomes, can lagoon infrastructures be rearranged for equity? The fishers of the Venetian lagoon identify MOSE, and not high water, as the dominant factor in unjust lagoon relations. Their critique re-opens possibilities beyond expectations of optimizing lagoon management. Rejecting imperial modernism's promises of control, the fishers' critique flows with bottom-up climate adaptation efforts seeking to reorganize current ways of living.

The dominant framework of MOSE assumes that high-impact environmental modifications (temporarily separating the lagoon from the sea) can be a solution to problems caused by previous high-impact environmental modifications (river diversion, subsidence, and global carbon emissions). To some extent, this view is supported by the last 1500 years of Venetian lagoon maintenance practices, which engineers have cited to me as justification for the present climate adaptation project. The fishers' critique, however, takes issue with this reasoning. It is not the question of *whether* a technology can be applied, but *how* it is applied, they would say (cf. Scaramelli 2019, 398). After all, fishers' technologies like weirs, stilt houses, *valli di pesca*, wharfs, and moorings have probably had the greatest cumulative effect of any group on lagoon infrastructure in Venetian history (Omodeo 2022). The incommensurable differences between their perspective and that of the engineers (though this is a simplification of wide-ranging views within each group) appear to be based on a difference in moral practice, according to the fishers. Simply put, they see MOSE as a form of domination over working waterscapes without consent from those who work in them. Fishers know they aren't saints: they hold a sometimes-ambiguous ethic of care for place, torn between desires to take from and sustain the lagoon (Vianello 2021, 107). Nevertheless, fishers hold strong notions of justice: they are committed to place and rue its world-ending transformations. For this, they evaluate MOSE as an immoral infrastructure (Scaramelli 2019, 391). To fishers, it does not express shared values for a livable lagoon future.

Protest around MOSE

Multiple locations, Central Lagoon

From 1968 to 1970 a group that called itself the *Fronte per la difesa di Venezia e la sua Laguna* (the Front for the Defense of Venice and its Lagoon) made waves in Venice. A diverse coalition of anti-industry stakeholders, it set the tone for environmentalist political formations in the lagoon. Despite (or perhaps because of) its rhetorical claims grounded in place, however, the *Fronte's* goals clashed with Porto Marghera's working-class environmentalism (cf. Barca and Leonardi 2018). This wedge between divergent claims to livable futures expressed by different parts of the working lagoonscape has persisted in Venice's moral ecology of infrastructure as debates shifted to the MOSE mobile barrier project. Local coalitions following in the leftist tradition, including *No MOSE* in the early 2000s and *No Grandi Navi* since the 2010s, retain certain elements of the *Fronte's* antagonistic rhetoric while also trying to build bridges with working-class realities. Understanding the history of these clashing working lagoon relations requires going beyond old dichotomies like mainland vs. lagoon and industry vs. nature to probe the space where differentially-expressed notions of justice and livable futures may overlap.

The *Fronte* was born from a screening of journalist Indro Montanelli's 1968 documentary film on Venice and its degraded lagoon environment.²⁸ Just two years before, the 1966 *aqua grande* had devastated Venice, and scientists and intellectuals were starting to talk more broadly about global warming and other dangers of industrial society. In addition, the Venetian public tuned into Montanelli's documentary were likely immersed in international debate such as the Vietnam war, the nuclear arms race, and civil rights movements, all of which created a historical space attuned to the emerging concept of 'environment' (Rome 2003). In the documentary, footage from the Rialto Market shows vendors and distributors going about their working routines, walking through ankle-deep water. Montanelli's voice-over explains that *aqua alta* is rapidly increasing in Venice because of rising sea levels "caused by the melting of the polar ice caps," and also because of subsidence induced by intensive groundwater extraction for Marghera (20:00-22:00). For a crowd in 1968, a description of global climate change and local landscape degradation was shocking journalism. Naomi Klein notes that visual forms like film are still

²⁸ The film, "Montanelli - Venezia," was rebroadcast on Rai on 12 November 1969, and can be found in four parts on YouTube. <https://www.youtube.com/watch?v=P3Y8Pz9jjuk>

nodes for outrage (2015, 372), and indeed environmental activism today relies heavily on social media for community organizing.

At its height in the late 1960s, the *Fronte* brought together many working livelihoods against industrial activity at Porto Marghera, prefiguring forms of activism that have spread to the global scale only in recent decades. Young people, older people, workers, students, and more openly criticized “technology, wealth, and institutional absurdity” that they claimed was destroying the city (Mencini 2005, 87). An ethic of conspiracy runs through the words of a spokesperson to a local newspaper: “the shopkeepers, the fishers, the gondoliers, everyone is with us. History is with us.” (26) With militant nonviolent actions, the *Fronte* anticipated by fifty years what brings together current climate activists, according to Andreas Malm: “an insight, more and more widely shared, [that] the ruling classes really will not be talked into action... change will have to be forced upon them” (2021, 20). The denunciation written by Montanelli punched up to the politicians and industry magnates: “hands off the lagoon, our lagoon!” (Mencini 2005, 25). Newspapers and flyers from the time suggest that lagoon inhabitants came to the *Fronte* because it imagined and tried to enact a pollution-free, anti-authoritarian future.

Lagoon talk in the late 1960s centered the newly-dug canal that linked Malamocco, one of the mouths of the lagoon, to the mainland industrial zone Marghera. Not only did the Malamocco-Marghera canal allow for massive oil tankers to enter the lagoon – hence its common name, *Canale dei Petroli* – but its deep channel shape also brought higher tides into the city, the *Fronte* claimed (Mencini 2005, 37). On 16 December, 1969, fishers from Pellestrina and Malamocco were joined by students and workers from Venice, all in boats, to block ship traffic through the *Canale dei Petroli*. From Marghera, this canal was seen as a lifeline to international trade. From Venice, however, it was clear that this canal did not live up to its promises to be the “solution to the economic problems of the Venetians” (*ibid*). These conflicting realities clashed in the middle of the lagoon, at the blockade that would not let a single oil tanker pass. “Dozens and dozens of boats tight around the gigantic invader like ants surrounding a paralyzed scarab beetle, yells in Venetian of “*fora, fora*” [out, out!] from the fishermen,” was how one journalist described the event (38). Fifty-five years later, Venetians still take to their boats and try to expel large ships from the lagoon.

Waves of anti-extraction protests have flared around the world in the 1990s and early decades of the 21st century (Malm 2021). To describe the *zeitgeist* uniting them, Naomi Klein popularized the term Blockadia: “a roving transnational conflict zone that is cropping up with increasing frequency and intensity wherever extractive projects are attempting to dig and drill” (Klein 2015, 331). The *Fronte* was an early outpost of Blockadia. They made a moral claim for livable futures against industrial development, symbolized by the *Canale dei Petroli*, with tactics common to current resistance to environmental devastation, including marches, occupations, and nonviolent confrontations. Despite the *Fronte*’s strong critiques resonating with the island-dwelling Venetian population, however, mainland workers groups from Porto Marghera opposed their bid for transformative politics. This is a strange situation, because while Venice’s activists were embroiled in bottom-up calls for livable futures, activists in Marghera were also pushing a radical critique to industrial society that set the trend for working-class critiques across Italy. These two neighboring anti-exploitation ethics actively clashed in the late 1960s because of their divergent analysis of the working lagoonscape.

The *Fronte*’s protests for livable futures were saturated with claims of belonging and heritage. Montanelli was particularly vehement to how special interests of petrochemical giants Eni and Montedison appeared to be taking over the lagoon and causing flooding, sinking, and pollution, all of which could be traced back to the ‘original sin’ of industry. In this way he had the support not only of student activists but also those whose livelihoods suffered directly from disturbances to the lagoon, like fishers (Mencini 2005, 42). This conceptual formation, however, falls into the trap that historian Richard White describes as “a sentimentalization of archaic forms of labor” (1996, 178): just because something is modern or comes from elsewhere does not mean that it cannot contribute to good lagoon relations. The *Fronte* held a strong bias to their own ‘pure’ patrimony, exemplified by when Montanelli’s documentary fixates on a crumbling marble statue or a sooty painting to lament how evil Marghera has stained Venice (11:00). It slips too easily into a form of conservatism similar to that which influences recent autonomous movements like *Lega Nord*. Based on a desire to recover ‘natural’ relations, the *Fronte* proposed a strict set of regulations for the lagoon (Mencini 2005, 46). They envisioned a space only for low-impact recreation and fishing, exclusive of all industrial activities and new deep excavations.

In light of the *Fronte*'s highly-regulated proposal for human-lagoon relations, Marghera newspapers called the group "bourgeois and fascist" (*ibid*). CISL, a major worker's union, called for a demonstration against lagoon restrictions and was prepared to call for strikes if the *Fronte* got its way (*ibid*). From a working-class point of view, the Venetian activists were overlooking industry's complex relations to the lagoon that secured livelihoods and ran necessary services. Through the *Canale dei Petroli* traveled materials extracted from across the world that through careful treatment could become a paycheck at the end of the month, allowing a 1960s worker to feed his family and perhaps buy into the new consumer goods becoming increasingly available to the average Italian factory worker. Thousands of livelihoods, not to mention routine services, still rely on an uninterrupted flow of goods through the lagoon, and the workers who dealt with imports and exports have a strong understanding of the waterscape that lets Marghera trade with land and sea.

Contrary to the moral claim to belonging that drove the *Fronte*'s environmentalism, working-class environmentalism at Porto Marghera grounded a claim to livability against the forms of *novità*, or noxiousness, that they encountered in industrial workspaces (Tzionki, in Baldacci et al. 2022, 135). What this presents is an already-contaminated ethic that critiques profit-based interests and works for collaborative reform. Experiencing rapid growth in the postwar boom, Porto Marghera's petrochemical, processing, and manufacturing operations employed about 40,000 workers by the late 1960s. Most workers commuted from the countryside, not from the islands of the Venetian Lagoon, due to the logistical and psychological barrier represented by open water spaces (Zazzara 2017). From experiences handling toxic chemicals without attention to safety or occupational health, activists made a class-based critique that asserted that working bodies were not disposable. Workers' movement *Potere Operaio* came into being around 1964 and pushed for structural reform (*ibid*). "Masks to the chimneys, not the workers" was a telling slogan from this period: workers were expertly aware of bodily exposure and risks for contaminations of soil, air, and waters (Feltrin and Sacchetto 2022). In fact, Porto Marghera's activism (far eclipsing that of the *Fronte* in national memory) helped to make strong regulations in the 1990s and continues to influence critiques of industrial power (Zazzara 2017).

In both movements, there was renewed effort to take back historical authority from a ruling class on the basis of its poor environmental management. What divided them was not their tactics, but the root of their claims, which in that moment in northeastern Italy drove a deep

wedge between lagoon perspectives from Venice and Marghera. The *Fronte*'s claim to belonging is still seen in some ongoing Blockadia rhetoric, which in Venice generally denounces business-as-usual capitalism and industry as monsters that should be banished from the city. MOSE workers look at the *No MOSE* campaign and see a group of people who say “no to this, no to that,” as one technician phrased it. She continued: “It doesn't resolve anything... to be stopped, static, and suffering in a situation is not okay. Instead you need to make a choice in the right direction.” They have a point: declaring “No MOSE” rings the bells of the NIMBY (not-in-my-backyard) activism that has historically reflected upper-class concerns at the expense of working-class realities. Historian Richard White put it bluntly: “environmentalists need to come to terms with modern work.” Saying an uncompromising ‘no’ leaves little room for working through the false dichotomy between work and nature.

Yet, the stories from Blockadia are still vital pieces of the moral ecology of infrastructure that swirls through the lagoon today. I sat down in a conference room with Giannandrea Mencini, a writer who penned a comprehensive history of the *Fronte*, to ask him what legacies this group left behind. ‘It was a unique historical moment,’ he tells me. People were highly politicized in the late 1960s, and it only became clear in later decades that different political realities – fishers and factory workers, reforms and restrictions, diffuse interventions and big projects – could in fact work well together. While saying this, Mencini interlocks his fingers and opens his hands like a hinge. The joint uniting these differences is key to imagining lagoon futures from below. Richard White again argues that “if work is not perverted into a means of turning place into property, it can teach us how deeply our work and nature’s work are intertwined” (1996, 185).

During the time the *Fronte* was active, the working hinge that unites many different issues was missing. Instead, they played a blame game that implicated the workers (a common trope in Italian environmental history, cf. Barca 2014), and so their fiery rhetoric drowned out the shared claim to livable futures. The most progressive activist groups now turn instead to intersectional analysis, or how many different realities and their issues cut across each other. A common slogan seen at the annual Venice climate camp is ‘end of the month, end of the world, same fight.’ Intersectionality, however, is only the start of a process to work through divergent perspectives for common ends (Ytterstad, in Rätzzel et al 2021, 257).

The question of industrial society and livability is still alive in Marghera as it enters a phase of industrial transition. Can a working community accept compromises with pollution-

heavy industry through a cycle of reforms, or does it choose to break with industry altogether? As of this writing, the *Canale dei Petroli* still brings toxic petrochemical products into the lagoon and into workers' bodies, even if to lower doses than before. Shaking his head in admiration, Mencini tells me that it's staggering to think that the issues the *Fronte* brought into the spotlight in the late 1960s are still being debated. What to do about forms of high-carbon industry is a matter hotly contested in the lagoon and in countless other environmental justice sites worldwide (cf. Klein 2015), and the talk around it doesn't appear to be receding any time soon.

As I wait for my pizza in a local *centro sociale*, my eyes wander to its walls covered in posters that chronicle the last twenty-five years of leftist politics in Venice, elsewhere in Italy, and across the globe. Among the criticisms of cruise ships, oil companies, and George Bush, several posters testify to the actions of the *No MOSE* committee in the mid-2000s. Two in particular catch my eye. One is all black with minimalist white letters spelling out “*Mose serve solo chi lo fa*” (MOSE only benefits those who make it). The other shows a low-budget film still of Godzilla or some other creature attacking a cowering victim, captioned with the latin phrase “*Mose Monstrum*” (MOSE monster). Both are from the height of protest around MOSE between 2005 and 2007, when it still seemed possible that a small group of people could prevent this massive construction project and contest its environmental impact assessment. Like the *Fronte* in the 1960s, the *No MOSE* campaign makes moral claims of infrastructure that diverge from those from Marghera.

After my pizza arrives, I get talking with a member of *No MOSE*, an older man who tells me, unprompted, ‘MOSE has eroded civil society in this city’. We make plans to talk another day in a quieter space, since a local band, *I Rimorchiatori*, is about to play.²⁹ In the middle of the set the bassist calls out, ‘this one’s about... MOSE!’ The story of the song follows a group of young men in a boat as they get chased away from MOSE by some “*bruti*” (brutish guards) and then, on their way home, notice how the mobile barrier project alters the entire lagoon. They sing, “the currents have changed, they drag us into the sea.”³⁰ The major themes of the environmentalist

²⁹ Their name means “the tugboats.” The song is on YouTube: <https://www.youtube.com/watch?v=TMiNDwnontI>

³⁰ “*Le correnti son cambiate, ci trascinano nel mare,*” my transcription and translation.

critique – namely, that MOSE has upset the hydrological balance of the lagoon – are folded into a single sung narrative. Also notable is that it takes the form of a brief but eventful boat trip around the lagoon, which is a delightful trope in popular Venetian songs, bending old forms to new narrative demands (cf. Codato 2022).³¹

Weeks later, I catch up with the senior member of *No MOSE* at a bench in Sant' Elena. He gestures out across the water, remembering when many environmentalist groups led a *corteo acquero*, making a long parade of boats and banners, to protest the ceremonial placing of the first stone of MOSE by Silvio Berlusconi on 14 May 2003 at the “F. Morosini” Military Academy just a five minute walk from where we sat. The division between high-impact engineering and diffuse maintenance projects, he tells me, has been a hot topic ever since the 1960s – implicitly referencing the *Fronte*'s calls for a ban on industrial development – but it was only around 2005 when student, environmentalist, and citizen groups came together to form a permanent assembly under the name No MOSE. They held weekly meetings, occupied MOSE construction sites multiple times, and contested the project until it was definitively approved in November 2006 by the Prodi government, it having been challenged by the city of Venice. Since then, he sums up, the association has worked to monitor the project as much as they can, acting as a watchdog group. In the 2010s, they transitioned much of their pre-existing efforts to the *No Grandi Navi* campaign. He points out that cruise ships have mostly benefited from MOSE, since MOSE keeps the port mouths deep and wide to let the ships pass, while environmentalists wanted them shallower, to slow down tides entering the lagoon. Cruise ships are more visible than MOSE as a political issue, and so these citizens of Blockadia learned to rally around a different sort of “monster” (cf. López 2021).

In the 2020s, a major development in the working lagoonscape is that unions and environmentalist groups both oppose (or at least question) MOSE, because activists from both Marghera and Venice are aware of its future impacts on their livelihoods. With business-as-usual climate politics, the coming decades are forecasted to bring near-constant MOSE closures of the lagoon, or else risk more frequent flooding events (Umgeisser 2020). Conversely, in the 1960s, unions generally favored the *Canale dei Petroli* while environmentalists denounced it, though both were making claims to livability. Today's combined unionist-environmentalist critique

³¹ Perhaps the most famous example of this is “Pin Floi” by Pitura Freska, which describes a failed boat trip to the notorious 1989 Pink Floyd concert at Piazza San Marco.

points out that closure of the lagoon without other adaptation measures will unequivocally strangle both the port and the ecosystem. On the MOSE question, then, there is strong possibility for talk between different overlapping claims for just lagoon futures.

MOSE strikes and other union concerns

Arsenale Nord, Venezia

From its beginning, MOSE was built on an unusual public-private partnership. In a controversial move, the Italian state gave ‘sole concessionary’ rights to a consortium of private firms known as Consorzio Venezia Nuova (CVN) under the special law of 1984 (Mencini 1996, 44). It was their duty to plan, build, and manage MOSE with funding and oversight from the state. This arrangement failed: after a long string of embezzlements and patron-client relations within CVN, the well-documented ‘blitz’ of 2014 indicted key figures and placed the consortium under interim leadership (Vianello 2021). The message from the top was clear: no more messing around, get the job done.

In the last ten years (2014-2024), local unions have been constantly responding to this public-private arrangement and continue to deliver coordinated responses to major lagoon management issues. They have a crucial but often overlooked role in asserting working knowledges of the lagoon, trying to center workers while they negotiate with the state to deliver socially-just outcomes (Barca and Leonardi 2018). Pressure from unions rose in the period 2019-2021, when employees from CVN and its two operational firms Comar and Thetis went on strike to protest missing payments. Working from newspaper articles, facebook posts, and interviews,³² I find that striking was a tactical response to reactivate bottom-up participation at MOSE during a funding crisis. Today, however, wider debates about workers’ participation in lagoon futures are requiring cooperative efforts (rather than antagonistic ones) to address union concerns about long-term job security, especially in the context of who wins out in the transition to climate adaptation. Cross-sector leadership, attuned to working lagoon knowledge, will be necessary to achieve equitable outcomes.

Early dissent around MOSE

While local confederated unions CISL and UIL Venezia have supported the MOSE project for its role in job creation and maintaining port functions, a third, CGIL Venezia, came out against MOSE as early as 2003. Their statement on the matter denounced 1) the reduction of lagoon stewardship to one major project, 2) the lack of environmental impact planning, 3) the

³² A full list of facebook posts and newspaper articles can be found in the primary sources references section.

impact on port functioning, and 4) the lack of attention to longstanding maintenance practices (CGIL Venezia, 2003). CGIL's critical position on the project itself is the greatest difference between the three unions; however, all three unions, regardless of their overall position, represent and defend the workers on the project. In 2005, CGIL established a standing meeting between workers and administrators at CVN, and this line of communication has remained open through the present.³³ The meetings focus on securing workers' rights, avoiding workplace accidents, and creating opportunities for broader decision-making.

Fast-forward to 14 June 2014, when a 'blitz' on CVN headquarters revealed the string of bribes and embezzlements benefitting key administrators and politicians for many years. Ex-mayor Giorgio Orsoni was forced to resign, the centuries-old *Magistrato alle acque* (Water Magistrate) was dissolved, and CVN was placed under new interim management. Since then, internal MOSE communications have been characterized by extreme uncertainty. Workers at CVN, Comar, and Thetis consistently express frustration with the hesitant pace of decision-making, and interviews from the late 2010s suggest that blame for the project's stagnation is routinely tossed back and forth between bureaucrats, managers, and workers (Vianello 2021, 109).

Early dissent from within highlights cross-union concerns that MOSE would open only a few "climate jobs" while foreclosing possible work both at Porto Marghera and in the general lagoon maintenance sector (cf. Ytterstad 2021). These both turned out to be justified, since after 2014 the scandal at CVN redirected all funding toward finishing the mobile barriers, which meant that funding for salt marsh restoration and other maintenance projects dried up.³⁴ In addition, MOSE has already disrupted port operations on the mainland when the barriers are closed.³⁵ While it created hundreds of jobs during its two decades of construction, on the whole MOSE casted wide doubt about long-term job security for port workers, cruise ship operators, and other residents whose lives depended on a stable configuration of working elements at the lagoon mouths. In some early publications, and even to this day, some voices find that MOSE sets up a trade-off between '*salvaguardia*' – safeguarding the city – and '*portualità*' – maintaining a functioning port (Mencini 1996; Umgeisser 2020).

³³ This was called the '*tavolo di sicurezza*' (the security table); see the "Lagoon Trust" chapter of the same name.

³⁴ Confirmed in interviews with a CVN administrator and a Thetis technician.

³⁵ Interview with union leader.

Arsenale Nord, 2019-2021

After 2014, the MOSE project was consistently waiting on funds from the state. A union representative told me there was “too little oil in the machine” of CVN whenever they were waiting on a new line of funding, which prevented them from paying employees and contractors. The unions condemned this continuous state of uncertainty. CGIL published an opinion in March 2019 that denounced how the decree known as *sblocca cantieri* (unblock the construction sites) had no mention of employees or their late salaries. They asserted that MOSE workers “work not only for MOSE but also for the protection [*salvaguardia*] of Venice, of its lagoon, and for the environmental, social, and economic recovery of the city.”³⁶ The same workers then demanded guaranteed employment for “all of the people who live and labor in this particular and fragile reality” at the offices at Arsenale Nord.³⁷ According to available press releases and social media posts, these complaints went unresolved through the rest of 2019. While the MOSE project was supposed to safeguard the city, its workers declared that it was not safeguarding them.

The November 2019 *aqua granda* was, for unions, another frustrating sign of “no-decision” politics.³⁸ CGIL republished a statement from their labor secretary (*segretaria della Camera del Lavoro*) that called for thoughtful action in lagoon management “without everything relying on the completion of the MOSE system.” He wrote that climate change is an outside force requiring “radical interventions to guarantee a future for Venice, humanity’s heritage.”³⁹ In the context of ongoing labor problems, the flood made unions see inefficient bureaucrats as figures failing the city’s workers.

Another financial crisis hit CVN in early 2020, which was about to be resolved when COVID-19 caused the Italian state to send all non-essential workers home. Most if not all CVN employees were put on furlough (*cassa integrazione*), and so the first operational tests of the MOSE system were delayed until fall 2020. After the 2019 *aqua granda*, the effects of COVID-19 represented yet another embarrassment for the Italian state from the workers’ point of view. Then, missing salary payments for employees of CVN, Comar, and Thetis made tensions run high in the summer of 2020. To request swift payment and to demand guaranteed

³⁶ CGIL Venezia facebook post, 30 May 2019.

³⁷ *Ibid.*

³⁸ CGIL Venezia facebook post, 27 November 2019.

³⁹ CGIL Venezia facebook post, 19 November 2019.

participation in future lagoon management, union representatives sought a security table meeting with the commissioners of CVN, but, distressingly, they could not get promises on either count.⁴⁰

In the following months, two major events marked the transition to the after-MOSE period. In August 2020, the state created the *Decreto Agosto* (August Decree), which would establish a secure line of salary payment and formally create the *Autorità per la Laguna* starting in 2022. This decree at first satisfied the unions' demands, but over time it would come to be seen as an empty promise for lagoon governance that, as of this writing, still hasn't been met. Then on 3 October 2020, the MOSE barriers were raised for the first time. A facebook post from UIL Venezia the following day put the workers at the center of this achievement.⁴¹ Yet, according to a CGIL Venezia post one month later, "environmental research and eco-sustainable" workers at Thetis were still not getting paid on time. The union declared a state of agitation among workers because of the missing payments, the furlough during lockdown, and widespread job insecurity, with more aggressive action expected if their payments were not delivered.⁴² And so, the first MOSE tests coincided with missing payments for workers with working knowledge of the lagoon. In late 2020, it was clear to workers that the state undervalued local ecologies.

Still missing salary payments, workers from all three companies threatened a strike on 16 May 2021, and used MOSE as a bargaining chip in the process. "We want answers or we block everything," read a local headline.⁴³ Unions demanded an audience with local authorities at the Prefecture within ten days, otherwise they would walk out on the job.⁴⁴ Before long, the commissioner and superintendent procured a line of financing, and the unions backed down. In this case, collective pressure from unions and subcontractors pushed the administrators to move rapidly to resolve the situation and deliver paychecks.

A few months later, the situation repeated itself: because of late salaries, workers – in masks and standing a meter apart from each other – gathered in union-led assemblies at Arsenale Nord. They demanded a standing meeting with the *Autorità per la Laguna* and payments for all 260 employees. At this time, nearly a year had passed since it was promised that the state would restructure the MOSE debt to guarantee payments and begin to form the *Autorità*. By late July 2021, neither of these had occurred. The three unions published a press release to declare that

⁴⁰ CGIL Venezia facebook post, 23 July 2020. "Comunicato Stampa su Incontro con C.V.N." 2020. CGIL CISL UIL.

⁴¹ UIL Venezia facebook post 4 October 2020.

⁴² CGIL Venezia facebook post 5 November 2020.

⁴³ Tantuco, *La Nuova*, 16 May 2021.

⁴⁴ Fullin, May 16, 2021.

“MOSE is stopped and without an agreement on the debt restructuring, it will remain so.”⁴⁵ While not an official strike, little progress on MOSE could be made at this time; the workers were in a state of agitation and “very worried, obviously, and above all also embittered in the face of their commitment, from the beginning, to complete an important project for the region, decisive for its protection [*salvaguardia*].”⁴⁶ Meanwhile, local authorities were waiting for a response from Rome that would resolve the situation.

On 26 August, 2021, the first declared strike on MOSE took place. Workers had gathered for an assembly on 24 August and, led by union leaders, resolved to strike during the panel-raising test two days later. They stressed that the move did not directly threaten Venice, though unseasonably high tides had been recorded earlier in the month, much to the dismay of those walking through Piazza San Marco.⁴⁷ “We cannot forget that if MOSE exists today, it is because these 250 to 300 people have contributed to the construction and functioning of this project,” a union leader stated to media outlet Rai News, which commented that the strike was “a symbolic gesture that does not damage the city but reminds everyone that MOSE does not raise itself up.”⁴⁸ This first strike was the expression of two years of frustration with missing payments and a general lack of respect to workers, not to mention decades of project mismanagement prior to this event. While symbolic, it also seems to have generated greater willingness to strike among MOSE employees, as these scenes would be repeated throughout the fall.

On 1 September, 2021, not even a week after the strike, the national Ministry of Public Works agreed to a financial arrangement such that all employees would get paid for each successful raising of the MOSE barrier. The workers’ state of agitation was lifted on 9 September, and the companies executed another successful test raising on 10 September. In these weeks, the National Ministry and Prefecture of Venice made a series of promises to guarantee all payments by 25 September. The unions responded that they are satisfied with the arrangements but added that, if the promises are not held, “the workers’ response will be firm, decisive, and destined to worsen.” They held a joint assembly at Arsenale Nord, the offices of the three firms, on 13 September. A reporter remarked that “faces are tense, there is much worry.” Those featured in a segment from RAI News insisted that the workers have upheld their end of the

⁴⁵ CGIL Venezia facebook post 23 July 2021.

⁴⁶ Rai News segment, 12 August 2021. Reposted on facebook by CISL Venezia.

⁴⁷ Zorzi, 7 August 2021.

⁴⁸ Rai News segment, 26 August 2021. Reposted on facebook by CISL Venezia.

bargain and expect compensation, no longer willing to proceed on trust alone. On 25 September, one remarked, “we will measure the credibility of our counterparts.”⁴⁹

By 29 September, workers at Thetis had not been paid, and everyone was thinking about how the firms would recover from a string of broken promises. Union leaders demanded to know “what might be the actions that we can put into action to guarantee salaries in stormy times [*tempi tempestivi*],” playing on the fact that their services will be most needed during winter storms, but are also threatened by internal bureaucratic storms.⁵⁰ They held another assembly and resolved to strike again if the situation was not resolved. This mobilization turned into a strike outside CVN headquarters on 19 October, 2021: “We want certainty for the future of MOSE,” the unions wrote.⁵¹ Photos from the event show workers proudly flying union flags as the secretary generals of CGIL, CISL, and UIL addressed the crowd. This second strike of MOSE workers reiterated the same position held for at least two years: the unions want respect for workers in the form of payments, and labor participation in the form of guaranteed employment in lagoon futures.

Finishing MOSE

As engineers and unionists were quick to point out to me, MOSE is not yet complete. The project is functioning, but there are many small details remaining before it gets a final inspection and is transferred to the Italian state and the *Autorità per la Laguna*. As of 2024, the final works are expected to be completed in 2025. Until then, and until the *Autorità per la Laguna* gets running, workers at CVN, Comar, and Thetis are in a holding pattern, waiting for their work structures to get completely rearranged.

The complaints from the 2021 MOSE strikes are now only partially resolved. Workers did eventually receive salaries as the state finally caught up with a backlog of liquidity problems due to bad timing and political turnover that constricted payments to CVN. The two strikes on 16 August and 19 October 2021, served to “reactivate the table” between union leaders and the consortium, showing again how unions are highly adept at “managing complex political economic situations and trying to produce more just alternatives to existing situations” (Steviss and Felli 2015, 40). However, the state has not yet delivered any certainty about future

⁴⁹ Rai News segment, 13 September 2021. Reposted on facebook by CISL Venezia.

⁵⁰ CGIL Venezia facebook post 29 September 2021.

⁵¹ CISL Venezia facebook post 19 October 2021.

employment. More than just requesting that a plan gets made, local and regional unions branches are actively pressuring the state to create a more inclusive vision for future jobs in the lagoon of Venice. A MOSE representative told me that “the main objective is the protection [*salvaguardia*] of all our personnel.” The skills that they’ve developed in these years are unique to this working environment, and so “it would be a pity to waste them,” he says. In the MOSE strikes, union leaders assumed critical intermediary roles to negotiate and mobilize political discussion between workers, commissioners, and state representatives. As the *Autorità per la Laguna* gets set up, unions are again at the forefront of a just transition.

The union leaders who I spoke with consistently position themselves in what Stevis and Felli (2015, 37) call the “transformative environmental justice approach” for working futures. In union politics, they say, this can emerge as a call for “differentiated responsibility”: a just transition means shifting structures of power toward climate mitigation and adaptation while protecting the individual workers from any loss in income or job security. The authors are mostly thinking about workers who are at risk because of environmental regulations, for instance. However, the same applies to MOSE: because a public entity will assume control of a climate adaptation project, local workers are at risk of being excluded from the post-transition working space. Unions, therefore, use the workers’ specialized knowledge as an argument for protecting them during a major institutional reorganization. This argument is compelling, but it remains to be seen if it is legible to the state: the rhetoric from Rome, and the nominated president of the *Autorità per la Laguna*, is that they want the *Autorità* to run on as few people as possible for efficiency purposes.⁵² Unfortunately, the unions currently have a weak position in promoting working-class environmentalisms. The state has no obstacles to creating a less-democratic *Autorità per la Laguna*, one that does not allow for broad labor participation. This new entity could serve only to execute the technocratic approach to lagoon management that produced MOSE in the first place. A central concern of local unions, then, is how to recognize and dismantle weak forms of coercion toward exclusive top-down management in the MOSE workspace.

Strikes have worked to reactivate participation in the past, but the union leaders who I talked to insist that these sorts of collective bargaining tactics will not work for the broader question of guaranteeing long-term climate adaptation jobs in the lagoon (cf. Ytterstad 2021).

⁵² *Venezia Today*. 2024. “Via Libera Della Corte Dei Conti a Rossetto...”

For one, strikes generally have a strong effect only on specific demands, such as missing payments, where workers are directly impacted by negligence from their employers. For another, the public-private partnership of MOSE (which will be maintained in the *Autorità per la Laguna*, because specialized workers will be under private contracts via the *società in-house* provision⁵³) brings up legal paradoxes for public service workers. The Italian constitution guarantees that certain general rights cannot be violated by workers exercising their right to strike, including rights “to life, to health, to freedom, and to security of one’s person, of the environment, and of historical-artistic heritage” (in Lorello 2015, 84). If MOSE workers go on strike when an extreme high tide arrives in Venice, a judge could, in theory, require them to provide some minimum level of service to protect Venice’s “historical-artistic heritage” and residents’ personal security (109). This itself presents a contradiction, however, because one could also argue that MOSE as a public service itself violates the right to a healthy environment for fishers who depend on a certain territorial arrangement of currents and species migrations upset by MOSE, and the right to livelihood security for those who work in Porto Marghera and face job cuts as a direct result of reduced lagoon traffic. The constitution does not keep up with rapid environmental change (Lorello 2015, 5).

Instead, unions are currently enacting collective bargaining with the state through a cooperative, though still contentious, process of negotiating the structure of the *Autorità per la Laguna*. Learning from the poor example of MOSE, where the fox was watching the henhouse, union leaders want a “clean and fast” process for coordinating the lagoon, insisting that all workers “get their work treated with dignity and respect.”⁵⁴ To that end, the meetings at the Prefecture to debate about who gets included in the post-transition lagoon are attended by many more union representatives than usual. “Touching three different working realities [of CVN, Comar, and Thetis], with three different peculiarities, it’s right that everyone is present,” one union leader says. Their goal is to safeguard the lagoon and its workers at the same time, and this presents a strong claim for solidarity politics in the lagoon’s moral ecology of infrastructure.

⁵³ See “The *Autorità per la Laguna*” in Lagoon Trust for more on this arrangement.

⁵⁴ Interview with CVN administrator.

Multispecies stories of Ca' Roman

Pellestrina, Southern Lagoon

I wrote the following verses after two guided visits to Ca' Roman, an island adjacent to the MOSE construction site at the Chioggia lagoon mouth. Each corresponds to a nonhuman island inhabitant described in the text below.

1

We left when the works started.
Too loud twenty years.
In our home there cannot be invaders.
Go away. We want to stay.

2

I am part of a thing that lasts.
The wind swirled during a storm.
The city flooded; we didn't.
I am crossed with spider webs and fungal lines.
The coralline call above, the roots dig down.

3

Circle circle into the nests we've
Made in the dunes in the grasses
Come home after a long flight out
Oh taking food they leave out for
Us back to our new colony in the
New sands oh they don't want us
Here they don't want us anywhere
Going on to the next disturbance.

4

Withdrawn from the foot trails
We/I grow far from where work boots walked
Lagoon fog and sea rains feed me/us
Silver/rust, Leave/be

5

Here down here in the sand
Here there is always more sand each year
Under sand under earth
Under water we feed, you feed
We live beneath your feet here.

6

I will take this world you designed that you will not know.
You hurt here so I thrive. Behind thorns I hide.
Afraid of you and your dreams my brambled life starts in your sharp shadow.

Because the construction of MOSE entailed the destruction of sand dune areas that are deemed critical habitat under the EU Natura 2000 directive 92/43/EC, Italian and European Union courts have directed Consorzio Venezia Nuova to perform compensation works in the Venetian lagoon. The ruling came also with sustained pressure from environmental groups early in the process of writing the project's environmental impact report, since habitat destruction was one of few legal routes available for formally contesting the project.⁵⁵ The final decision was that the negative impacts of MOSE could be offset by nearby conservation and restoration projects. The intentions of compensation are not nearly enough to let this place heal from MOSE, but the actual projects proposed have tendrils of regenerative potential to them, and so they present multispecies stories.

⁵⁵ This story came to me through conversations with Luca Mamprin and a presentation by Margherita Breil to the Ca' Foscari Environmental Humanities Topical Seminar, April 2024. Further information about the compensation works can be found at the website of the *Provveditorato Interregionale per le Opere Pubbliche del Triveneto*, e.g. the presentation "Mose. Piano delle misure di compensazione" delivered in July 2016, downloaded April 2023.

One site of the compensation projects is Ca' Roman, an island in the southern lagoon adjacent to the Chioggia barriers. Much of the island is uninhabited and designated as a nature reserve, but it is far from wilderness. "Ca' Roman's geomorphology is hybrid, semi-artificial, the result of recently built infrastructure," writes Margherita Tess (in Baldacci et al. 2022, 115). A 1911 breakwater project made a lacuna in the coastline that has trapped sediment from the Piave River transported south by wave action. As a result, the island grows seaward by several meters each year. MOSE construction prolonged the breakwater, so presumably the island will continue to grow for some time. With beach, dunes, and mixed upland ecosystems flanked by a massive piece of infrastructure, Tess observes that "the nature of Ca' Roman is discordant, multiple, and unbalanced" (*ibid*). Its mixed forest {2}, the unique community of mosses {4}, and the intertidal *lupini* clams {5} underfoot are getting by in this island space. Ca' Roman has long been a site of naturecultural co-becoming (cf. Haraway 2015).

Two compensation projects at Ca' Roman are intended to accelerate habitat creation in the wake of MOSE construction. The first is the proposed conversion of an artificial construction-site island into a low thorny bush ecology, which is otherwise rare in densely-settled human areas nearby and provides critical habitat for the *averla piccola* (little shrike, *lanius collurio*, {6}). No walking trails or other means of human access would be made for this island. The second proposal is beach replenishment to expand the sandy dune habitat favorable to the endangered *fratino* (friar bird, *charadrius alexandrinus*, {1}). The *fratini* left their habitat in the early 2000s under "the anthropic pressure deriving from tourism and years of work for the nearby MOSE construction" (Tess, in Baldacci et al. 2022, 115). Part of the restoration process in this zone also involves displacing the nesting colony of *gabbiani* (seagulls, *larus argentatus*, {3}) who have taken over the dune area. The replenished beach, too, would be made inaccessible to public visitors. Work on both projects has not yet been started.

MOSE represents both a local intrusion and a part of ongoing lifeworlds. It cannot be characterized as an artifact in a natural oasis. Better perhaps is to understand its inhabitants as living in *alterlife*, a term suggested by scholar Michelle Murphy:

Alterlife names life already altered, which is also life open to alteration. It indexes collectivities of life recomposed by the molecular productions of capitalism in our own pasts and the pasts of our ancestors, as well as into the future. It is a figure of life entangled within community, ecological, colonial, racial, gendered, military, and

infrastructural histories that have profoundly shaped the susceptibilities and potentials of future life. (2017, n.p.)

The messy afterlives of infrastructure are making planned and unplanned worlds on Ca' Roman that may, on one hand, make room for fragile existences that weren't there before. On the other hand, they can bring up ethical dilemmas of lagoonscape transformation, like which species to carry forward at the expense of others (Povinelli 2015, 5). Current conservation leaders are keeping a set of values that inform trajectories of community coexistence without falling into frames of either purity or nihilism, working within the space of alterlives to talk about what comes next.

Lagoon Time

In Italian, *tempo* binds together time, weather, and rhythm (Scarpettone, in Baldacci et al. 2022, 197). Phasing in and out of view while controlling the tides, MOSE draws together certain temporal rhythms while interrupting others. Even less visible but no less important, climate change is another temporal modifier that runs through the five pieces presented here (cf. Morton 2013). Narratives in this section return often to the MOSE workspace at Arsenale Nord for its workers' central role in predicting the tides and activating the mobile barrier system. In the gaps between these sections, the analytical thread crosses over to spaces caught between MOSE and climate change: employment contracts and barrier islands. While keeping a narrow time horizon shortens the decision-making framework to the next *aqua alta* event, broader time horizons found in scenario thinking, historical narrative, and scientific analysis tend to open possible futures to good lagoon relations.

This chapter is made of five essays. To start, 'Countdown protocols' narrates how MOSE workers identify and respond to high water events. Finding that the protocols tend to narrow workers' focus to discrete events, I wonder how future operations might respond to long-term concerns in the lagoonscape. Then in 'Climate change contracts' I briefly present the way that sea-level rise is lengthening the *aqua alta* season and, in turn, changing MOSE workers' lives. Back in Arsenale Nord, 'Forecasting and scenario thinking' compares two ways that workers and planners anticipate the future. While MOSE's forecasting technology tries to control temporal uncertainty, some scenario thinkers are able to reframe toward possibilistic outlooks for the lagoonscape. I then cross over to the barrier islands, where 'An incomplete history of Santa Maria del Mare' sifts through presences and absences in the after-MOSE temporal landscape of Pellestrina. MOSE brings altered relations between marine creatures, human settlements, land history, and security narratives in the peripheral parts of the lagoon. Finally, 'Science and MOSE' returns to crucial questions about the Venetian lagoon and discusses how mainstream scientific analysis is unable to confront denialism around MOSE. Other 'earth practices' appear to be more attuned to how long-term geologic phenomena like sea-level rise and MOSE emerge at human scale.

Countdown protocols

Arsenale Nord, Venezia

A senior engineer told me that operating MOSE is about making decisions. MOSE workers have a set of countdown protocols that help them identify, prepare for, and organize around high water events.⁵⁶ From more than a week before each event, these protocols set the rhythm of the work space and modulate the way that working knowledge and the weather dance with each other. Out of this dance comes a careful decision of whether to activate MOSE or not. If they decide to “push the button,” the protocol allows for strong communication between weather forecast teams and activation teams as they decide when to activate, which barriers should be raised, and how long they should remain up. The MOSE working space is permeated by a sense of ‘countdown time’: constant anticipation of an event on the horizon.

Weather is perhaps the central concern of the MOSE activation system. The influence of the sun and moon on the tidal cycle is extremely predictable, since technicians can know for years in advance when celestial bodies will line up in a syzygy, an alignment that pulls especially hard on the Earth’s tides. Wind patterns, however, are highly unpredictable and can exert a strong influence on the water height at a given location. MOSE workers in the forecasting teams know how to read these winds from a large network of sensors scattered throughout the region. A *scirocco* (southerly wind) can push water up toward Venice, while a *bora* (northerly wind) pushes water away from Venice but toward Chioggia, at the south end of the lagoon. Their predictions can change rapidly, so the teams following countdown protocols are always attentive to these known unknowns. “You can’t control the wind,” a technician told me with a small laugh. Still, those who are trained in this field try to interpret complex atmospheric patterns and anticipate their effects on the water level at Punta della Salute, the site of Venice’s local tidal gauge (cf. Liberti, in Baldacci et al. 2022, 193).

A water event is forecasted as far as ten days out from when it will manifest in Venice. The teams at Arsenale Nord look at their models and identify approaching periods when water could rise over 100 cm above the local datum. When all works are completed, MOSE will likely be activated for any events above 110 cm, and not activated below this threshold. However, the

⁵⁶ Thank you to various engineers and technicians who let me tag along on tours of the Control Room and clarified elements of the countdown protocols for me. This essay was put together from informal conversations and recorded interviews with MOSE workers; all unattributed quotations are from these talks.

meteorological uncertainty has led engineers to write in a 10-cm margin of error on all forecasts. In other words, if there's a 100 cm prediction but then the winds shift at the last minute and water reaches 110 cm in Venice, the MOSE system will still be prepared. Each discreet *aqua alta* period above the state-sanctioned quota gets a number, so the first *aqua alta* event of the season will be 001, the second 002, and so on. In this way, forecasting protocols take a fluid phenomenon – the weather-driven tidal cycle – and isolate certain periods in time when it is especially notable.

Slicing up linear time into *aqua alta* events creates an equivalent but distinct political event as well. Each identified event activates more steps in the protocol as MOSE workers prepare for the activation sequence and communicate the event to other parts of the working lagoon system. Suddenly, many distinct realities are drawn together in coordinated action around this high tide time period. By T-48, or forty-eight hours before an event, technicians have double-checked the weather data with the city's Tidal Center (*Centro Marea*) and run a model simulation to decide the ideal times to raise and lower the barriers. They check in with the Port Authority to let them know that the mouths will be closed, and sometimes the MOSE workers and the port workers will renegotiate the timing by an hour or so if a ship is scheduled to pass in or out of the Malamocco channel at that time. They also rendezvous with the port of Chioggia to advise sea-going fishermen to return before the closure, and they radio the emergency services so that rescue teams know to use helicopters and not boats to respond to calls in the Adriatic. "It's a constant communication," a worker involved in this process told me. After T-12 they send out email updates every few hours to all the main authorities involved. Working realities across the lagoon re-orient their actions to MOSE during this time, all folding the timing of their work into the event quickly approaching.

With nine hours to go before the event, the MOSE teams stationed at each of the lagoon mouths receive final confirmation that they will perform the activation process. Many of them are office workers normally but then, as a union leader described it, they 'go into a phone booth to change, put on a new costume' when they are called upon to raise the barriers. The Malamocco team members go by boat, the Chioggia team goes by car, and the Lido-Treporti team goes by car and a short boat ride to reach the control room. They settle in and run tests to make sure the system is working before the activation event. By T-9, the forecasts are increasingly certain but never guaranteed. Indeed, false alarms have been fairly common in the

first few years of the system's operations. I was once shown a report of twenty *aqua alta* events during the 2023-2024 season, and about half of them were highlighted in red for false alarm. In this case, the forecasting team checks in with the decision-making triangle (CVN commissioner, city superintendent, and MOSE commissioner) and then tells the teams to go home. This is, of course, frustrating for the workers who have been preparing for the event, and one of them who I spoke with smiled ruefully, remembering "the swearing, the cursing between the teams" when a false alarm was declared at T-2. The build-up to the activation event puts attention and pressure on this decision process made between those who read the weather and those who run the system. Countdown time around MOSE turns *chronos*, the measured flow of time, into *kairos*, a temporary moment of crisis where tensions run high (cf. Hartog 2021).

In each control room, there are on average four people from CVN, Thetis, and Comar who act as coordinating workers.⁵⁷ They radio to the other lagoon mouths, run systems checks, and keep in touch with the forecasting teams in Arsenale Nord. Finally, at T-0, there is a final coordinated decision between the three commissioners, the forecasting teams, and the central control room at Lido-Treporti to activate MOSE. "When it's certain that it's the right time, the right level to raise," they send a signal to all three activation teams to raise the barriers, a technician tells me. The yellow panels go up within about thirty to forty minutes, and then the teams continue to monitor the physical situation: the wind in the Adriatic, the water levels in the lagoon. When the sea and the lagoon are nearly equal levels, they decide to *zavorrare* – to ballast, to lower – the panels again. The tests, the raising, the monitoring, and the lowering and close-down procedures can easily spread across multiple shifts. Plus, the teams are responsible to communicate their actions to the rest of the working lagoon, too. An activation team member described it to me: "Even when MOSE is closed, it gets broadcast every hour, saying 'watch out, it's still up, still up, still up, still up', and then 'in an hour we're pulling it down,' and then we say 'all the panels are ballasted again,' and so the water begins to flow back through the lagoon mouths again."

Two learnings stand out to me from these countdown protocols. First, the system is fundamentally based on human decisions. I once asked an engineer if the system could ever be automated, and he said absolutely not. It's been tried elsewhere, but there was always a fear that

⁵⁷ At least during the first MOSE tests in 2020, there was also a member of the military present at each of the three control rooms, one for each lagoon mouth.

it would close on a ship or something. MOSE will never work “without a man’s [*sic*] head,” he quipped. Countdown protocols are made to be flexible, not algorithmic. They require an intense knowledge not only about how to read the weather patterns but also about how to negotiate between many different local human actors who rely on passage between the lagoon and the sea. Notably, nonhuman actors outside of the narrow analytical window of tidal height are excluded from the participation process. As far as I know, marine creatures’ migration cycles and healthy water exchange does not factor directly into the decision, though everyone working at MOSE is also well-aware that the entire lagoon system suffers if the barriers are raised for too long.

Second, countdown protocols entrain many perspectives into intense focus on discreet events. This is a fortunate arrangement for everyday life in the historical center of Venice: specialized workers are positioned to accurately and precisely prevent the lagoon from rising above 110 cm above the local datum, even in the stormiest weather.⁵⁸ However, this temporal focus propagates a particular defense-oriented relationship with the water. Using forecasting and scenario technology to identify, prepare for, and organize around a discrete event habituates MOSE workers, and the residents who receive their text alerts, to see high tides as an eventual threat that must be routinely anticipated and defused. In this way, it is not very different at all from how many narratives frame climate change as a “catastrophe to come” (Stengers 2015). Indeed, state militaries around the world are highly focused on climate change and work to anticipate events that could threaten status quo society (cf. Samimian-Darash 2022). Even climate activists often frame the future as a kind of countdown to some doomsday event.

Scholar Kyle Powys Whyte calls this temporal mindset “ticking clock time” and critiques how it makes people “seek ways to stop the worst impacts of climate change immediately” (2021). This is an understandable response if climate change is narrated as an external threat. However, Whyte points out, climate change is not external, but rather a disturbance internal to wider land (and lagoon) relations. Another way to narrate how climate change makes change over time is through shifting ecological relations. “Humans’ interventions into the climate system are disrupting the interaction between the responsibilities and tensions” of local ecologies, he writes (*ibid*). The countdown protocols of MOSE give little attention to forms of telling time that include responsibilities to the broader lagoon system. For instance, salt marshes accumulate the majority of their new sediment during periods of storm surge, and so closure

⁵⁸ See “A personal diary of MOSE” in Lagoon Talk for more nuance on this point.

events limit their ability to keep up with sea-level rise (Tognin et al 2021). Instead, the protocols reduce long-term tidal changes to a series of quantized and quantified events that can be managed for the benefit of some humans. MOSE sits in a network of responsibilities, but at the moment of the event, its activation literally sets the *tempo* (time, weather, and rhythm) for all other working lagoon realities (Scappettone, in Baldacci et al. 2022, 197).

When considering institutional responsibilities in climate change, Whyte asks “who do we reach out to as trusted partners for coordinated action?” (2021). MOSE doesn’t so much reach *out* to its partners as it reaches *over* them, in part because countdown protocols are mostly set up to see the short-term, rather than the long-term, picture of what to do next. Re-orienting operations to a longer time horizon, as some MOSE workers already try to do, may increase the possibilities for responding to high water with good lagoon relations.

Climate change contracts

Via Marcello, Mestre

Field notes, February 2024.

I spoke with two union leaders at their offices in Mestre. Toward the end of our conversation one of them told me about the contracts that they're rewriting for the workers who are on the activation teams — the people who go rain or shine, day or night, to manage the MOSE system when it's needed. And *aqua alta* doesn't tend to come on a beautiful day. A worker last week told me they're all 'like Captain Nemo' in the boats in the driving winds when they go to the control room. They bring lunch or dinner with them (at least the state lets them order from a caterer in Treporti, a place that makes good pasta) and settle in for an eight-hour shift. It's not work in the sense of laboring and producing. It's work in the sense of providing a service, of knowing a system inside and out.

One union leader told me that the new contracts aren't seasonal, they're year-round. That is, the workers can be called on at any time. That's fine, though it's taken some negotiations about payment and overtime, about making sure they don't get overworked, about respecting their schedules. But let's look at the broader picture: the historical season for *aqua alta* is October to April, seven months of the year. Winter storms tend to hit harder than summer storms, blowing more water up the Adriatic toward Venice. In recent years, though, Venice saw *aqua alta* in May and August. If it continues in this way, the season for *aqua alta* has lengthened. Ten months of the year. But with rising seas, there's little guarantee that an *aqua alta* won't hit in June or July. Before, it would have been 'unthinkable.' Now, it's all too possible. So the contracts are preparing for this scenario: they anticipate that MOSE workers will be responding to *aqua alta* even in summer months; they're adapting to changing seasons.

The strongest storms will likely still hit in the winter – there's still seasonality in the lagoon. But it's changing. And that change is creeping into the most formal parts of a society, like its work contracts. The union leader said that these workers "are re-reading the timing of their lives according to the timing of the tides," and the highest tides are coming more and more often. It's frustrating when ever-more chaotic water interferes with your everyday labor for the lagoon. In the work contract, the old *aqua alta* season is now narrated in the past tense. That *was* the state of affairs. MOSE workers are now contractually under the influence of climate change.

Forecasting and scenario thinking

Arsenale Nord, Venezia

The Venetian lagoon has long been a site of “debates on the future” as its inhabitants deliberate on how to maintain a livable built environment in a hydrologically unstable setting (Fabian and Centis 2022, 25). This is not unique to the lagoonscape: without crafting stories for the future, humans cannot plan for eventualities, uncertainties, or possibilities. Arjun Appadurai calls on scholars to be attentive to how many cultures engage in acts of future-making through “imagination, anticipation, and aspiration” (2013, 286). Decades of planning for MOSE have constituted an especially fervent debate about what comes next for the lagoon. Now in the after-MOSE period, tools that extend one’s thinking far into the future are key for claims within the lagoon’s moral ecology of infrastructure. Here I differentiate between two anticipatory approaches, two future-making technologies used in the Venetian lagoon: forecasting and scenarios. Forecasting channels scientific data into predictions, like how high the tide will rise at a certain point in time. Scenario thinking – a more speculative technology – goes a step further to imagine the complex relations that could take shape around forecasted conditions. The latter asks, what could it look like to live in the lagoon after MOSE?

Both forecasts and scenarios are technologies that are embedded with assumptions. The forecasting methods in MOSE workspaces rely on models to anticipate future events and reduce uncertainty. They make partial representations of possible future conditions while also holding blind-spots. Models, explain Cristina Mangia and Alba L’Astorina, will always have incomplete data input, parameters, and coverage; this makes them “essentially unverifiable, if not done *a posteriori* or directly in the field, in showing the event” that they try to predict (2022, 17). Despite their uncertainties, forecasting models are very useful for planners. Scenario thinking has even more ‘subjective’ components. Over the 20th century, writes Limor Samimian-Darash, scenarios became “a widespread means through which states, large corporations, and local organizations imagine and prepare for the future” (2022, 2). Unlike forecasting, she explains, scenario thinking designs for uncertainty and tries to “mitigate overreliance on existing knowledge and models in efforts to address the unknown future” (*ibid*). As scenarios for lagoon futures imagine different working arrangements of city, port, and MOSE, as well as the way they are governed, they also put forward their own assessments of what actions would constitute good

lagoon relations in the broader moral ecology of infrastructure. Striking out narrative terrains in the still-undecided future, these planning tools grapple with uncertainty on long time scales. Some of the practices explored here are resigned to bleak futures, while others explore the utopian edges of the horizon.

Forecasting

In the control room at Arsenale Nord, a bank of computer monitors show real-time data from sensors across the lagoon and out at sea. A technician explains to me that the decisions for MOSE rely on two models. One is the deterministic model: it relies on a physics-based representation of the lagoon. Given specific tidal and meteorological conditions, the model produces an array of water levels across space, allowing engineers to predict tidal flows. The second is the statistical model: it relies on historical records of tidal heights between the lagoon and the sea. By comparing a future event with a similar one that has happened in the past, engineers predict expected water levels in the lagoon. The workers in the forecasting teams cross-check the models with each other and with other forecasting centers across the region to reduce uncertainty as much as possible. Their deep familiarity with modeling technology lets them generate precise forecasts. The uncertainty of each forecasted event is only about ± 10 cm, mostly on account of unpredictable wind conditions. Wind is a *known unknown*, so the modeling effort can account for it and try to manage its uncertainty. *Unknown unknowns*, or significant factors that are not included in the model, may still exist, but the forecasting teams have consistently shown they can regularly anticipate high tide events.

The rhythms of the countdown procedures mean that forecasting teams at MOSE are looking about ten days ahead at any given time. Their models depend highly on meteorological data and may adjust over time to account for sea-level rise, but the temporal focus of these MOSE workers now is focused on the next event, the next season. When I asked MOSE workers generally about long-term futures, most of them understandably replied that this was outside of their zone of expertise. A few said simply ‘I’ll be dead’ by the time sea-level rise presents a real problem for Venice. Their fatalism is indicative of how more weight is given to short-term planning in the working structures of MOSE. Of course, not all MOSE workers share this opinion, and some were quite ready to talk with me about long-term ideas.⁵⁹ Among the

⁵⁹ These conversations are reported more in-depth in the section “MOSE as heritage” in Lagoon Trust.

imagined futures of the lagoon, a handful mentioned that another barrier project could be inevitable. Few if any mentioned retreat- or accommodation-based strategies.⁶⁰ Most often, I was referred to the work of several local scientists who were using similar models to forecast long-term futures of MOSE under sea-level rise scenarios.

Among the scientific papers forecasting MOSE operations under sea-level rise, the name Georg Umgeisser is everywhere. Umgeisser is a physical oceanographer associated with CNR-ISMAR, the Institute of Marine Sciences run by the National Research Council of Italy, and he specializes in running models of the Venetian lagoon. Using both deterministic and statistical models, he has tried to answer questions about how often and how long MOSE would need to be raised under various sea-level rise scenarios. Drawing from the IPCC's global carbon emissions pathways – highly-researched but very technical representations of climate change on the global scale – Umgeisser's 2020 paper shows that under current protocols (closing the lagoon at 110 cm above the local datum) MOSE is roughly viable up to an additional 50 to 80 cm of sea-level rise. (Venice is predicted to have an additional sea-level rise between 40 and 150 cm by 2100, depending on carbon-emissions pathways and earth-system tipping points [IPCC WGII 2022, 1828]; see also Ghezzi et al 2010, Ferrarin et al 2013). Past this range, he says, operating MOSE is senseless. The mobile barrier system was not designed for hundreds of closures each year, and at 50 cm the city would still be flooded regularly because of the leakage between the panels. Carrying the argument *ad absurdum*, Umgeisser writes that at 80 cm of sea-level rise “the closing and opening procedure breaks down and cannot be applied anymore. During the short periods where the water in the lagoon is higher than the sea, the barriers are opened, just to be closed again after a short period” (2020, 12).

Based on this research, it is clear that (a) MOSE has a finite period of viability and (b) attention needs to shift now to what comes after MOSE (Giupponi 2022; Giupponi et al 2024). Because Umgeisser's modeling does not consider any changes to the current situation, however, the future it predicts looks unavoidably dire. Models reflect their parameters, making assumptions that simplify reality, Mangia and L'Astorina point out. Future-oriented quantitative research is limited because it “can't always offer, in terms of explanations, management, and forecasts, well-founded theories based on experimentation, but often they can only produce mathematical models, probability distributions, and simulations” (2022, 17). What is never

⁶⁰ See Mach and Siders 2021, as well as the section “Methods for sea-level rise” in the introduction.

included in forecast models is “the little-foreseen entanglement between the physical environment and human behavior, where one tends to influence the other and vice versa” (*ibid*). It is at this point that expansive scenario thinking goes beyond what forecasts can predict.

Scenarios

Rather than relying strictly on models and datasets to anticipate what comes next, scenario thinking mixes predictions with imaginative methods to see a wider picture of place-based relations. The most recent wave of scenario thinking for the Venice lagoon comes from collaborations at the Istituto Universitario di Architettura di Venezia (IUAV). Surveying recent collections published by IUAV professors and students – including *Laguna Futuri*, *The Lake of Venice*, *Voci: Echi: Laguna*, and *Amphibia* – I find a diversity of scenario planning methods used to sketch out lagoon futures for the next century. Many of these collections ground their analysis in plurality, bringing together many voices from architecture, urbanism, history, hydrology, anthropology, politics, and local activism to discuss strategies for Venice. They tend to make glossaries of critical concepts, terms, practices, and adaptive features. Some engage in speculative writing practices, and almost all feature striking, high-quality maps of future lagoon scenarios.

Not all of these collections converge on a singular vision for the lagoon, however. As the authors of *Amphibia* point out, “some scenarios, although they seem equally valid lines of thinking which take different postulates as their starting points, contain some questionable rationalities” (Fredrick et al. 2021, 104). In particular, they say, readers should notice how scenario thinking can be instrumentalized toward non-democratic futures. Some points where these many scenarios diverge are:

- Whether communities in the lagoon area will make room for water to spill onto low-lying land, or try to block it with barriers;
- The arrangement of lagoon mouths, city, and port functions, especially on the question of ship traffic into Porto Marghera;
- Whose political interests are represented in governance bodies such as the *Autorità per la Laguna*;
- Whether Venice is prepared to perform another big engineering project;
- How much the lagoon is considered as a distributed complex system;

- Whether Venice will continue to rely on tourism as its principal economic driver.

The scenarios represented in these collections, therefore, are criss-crossed with their author's values. The spectrum of visions they lay out roughly runs from a 'lagoon-on-life-support' prediction to an 'eco-social transformation' utopia, all the while offering some useful practices for critically re-imagining Venice.⁶¹

Techno-Pessimist

On what I see as the pessimistic end of the spectrum (others might see it as 'realistic,' but this is implying that the future can't deviate from a chosen path), proposed scenarios imagine that MOSE continues to function as planned. In their paper looking ahead to the year 2100, Umgeisser and the late biologist Davide Tagliapietra write that "Venice is unique and to preserve it our society must be prepared for the closure of the lagoon" (2022, 125). Working directly from Umgeisser's models, they extrapolate that in order to protect the historical center MOSE should eventually be raised almost constantly, or that permanent wall-and-lock systems will have to be installed at the lagoon mouths. Because complete closure would dramatically change the ecosystem, certain "innovative solutions" would need to be put in place: water treatment infrastructure, "eco-toxicological surveillance and early environmental warning criteria," scientific management, industrial activities "relocated and moved," and salinity levels "managed and adjusted." In addition, inland areas would likely be subject to controlled flooding under what they call "managed realignment" of the lagoon space (125-126). In an interview in *Voci: Echi: Laguna*, Tagliapietra confesses that he sees no other clear solution for the future: "we don't want to make a lake! As a resident of Mazzorbo, it does me harm to think of a closed lagoon, but on the other hand this is the situation. Either you notice the trends and try to be proactive, or you fail on all fronts" (Fabian et al. 2021, 166). While their proactive stance is inspiring, no-alternatives thinking remain within the protectionist discourse around Venice, using a state of emergency to justify more technological 'fixes' that have not been deployed at scale (cf. Agamben, 2008).

Yet, scenario technology remains flexible to revision despite moments where discourses fall back on the technofix, or what Donna Haraway (1988) calls the 'god trick' of universal scientific management. Tagliapietra goes on to say that planning for all possibilities is necessary:

⁶¹ Thanks to Lucio de Capitani for providing this framework in his Environmental Writing seminar.

“we’re on the edge of science, because it’s not experimental science in the strict sense, but it’s scientific forecasting” (Fabian et al. 2021, 169). Umgeisser and Tagliapietra’s vision comes from a background where scientists are trained to trust engineering interventions and solve infrastructure problems with solutions that bring human benefits and maintain ecosystem services. Hydrologist Luigi D’Alpaos critiques these engineering-heavy scenarios for Venice elsewhere in the collection *Voci: Echi: Laguna*:

It is easy to get carried away when acting in a field where technology seems to be able to offer all the solutions. It offers all the solutions because you don't have the ability to understand that, in the problem you are dealing with, you are only solving one part. Next to it perhaps there is something else that escapes us and is not considered. If you can realize that you are not omnipotent, perhaps you can make some progress, but the path will sooner or later break. This is the danger that looms over modern humans, because the availability of advanced tools, of increasingly refined technology, leads one to delude oneself that it is enough to solve everything; but it is not. (208)

Beyond their technological optimism, engineers may also fall into the sunk cost fallacy, which makes scenario-planners averse to incurring losses or rearranging pre-existing social conditions as a first step. Venice is the epitome of sunk-costs: there is so much memory, heritage, and capital invested in the historical city that it seems absurd not to protect it as it stands (168).

Eco-Compromise

Learning from the drawbacks of Umgeisser’s lagoon scenario, but also respecting the sunk costs of Venice, a kind of middle-road scenario thinking plays out across some collaborations from IUAV. Most notably, urbanist Lorenzo Fabian and architect Ludovico Centis have proposed *The Lake of Venice*, a collection that uses speculative vignettes and stunning maps to put forward a vision of a divided lagoon. That is, they imagine a future intervention where long fixed barriers partition the basin into three sections: two low-water lagoon areas and one high-water ‘lake’ that includes the historical center of Venice (2022, 54-55). Working from earlier proposals by architect Antonio Foscari (cf. Frederick et al. 2021, 88), they situate their scenario as one that isn’t necessarily rosy (the citizens would likely be traumatized by the loss of a united lagoon, they say [81]) but does have many possible benefits if the society around the

lagoon adapted to this new territorial arrangement. In this “parallel lagoon,” they say, “toward the second half of the 21st century... it became clear that the MOSE, despite its name, would no longer be enough to save everything” (86). Instead, they use a large project to maintain certain parts of the lagoon for business-as-usual: ships enter the lagoon through the *Canale dei Petroli*, flanked by a new barrier, and the historical center of Venice is preserved as a tourist destination. Meanwhile, the low-water lagoon spaces are remade for new working ecosystems, replete with mixed park areas and innovative aquaculture opportunities (213). Pitching itself as a sort of compromise, the vision from Fabian and Centris manages to hit a pragmatic note, though it does not really consider if the public would be prepared to make this dramatic change (13).

Other similar contributions from the *Laguna Futuri* collection use urbanism’s stylish aesthetics to make maps for scenarios of compromise in Chioggia, in the southern lagoon. Scholar Marta de Marchi puts forth two possibilities, one called *resistance* where a series of walls protect the Chioggia city center and surroundings to sustain an gardening and agrotourism economy; and the other called *resilience* where controlled flooding under sea level rise, plus the assumption that people will not want to continue spending public funds on defense works, sees the area transformed into a shellfish economy amid a perennially inundated urban landscape (De Marchi et al. 2023, 70). These middle-road scenarios position themselves between total closure and total ecological conservation, recognizing that there are necessarily trade-offs that will have to be made and betting that the major ones are between preserving the city and preserving the abundant lagoon environment. The effect of division or multiple-scenario thinking is overcoming those trade-offs by zoning the lagoon in space or time into multiple possibilities, allowing contradictory visions like ecomodernism and degrowth economies to exist side-by-side.

Scomenzèra-utopia

On the optimistic side of the scenario-thinking spectrum is a series of practices and ideas based less in data and maps and more in narratives around transformative lagoon governance possibilities. Parts of *The Lake of Venice* gesture toward this, but the best examples of radical re-imaginings of Venice are found in the collection *Laguna Futuri* and the collaborative project *Amphibia*. The former offers learnings from an experience of co-management practices in the northern lagoon, the “*Contratto di Area Umida*” (Wetland Area Contract):

No, we're not in a fable: it can still happen that a community wants to change and improve the situation. The story of the *Contratto dei Area Umida* starts like this. Public and private subjects put themselves together through volunteering and participation to analyze the critical points of the environment, share ideas and projects, and sign an accord in which they commit to improve the waters, the socio-economic development of the territory, the flood risk, the restoration of the aquatic ecosystem, the birth of processes of environmental awareness and education. (De Marchi et al. 2023, 22)

Though it may seem like a fable, they write, their methods have moved what was previously out of the realm of possibility into a concrete, future-oriented proposal: a strong example of what scenario thinking can achieve. The project they conducted is grounded in participation strategies of the sort that have become best practice in environmental justice methods and bottom-up organizing. Out of this experience, the collection *Laguna Futuri* also gives space to other possible projects around the lagoon. Marco Ballarin describes a project to make an “*ecosetiere*” (eco-neighborhood) on the island of Giudecca: he envisions “an open shared laboratory, with projects and participation, with dialogue and writing” around reorganizing the community infrastructure (98). These projects fuse hyper-local concerns with collective care methods for public spaces.

Likewise, the project *Amphibia* from a trio of IUAV students (Fredrick et al. 2022) positions itself as a set of speculations that critically evaluate and learn from other scenarios, including Umgeisser's closed lagoon and Fabian and Centris' divided lagoon. They find that none of these plans offer clear ideas about livable futures, a value that has come even more to the forefront of local activism in the wake of the 2019 *aqua granda*, the March 2020 COVID lockdown, and the October 2020 MOSE activation. “Both the closed lagoon and the separated lagoon scenarios are today instrumental rational responses to what is ongoing, without the further question of how and for whom such scenarios are,” they write (105). And so, they base their scenario thinking not on a single project or intervention, but on a complex systems design approach that outlines a general ethic across the lagoon space that can translate differently from location to location across the aquapelago. An ethic, they write, that is grounded in specific local needs:

not providing control of what has yet to come, but increasing the adaptability to change by the time change will occur. In this frame, the continuation of processes of perpetual trial-and-error, management, and maintenance, as done by the Venetian ancestors, has proven to be the most successful in a dynamic environment. Constructing resilience through experimentation that is safe-to-fail, in which there is always a way back. (105)

This ethic is named by Silvio Testa as *scomenzèra*, a starting point, deriving from the Venetian verb for ‘to begin’ (Fabian et al. 2022, 45). It describes Venetian scenario technology, Testa says: a trial-and-error experiment in the lagoon waters based on public participation. Before it gets underway, look at the effects it produces, and decide whether to proceed. Under this protocol it is easy to fail and try again, to return to the starting point, to experiment.

The authors of *Amphibia* write their scenario as a travel diary, telling about a far future visitor to the lagoon who observes the post-transformation society that has learned to live with sea-level rise. The visitor witnesses examples of circular economies, reuse and recycling, communal work spaces, diffuse maintenance, reorganized living incentives for island residents, and built infrastructure designed for everyday flooding. The ‘solutions’ included in this future are all things that already exist, simply re-deployed under strong municipal programs. A good example is the design for the various islands of the historical center: the higher islands need only a few small barriers to keep them dry; the mid-level islands are designed to be half-flooded while elevated walkways let business continue as normal; and the lowest islands are continually flooded but covered with floating *passerelle* to facilitate foot traffic. “While I witnessed the tides invading the square, citizens seemed to be rather impassive,” the narrator remarks (Fredrick et al. 2021, 138). In this scenario, living with water has become re-normalized. For its part, MOSE is no longer needed and so gets buried under the water.⁶² While *Amphibia* as a design project does not engage in extensive stakeholder research, the ethic they describe gestures strongly toward participatory futures under new forms of governance that invest in floodland community spaces rather than orienting toward a protectionist future scenario or any compromises with it (160).

⁶² See the essay “MOSE as heritage” in Lagoon Trust for more on this significant narrative action.

Best practices

From forecasts to scenarios, future-oriented technologies around the Venetian lagoon use many methods to get at the question of *what could come next?* Each of them carry with them their own assumptions and rationales, which the savvy reader can observe by reading in between the lines of the proposed solutions to see what values govern the decisions that bring them into being. This thesis grounds its analysis in anti-colonial action. What bearings and best practices for making good lagoon relations can come out of the scenarios analyzed here?

First, participatory decision-making based on consent and consensus seems to be lacking across planning schemes that are based in large engineering projects. MOSE has its own history of not accounting for livability as much as it serves to protect the status quo of the lagoon, but to a great extent the current forecasting protocols, the closed lagoon scenario, and the divided lagoon scenario all seek to preserve in some way the current economic state of Venice. That is, they all tend to favor ship traffic and keep the historical center unaffected by flood events. Ensar Yilmaz names this type of thinking as an “addiction” to building and preserving, an attitude which “tends to ‘focus on the moment,’ narrows the time horizon and evaporates the ability to think about the future” (in Bayrak and Göktaş 2023, 13). In this sense, then, scenarios that seek to preserve the present state of things are not open to new possible arrangements in the critical sense that a project like *Amphibia* tries to be. Like forecasters, they remain working in a paradigm that trains them to use scenarios only to avoid damages and not as “a means to more” (Fredrick et al 2021, 199; cf. Fujikane 2021).

Second, scenario technology can be a useful exercise for re-imagining place so long as it is able to celebrate rather than fear uncertainty. Model-based political imaginaries wait for uncertainty to be reduced as much as possible, write Mangia and L’Astorina, and so institutional bodies may “procrastinate a decision while waiting for more information” (2022, 19). Those who embrace scenarios as a tool of keen analysis, however, rely on the process to bring up things that they might not have otherwise seen. The scenario, writes Marta de Marchi, “raises doubts, makes ideas react with existing conditions, and, in a fragile environment such as the lagoon, can be a shared tool for discussion and confrontation around many possible futures” (De Marchi et al 2023, 27). As a method it may be appropriated by collective initiatives without institutional oversight. At its core, the scenario is a story, and like stories it can spark movement toward what otherwise would seem unthinkable.

What I admire about the *Amphibia* project is that it makes a story about how the story of Venice could get rebuilt in sea-level rise futures. “The inhabitants found ways to overcome staticity,” the authors write. “They understood the value of their structures by constantly reframing their essence. The built [environment] is a permanent subject of addition, removal, elevation, replacement or repurposing, always with care for what was already there and how to build in such a territory” (Fredrick et al. 2021, 199). Courage to add onto the material narrative of Venice and set in motion a new-old ethic of care for place, while living in place, defines the most optimistic narratives that also inspire me most. MOSE is part of this story, but it is perhaps just the starting point, the *scomenzèra*. In a re-validated, reframed, non-static lagoon it will take on new meanings, and it may become one of many things that must eventually be let go.

An incomplete environmental history of Santa Maria del Mare

Pellestrina, Southern Lagoon

I'm standing at the end of the beach at Santa Maria del Mare, at the north end of the barrier island of Pellestrina. Ahead of me there's a long fence, and beyond that, the MOSE construction area. I can't go any further. I climb up on irregular stones and peer through the chain links. Through it I can see piles of gray stone on a platform that stretches for hundreds of meters into the sea. Environmental history is supposed to show how human ecologies are contingent on place and change over time, but this place has gaps: places I can't enter and questions I can't answer. The shore was once made of shifting sandbars, and now it's a space filled with bare rocks. What's going on here?

I go up to a small guardhouse and knock on the window. A young man comes out, dressed in an orange reflector jacket with a sweat band across his brow. We get talking, and he wants to know all about the United States. He prefers American television shows, he says, but has never been there. I ask him about this place. I still can't go in. As we're talking, a car filled with more young men drives out of the MOSE construction site. He asks them for their names and signs them out on his log. Everything we can see through the fence – warehouses, shipping-port architecture, big cranes and bays of gravel, and the MOSE buildings in the distance – is reclaimed land. It didn't used to be like this, he says. He gestures across to where the curving coastline ends. All this was beach, and at the end, over there, was a long breakwater with a lighthouse on it. 'I used to come here and piss off the end of the jetty and hang out with my friends,' he recalls. I look at some old maps later and it's confirmed: MOSE has completely

reshaped the shape of Santa Maria del Mare. What will they do with the construction area when the project is complete? I ask. The young man doesn't know for sure, but he thinks that there's a plan to turn it into a solar field – another form of state control over energy flows at Pellestrina. The next day I mention this idea to a resident of Lido. He replies that it would represent just another 'punch in the face for the lagoon habitat.'

Time and energy flow differently in Pellestrina. Twice a day the tides rise and fall. Fish migrate up and down the coast in ways that fishers know well. With the seasons, the residents of Pellestrina and their lonely vegetable gardens transition from spring greens to summer tomatoes to the fall grape harvest. Birds nest in the dunes and raise their chicks. Fluctuating rhythms of energy availability are harder to escape here than in Venice or other urban areas, where uninterrupted service at the grocery store is practically a constitutional right. Being geographically distant from the center and thus more reliant on local foodways creates in Pellestrina “a general and severe precariousness, strongly affected by the need for daily familiar sustenance,” writes Francesco Vallerani (in Baldacci et al. 2022, 106). Don't mistake this livelihood for a romantic escape from the world. Lively things – like MOSE – are startlingly present here.

Before MOSE there was the *murazzi* seawall project, and before that there were centuries of informal maintenance works to stabilize the barrier islands. They shift from year to year under the influence of storms and longshore currents. It takes great attention to traverse and maintain the thin habitable zone that separates the lagoon from the sea. With the 18th century *murazzi*, the Venetian Republic made it a priority to stabilize Pellestrina and Lido. “Replacing the traditional defenses that had been vulnerable to periodic destruction, these new sea walls complemented the measures Venice had taken to control the waters within the lagoon itself,” writes Salvatore Ciriaco (2018). Keywords: replace, defend, control. It was made clear to the residents of Pellestrina that they were expected to maintain these walls for the good of the whole lagoon. A 1870 city decree for Pellestrina reads: “The goal of this arrangement being the defense of the Canal or the Lagoon Basin against the bank sliding down and not the defense of the shore against the action of the water... this Prefecture hereby warns all those concerned to make all the works or repairs necessary to put all shores bordering the Lagoon or Canal in perfect condition” (Crovato et al 2020, 53). Whether ruled by Venetian, Italian, or other foreign powers, these semi-rural islands have long been expected to provide environmental security for the working lagoonscape.

The mobile barriers were laid down over twenty years, changing time and space at Santa Maria del Mare. They are part of the pattern of precarious sustenance. Like the *murazzi* they offer future protection from high water, which hit Pellestrina very hard in the *aqua grande* events of 1966 and 2019. Winter storm seasons suddenly don't bear down so heavily on the residents; they can sleep easier at night and forget the urge to constantly adjust their dwelling habits according to tide alerts on their smartphones. At the same time, each closure creates an event that slices across the ecosystem's rhythms. Fish feeding cycles are interrupted; boats come in early from the sea; the incoming tide slows down.

A barrier island is not a resource. Though I've been told by representatives from CVN that they did due diligence in seeking consent and title to the land at Santa Maria del Mare that was eventually occupied by construction sites, an anti-colonial stance starts from the assumption that the land was never available *a priori* for state use. Treating land as property presumes it has an inert character that can be a tool for the owner. When constructing the *murazzi* and MOSE, a powerful bureaucracy made access to the barrier islands to enact a project that would protect the urban center. Interventions at the lagoon mouths were built on a state's entitlement to land. National leaders decided it was necessary and justified to occupy and alter crucial points of the lagoon, historically inhabited and traversed by beings who are not the primary beneficiaries of defense works (Crovato et al. 2020, 52). As imperial meta-infrastructure, MOSE protects the high-consumption lifestyles of urban Venice, especially those of the tourists who fly in to see it. This, in turn, relies on matter and people that can be easily disposed in what Marco Armiero calls "wasting relationships" (2021). So too does a stable center rely on seizure of marginal territory, or as Max Liboiron says, on "infrastructural access to Indigenous Land" (2021, 8). The capitalized term "Indigenous" translates poorly to Europe, as a North American concept too often taken out of context to make a claim to belonging (Povinelli 2022). But I want to look at the deeper meaning it suggests for Pellestrina. Residents would say they are part of the land, caught up in its flows for hundreds of years. Vallerani observes that some hold "a sad consciousness that climate change and lagoon pollution are seriously affecting their environment" even while living under the bitter taste of protection (in Baldacci et al. 2022, 107).

There are about ninety workers still completing MOSE at this construction site, the man at the guardhouse tells me. They come from Venice or Chioggia mostly, one or two from Pellestrina, and also a few from firms based in southern Italy. During the height of MOSE construction, when hundreds of people were working at this site each day, workers were housed

in temporary apartments made from recycled shipping containers. The housing units still stand on this thin strip of land. They were supposed to be demolished, he says, but now some function as “receiving houses” (*case di accoglienza*) for otherwise homeless or displaced people, including many recent immigrants. After Pellestrina was razed to the ground during the 1380 Battle of Chioggia, four historical families of Pellestrina re-settled the island. These newcomers had to recover what they could from the damaged houses, vineyards, and roads, historian Mariavittoria Tagliapietra writes (Crovato et al. 2020, 52). I don’t know what the relation is between the new arrivals who settle here and the people who come from old settler families, but I suspect that what separates them is not so much their life experiences as the time they’ve had to know this particular place.

MOSE is now part of the temporal reality of the barrier islands. Its irregular eventfulness and project-driven timeline have inserted themselves into the long play between the entities that sweep through Santa Maria del Mare. Writing about coastal changes in the Bering Sea, historian Bathsheba Demuth observes that “the scale of human transformation was often distinct, and faster than those initiated by other beings trying to convert energy from the land and sea. But even the greatest human endeavor was the mutual creation of people’s ideas and the world around them” (2019, 19). Though it doesn’t seem so at first glance, MOSE is one such mutual creation. A narrative about great engineering overwrites the land that it is built on, partially hiding the time-cycles that go on beneath and around it, which remain largely unseen.

Science and MOSE

Multiple locations, Central Lagoon

MOSE is built on engineering reports and models, and its operations depend on disciplines like hydrology and meteorology. All of these can be represented under the category of ‘mainstream science,’ the formalized methodologies taught in European universities and used in MOSE workspaces to activate the mobile barrier system at the right time.⁶³ However, mainstream science is only one of many possible ways to perform methodological inquiry into a phenomenon and assess how something is known to be truthful (Kimmerer 2013). The more general practice of inquiry might be called simply ‘scientific analysis’ and includes formalized disciplines like engineering science, as well as other less-recognized ways of understanding the dynamics of a place, which here I refer to as ‘earth practices’ (cf. Whittington and Oguz 2023).

The swirling relations around MOSE are not easy to understand by looking at it for a short time. Yet, by briefly and uncritically assessing its presence, powerful voices have made claims that it presents no significant changes to the lagoon. For example, Gilberto Pichetto Fratin, the Minister of Environment and Energy Security in the Meloni government, has declared that “MOSE’s impact on the entire ecosystem have proven to be virtually non-existent thanks to rigorous and continuous scientific monitoring.”⁶⁴ This claim is made more credible by referring to scientific methods, but anyone trained in the geosciences would know that rigorous study of an entire system cannot be based in only three years of observations. Sea-level rise and lagoon infrastructure are engaged in a complex relation unfolding across long time scales, on the order of decades to centuries (Ferrarin et al. 2014).

Discerning what forms of scientific analysis are being used to understand MOSE, and how their conclusions are validated and communicated outward, may show what assumptions are hidden behind sweeping claims like the above statement from Minister Fratin. To dig into the construction of truthfulness around MOSE, I look at how scientific practices respond to two questions: *How fast are sea levels rising in Venice?* and *Does MOSE have a significant impact on the lagoon?* In fact, both mainstream science and earth practices that I find in Venice agree on the answers: *very fast* and *yes*. However, the political implications of these practices diverge.

⁶³ See “Countdown Protocols” and “Forecasting and Scenario Thinking” in this chapter.

⁶⁴ *Fortune Italia* magazine, “MOSE ingegno italiano,” 2023.

How fast are sea levels rising in Venice?

Mainstream science reports unequivocally that sea-levels in Venice are rising rapidly on the geological timescale. “The frequency of floods affecting the city has increased from once per decade in the first half of the 20th century to 40 times per decade in the period 2010-2019,” the 2022 IPCC report summarizes (WGII, 1828). Such data analysis, however, is embedded within a tradition that attempts to remain objective: that is, only reporting the direction and magnitude of data trends. In particularly conclusive situations scientists may use cautious normative language about implications of sea-level rise, sprinkled with terms like “may” and “is likely to,” which to a lay reader can make the analysis appear laced with doubt. Researchers may also run computer simulations based on real-world dynamics, such as hydrologic models of the Venetian lagoon, but these tools, too, are semiotically removed from the space of action.

It is only at the broadest level of scientific writing, such as in the IPCC reports, where cross-cutting conclusions are made about the causes (fossil fuel extraction and combustion) of the phenomena at-hand (sea-level rise). Even then, authors are discouraged from making direct critiques of capital relations, to personify in any way the bodies that they study, or to center their analysis on what many practitioners are calling *earth beings* (de la Cadena 2015; Luisetti 2023). Except in a handful of cases, place-specific earth practices besides those endorsed by governing bodies are ignored in favor of analysis that feeds into a universal theory of earth system dynamics, and affective relations or lifeways around these systems are almost always omitted from mainstream scientific studies (Liboiron 2021).

Inside the MOSE workspace, an understanding of wind and water dynamics is mostly – but not completely – mediated by workers’ background in engineering, hydrology, or environmental science. Yet at the end of our conversation, one engineer told me about a more embodied form of scientific analysis that goes discussed among the MOSE workers:

I can tell you a personal thing that I've shared with them [other engineers] as well, we talk about these things here from time to time: that the last two years we've felt this change really physically, you know? And not by reading some analyses made by who knows who, who knows where. It's an evidence that the tide levels are rising. Maybe these are extraordinary years... you don't know if it will continue in such an incremental way or not, however in the last two years we have noticed that... you notice it really physically, which on the analyses is a bit difficult because it changes a decimal point, you don't

notice it over time... you see it, we see it, with the naked eye, you know, without an electron microscope.

An earth practice of noticing flickers in and around mainstream science, which the engineer represented with the “electron microscope,” a specialized piece of equipment used in laboratory settings. He grounds a parallel way of knowing in “physical” and “naked eye” observations, finding that this “felt” change can notice things that instrument-based methods are unable to clearly detect in their analysis. In this case, embodied knowledge is shown to pick up on significant relations that may otherwise appear negligible or within the range of scientific uncertainty. When it comes to noticing and acting on sea-level rise, this is a crucial difference.

Contrary to mainstream science’s claims, scientific earth practices do not necessarily point to a singular truth, but rather offer a truthful description of an entity, an assessment that may not remain valid if removed from its context (Vivieros de Castro 1998; Povinelli 2015; Liboiron 2021). An excellent example of this is the local names for winds. A *scirocco* (southerly wind) is an accepted scientific term to describe a wind pattern that blows from the Adriatic Sea and makes water levels higher in Venice (Wille, in Baldacci et al. 2022, 187). It is not an unsupported narrative based on a misreading of data, but an earth phenomenon that can be noticed and discussed. Yet, a *scirocco* cannot be universalized without losing its particular connotation: it remains bound to place, untranslatable. So too, the analysis of sea-level rise offered by the engineer is an informed and truthful description of an earth phenomenon whose particularities cannot be represented or even detected with instrument-based methods. Place-specific earth practices have much to add to the local outlook on long-term sea-level rise (Liboiron 2021; Rush 2019).

Does MOSE have a significant impact on the lagoon?

As with sea-level rise, mainstream science unequivocally reports that MOSE construction has altered the shape of the lagoon mouths in such a way that incoming water flows faster, adding to the overall trend of erosion that has been going on for at least a century.⁶⁵ By using

⁶⁵ For instance: “The local variation in residual and instantaneous current velocities is a direct consequence of the new structures at the inlets and their new depths thanks to the MoSE project,” write Michol Ghezzi and colleagues (2010). The stronger tides lead to an “alarming acceleration of erosion” and as a consequence the lagoon is “flattening,” reports a team led by A. Sarretta (2009). They use lagoon-floor surveys from as far back as 1930 to show that the lagoon is now getting progressively deeper and therefore “high-energy and more open.”

models and cross-checking many data series, Christian Ferrarin and colleagues (2013, 2014) show that global sea-level rise in combination with changes in lagoon basin morphology, including those from the MOSE construction process, have changed the lagoon's tidal regime. Scientific simulations also indicate that continued use of MOSE under the current protocols will have dramatic negative impacts on critical habitats like seagrass beds and salt marshes over the next century (see also Rova et al. 2018).

One does not need quantitative data to make a scientific analysis of MOSE, however. Some residents are very adept at examining the lagoon and making their own impact assessments. Petra Codato reports a conversation she had with a recreational fisherman who often casts a line off the shore near one of the lagoon mouths. He told her:

“You have to look at the tides when you come to fish in the lagoon. Once fishermen could organize to go at a certain time of the day, while instead now... maybe you come here convinced that the tide is going one way, that it is rising and instead it is falling... or the water-turns that instead of being at 6 o'clock in the evening are at 8 o'clock.”

“And this is directly related to the MOSE?”

The fisherman looks me straight in the eye: “Yes to the MOSE, for sure” (2023, 90-91).

To describe the changing lagoon rhythms, the fisherman starts from his own earth practice of noticing. The direction of the tide and the timing of the “water-turns” influences where the fish will feed, and fishers depend on this information for their own sustenance. When Codato names MOSE, his answer changes tone, as if it were obvious that he was describing its impact all along. A similar analysis is reported in Rita Vianello's 2016 interview with a recreational fisherman. She remarks that “the local population [is] able to see and interpret the relationships between the environment and the new infrastructures built” (2021, 113). Scientific earth practices of constant observations, cross-checking, and inquiries into change, suggest that local waters are highly sensitive to this new entity.

Earth practices add additional layers of analytical significance to MOSE. As Elizabeth A. Povinelli observes, keen analytical practitioners will engage in “detailed examination of [certain extent beings] so as to determine their nature, structure, or essential features and, by extension, the features of the world in which they emerge as such” (2015, 181). If the process of examination, not the exact tools of analysis or politics of recognition, are the markers of an

analysis deemed valid among one's peers, then the fisher and the engineer both make scientific claims, basing their analysis on practices attentive to water dynamics over many years. What these claims implicate about "the features of the world in which they emerge" is withdrawn from easy view, tucked into hesitations and statements that go unsaid. One can infer, though, that in the fisherman's analysis, MOSE represents a social world that is disrupted, beating out of time.

"Shot through with geological relations"

Both mainstream sciences and other earth practices assert that the socio-geological formation between sea-level rise and MOSE has altered the lagoon's physical dynamics, even if they don't use these terms. The turn to geology as a field of critical analysis in formalized academics writing only points to the relations that have been there all along, but are more noticeable in an age of rapid changes. As Jerry Zee observes, "human beings in their plurality have become shot through with geological relations," and it is crucial to map where those ties come into being and are thrust together in "seismic collisions" (in Whittington and Oguz, 153). In the Venetian lagoon, a critical geology includes salt marshes, cruise ship emissions, fiberglass hulls, river diversions, barrier island sand, tidal surges, Proconossian marble, wind patterns, mercury in clams, nutrient runoff, oil and liquid natural gas containers, airplane tarmac, imported sand to make Murano glass, and the salt that I put in pasta water, to name just a fraction of our everyday encounters with mineral and geomorphological entities.⁶⁶ Some of the items on this list immediately imply hostile, extractive, or toxic relations, while others point to more collaborative ends. According to current scientific analyses, MOSE has been a disruptive geological force, but that does not mean that it will always be so.

However, the perils and possibilities of these "shot through" socio-geological formations are largely invisible to mainstream science, say Kathryn Yussof, Elizabeth A. Povinelli, and others participating in the turn to critical earth praxis. Instead, mainstream science attends to a "white geology" that washes out the colonial legacies of destruction from its 'objective' methods and instead starts from an assumption of how "we" humans are apart from and above the Earth:

This "we" negates all responsibility for how the wealth of that geology was built off the subtending strata of indigenous genocide and erasure, slavery and carceral labor, and

⁶⁶ See also Jorge Luis Borges' "Atlas" as quoted and discussed in Iovino 2015, 52.

evades what that accumulation of wealth still makes possible in the present—lest “we” forget that the economies of geology still largely regulate geopolitics and modes of naturalizing, formalizing, and operationalizing dispossession and ongoing settler colonialism. (Yussof, 2018, 109)

Putting science in question for its complicity in destructive politics, Yussof and others use the term “stratification” (65) to describe how geologic knowledge tends to be used to divide, extract, and govern what it sees as material resources (including human bodies) for privileged human classes.

Venice is rife with socio-geologic stratification where unwanted bodies are snubbed and kept out to preserve the facade of a fragile city. ‘Stratification is strategy,’ say Whittington and Oguz.⁶⁷ They continue: “a ‘politics of strata’ binds the ungovernable volatility of an inhuman earth with the violently-governed, enforced inhumanism of racial and class difference” (2023, 147). This is the geo-social formation that links such diverse phenomena as the Venice access fee, structural barriers to immigration from the global south, and MOSE. All are part of a tendency that favors neatly divided and stabilized territories over otherwise possibilities for earth practice. The “white geology” (Yussof 2018, 16) that stratifies the lagoon into neatly controlled and extractable areas (for tourism) gives scientific backing for politicians to claim that MOSE has no negative impacts, because in their analysis where the principle analytical criteria is maintaining short-term stability, the mobile barriers perform exactly as promised. White geology, moreover, allows for acceptable risk and a threshold for damages, and so as long as MOSE does not constitute an extreme and immediate hazard to the lagoon then it is considered part of the greater good (cf. Liboiron 2021).

Though there is no doubt that many scientists try their best to work for just relations from within disciplinary frameworks, they tend to overlook “a wide range of engagements that refuse to be defined by the terms of mainstream scientific knowledge and efforts to weaponize it alike,” observe Whittington and Oguz (2023, 147). Instead of lingering within mainstream science, they encourage new affective practices outside the frameworks of risk-avoidance and “anticipatory ruination,” where states and businesses bank on eventual failure as a long-term strategy (151). What analytical earth practices may help residents re-orient toward just and care-based lagoon relations? Workers who I spoke with know that certain small-scale interventions can help the

⁶⁷ From a conversation with the authors at the Ecological Design Collective, February 2024.

morphological and habitat diversity of the lagoon keep up with sea-level rise.⁶⁸ Some scientists do study and support these initiatives when they have formal backing; however, engaging with ‘traditional’ earth methods goes against geosciences’ long-running tendency to stay aloof and distant from what Whittington and Oguz call “violent, creative, and liberatory planetary practices” (147).

MOSE is a still-unfolding geologic relation, and future scientific practices around it may be able to shape its impacts toward more just arrangements. Affirming “intimate and embodied relations with the earth,” write Whittington and Oguz, “will make possible human capacities for geo-social existence that can contend with the deeply unequal and far from homogenous collective predicament faced today” (149). Research on MOSE and lagoon futures will need to shift its time-scale to one that looks not only at impending damage, but also at livable adaptive possibilities. In that way it can avoid damage-centered research shadowed by the governance of catastrophe and instead imagine engagements that bring about critical hope.

⁶⁸ Including salt marsh restoration projects, opening up the fishing valleys, and shallowing the lagoon inlets.

Lagoon Trust

The history of MOSE is littered with broken promises: delays, scandals, lack of participation. Social trust is missing from the working lagoonscape, and yet trust will be necessary to have an equitable process of re-imagining the lagoon over the next decades. Small glimmers of abundant trust shine up through my conversations with MOSE workers and other lagoon inhabitants, and time and again they are brought forward in the context of bottom-up ethics: solidarity, exchange, collaboration, critical thought. Rather than seeing sea-level rise as a form of violence that must be warded off through defensive tactics, however, trust-based entanglements offer a reframe wherein sea-level rise is a challenge of how to work with one's neighbors to design a place that can become-with water. The narrative essays here contribute to a mosaic from which can emerge models, proposals, and alternatives that contribute to the necessary work of adapting for "the flood next time" (Battistoni 2012). I enact some of these ideas in the "Speculations" section.

This chapter is made of four essays. First, "The security table" traces the agreements made between unions and CVN to ensure workplace safety. As a small but effective mechanism to make top-down power accountable to bottom-up demands, their long-standing meeting provides a model for future governance possibilities. The following essay outlines how governance will likely change with the creation of "the *Autorità per la Laguna*," a public entity responsible for comprehensive management of the Venetian lagoon. I review its legal basis to highlight places where possible democratic logic may come out of an entity that, so far, seems to continue control-oriented management tactics. Then "Consenting to MOSE" again takes up critiques from fishers, port workers, and even MOSE employees to wonder about the legitimacy of power formations constructed around the mobile barriers. Finally, in "MOSE and heritage" I take the project as a physical structure to outline possible futures centered on good relations not only with the city of Venice and its lagoon, but also to the far future, where one way or another the barriers will be part of another arrangement in a living lagoonscape.

The security table

Arsenale Nord, Venezia

Confederated union CGIL Venezia initially came out against the MOSE project. In a statement released on 14 May 2003, the day that prime minister Silvio Berlusconi laid the first stone, they made several critiques, which can be summarized as follows:

1. Safeguarding the city, as required by the 1973 special law, cannot be reduced to a single intervention. The large sum reserved for MOSE would be better spent over many decades of diffuse maintenance projects.
2. Consorzio Venezia Nuova has not produced any definitive evidence about MOSE's effectiveness, environmental impact, or unintended consequences on lagoon hydrology.
3. Consorzio Venezia Nuova has not made plans that will ensure the continued functions of the port system, leaving working futures of Marghera very uncertain.
4. The entire MOSE project is being supported by a propaganda-like narrative from the "miracle-seller" media that washes over the problems in the proposed interventions.
5. The monopoly that Consorzio Venezia Nuova has on the project prevents true participation and is an illegitimate arrangement made by the state for its own gain.⁶⁹

Each point addresses a specific piece of the moral ecology of infrastructure around MOSE. CGIL put into writing issues that were part of lagoon talk at the time and have shown to be valid concerns (especially points 2, 3, and 5). In this way they initially appeared to align themselves with the *No MOSE* public committee.⁷⁰

However, like many working-class environmentalist groups, CGIL also made job security a top priority. So despite being against the project, CGIL Venezia joined other local branches of unions CISL and UIL to formally represent workers on the MOSE project. Their collective bargaining power helped to create workplace safety during construction and has remained a fundamental piece of participation around MOSE. The 'security table' (*tavolo di sicurezza*) that they set up between unions and leaders of CVN is a model for how bottom-up representation of

⁶⁹ CGIL Venezia, 2003.

⁷⁰ See the essay "Protest around MOSE" in *Lagoon Talk*.

workers' experiences can help guide decisions to more equitable outcomes in a top-down power structure.

A year into the construction works, in 2004, the three unions came to CVN with an appeal to address together the main problem: that MOSE had no existing coordinated systems for worker security. In the CVN-CGIL-CISL-UIL accords signed that summer, they laid out the general objectives of a standing meeting between commissioners and unions: keeping the project up to code, ensuring that workers are trained for the job, avoiding accidents, and respecting workers' rights (CGIL Venezia 2004). Unions were particularly keen on making sure that contracts were written with an eye toward equity and safety on the job. In my research, this is the only formal mechanism I have found whereby an outside party had oversight on CVN. Through the security table, unions claimed a "guarantee of a constant monitoring and verification of works" for as long as MOSE was under construction, otherwise they could pursue retribution through strikes or other collective bargaining tactics (*ibid*).

The security table accords, however, limited public participation to a very narrow aspect of the safeguarding projects: workers' security. Unions and the workers they represented could, in theory, bring concerns and inquiries to the attention of CVN through the security table meetings, as long as they worked toward the end goals of the project. The accords stated that all the parties involved should "take action and participate in initiatives tending to guarantee transparency, good conduct, and legitimate execution of the works" (CGIL Venezia 2004). It was a start. With the accords' common reference frame, based on working experiences, all parties were oriented toward what they called *cantieri sicuri* (safe construction sites) and were prepared to resolve issues around workplace safety as they came up (*ibid*).

As far as records show, the security table worked to make a construction site largely free of any accidents or irregularities. The table kept open a communication channel between workers and managers, encouraging dialogue so that everything remained in-line and up to code. I spoke with a security manager who interfaced with both CVN and the unions in his duties for workers' safety at MOSE. While walking the 'vast construction site,' checking that the workers were being treated well and that no one was missing helmets or work belts, he observed good practices and a high level of communication relative to other jobs he worked on.⁷¹ CVN also made an online portal so that the public could access information on "the expected works in progress and

⁷¹ Telephone conversation with former security manager.

specific information on security measures” (Conorzio Venezia Nuova 2005). Union representatives saw that the works were going ahead at a good pace through their constant contact with CVN.

The security table was a clear boon for unions as they sought to check the monopolistic arrangement that CVN had over the MOSE work. The secretary general of local branch UIL-Venezia at the time commented to the press that it was “an innovative step to model which type of intervention will work in similar construction sites in the future” (Costantini 2005). Union leaders from CGIL, historically opposed to MOSE, were also satisfied with the workers’ rights outcomes. A press clipping from 2007 shows the strong but narrow position that they had: while environmentalists were protesting the entire project and its impact on critical nesting sites at the barrier islands (see point 2 above), unions peaceably reported stable jobs and good working relations (“Mose, anche il WWF” 2007).

The rosy picture, kept deliberately separate from environmentalist concerns in a fragile peace deal, was damaged in 2014 during the scandal that erupted at CVN. The security table, however, was preserved as a crucial site of dialogue between workers and employers, and has continued to make unions a key institutional player who can bargain with local and national institutions. During the MOSE strikes in 2021, when CVN had liquidity problems, strikes were used to help ‘re-activate the table,’ that is, to get an audience between CVN and union representatives.⁷² The precedent of participation — in other words, the history of trust built between unions and CVN — made this a legitimate request that resolved a complex situation.

The CVN structure will dissolve with the arrival of the *Autorità per la Laguna*, according to the *Decreto Agosto* of 2020. That means that in 2025 or so, the security table will cease to exist as well. Unions, however, have strong momentum from this two-decade experience in negotiating narrow workers’ rights issues between MOSE workers and their employers (cf. Stevis and Felli 2014, 40). As an effective participatory mechanism, it offers a model for bottom-up pressure within an overall top-down structure that might guide decision-making in a ‘soft’ way toward more equitable measures. It remains to be seen if union organizers are able to make binding accords that allow them to advocate not just on working futures but also on broader lagoon futures; that is, if workers’ ecological knowledge can inform recommendations on good lagoon relations from below.

⁷² Conversation with union leaders.

The *Autorità per la Laguna*

Rialto, Venezia

I. The *Autorità*

In the after-MOSE period, the *Autorità per la Laguna* (Authority for the Lagoon) will become the new institutional system holding political jurisdiction over the coastal territory around Venice. In August 2020, during a period of trouble with finances for MOSE workers that would later lead to a set of strikes, the Italian state issued article 95 of decree 104/2020, titled “Measures for the safeguarding of Venice and of its lagoon and the institution of the *Autorità per la Laguna* of Venice.” This law references and builds off of special laws for the safeguarding of the Venetian lagoon issued in 1966, 1973, and 1984; and the 2014 law that placed MOSE under interim control of the regional superintendent after the corruption scandal emerged. In the briefest possible terms, article 95 of decree 104/2020 creates an autonomous state entity that will authorize and coordinate comprehensive management of the Venetian lagoon.

In the text of this law, the features of this public entity are laid out to give some indication of what is likely to come. Like the old *Magistrato alle acque* (Water Magistrate), the new *Autorità* is tasked with “safeguarding [*salvaguardia*] of the city of Venice and its lagoon and maintaining the lagoon’s hydraulic system” (Article 95.2). Also, it is meant to “promotes studies and research” to these objectives (Article 95.3). However, much of the exact structure of how the *Autorità* will work is deliberately left out of the legal decree. The law foresees that there will be a President, a Managing Committee, and a Consulting Committee. Most of the rest of the structure for the public entity is left up to the President to decide, with the approval of the two committees (Article 95.5). This means that a single figure, nominated by the state, will have a major role in deciding the organizational structure, budget, and comprehensive plans for future lagoon governance.

The *Autorità per la Laguna* will have the guiding responsibility for coordinated action across the lagoon from the date when it is formally activated, likely in 2025. The actions will be written in the comprehensive *Programma triennale della Laguna di Venezia* (three-year program for the Venetian Lagoon) and will include plans for environmental interventions (such as salt marsh restoration, canal dredging, and beach replenishment), plans for monitoring and evaluating these interventions, and plans for operating MOSE. To execute these plans, the *Autorità* is

granted a yearly budget of 40 million euros through 2034 (Article 95.17). The powerful long-term position filled by the *Autorità*, combined with the great institutional uncertainty it represents, makes it a large question mark for lagoon futures. The *Autorità per la Laguna* could represent a great transitional upheaval or an opportunity for improving lagoon relations, depending on how collective decision-making is re-expressed by this new public entity.

At present, the *Autorità* is planned out as a top-down planning entity staffed with representatives from national and regional levels who are likely to guide the entity toward high-budget, low-participation defense actions. On the Managing Committee, whose duties are to oversee the budget, direct interventions, and make strategic plans, there are representatives from the Ministries of Finance, Environment, Infrastructure and Transportation, and Cultural Heritage and Tourism; and from the Veneto Region, the metropolitan city of Venice, and the *comune* of Venice. The Consulting Committee, composed of seven representatives with knowledge of hydrology and environmental conservation, is selected by interests including the mayors of Venice and Chioggia, the Port Authority, leaders of ISPRA, and the regional council. As of May 2024, the only role that has been filled of all of these is the president of the *Autorità*. It was confirmed that Roberto Rossetto, a retired urban planner, would be filling the first three-year term as President. Many voices across the city have noted that Rossetto is a strange choice for a lagoon planning body. Though he studied at IUAV in Venice, he is not from the city, and his first actions have indicated that he is concentrated on efficient rather than holistic management strategies.⁷³ Lagoon residents are on high alert after the 2014 scandals and are trying to decipher whether this new agency will really be able to bring balanced and transparent governance.

II. Expectations

Despite the initial signs, many MOSE workers are nevertheless very hopeful about the new arrangement. The most common response to my questions about expectations for the *Autorità* is that it will help to centralize a lagoon governance system that until now has been quite fragmented. An example that was twice given to me was this: if you have a boat and are caught speeding in the Giudecca Canal, the amount that you have to pay varies by which agency stopped you. Local police, the port authority, and the coast guard all have slightly different regulations and report to different authorities, even though they have overlapping jurisdictions.

⁷³ See for example, *Venezia Today*. 30 May 2024. “Via Libera Della Corte Dei Conti a Rossetto...”

Under the *Autorità per la Laguna*, these rules would be streamlined. A technician could plan for ecological interventions by going through a single coordinating agency instead of working across a distributed network of siloed municipal and scientific research offices. One remarked to me, “it’s too complex because each one tends their own little garden... if one little piece tries to move by itself, it can’t – [the lagoon] is a complexity that needs to be managed well.” Many workers expect that, on the structural level, their projects will have a greater ability to maneuver toward their goals.

However, with every hopeful response also came a strong sense of uncertainty. From the workers’ point of view, the most crucial piece of the transition to the *Autorità* is the so-called *società in-house* (in-house company), which will be the arm of the institution that will receive engineers, technicians, and other staff from the dissolved CVN work spaces (Mingarelli, in Perulli 2021, 27). The companies that have designed and operated MOSE will be dissolved or shifted to other duties, allowing the *Autorità* to retain staff members who have specialized knowledge of the mobile barrier system. In practice, many of the workers will continue to have the same desks and responsibilities, but the institutional framework around them will have changed significantly. Indeed, the way that the *Autorità* performs the transition from a set of firms under interim management to the *società in-house* will be the litmus test for its intentions as a public agency for many workers. Many questions remain for MOSE workers at this time. Who will be in the *società*? Who will be left out? Will our skills be valued? When will we know? Lacking any clear information, the whole office space grew tense when I asked about what would come next. It’s like an “interregnum,” one administrator told me. No one knows what to expect when the new power structure arrives.

In the middle of an uncertain transition, workers question whether their working knowledge of the MOSE system and the broader lagoon is valued at an institutional level. In our conversations, MOSE workers expressed frustration, doubts, worries, and fears about their job security. Union leaders are clear that they don’t want to leave anyone behind in the transition, and many meetings have been held to negotiate the structure of the *società*.⁷⁴ A lack of direction from above seems to be putting workers at the end of a wasting relationship, where their working ecologies are put on the brink of being discarded. Speaking from a precarious situation, an engineer used words like ‘crashing’ or ‘failing’ to imagine what could happen: “the more this

⁷⁴ See discussion on this issue in “MOSE strikes and other union concerns” in Lagoon Talk.

thing gets delayed, the more this place dies.” It was difficult to tell whether he meant the office work space around him or the lagoon itself.

MOSE workers and union leaders would advise the *Autorità* that it must work for the whole working lagoonscape. While decisions to raise MOSE must account for hydro-dynamics of the entire lagoon basin, political attention is always on the water levels at the historical center and the ability of the system to ‘save’ Piazza San Marco for tourists. A union leader argues that this arrangement misses the point: “there isn’t any one part of the lagoon that’s more important than another.” To make decisions that more equitably analyze the situation, the *Autorità* was designed to include perspectives from Chioggia, Mestre, and the regional Veneto government. Despite this, MOSE workers – many of whom come from mainland towns – are afraid that a Venice-centric *Autorità* will continue to ignore workers’ whole-lagoon perspectives. Technicians who use models and monitoring to have a gaze on the broader lagoon system are willing to work with the new *Autorità* leadership to develop a language about holistic management. However, they are also looking for concrete actions from the *Autorità* that show their work is valued: job security, long-term contract, fair pay, and equitable treatment. The nascent coordinating agency so far has not been able to guarantee these terms for its future workers.

As workers readily point out, the future of MOSE operations depends on this transition, and MOSE operations currently modulate the everyday life of the Venetian lagoon. The group of two hundred employees currently working to make sure that everything runs well has a particularly critical role in the new governance arrangement, and they imply that the *Autorità*’s leadership would do well to come in with an ear open to their suggestions and not pretend like they know everything about managing the lagoon. The structure of the *Autorità*, which leaves much about its internal operations unwritten, may have room for a much more participatory style of governance. Like the water magistrates of the past who learned from fishermen and other lagoon workers (Omodeo 2022), the new *Autorità* workers may be able to bring systemic knowledge of the lagoon to bear on political decisions.

III. Possibilities

In a review of the new legislation for the *Autorità per la Laguna*, scholar Claudio Alderghi writes the following:

This new institution does not exclude local modes of control. It will be interesting to see if there are spaces and opportunities to work internally within the *Autorità*, with the aim of having choices and decisions expressed in a democratic logic (a move beyond the idea of only exercising powers). The agency... could be given many more responsibilities, precisely because of and through proper decentralization. In doing so, it would move from a hypothetical powers-only rationale to a broader vision, thus aiming for a different reception and greater success... (in Perulli 2021, 86)

Thinking big, Alderghi envisions the *Autorità* as an opportunity for a larger reform of the system of governance that Venice has inherited. Personally, I think some of the ideas he proposes in his essay are impractical for near-term changes. However, I find that his keen analysis of what the *Autorità* does not yet exclude shows exactly the window of institutional possibility where just-transition policies and practices can take root.

Article 95 does not explicitly call for modes of active participation in the *Autorità*'s decision-making process. It implicitly suggests that decisions are made only by executive leadership, by the two committees made up of local political representatives and institutional scientific advisors. In this way, it seems to go against the terms of the Aarhus Convention (1998), which instructs signatories to “endeavor to ensure that officials and authorities assist and provide guidance to the public in seeking access to information, in facilitating participation in decision-making and in seeking access to justice in environmental matters” (Article 3.2). As one of the main UN statutes that continues to shape legal perspectives on the environment, these principles put forward best practices for governing bodies. Alderghi points out, however, that there is nothing stopping the president of the *Autorità* from internally structuring the public entity according to participatory logic. Indeed, MOSE workers have repeated to me that if we are to learn anything from the project so far, it's that future governance should be transparent, accountable, and respectful of working knowledge of the lagoon system.

If the president of the *Autorità* were to write a participatory Statute, what could it look like? Again, Alderghi has a vision for this reformed system: “A broad and inclusive platform of individuals and organizations could be activated, taking into account local context, culture, and practices. This is to address issues such as participation, operational mechanisms, monitoring tools, funding, and implementation of participatory processes” (in Perulli 2021, 90). In other words, there could be a bottom-up advisory group to guide the top-down lagoon structure. This is

already something that has existed for a narrow purpose with the security table between union representatives and the leaders of CVN. The version that is envisioned here clearly looks at many broad themes to keep the *Autorità* responsible to the citizens in the lagoon that it is tasked to coordinate.

Pushing the envelop further and in a different direction, it is not impossible that the Venetian lagoon one day is recognized with the so-called *rights of nature*, which in other precedents around the world allows for humans to file legal suits on behalf of nonhuman beings. The nearest example to Venice is a saltwater lagoon in southern Spain, the Mar Menor. In October 2022 the Spanish government ratified the decision to recognize the lagoon's right to "exist as an ecosystem and evolve naturally," the first rights of nature decision in Europe (Winters 2022). This happened out of a lengthy process of public participation across many different stakeholder groups. Ecologist Carolina Boix-Fayos and colleagues have observed that around the Mar Menor issue, "all the stakeholder groups prioritized transition to governance, economic and educational models that respect nature and cultural landscapes, with values aligning with the population's identity and their livelihoods" (2023, 1). The general learning from this case is that rights of nature is a tool that has allowed residents to push back on overuse of common-pool resources and disrespect for nonhuman beings. The experience of Mar Menor is specific to that place and would not easily transfer to Venice, but it provides a further example for the *Autorità per la Laguna* to understand possible ways of coordinating action across a vibrant space that will resist being controlled.

The *Autorità* will doubtlessly bring a new tone to the political structures across the lagoon, especially in the MOSE work spaces. Scholar Alessandro Casagrande recounts that "during the establishment phase of the *Autorità*, some criticisms were raised about its centrally-planned nature, arguing that the demands of the local authorities, environmental associations, and other stakeholders would not be heard" (in Perulli 2021, 94). These critiques have not yet been disproved, and it remains to be seen how the *Autorità* will take its first steps in the rapidly-changing lagoonscape. For now, opportunities for participation remain open despite the everyday uncertainties that union leaders and lagoon workers are negotiating every day.

Consenting to MOSE

Via Marcello, Mestre

The MOSE mobile barriers are a large project that directly alter the lagoon environment, in both intentional and unintentional ways.⁷⁵ As I discuss elsewhere, fishers, environmentalist groups, and port workers have made criticisms that MOSE does not reflect their values, and that its effects actually increase the vulnerability of the entire system.⁷⁶ This critique resonates with other cases of environmental justice around large-scale infrastructure, often led by Indigenous activists with an eye toward dismantling ongoing colonial relations (cf. Alba et al 2020). Critical writings on how large projects deal with the issue of consent – the process of asking and receiving permission for an intervention – have made me wonder about how this matter manifests in the Venetian lagoon. Do the ethical conditions of the MOSE project make it possible for residents to consent to it?

Some literature on consenting to infrastructure comes from geoengineering ethics, which translates easily to MOSE. Even if it isn't strictly a geoengineering project, MOSE will have a regional-scale, long-term effect, similar to proposed global climate interventions. In liberal political theory, institutions responsible for authorizing large-scale decisions are considered legitimate powers only if they have consent for those decisions from the people who are affected by them. From this premise, two main problems arise for scholars like Pak-Hang Wong, who asks: "whose consent is required?" and "how is consent to be obtained?" (2016, 177) The answers, he writes, depend on whether consent must be *explicit* or *implied*. If it is neither explicitly or implicitly given, then valid consent may also be granted through *hypothetical situations*, such as 'future generations would give their consent for X project if it were the only feasible way to prevent daily flooding.' Even just touching the surface of the issue, is it clear that how consent is framed in the politics around a proposed project is a critical factor in the ethical impact it makes (*ibid*).

In the long political process around MOSE, public participation was restricted; there were discussions at the popular level but little way for residents to express favor or not (Munaretto and Huitema 2012). For large projects, explicit consent is generally seen as implausible: asking an

⁷⁵ See "Science and MOSE" in Lagoon Time.

⁷⁶ See "Fishing in changing currents" and "Protest around MOSE" in Lagoon Talk

entire population their opinion is difficult, and not everyone will agree on common-pool resource questions. It's also impossible to ask future generations for explicit consent (Wong 2016, 179). Instead, the MOSE process could have relied on implicit or inferred consent, whereby "individuals indirectly consent to a decision by endorsing another situation that is similar in nature" (*ibid*). This gets complicated quickly, because what counts as a similar situation? Some examples could be: the decision to divert the Brenta River in 1610, long-standing lagoon maintenance practices, the 1973 special law to safeguard Venice, or the research and development actions leading up to MOSE construction. It is highly debatable to what extent these precedents reflect the same risk of MOSE itself, or if Venetians even consented to them in the first place. For instance, many fishers disagreed with river diversions in the 16th and 17th centuries (Omodeo 2022). Also, MOSE may be so unlike any preceding event that there is no way to base implicit consent on earlier decisions.

Therefore, consenting to MOSE appears to have been largely based on hypothetical consent. Without a referendum or a clear political precedent, the process falls back on an assumption that this choice represented good governance for the common benefit (Wong 2016, 180). It is besides the point whether political leaders intended to frame MOSE through this form of consent; what matters is that the argument for state legitimacy did not rely on actually asking people for their consent through referendum or public consultation (Muranetto and Huitema 2012; Mencini 1996). Wong points out the main flaw in this action: "if the source of legitimacy of hypothetical consent indeed comes from the values embodied in the acceptability of the decision-making procedure, there is the question of whether those values – or the decision-making procedure and the conditions that ground it – can be genuinely acceptable by all" (2016, 181). In other words, if consent for MOSE was based on the assumption that the state's values reflect everyone's values, and that assumption turns out to be false, this consent is not valid.

So it must be asked then if the state's values in this case adequately reflected the values of people who would be affected by the decision that was made, and also if the values of the new governing system for MOSE (the *Autorità per la Laguna*) will adequately reflect their values as well. According to work by Rita Vianello (2021), the answer from the fishing community is decisively no, they are not represented by this project. Other misalignment in values between the state and those impacted by the decision have been at times voiced by the *No MOSE* committee.

In my own fieldwork, I also heard dissenting voices on the state decision to construct MOSE from union leaders, both past and present. At union offices on the mainland, one said to me:

‘What MOSE represents for us is a problem for port activities. There are many businesses in Marghera, and these companies receive their materials from the sea. Not just petroleum, but also grain for mills, sand for glassmaking, etc. When MOSE goes up, like that exceptional situation in October,⁷⁷ then the businessmen are waiting for their goods to come in. And when there are open windows for the shops to come through the *Canale dei Petroli*, the cruise ships go first (they carry riskier ‘cargo’ than the others) and the businessmen are kept waiting. If it takes too long and if it keeps going like this, well then they say we’ll close down this factory and open it elsewhere. But it’s not just MOSE, the bigger problems are climate change and sea level rise...’⁷⁸

Positioning workers at the receiving end of a long series of unfavorable dynamics, this union leader suggests that working-class values are not being currently represented by MOSE.

In conversations, I also heard implicit dissent from some (but not all) MOSE workers who are dismayed at the constant tendency from the state to funnel resources toward the barrier project and away from diffuse restoration projects. Regarding these restoration projects, some recent salt marsh reconstruction efforts have been criticized from environmental activists for the tendency to dredge sediments from areas of the lagoon that have previously been placed under no-dredge zones for toxic substances deposited there from industrial pollution. Other restoration projects such as those funded by the EU LIFE Program are intended to build new habitats in the lagoon by involving fishers and other local stewards in the process. However, these should not be seen as projects that offset impacts of MOSE or somehow imply consent, because they are very different cases in scope and risk from the mobile barriers and their systemic impact.

For the way that the state presumed consent for a large-scale earths system intervention, the situation in the Venetian lagoon has strong resonances with problems of neocolonial ethics experienced by Indigenous groups around their consent to geoengineering projects.⁷⁹ To summarize a complex situation described by Kyle Powys Whyte (2018), there have been

⁷⁷ See “A personal diary of MOSE” in Lagoon Talk for more about this period in October 2023.

⁷⁸ Conversation with union leader, reconstructed from handwritten notes taken at the time, not verbatim.

⁷⁹ “Indigenous” with a capital I is used here to indicate identity groups with histories of dispossession that oppose colonial relations. See Fujikane 2021, e.g., for a more precise discussion, and Povinelli 2022 for how that definition translates poorly to European contexts.

instances where Indigenous groups on occupied lands of North America have been asked for their consent to projects like ocean fertilization, sulfate aerosol dispersion, or direct-air carbon capture. In the Western imagination, Indigenous peoples are known to have made sustainable interventions in local ecologies. However, Whyte points out that geoengineering the climate is a practice more similar to long-term fossil fuel emissions from colonial industrial societies than any local ecology ever engineered by Indigenous people (8). For another, geoengineering ‘solutions’ can never be plausibly framed as tools for Indigenous well-being, he says. Destruction of Indigenous worlds “do not arise only or primarily from the looped back effects of recent anthropogenic climate change. They are due to factors including land dispossession, disrespect of rights and ecological degradation” (10). So too, MOSE is more like the *Canale dei Petroli*, land reclamation at Marghera, and colonial-era dam enterprises than any small-scale fishing infrastructure, and loss of livelihoods like fishing is not only due to sea-level rise and ocean warming, but also because of systemic “dispossession, disrespect... and ecological degradation” (*ibid*).

Given the similarities between the cases analyzed by Whyte and those discussed here, attempts to justify consent for MOSE from Venetian residents who have been dispossessed of livable futures reproduce a colonial logic well-known to Indigenous peoples. In decolonial campaigns, Tuck and Wang (2012) point out, disenfranchised populations have made their requests very clear: give land back, respect treaty rights, recognize us as sovereign peoples, do not repeat colonial policies. In essence: stop what you’re doing now. Large-scale infrastructure projects cannot be isolated from this context (cf. Colven 2017). A history of power of the MOSE project reveals that dominant political voices have repeatedly asked non-dominant voices to trust them without an honest conversation about the structural mechanisms that allowed special interests to disregard numerous instances where consent was refused (Muranetto and Huitema 2012; Mencini 1996). From an Indigenous perspective, the broader context of climate change doubles-down on this ethical duplicity. “Colonial domination,” observes Whyte, “continues to be the problem that generates – to a large but not exclusive extent – the risk” represented by effects of climate change (2018, 9). Powerful individuals and their investment in Venice as a tourist apparatus continue to pretend entitlement to high-emissions lifestyles unaffected by past, present, and future ecosystem changes, while non-dominant critiques in support of low-emission adaptive lifestyles are consistently pushed to the side. What might dispossessed lagoon residents learn

from Indigenous critiques of geoengineering? Clear steps proposed to power: give the lagoon back, respect our lives, do not repeat mistakes of domination.

The question of consent in the lagoon space is troubling. Not only because decisions about MOSE were not built on any valid form of consent, but also because relations between governing structures and the lagoon as a body of water continue to enact dominating logic. Astrid Neimanes (2017) invites her readers to consider the trans-corporeal flows between bodies of water. When I am in the middle of the lagoon in a small boat, I am aware of this stretched body around and beneath me, but also materially-sensationally *in* me too. It is a body (not my body) that tells a story of serenity and co-laboring with its inhabitants, along with other stories of betrayal and slow forgiveness flowing in both directions. “Bodies of water as figuration asks us to respond to wounds of other bodily waters in which we are implicated, even at a distance,” Neimanes adds (170). The trauma of MOSE hits the “hydrocommons” – the relational bodies “that we make, and that makes us in turn” – not just at the single sites where it was constructed, but also across all bodies mixed up in the lagoon body (169). The very name of the *Autorità per la Laguna* implies not a hydrocommons, where responsive and reciprocal relations to bodies of water are put first, but rather a guardianship over and on top of: a paternalistic authority *for* the lagoon. The lagoon’s bodies of water become objects of control that do not need to give consent to anything that is done. Consent is assumed; the state knows best.

Because they notice the effects of MOSE and have voiced critique against it, fishers are icons for non-consenting bodies of water in this story. As Rita Vianello points out. “Sometimes the fishers make strings of conceptual associations in words and images using the human body” to reference features of the lagoon (2021, 97). Neimanes would suggest that this fishing language makes indeterminacies between self and surroundings, which conjures up an “alter-imaginary” of territory that “flows in modern/Anthropocene water’s undercurrents” (2017, 169). In our conversations, I also find that workers at MOSE and in union offices have their own alter-imaginaries, perhaps less visible but no less strong, that envision lagoon relations beyond state control. Imaginaries, for instance, of crossing the lagoon with a fishing skiff and knowing each bend of the free-flowing canals. It is the existence of an alter-imaginary that negates the possibility for modern institutions to obtain valid hypothetical consent over the lagoon territory. The critique from below shows not only that have residents *not* consented to MOSE, but also that the control-oriented conditions of the project have occupied the future possibility space in such a

way that any consent obtained is *a priori* invalid because of the power relations already structuring socio-ecological transformation in the Venetian Lagoon (cf. Whyte 2018). An entitlement to control bodies of water got Venice into this mess; more entitlement will not get it out.

MOSE as heritage

Arsenale Nord, Venezia

At the end of my conversation with each MOSE worker, I gave them an open question: what other concerns do you have for the future of the lagoon? Almost unanimously they responded that sea-level rise would be the major issue facing Venice. They mentioned projects that had been proposed: walls, pumps, offshore ports. But perhaps because I asked in vague terms, I never received a clear vision of what might come at the end of the story of MOSE, leaving me with the impression that its fate has not been yet considered. It seems that the project to protect Venice from high water is running on hopes that it will continue for long enough that no one currently working on it will have to figure out what comes next. In the meantime, all attention is put toward making MOSE function at full capacity.

At other points in our chats, though, I heard workers imagining what would happen to MOSE if there were no effort put into its operations. An engineer remarked to me that if the *Autorità per la Laguna* continued to get delayed, “after [the act of] safeguarding, at a certain point MOSE will be withdrawn, beneath [the water], because no one will know how to raise it anymore.” His bleak tone conjured for me an image quite opposite to the shiny promotional materials of MOSE: I thought of crumbling concrete buildings and faded yellow panels that are gradually covered by lagoon sediments, waiting to be found by future archaeologists. Was this what would happen if the entire project to ‘save Venice’ stopped? Sooner or later, surely efforts will fade and leave MOSE to the sea, I thought.

Telmo Pievani and Mauro Varotto, two scientists from the University of Padova, think that this scenario could happen. They have mapped Italy under a far-term future of extreme sea-level rise, and in their speculative narrative MOSE falls into ruin. “After the inauguration it did function for some time, to everyone’s delight and relief, but quite quickly the Adriatic rose enough to overtop that poor, out-of-date dam” (2021, 20). However, Pievani and Varotto also admit that their narrative is not a prediction, but a warning. Imagining the decay of MOSE and other coastal infrastructures of Italy gives a push to the present generation to “steer our country in one direction or the other,” they write (8). The scientists encourage new practices for coastal living that avoid a future where Venice drowns; these reimaginings, however, tend to get stuck in

parts of MOSE's moral ecology where the project is tangled with discourses of heritage and decay. What sense can I make of these tensions between saving and letting drown?

As meta-infrastructure, MOSE enacts a preservation practice, a relation of protection toward the historical center and its outlying areas that narrows other relations toward passive appreciation or concern. "Preservation is the opposite of transformation," write architects Sevince Bayrak and Oral Göktaş. "The main desire underlying the act of preservation is to take the Hero back to his glory days, to respect the original and the authentic and never add anything to it" (2023, 42). Venice is the precious object of a story with MOSE as the Hero. The only way to sustain this heroic arrangement is to furiously maintain the barrier system, "recovering this moment of wholeness and unity" at the instant of its completion, or else all is lost (DeSilvey 2017, 20). The engineers who I spoke with implied that if the storm surge barriers fall into ruin, so does Venice.

The preservation dependency between the two runs deeper still through political formations around MOSE. The city of Venice is a UNESCO World Heritage site, but factors including overtourism, depopulation, and sea-level rise have moved the organization to consider removing it from the list, which would have wide implications for its recognition as a valuable material complex worthy of preservation funding. In an editorial in the magazine *Fortune Italia*, right-wing prime minister Giorgia Meloni implied that "protecting Venice" through MOSE was a key part of how "we thwarted this anti-Italian maneuver." She ends with a piece of telling nationalism: "without Venetians, there is no Venice, and without Venice, there is no Italy."⁸⁰ MOSE, then, becomes an anchor for national heritage. "Objects of heritage are preserved, most transparently, in order to stabilize memory in material form and to stabilize associated identity formations," writes Caitlin DeSilvey (2017, 13). The identity being stabilized here is that of a population united against decay, infiltration, and improvisation, in line with moves to conservatism happening on the national level. Venice as preserved heritage is enrolled as a state asset that one may contemplate from a distance but not touch or transform (*ibid*, 187).

Though a newcomer to the material complex of the lagoon, MOSE itself is a piece of heritage that will continue to serve as a mnemonic anchor for the Venetian community far into the future. What exactly it will represent, however, is still up for discussion and may depend on what time scale one considers. In the twenty-year view, MOSE may still be part of the

⁸⁰ "MOSE Ingegno Italiano," *Fortune Italia* 2023, 13.

mechanism to protect the city. My generation may find itself prepared to maintain and upkeep the story of large technological intervention from the 1980s, and so this infrastructure may appear to be part of an urban fabric that has never adapted to the environment but always resists it. These workers would carry the Hero narratives of MOSE, which “obscure and eliminate certain traces of the past even as they secure others,” DeSilvey writes (2017, 14). Namely, they overwrite the many possible forms of adaptation that have and could have been practiced.

Over the hundred-year time scale, however, the Hero story for MOSE breaks down. Since one cannot continue shutting off the lagoon at all high tides without changing the entire regional waterscape, adaptive needs change. MOSE becomes “no longer a Hero, but an ordinary structure waiting to be rediscovered,” write Bayrak and Göktas (2023, 22). It is here that heritage practices may need to shift. If, however, the preservationist paradigm prevails, then MOSE may be simply abandoned or demolished in favor of the next stabilizing project (*ibid*, 36). Few people want to see Venice continuously flooded: for these large heritage sites rich with meaning, “its unmaking threatens to unmake our identities as well” (DeSilvey 2017, 13). The engineers who imagine a corroded, non-functioning MOSE call to mind this idea of failure, defeat, and loss. But this, too, is stuck within a narrow set of relations in the moral ecology of infrastructure. How then does one imagine MOSE differently, as neither glory-days Hero nor failed Hero?

I want to suggest that heritage practices that dance with transformation – especially processes of entropy and decay – can reframe MOSE toward care-based lagoon relations. Planning for MOSE’s end-of-life over the next few centuries opens up possibilities for material arrangements that go beyond clinging to a preservation arrangement requiring extreme effort and resources. Instead, DeSilvey writes:

the withholding of physical care does not have to mean withdrawal of a care-ful attitude toward the objects of the past that we engage with. The key, it seems, is to realize that by accepting ongoing process, we are not automatically triggering disposal and loss. Rather, we may in fact be opening ourselves up to a more meaningful and reciprocal relationship with the material past. (2017, 179)

The Venetian lagoon holds an immense archive of the material past. Indeed, on a thousand-year scale one can see that the structures of the present lagoon are palimpsests of transformations enacted by past inhabitants, not only to balance the lagoon hydrology but also to eke out lives in

rich social-ecological-economic-political tapestries according to the challenges of their time (Calaon 2017). In this view, then, the preservation paradigm is revealed as a highly selective memory of past habitation, one that only in the late 19th century focused on conserving artifacts and restoring structures to some suspended past state (Holtorf, 2012). A transformative heritage practice, argues DeSilvey, is oriented to the horizon, asking what material heritage can really *do* for the future (2017, 178).

If MOSE is a site of potential reworking of future lagoon relations according to transformative heritage practices, then we residents may learn from other cases and narratives to triangulate what about its current storied state may be useful going forward. In fact, the project *Amphibia* by a trio of IUAV students already attempts this through a utopian lens.⁸¹ Learning from ecologists and environmental activists, they suggest that the best way to rework MOSE is to bury it: lagoon workers “laid the rubbles on the seabed to shallow the inlets, to cover their rigid and obsolete protection system,” the narrator says (Fredrick et al. 2021, 113). In terms of material heritage, their vision is a major upgrade from the bleak futures implied by MOSE workers. *Amphibia* shows a community moving on from a traumatic project, trying to heal and move on. The project gets buried, symbolically putting it to rest while helping to shift the lagoon ecosystem toward a de-industrialized, more estuarine state. In the words of one of its creators, the arrangement would encourage residents to “rediscover the lagoon’s particular modes of living and working.”⁸² Yet, deviation from business-as-usual practices would surely meet some resistance.

In particular, any movement away from the preservation mindset requires stakeholders to engage in a process of “relating to disarticulating places and things”: in other words, to still hold ties with something that is changing. This, DeSilvey writes, is the central challenge to ‘no active intervention’ heritage practices. “Even when a decision has been made to accept eventual ruination... in moments of threat, it is extremely difficult to step back and allow destruction to continue unchecked.... If we are to explore alternatives to the preservation paradigm, perhaps we need to develop modes of care that help us negotiate the transition between presence and absence” (2017, 179). She explores in-depth the case of Mullion Harbour, in southwest Britain, a sea-wall forming the center of a coastal community. As the harbor wall slowly decays, local

⁸¹ See “Forecasting and Scenario Thinking” in Lagoon Time.

⁸² Personal communication with Francesco Lombardi.

interests continue to defer the choice to ‘let it be’ and instead spontaneously engage in acts of salvage. Whenever storms wrought damages that seemed to push preservation past any reasonable limits, DeSilvey reports that “the response was to retreat into defensive mode and to look away” (2017, 61). A similar attachment drives reliance on MOSE, precluding any shift to entropic practices.

On the micro-scale, entropy – or “a measure of the multiplicity of potential arrangements of matter within a given system” (DeSilvey 2017, 10) – is already emerging around MOSE. With each ebb tide, sediments settle around the panel casings sunk into the floor of the lagoon. Left alone, the sediments would eventually build up and cover the system in a sort of natural burial. To maintain the system, workers must scrape up these trapped sediments. The salt marsh restoration teams see this as a boon, in fact: MOSE creates a new, unexpected source of sediments that they can use to rebuild marsh areas, an example of possible co-becoming.⁸³ On the other hand, the build-up of algae and other clinging creatures on the panels is discouraged by varnish that resists rust and ‘marine accumulation,’ as one engineer put it. Maintenance practices are urgent and intensive around MOSE: each panel needs to be taken out and cleaned once every ten years, and the process of rotating and re-affixing the panels has not only proven to be time-consuming, but also raises additional concerns about the processes of decay already occurring to these metal objects. I do not argue that anyone should necessarily be encouraging MOSE’s demise, but rather that noticing the unpredictable and open forces that flux through and on it can track to what lengths preservation practices must go to maintain the Hero story.

Venice’s dependence on MOSE means that the fate of an entire city seems to hinge on its heroic functioning. A defused situation, learning from other places and from theories of transformative heritage practices, would imply that the city and the lagoon do not have to remain static objects of contemplation, nor do residents have to rely entirely on MOSE and its associated political formation to continue to live in the coastal region. Communities resistant to practices of ‘letting be’ may feel threatened because they are left without other clear ways to commemorate their material heritage and pass on collective identity to their descendants (DeSilvey 2017, 59). In a built environment without heroic structures, architects Jane E. Jacobs and Stephen Cairns suggest “informal and incremental architectures, in which people are granted the agency to respond to change and ruination on their own terms, unscripted” (2014, 187). The key is that

⁸³ Interviews with MOSE engineer and CVN administrator.

inhabitants are *granted* the power to transform; in cramped spaces it is difficult to see ways that decay processes can “break down the integrity of a substance... to make its components available for enrollment in other projects” (DeSilvey 2017, 11). MOSE presents a project in need of a good ending, such that its physical or narrative components become part of these other projects that will further good land relations. How to reframe it through better heritage practices is an intricate but not insurmountable issue for the current generation, one that will have rippling effects for centuries to come.

Speculations

Nadia: 2028

The *Assemblea* started last year, in 2027, as a body that runs parallel to the *Autorità per la Laguna*. The *Autorità* was meant to be the public governing body that was taking over from the monopoly that the state had given to a consortium of private firms. When the transition happened a few years back, MOSE was active. At the top of the agenda were other diffuse projects of caring for, managing, healing (whatever word works for you) the lagoon. The trouble is that the collective trauma of the MOSE project on the Venice community had left a fragmented and uncoordinated response from the public. There was absolutely no clarity, and so not even a shred of trust, around what would happen next. The national government chose a public entity to consolidate the responsibilities of maintenance and management, but it was a slow process. They only had their first full meeting in 2026, after the Olympics fiasco. Even then it was a whole year of understanding the existing systems before anyone in the *Autorità* even dared to start changing them.

In 2026 some of us in the unions and local assemblies delivered a joint report on the lagoon situation to the city council of Venice. The new mayor, well, she wasn't convinced by our ideas, but one council member was a staunch unionist and saw the need for a working group that could guide the actions of the *Autorità*. That's what we put on the table: an assembly of delegates representing leaders in civil society and lagoon livelihoods. The crucial piece, in my opinion, is that we included engineers and port managers as equal parties in these gatherings, and we owe lots of that work to my co-chair Andrea Lombardo.

My name is Nadia Hadir and I call myself a community organizer here in Venice. For fifteen years I helped to run a small office that provides assistance to Venice's immigrant community. Our clients are mostly recent immigrants from Southeast Asia, North Africa, Eastern Europe, and the Middle East. The Palestinian community in Venice is growing quickly, but the other newcomers who don't make headlines are from all over. I myself was born in Somalia but came here with my parents when I was twelve and quickly learned Italian from my classmates. It was my circles of peers who welcomed me first, even from a young age. I'm now almost fifty and it's the same. You know someone and they give you real help, but if you know no one you're gonna get crushed under the lack of handouts. My work that got me into the *Assemblea* is my

alliance-building between the unions, the immigrant community, and local activists. They know me as a no-nonsense deal-maker. It's exhausting work, honestly, but I love it. I don't sleep very much. Three years ago I got myself an apartment in Sant'Elena above a bar that just opened there. That's where I met Andrea, a hydrologist who lives in Chioggia, in 2025. Between the two of us we had just enough political sway to challenge the restricted politics that the *Autorità* was pulling together. Since such a major body was about to really make changes in the lagoon, our network knew we needed to do it right. Just over a year later, the *Assemblea* was authorized to act as a guiding body, and so here we are after another full year of work.

I have a seat on the *Assemblea* because of my connections to the immigrant community, but also because I have strong backing from the university students and workers, and they would have rioted if there were only old Italian-born men in this supposedly socially-aware group. Let's see, there's also my colleague from the Bangla community association, three union representatives, a pair of reps from youth associations here in Venice, two fishers' associations delegates, two MOSE engineers, a port authority rep, and reps from the tourism board, the small business owners association, and the old people's groups. Then three seats allocated to geographic representation, currently filled by an artisan from Murano, a café owner from Lido, and a local councilwoman from Mestre. A biologist from Jesolo and a university anthropologist attend infrequently as non-voting members, and a member of the *Autorità* is there for accountability purposes. That makes about twenty-five of us, not too many that we can't be effective. We don't come to the table as politicians. Even the people who are state employees are paid separately for their time out of the small budget that we were given, and we hope that this set-up encourages members to attend and speak freely at our bi-weekly meetings, and to make the effort to share what we learn in these assemblies when they return to their day jobs.

I was one of the founding members, and I insisted that all delegates get paid equally and well for their formal participation in the *Assemblea per la Laguna*, though we know by now, a year later, that each of us does far more work for this project than we're compensated for. I tell myself that the outcomes we've seen so far from the *Assemblea* have set the *Autorità* on a good track. I like to think that we're ghostwriting the future. The future comes out of our conversations and group learning practices. It's been a journey so far.

Our mission is to grow trust between all of the little isolated parts of this lagoon. The *Autorità* sets out a table, but we make the invites and cook the feast. We're building bridges. Or,

my favorite metaphor is that we're rowing in little boats from island to island, across the open water. Any way we look at it, we see that we're filling a crucial gap that was missing from the special laws, missing from MOSE, and missing from the *Autorità* until now.

Enough about those lofty goals. We were actually at an impasse when the *Assemblea* ended tonight, and I came out frustrated. The meeting was in a conference room at Arsenale Nord offices. We call them 'the galley' for its nautical-industrial design, now covered by contemporary art and flower beds that someone has been taking care of. I never see the gardener, but I see the bees reveling in this unexpected green space.

Andrea had put on the agenda the matter of landward lagoon migration. He's better at explaining it than I am, but it means that in the next decades the sea level will rise enough that the communities to the north and west of the lagoon will be more and more flooded unless they continue to engineer their way out. The mainland doesn't have super tall levees like New Orleans or Shanghai, but it does have a network of pumps. Is it feasible to keep them going? Here's the other thing though: once you start to talk about the near future of the mainland – which of course we need to be doing – you can't avoid the question of what to do in the historical center of Venice. He reopened this discussion at an unfortunate time.

We promised the *Autorità*, which is relying on us to set their guidelines for action, that we would deliver recommendations for long-term pathways to livable lagoon futures within a year. The promise wasn't binding, and I'm thankful that we're not rushing it, but we're now at twelve months from the start of the *Assemblea* and we need at least three more to write, validate, and deliver the recommendations.

Anyway, Andrea suggested that we think about asking local communities to consider shutting off the pumps and adapting their municipalities so that brackish waters can begin to extend landward. Why is this necessary? Well, he remarked, we might be forced to confront the fact that MOSE has a limited lifetime. The working group that he's part of has made some new forecasts: if sea-level rise continues as expected, then we're in a brief window of time where we can have some room to maneuver. That means thinking now about what to do in twenty years, since MOSE will only stop the biggest storms and not long-term sea-level rise. It simply can't.

Responses from the *Assemblea* were thoughtful but brief. The union representatives continued to push for adaptation and not safeguarding as a general tactic, but said they'd have to think about what shutting down MOSE in twenty years would mean for port functions. Same for

the youth reps, who wondered what programs could assist new families and students if the housing market took a sudden shift in favor of the upper floors. The engineers, both of whom had worked on MOSE but were now deployed on anti-erosion projects for the salt marshes, pledged support either way but indicated that their past tribulations make them wary of a ‘MOSE 2.0’. I tabled the discussion because of the late hour, and most people left quickly to catch the night boat bound for the western part of the city or the mainland. I let out a sigh of relief, and the buzz of passionate speaking started to fade, leaving me with self-doubts.

Andrea came back in. As co-chairs, he and I have to clean up after each session, so we always take the last boat together. Andrea would rather be behind a computer or in his fishing boat than in a conference room, and it’s taken a lot of work to get him to build bridges with anyone who can’t read a tidal chart. That said, he’s kind. He saw I was tired from the day and started to put the chairs in order without any expectation I would help. The shuffling silence was welcome, but after a few moments he came near and spoke again. A soft voice, weary.

“Nadia, do you believe we can really do it? Can this city, our city, really reinvent itself for climate change?”

I didn’t respond to that, at least not right away. I let out a long breath, a sigh that contained a laugh for the absurdity of the situation. He stacked another chair, then waited for me to speak.

“I don’t think we can plan it,” I said at last. “I believe we can only guide it through what we discuss here, and what we decide here should be the principles that we as a city follow. But really, any way you slice it, someone in the lagoon will be hurting with the changes that will come. I guess I don’t believe that anything is possible because of traps like that, these small things that angry people strike me down for and wise people like you challenge me to rethink.”

I got up and took the chair I’d been sitting on, put it on the stack he was making. My thoughts were tumbling out now that the allotted two-hour time to use careful words was over.

“If more of us are wise and less of us are angry, maybe there’s a chance for the city to reinvent itself,” I added. “But where do we find that wisdom? I’m searching for that in our relations to each other, in honest conversations. I’m trying to find someone to trust here.”

Outside, the dark lagoon shimmered in cold moonlight. Andrea nodded without a word. In the silence I went on ahead.

“There’s a certain class of people that don’t like to be told that the world is coming down and there’s nothing to do to fight it. They’ll hide from that reality.” His proposal to start opening up the edges of the lagoon came to mind. “I think what we’re suggesting is wise, and the rest of the assembly sees that wisdom. But will Venice ever do it? Can it rise to the challenge of giving up and regrouping on higher floors? Because that’s what it will be seen as – giving up.”

I stacked the last chair with too much force. It slammed a bit against the others. Andrea looked up, momentarily startled by the noise in the night-lit room. He had his hands on the lightswitch, ready to go. I fixed his gaze.

“If you’re thinking that it’s hopeless, don’t erase our other options. Don’t push aside those of us who can help you pivot if the politics change. We don’t know if this proposal to shut down the pumps – to shut down MOSE – will work. It’s based on ten thousand stories that all will have to align. I think we can write those stories. But do you trust me to write them with you?”

I couldn’t read his face in the half-dark, somewhere between a grimace and a smile. But he spoke without hesitating. “Yes, I do.”

“Good. Let’s go catch that boat.”

Andrea: 2035

The next slide flickered on the pull-down screen. I checked the time on my note-tablet and wiped my brow. Early April and already the day was sweltering. Our group was returning from a coffee break. Giovanni Bussetto, a fisherman by trade, brought me a small paper cup with a wooden stick in it, giving me a reassuring smile.

“Don’t worry, I know these people. They support our work.”

“Community review always makes me nervous,” I said. “I’d rather be working on the zoning protocols.”

He reached down and touched my jaw for an instant. “Andrea. You know how important this is.” He turned back to the room and went quiet while he watched people fill in. “Pellestrina needs to be part of the conversation, not just through me. We’ve been scared of what’s going on for a long time. The *Assemblea* is something that everyone is approaching with new eyes.”

I nodded. We waited for the crowd to settle down.

My name is Andrea Lombardo, and I'm the current co-chair of the *Assemblea per la Laguna* along with environmental technician Michela Ayva. The *Autorità* has been running for seven years, give or take, and the *Assemblea's* guidelines have been in effect for most of that time. After a year and a half of participatory visioning, we presented five points to the *Autorità*, and under wide citizen pressure and the game of political favors they were adopted as non-binding protocols in their Statute. Now at the five-year mark, small delegations have been going through the painstaking process of community discussion, asking for feedback and approval on the guidelines. It's slow, but it works.

I stood up and made some quick greetings, then read from the slide:

Article 1: The *Autorità per la Laguna*, in coordinated collaboration with the inhabitants of the Venetian lagoon, resolves to make interventions for the benefit of long-term social and hydrological balance through the historic practice of *scomenzèra*, or gradual alteration of the lagoon environment only with observational understanding of its effects.

Stealing a glance at the room, I saw heads nodding along and a couple whispering and pointing at the words on the screen. These were the inhabitants that we had always discussed in general terms in our *Assemblea* meetings. I let the words sink in, then carried on.

“Article 1 is the most important of the five guidelines that has been adopted by the *Autorità per la Laguna*. It represents not only the vision that the *Assemblea* believes can best shape the lagoon environment going forward, but also the political process that we want for the territory. This meeting is part of that process, and in fact we believe it is the center of the process. Five years ago, we were able to make a strong intervention by getting the *Autorità* to adhere to these guidelines, and we now want to understand if it is having its intended effects across all realities that interact with the lagoon. Giovanni Bussetto and I are both rotating members of the *Assemblea*. To start, we want to know if anyone here would like to make a comment on this article or the process more generally.”

A man with a white beard in the second row raised his hand, took a cursory look around, and stood up from his chair, taking a cane in hand. His tone was measured but tired, clearly accustomed to participating in meetings like this.

“Good morning, and thank you for coming to Pellestrina. I worked as a union representative for thirty years and knew to never rely on promises from an administration body in this city. We all remember the ‘sole concessionary’ fiasco around MOSE. From what I can see, we’re still in a monopoly situation here, where the *Autorità per la Laguna* makes the rules and everyone else has to follow. How do your guidelines have any power? What’s there to stop the next president from overriding them? And on a day-to-day basis how do they keep the *Autorità* accountable?”

He sat down at the same moment that Giovanni rose up, his kind, booming voice meeting the former union rep’s questions and filling the small room.

“I’ll answer your questions as best I can. We’ve got nothing to hide. These guidelines started out as tacit agreement but have since become all but binding law. Formally, they are directives approved by the regional government and adopted by the *Autorità per la Laguna*, similar to the special laws that gave legal language to ‘gradual, experimental, and reversible’ but without any way to enforce those guidelines. The difference here is that all the main unions support the *Assemblea* with full commitments.” Giovanni gave a smile, like he was letting them in on a secret. “In fact, CGIL regional secretary Nadia Hadir was one of the catalysts of this process, and she’s managed to raise union participation to over fifty percent of workers in the Venetian lagoon. Because of this, there is enormous pressure on the *Autorità* to follow our guidelines. If not, they know that workers will not only strike, but that we’ll set up our own alternative courses of action under the *Assemblea*, which has far more popular support than the *Autorità*. The next president can’t override the guidelines because they know that they would lose their job within months. Our seven years of work are paying off, because the guidelines now have a sense of legitimacy that the *Autorità* has to keep up with. Who here has read them?”

About two-thirds of the room reluctantly raised their hands. I was surprised.

Giovanni carried on. “On the everyday level, delegates from the *Autorità* and their in-house workers join with the *Assemblea* once a month to review project updates. These meetings make sure that the *Autorità* always keeps the guidelines at the top of their work. In turn, we host regular open community conversations to make sure that we are accountable to citizens and aware of current collective needs across the lagoon. Feedback from spaces like this helps us validate the guidelines and make adaptations if necessary.” He looked at the man with the white beard. “Do you want to respond?”

“No, I’m satisfied.”

“Thank you.” With a glance, Giovanni passed the speaking duties back to me.

We continued like this through the other four recommendations, which all follow from the first. Article 2 valorizes working knowledge of the lagoon territory, requiring at least three members of the *Assemblea* who represent fishing, boat mooring, climate adaptation, port operations, natural area conservation, or similar fields to be present in certain decision-making arenas. Article 3 plans for low-carbon futures and energy transitions in strict consultation with local union leaders. Article 4 seeks to reform residency laws in Venice, making incentives for young people, families, and migrant workers to re-inhabit the various mainland and island communities across the lagoon, and conversely dis-incentivizing or redirecting forms of short-term tourism. Finally, Article 5 addresses sea-level rise infrastructure by putting strong adaptation targets on the city such that MOSE activity will be reduced over time.

Out of all of them, the last point was the most contested by the *Autorità per la Laguna*. In my personal opinion, it’s difficult for seasoned politicians to let go of the narrative that MOSE will continue to work and preserve Venice forever. Pretty much everyone else, though, knows that the situation is getting ridiculous. MOSE was closed sixty times last year at the quota of 110 cm above the local datum. The ratcheting guidelines will reduce that number to ten times a year by 2050, and five times a year by 2060.

When I put Article 5 up on the screen, I expected the discussion to erupt into controversy. But no, it was civil. A young woman, holding a sleeping baby in her arms, stood up to ask if this means that Pellestrina is doomed. We didn’t have time to respond before the old union rep in the second row stood up and answered for us. “Pellestrina has been settled for seven centuries, and long before that,” he declared. “People will always live here, but we have to change the houses, because the lagoon will be higher, and storms will be stronger. They already are. More people will have to learn to steer a boat.”

A voice called out from the back, “yeah, like you ever learned Francesco!” And the whole room shook with good-natured laughter. Giovanni later told me that this man was known for getting sick every time he took the ferry. He smiled along with the rest of us.

The meeting came to a close and the inhabitants of Pellestrina went back to their working lives. I was packing up my things and checking the times that the electric ferry was leaving to take me back to my apartment in Chioggia, where I was promised an excellent pasta dinner by

my son and his husband, who were visiting for the weekend from Padova. Lost in thought, I didn't notice that a woman was waiting to speak with me. About my age, late fifties, she wore a bright pink sundress and a stylish hat, as if she was going to the beach.

"I just wanted to say thank you," she said. "My mother, bless her soul, she fell and broke her leg in the flood of 2019, and she cursed the leadership of this city until her death for ruining the lagoon, turning it into an arm of the sea. Not that it's more peaceful now; it's worse, even, and I know all of us feel the effects of these changes every day. But for the first time in a while I feel like I can rely on the city to hear us and do what's right for my children and my neighbors. We know we can stay here and have good lives. It might not always be easy, you know? I don't want to give up the ground floor of my apartment. But if you all say we need to do it, and you help us get there, we'll be there for you."

I smiled, unsure how to respond. "I don't think we know yet what's best to do, honestly," I managed. "But thank you. We'll try."

She held wide sunglasses in one hand and with the other reached out to shake my hand. "I'm sure you will. Keep us in mind." With that she turned and walked to the door, calling back to me. "Who knew that it would be beach season already?"

Michela: 2047

The vaporetto hummed, gliding away to the east. Bright early morning. The northern lagoon grew quiet again, no taxi boats zipping like I remember as a child when I arrived here with my parents. It was past time to go into the office, but I'd linger here at the rail a moment more. I fished in my pocket for coffee money.

As my hands closed around a few coins I noticed an egret standing on the dock's chains, watching the pale blue water. We'd had plenty of rain and runoff so the water was cloudy and high, but not exceptionally so. The waves passed up and down, swirling around the bird's long thin legs. Scientists call it turbulent flow when a fluid acts chaotically – there's no telling where individual droplets will end up, only how they might move. Sometimes when I'm in my office I fall into the numbers and the programs, but seeing the breathing waters swinging with the chains and the egret perched there is a reminder that the most detailed simulation of reality is always reality itself. There's more information about the future in each ripple around her legs than in all

our models. It's okay, we make do with what little we know. She was perching and watching the water intently, so intently.

Time to go in. Time for coffee.

Five minutes later I was walking quickly into the offices, not drawing attention to myself, balancing a bright blue travel mug in one hand. Ready for action. Or, hopefully, non-action. I ran through again what I was going to say.

Turned the corner – shit! Nobody here, they all must be upstairs already. A voice behind me – who is it?

“*Buongiorno*, Michela! Don't worry, the meeting starts at half past nine. Everyone just went down to greet the *Autorità* people, all formalities.” This was Alvisè Zulin, my colleague, another technician.

“What's the situation?”

He turned to the nearest touch screen. “High water event zero-zero-four is going to reach 140 above local datum, not much error because we know the wind from the east will sustain through this evening. But if we keep standard uncertainty on these things, then give or take ten centimeters, we're looking at a maximum 150 centimeter event just after 2300 hours tonight. The activation teams have been put on stand-by.”

“River influx?”

“Minimal. The water discharge has already happened, river levels are back to steady-state across the region as of last night. Winds are steady but not too strong. This will be a fairly calm high water event. We've been waiting for your assessment before we go to the control room.”

Your assessment – as in, from the technical committee of the *Assemblea*. I'm one of the current delegates from the MOSE operations teams, and everyone knows our current protocols are about to come into effect in a big way.

I deflected his question. “What do you think we should do? You know the situation.”

He looked back at the pad full of charts and data read-outs, shifting his shoulders as if there were an itch between them. “A year ago there would have been no question, but I know this season is different. It's just unthinkable to me that we let the city flood.”

“It's ready for the flood,” I reminded him.

“I know, I made all the preparations yesterday at my parents’ place, and honestly I’m curious to see what will happen. I don’t know – I’ve never had to walk around with boots. All the places will feel wrong.”

“Alvise,” I laughed softly. “A small price to pay, and after all everything has always been changing here. When I was in university all the bars were still at the ground-floor and there were only one or two fruit boats. The dry city you know has changed from the city that I knew, but it will always be the same place.” Here I was, only ten years older than him, lecturing about what it looked like back in my day, because in those ten years so much had changed.

He grinned. “I would like to see the floating walkways actually float.”

A colleague walked by and handed me the briefing from the overnight shift. “Control room, ten minutes. The whole *Autorità* team is there now.” I thanked her, took a sip of my coffee. Alvise wanted to say something more.

“Michela, I know the *Assemblea* has been preparing for an event like this, so I’m not scared. But like my parents said yesterday, it just feels wrong for MOSE to do nothing when an *aqua alta* comes!”

“You spent all day at home helping them prepare, tell them that that’s what MOSE does. It gets their son to eat dinner with them during the flood season.” He stuck his tongue out at me. After five years of sharing office spaces, I know when he’s joking. “What did you end up doing with their entrance hall?”

“Same thing I did in my apartment, made *passerelle* in the interior spaces and put up small shelves all around for their things that usually go on the floor. We’ll see what happens and maybe make more adjustments if needed. With the city grant we put a new addition upstairs, I told you about that? They like the new space, and the skybridge.”

“Who did they connect with?”

“Got lucky, they went in with an old friend who has a small *palazzo* across the street, and she converted the *piano nobile* into a trattoria. They’re thrilled that they can get lunch whenever they want, and at a discount!”

“Darn, I only got connected –”

“To the police station, I know, you told me all about it last week”

I gave him a fake pouting face. “I can complain all I want because there’s not a bar connected on my island yet, so when the water comes in I’ll have no friends and no caffeine.”

“But surely they’ll connect one in the next round of grants?”

“Yeah, there’s already a call out from the Cannaregio *aqua alta* council, so we’ll probably have a new bar or at least a connection to one within the next year. It’s a good business to be in now that there’s investment going into community spaces! Until then –” I gestured at my travel mug – “I’ll be making it at home on my crappy moka pot, or getting it here I guess.” I stole a glance at my tablet. Time was up. “Gotta go, see you at lunch?”

“You’ll buy me a spritz to celebrate the flood? Anytime.”

I walked out and around, past the great basin of water that we call the Arsenale. A small corner is still used for art shows, but the large part closer to city center is now zoned for houseboats. A thriving district has built up there since the latest zoning reforms in 2037. It’s known as *the* place in Venice where you go for tattoos, good falafel, and the best summer festival the city has to offer. One boat even styled itself as a floating tea house. But I couldn’t go there now, much as I wanted to linger in the last days of October sun.

I hurried in the other direction to the converted warehouses that some designer in the 2010s had decided should have the same feel as a spaceship. We weren’t blasting off to leave Earth, though. We were staying right here. Up the stairs, I set my coffee down at a free computer station. Don’t spill it on the important stuff, I told myself, or you’ll deactivate MOSE ten years too early.

I pulled up my account and quickly opened a portal to show all the available forecasts. I’d been trained in ocean chemistry with a specialty in ocean acidification before coming to the engineering side of MOSE operations, so I know damn well how to read a tide chart.

Yep, there it was, an event forecasted at 140 cm at 23:02, about fourteen hours from now. This was an ideal event to test the new protocols. The ratchet had just jumped to 150 cm over the summer – the first major quota adjustment for MOSE under the famous five guidelines that the *Assemblea* produced in the late twenties. All of Venice had been preparing slowly for years under funding streams made available by the *Autorità per la Laguna*. We’d see how this goes, then revise the ratchet for the next year, then the next year, and so on. But true to its name, it can’t go down. Last year there were twelve events recorded over 150 cm, so we expect about that many closures this year, maybe a few thrown in for false alarms. The trade off, of course, is that the lagoon can breathe and MOSE can rest. It was getting a bit ridiculous: last year, sixty-seven closures for a total of twenty-one days that the lagoon was cut off from the sea. Now with the

ratchet it should be no more than a few days total. A sigh of relief for everyone, from what we've been hearing in our listening sessions.

My name is Michela Ayva, and I'm the co-chair and most senior active member of the *Assemblea*, not counting emeritus chair Andrea Lombardo, who sat to my left. The room quieted down. Across the way stood a team of my colleagues from the MOSE offices, then seated at the head of the control room was the managing committee of the *Autorità*, including its president, the mayors of Venice and Chioggia, and some high-level ministry representatives. The screens above us were flashing with tidal readouts and wind patterns, and on one large screen was the text from guideline number five. Clearly, someone thought this would be a historic moment.

I drew a little cat face in the corner of my notebook. It resembled my new neighbor's gray kitten who keeps wandering across our skybridge. I give her scratches when she gets near.

Alvise was there, too, and the engineer next to him was the first to speak. "We've given notices to our activation teams to be on-call tonight for high tide event zero-zero-four, forecast with maximum tidal height 150 cm at sea, closure time expected at 19:30 to keep water levels in lagoon at 90 cm per normal protocols. We await the decision from the *Autorità* for confirmation. It is currently T-minus ten hours to activation."

I looked to my left; Andrea gave me a nod. My turn. I stood for effect.

"To remind all those who are present, the new protocols have been in place since the first of September. Even though it is a borderline case, high water event zero-zero-four does not qualify as exceptional under the new protocols. At lower quota levels, borderline cases were considered on the basis of hydrodynamic uncertainty, and this event presents little indication that winds will shift for the worse. According to guideline five, which has twenty years of support from the Venetian people and the scientific committee of the *Autorità*, MOSE should not be closed this evening. This is a particularly fortuitous event that will allow the whole city to test its adaptation infrastructure under calm meteorological circumstances. The *Autorità* has organized response teams for any failure in local community networks, but last month's checks indicate that the likelihood of disaster is very low. In short, the city is prepared to live with flooding events up to 150 cm, and it is our responsibility to the lagoon system to begin to phase out the frequent use of MOSE, starting today."

I sat down, seeing nods and unsurprised faces across the room. A couple of cameras flashed in my eyes, and light chatter arose in my ears.

The mayor of Venice spoke briefly, giving her assent to non-activation. The mayor of Chioggia did the same. Then the president of the *Autorità* spoke.

“Many of you know that I have not always been in favor of guideline number five,” he said. This was an understatement. Word on the street is that his family didn’t qualify for any of the funding to renovate their second home, a fifteenth-century *palazzo* on the Grand Canal, and so the *Assemblea*’s guidelines essentially condemned it to constant flooding unless the ground flood was redone. They eventually put in the money, with the help of some savior-organization grant that really could have been put to better uses, to artistically transform the space to rising waters. Of course, this was quite an embarrassment to them, though no one else really cared. “However,” he continued, “I see its merits for the health of our fisheries and our global reputation as a leader in policy innovation.” Eye roll. “We should be proud of this monumental decision to follow guideline number five and welcome the waters of the lagoon into our city again.” I kept sketching cat faces on the corner of my briefing papers as the talk continued. Andrea nudged me when they finally called for consensus.

“Any objections?” the president asked. No one moved. “Alright, that’s settled. Engineer Mohammad, please recall all the activation teams and continue to monitor the situation. Thank you all for your participation here.”

With that, the meeting was adjourned and the guidelines had prevailed again. I was feeling a bit overwhelmed at the decision that had just been made. I went back in my head: yes I packed my boots, yes the *passerelle* in the downstairs hall will work just fine, yes we have floating walkways outside my street... I wandered out of the offices and back down to the square overlooking the dock where I had stepped off the vaporetto. The lagoon was quiet and brimming. My attention wandered to where the sun shone on the water. I sat down on the wooden steps that had been built to elevate half the surface of this gathering space. Where my feet were, it would be wet in twelve hours. I could sit here all day and watch the water pool around my legs, every ripple a new sign. We would welcome it into our lives again.

Conclusion

MOSE can be a starting point for living amid rapid socio-geologic change, but not because it is an effective long-term adaptation solution. To the contrary, because it is a partially-effective short-term social formation, MOSE demands other social formations to fill in the gaps and bring about more participatory futures. To that end, this thesis has tried to collect stories that map out the structures and histories in play around MOSE that may re-orient present sea-level rise narratives and policy actions to good lagoon relations. Workers, union leaders, and others who I encountered along the way consistently tie good lagoon relations to modes of socio-ecological organization that foster long-term livability. These include respecting workers' rights, delivering payments on time, and ensuring job security, but they also may include funding diffuse lagoon maintenance projects, making transparent and accountable governance systems, and above all supporting healthy hydrological dynamics of the entire lagoon. As the working lagoonscape enters the after-MOSE period, claims to livability must be heard and used to form the basis of socially-just adaptation pathways.

Working from interviews and conversations with MOSE workers and union leaders, as well as materials documenting perspectives from fishers, environmental activists, and other lagoon residents, I find that many people involved with MOSE are not satisfied with the current outlook on its long-term operations and believe that some form of its governance should change toward more equitable outcomes. How exactly it should change, though, varies across groups. I have also noticed that looking ahead to the future is a crucial practice for MOSE operations. Workers are very successful at short-term forecasting, but there is high uncertainty about MOSE's long-term operations, how it will function with more sea-level rise, and its future impacts on the lagoon system. Some scenarios now suggest that MOSE will not play a major role in long-term lagoon adaptation, a conclusion which is in tension with the high resources currently being put into the project. With wide participation and long-term thinking, however, MOSE may be a starting point for transformative change. The city could use the mobile barriers to gain "breathing space" while other diffuse adaptation methods such as elevation, floating, relocation, and living with floods are created. Doing so, however, would require a re-orientation toward social trust between institutions, which is currently very low.

MOSE workers and union leaders largely agree that future maintenance practices in the lagoon ecosystem will have to work with what already exists, rather than looking toward a new technological solution, and this means that somehow the mobile barriers will need to be updated or transformed. “It’s good that there has been the courage to make interventions and act, to plan for what is happening, which we can’t avoid,” a technician said to me. “It will be necessary to intervene again because this is a tile of the mosaic, but it will not last forever.” Maybe MOSE was a set of poor choices, but we can’t change the past. Whatever comes next, don’t just say no. Make an active choice. Bring in new ideas. Adapt.

In addition, workers and union leaders don’t want to pass on the values that suffused the MOSE process. For the last fifty years, adaptation efforts were entangled in speculation, inefficiency, corruption, monopoly, and distrust. If another project has to be done, a union leader told me, do it “in a clean and quick manner.” The “original sin” was not making leaders accountable to the public. Future maintainers will be able to govern the lagoon differently. They will be able to navigate the complex process of funding public works and build trust across many realities. The political system needs maintenance too! (Mattern 2018) Place value on workers’ knowledge, consider all the alternatives, and care for people and the lagoon.

Finally, workers and union leaders know that the lagoon can be a way to live well, but only if someone makes it so. One of them calls it a *bene patrimoniale*, a public good that we’ve inherited from our ancestors. Future maintainers will treat it with care. An engineer tells me, “people are like the lagoon, either you take care of them and take them with you, or else they disappear, and their knowledge disappears too.” They need teachers whose knowledge is valued and whose knowledge fosters a care for place. Even if MOSE creates damages, people come to Arsenale Nord each day believing that it can create a livable place. “The lagoon is not an opportunity for commodification and speculation,” a union leader declares. Pass on not just the desire to live in the lagoon, but also the policies and incentives that make it possible for people who work here to want to stay.

Engaging in speculative writing methods has revealed to me the importance of starting something and then reflecting on its effects, an ethic known in Venetian as *scomezèra*. This was the “prudent attitude” of the *Magistrato alle acque* (Water Magistrate) for centuries, writes Silvio Testa. *Scomezèra* means “we start a project, then before going forward with the works we see what effect it provokes” (in Fabian et al. 2021, 45). It is a local earth practice that resonates not

only with the precautionary principle and posthuman attunement to nonhuman beings, but also with the famous criteria of “gradual, experimental, reversible” that drove early debates around MOSE (Mencini 1996, 35). What *scomenzèra* adds to the after-MOSE period is a hope that the working lagoonscape can recover guiding practices that may lead to transformative futures. As much as possible, I have tried to work with the principle of *scomenzèra* in my research, starting a conversation and then checking with those around me to see if I have “read” these material texts correctly (Iovino 2015, 3). As such, the learnings that I present here are always up for discussion, and in turn I hope they can be a starting point for wise choices going forward.

Local institutions will play a critical role in making wise choices and avoiding disastrous lagoon adaptation pathways. I have tried to sketch out one of many possible pathways for trust-based sea-level rise adaptation for Venice in the speculative writing exercised above. To summarize, this story describes 2025 as a juncture point where lagoon scientists and union leaders are able to convene the bottom-up *Assemblea per la Laguna* (Assembly for the Lagoon), which is authorized to offer guidelines for the new *Autorità per la Laguna*.⁸⁴ Using the fact that the Statute for the *Autorità* is decided by internal leadership, the *Assemblea* presents a set of five semi-binding articles that have broad worker and citizen support, based on a participatory and trust-based visioning process. They include a guiding ethic of local analysis through *scomenzèra*; a valorization of working knowledge and co-management practices; a required transition to low-carbon or decarbonized futures; new incentives for residency rather than short-term tourism; and policy guides for the end of MOSE operations.

The last of these five articles presents a ‘ratcheting’ mechanism for MOSE, whereby within several decades the quota level for activating MOSE will be gradually raised. In practice, this means that from 2030 on, MOSE will operate at its current protocols (preventing all high tides over 110 cm) for between ten and twenty years, after which it will operate only for the very worst storms. Eventually it will be decommissioned and buried, thereby completing the socio-ecological healing process.⁸⁵ This protocol gives the Venetian government and city residents a very clear time frame on which to shift the city, the port, and the lagoon environment to other modes of sea-level rise adaptation, while also using MOSE strategically to give the city “breathing space” (cf. Buck 2019). The *Assemblea*’s guidelines are continually ratified with

⁸⁴ Partially inspired by the institutional shift that forms the premise of Kim Stanley Robinson’s *The Ministry for the Future* (2020). Thanks to the Ecological Design Collective for rich conversation around this story.

⁸⁵ See discussion on this choice in “MOSE as heritage” in Lagoon Trust.

broad public support, which keeps the system of environmental governance accountable to the *Assemblea* and its participatory methods. Finally, in 2047 the first decision to not close MOSE at a high tidal event goes as planned, and so the working environment avoids a total ‘closed lagoon’ scenario that would, in the long run, devastate the entire lagoonscape (Ferrarin et al. 2015; Umgeisser 2020; Frederick et al. 2021; Giuppone et al. 2024).

A piece of infrastructure shot through with socio-geological relations, MOSE shatters into divergent modes of existence. I have chosen to follow one of these ontologies more than others: its manifestation as an artifact always on the edge of transformation. My ‘working’ encounters with this project have glimmered up to me out of many conversations centered on its assemblage of steel, stone, and stories. As Jerome Whittington and Zeynep Oguz point to in their review of earth-as-praxis, climate change is forcing out a set of Gramscian “historically dynamic, nondeterministic, and materialist processes of collective subject formation” (2023, 150). The ‘working’ manifestation of MOSE in the after-MOSE period gestures beyond itself to other possible subject formations: earth practices built on better lagoon relations, beckoning from the future. The work for the present is to make new (already-existing) ethics within the moral ecologies of instructure (Scaramelli 2019). It will certainly be possible to live in Venice with sea-level rise, as long as it’s not living in the same way we do now. Much will have to change.

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