Materialising Climate Responsibility: Water, Land, Oil and Air

Image 1: A material tussle among the climate matter of water, land, oil and air. Aerial photo of burning pipeline in Terrebonne Parish, Louisiana (Tjelmeland 2012)

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Declaration

I, Frances Butler, confirm that the work presented in this thesis is my own. Where information has been derived from other sources, I confirm that this has been indicated in the thesis.

Abstract

The climate and ecology emergency raises significant questions about responsibility for action. The irresponsibility of fossil fuel capitalism and insufficient measures from nation states have left an ethical burden on individuals. However, as climate impacts increase so do the responses from state agencies. The research investigates the kinds of state responsibility emergent from the matter of water, land, oil and air in coastal Louisiana, a place of extreme land loss, hurricane damage and sea level rise. It is also the ancestral homeland of Indigenous peoples and a site of colonialism, racism, oil and gas production and governance failures. Deploying an ethnographic sensibility and material thinking, the study practised an epistemological constellation of reading, walking, observing and listening while paying attention to the relation between matter and state responses. The research shows that these responses materialise into responsibility as the role or task of the state. However, state responsibility practised as mere action, while necessary is not sufficient, as its effects tend to marginalise affected communities leading to injustice. The research reveals the ways in which communities and advocates challenge the state to undertake a form of responsibility that promotes justice. Developing a taxonomy of state responsibility for climate matter, the thesis proposes a concept of climate responsibility which extends beyond individual ethics to understanding it as the job of the state. It seeks to contribute the notion of state responsibility as a counterpart to power in material politics scholarship and the significance of the relation between climate matter and the role responsibility of the state in climate governance literature and scholarly debates on the nature of responsibility in the climate changing world. It is argued that interrogating the way in which the state assumes and exercises responsibility in response to increasing climate impacts has implications for accountability and climate justice.

Impact statement

Over the course of my doctoral studies, I have presented aspects of my research on the relation between matter, responsibility and the state for discussion within the academy in various ways. At conferences of the American Association of Geographers and the Royal Geographical Society, I have delivered papers on: locating a responsible state in a session on the Politics of State-Change: Matter and Transition (AAG 2018), the role of the state in climate governance in The Incoherent State (RGS 2018) and on 'hydroresponsibility' in Water Matters (RGS 2019). Frederike Hartz, Noah Walker-Crawford and I convened a session on Climate Responsibility at AAG 2022 with Harriet Bulkeley as discussant at which I presented a paper on state responsibility in governing carbon emissions. Within UCL Geography, I have discussed my research at seminars with masters' students and visiting scholars. As a member of a research group on loss and damage within UCL Political Science, I participated in yearly reading groups reviewing colleagues' work and discussing developments in theory and methodology in climate change research. One outcome of this project was the publication in 2022 of a research note in Global Environmental Politics, co-authored with Lisa Vanhala and Angelica Johannson, which extends understanding of the practice of an 'ethnographic sensibility,' particularly in sites of loss. Outside the academy, the research seeks to challenge assumptions that the question of climate responsibility is primarily an ethical one for individuals or that the state is merely one actor among many. The intention is to disseminate more widely the research findings and argument that responsibility can also be the 'job' of state agencies as this insight has implications for advocacy and policy-making in pursuing responsibility for climate justice action.

Land acknowledgement

This research was undertaken at the ancestral lands of the Isle de Jean Charles Band of Biloxi-Chitimacha-Choctaw Indians Tribal Community, The Grand Caillou/Dulac Band of Biloxi-Chitimacha-Choctaw Tribe, Bayou Lafourche Biloxi Chitimacha, Grand Bayou Indian Village historically linked to the Atakapa-Ishak/Chawasha Tribe (FPCC 2024), the Pointe-au-Chien Indian Tribal Community and the United Houma Nation. These lands are sites of colonialism, genocide, forced displacement and removal and the Tribes' ongoing struggles for recognition and survival. I pay my respects to the traditional owners of this land and proffer my gratitude for the privilege of seeking to learn and understand this history from its people.

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Publication from the thesis

Elements of my research methodology and findings were published in Vanhala, Lisa, Angelica Johansson and Frances Butler (2022) Deploying an Ethnographic Sensibility to Understand Climate Change Governance: Hanging Out, Around, In, and Back, Global Environmental Politics 22(2) pp 180-193

Taxonomy: Matter, the state and responsibility

Type	Empirical Emergence	Explanation and theoretical engagement
Material response	Chapter 4, Water	Following Derrida (1997/2002) and Haraway (2008), the relation among humans and nonhumans is one of response, as well as circulation and entanglement (Latour 2005, Bennett 2010).
Response responsibility	ibid	In responding to material forces, the state is assuming a commitment to do something and the burden of carrying it out.
Materialised responsibility	ibid	Building on Mitchell (2002) and Pickering (2013), responsibility – and forms of state agency itself – are brought into being from the matter that the state is concerned with.
Role-responsibility	ibid	Adopting H L A Hart's categorisation (1968), a response responsibility (something is done in practice) becomes an expression of state role-responsibility (an agency is given the task for which it is accountable) when an authority with legal powers and duties is established.
Responsibility-as-action	Chapter 5, Land	The state undertakes responsibility as a 'task' (Baier 1972/1991), which may be exercised as management of a material problem with insufficient account taken of those who may be affected.
Responsibility-as-relation and reciprocity	ibid	An unrealised counterpoint to state responsibility-as-action, drawing on more hopeful ideas from Levinas (1998) and Derrida (1999/2008), understanding responsibility as involving relations with others, with the more-than-human world (Bennett 2010) and with reciprocity (Whyte 2013, Kimmerer 2013/2021).
Techno-responsibility / selective responsibility	ibid	Extending Barry (2001) and Braun (2014) on how infrastructure, technology and people may be enrolled in techno-governing practices, to understand it also as a form of responsibility-as-action with discriminatory effects.
Hydrocarbon governmentality / responsibilised state	Chapter 6, Oil	Interpreting the 'subjection' of the state to vested interests (Stengers 2015) as an inversion of Foucauldian governmentality whereby state agencies become the instruments of the demands of the dominant matter of oil.
Residual responsibility	ibid	Rather than industry taking direct responsibility for preventing and remedying coastal erosion or the state requiring it to do so, instead the state steps in to the responsibility gap, as it does in the case of disasters, as the repository of responsibility (see Hochschild 2016).
Responsibility for equity / justice	Chapter 7, Air	Building on but distinguishing from ideas of Arendt (1968/2003) and Young (2011) on collective responsibility, here community advocates challenge the state to undertake forms of responsibility beyond 'action' towards justice.

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Chapter 1: Introduction

"[G]et some … responsibility going"

Coastal Louisiana is suffering extreme land loss and faces 'ecosystem collapse' (Li et al 2024). In a reversal of Rachel Carson's geological history where "lands rose and seas receded" (1955 p 13), land is disappearing into the Gulf of Mexico. More than 2,000 square miles of Louisiana's coastal marshland have been lost to the ocean waters since 1932, a quarter of the land area, and the land loss continues at the rate of the proverbial 'football field an hour' (CPRA 2023a, Couvillion et al 2011, 2017, see Image 2 showing coastal land change).

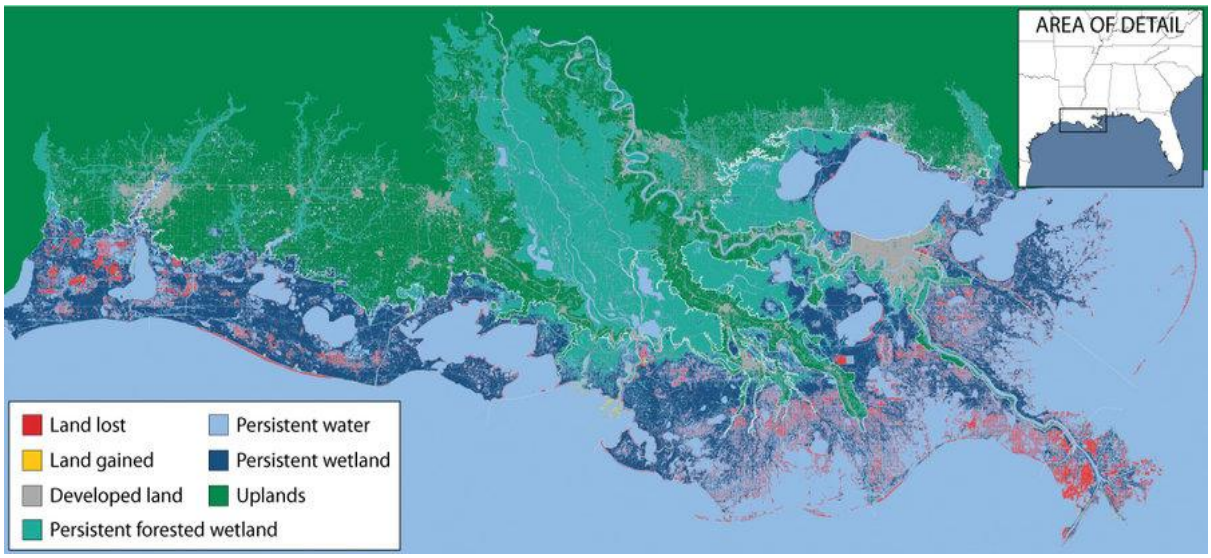

Image 2: Louisiana coastal land change 1932-2010 (Couvillion et al 2011)

According to the US Geological Survey, the region has been "losing wetlands because of multiple, compounding and interacting stressors" (Couvillion et al 2017 p 1). These include deltaic subsidence, embanking the Mississippi river within levees which prevents the distribution of land-building sediment and the long-standing industry practice of dredging canals for oil and gas transportation. The canals lead to salt water incursion which destroys trees and marsh grasses making them more vulnerable to storm surge damage and erosion (Bass and Turner 1997, see Image 3 showing canals in the wetlands).

The production and combustion of oil and gas extracted from the Gulf and 'made in Louisiana' contribute to increasing global atmospheric greenhouse gas concentrations which return to Louisiana in the form of accelerating eustatic sea level rise, a significant 'stressor,' at a rate that is four times the global average (Jankowski et al 2017). Recent findings from the National Oceanic and Atmospheric Administration (NOAA) suggest that sea level rise caused by greenhouse gas emissions could result in the Gulf being 2.5 feet higher along the Louisiana coast by 2050 (Marshall 2023). The effects of storms and sea level rise threaten the existence of coastal Louisiana and its principal cities, New Orleans and Baton Rouge.

Image 3: Aerial view of parts of Louisiana's Barataria Basin (NOAA Fisheries 2021) showing industry-dredged canals

These conditions are exacerbated by the further climate impacts of increased heat, precipitation and flooding together with stronger and more frequent hurricanes (Climate Reality Project 2020, CITF 2022). Climate impacts are a recent environmental crisis for Louisiana, especially for its Indigenous communities where, as observed more widely, anthropogenic climate change is an intensification of environmental change imposed on Indigenous peoples by colonial conditions that dispossessed them of their land and livelihoods to "make way for greenhouse gases" (Whyte 2017, 2022). Coastal and riverine Louisiana has also, and notoriously, suffered extreme and extensive pollution whether from the BP Deepwater Horizon disaster in 2010 or ongoing from the refineries and chemical plants along the Mississippi River. These are adjacent to largely Black residents who suffer both the eco-degradation and damaging health effects that have given the area its name 'Cancer Alley' (Rise St James 2023, Juhasz 2024). The pollution and its effects in southern Louisiana – a 'sacrifice zone' (Lerner 2010) - are often studied: as a site of 'slow violence' (Nixon 2011), a 'slow moving crime scene' (Hochschild 2016) and as a 'toxic geography' involving 'gradual brutalities' (Davies 2019). These devastating conditions are underpinned by state and industry practices of colonialism, racism, displacement and injustice (Wall and Rodrigue 2014, Bullard and Wright 2012, Forensic Architecture 2021, Maldonado et al 2013).

The Geological Survey's phrase 'losing wetlands' disguises the lived experience of the people of coastal Louisiana who are losing their homes, livelihoods, culture and connections to ancestors and treasured places. It also disguises the decades of state failure to regulate industry's contribution to coastal erosion by cutting canals through the marsh (Houck 2015). There has been an absence of responsibility and accountability for the damage caused that needs to be rectified. As Chief Shirell Parfait-Dardar of the Grand

Caillou/Dulac Band of Biloxi-Chitimacha-Choctaw Tribe of Louisiana said in a recent National Geographic documentary film:

> We know that they [the oil and gas industry] tore us up ... we've got all these canals and part of our work is to raise that awareness and *get some accountability and responsibility going* so that we can have futures for our kids and our grandkids (Chief Parfait-Dardar quoted in Killer Red Fox 2021, emphasis added).

In sum, coastal Louisiana presents as a site of extreme environmental degradation and the absence of responsibility (Houck 2015, Randolph 2018, Horowitz 2020). There is a stand-off – the necessary preventative and remedial action is lacking - but also a relation between the material conditions and questions of responsibility. This research problematises that relation. Through observing the different types of matter in play in Louisiana and the state responses to them, it is evident that varying forms of state responsibility are emergent and enacted in practice. These are set out in the taxonomy table on page 4. The aim of the research is to explore what kinds of matter are implicated in what kinds of responsibility in order to understand more about state responses to the climate changing world. It is argued that this has implications for how we think about the way in which state agencies will respond - take responsibility - for climate impacts and their causes more widely.

A material politics analysis allows this relation to be seen more clearly: matter is entangled with politics. In doing so, I engage with developments in more-than-human geography and material politics (Whatmore 2002, Braun and Whatmore 2010, Marres 2012, Barry 2013) with their antecedents in actor network, vibrant matter, governmentality and 'state effects' theories (Latour 1999, 2005, Bennett 2010, Foucault 1980, 1991, Mitchell 1991). However, material politics scholarship, often attending to the relation between matter and political power (see, for example, Braun 2002, Swyngedouw 2015, Menga 2018), has not yet explored the way in which matter also shapes state responses which, as this thesis shows, go on to manifest as expressions of state responsibility. The thesis argues that the significance of the relation between, on the one hand, matter and response and, on the other hand, between matter and state responsibility has been overlooked by material geographers and theorists alike. In understanding the state as an 'effect' (Mitchell 1991), I argue that it has been too narrowly drawn to recognise elements of response and responsibility. On the other hand, scholars who are attuned to the relation between matter and responsibility have not been concerned with the problem of governing (Haraway 2008, 2016, Bennett 2010, 2015). My methodological approach, following Foucault and Mitchell et al, has not been to try to investigate the 'state' to find out what it is governing but to go to the materials, whether trees, pipelines, techniques, plans or the matter of water, land, oil and air, paying attention to the way in which the state responds to them and how state responses differ depending on the matter. These interrogations provide an understanding of the state's practice of responsibility, for whom and for what it is exercised and who is excluded. [2]

[2] The words 'practice or 'in practice' are used in this thesis as a counterpoint to theory or abstraction to mean a plan, decision, action or an undertaking with a Latourian "emphasis on the local, material, mundane" (1999 p 309). To this extent I am aligning with the impulse behind the 'practice turn' in IR which calls for analysis of practice "understood as the study of action itself" (Neumann 2012 p 58) and which is increasingly drawing on STS, ANT and material

Inspired by Chief Parfait-Dardar's call to action, the thesis argues that attending to the particular responsibility of the state is important because the state has enabling power, authority, resources and capacity and, in a democracy, can be held accountable, whether through legal proceedings (Urgenda 2019, Sharma 2021) or political processes. As Olúfẹ́mi Táíwò and Thea Riofrancos (2024) argue, the state is necessary to achieve climate action and justice. I build on their arguments about the need for the state by proposing greater attention be paid to, first, the state as a locus of responsibility and second, the nature of that responsibility as one of role (borrowed from H L A Hart 1968). In doing so, I connect with but distinguish my argument from the more familiar ethical accounts of responsibility prevalent in the literature. This research is not concerned with what institutions *ought* to do (Goodin 1995) but with a conception of responsibility as the *job* that an institution assumes and is tasked to do. A further aim of this research therefore is to highlight that, rather than responsibility being thought of in terms of individual ethics, responsibility can also be conceptualised as the role of the state.

However, I need to make clear that in emphasising the responsibilities of the state in responding to and seeking to govern matter, I do not suggest that the state will respond competently or perform its responsibility in a way which respects the rights of those who may be affected. The history of Louisiana militates against that. The argument is not that the state is a 'solution' or a 'good' actor (Kojola and Pellow 2021, Pulido 2017, Hunsberger 2022) but rather that attending to the assumption of state responsibility has political potential as, unlike accounts of power, it engages accountability, whether accountability can be realised or not.[3] Building on but distinguishing from Hans Jonas' 'imperative of responsibility' arising from destructive technology (1984), it is necessary to attend to the risks of managerialism and discrimination associated with the notion of responsibility as an action or practice and the role of infrastructure in enabling those outcomes (Appel 2019). Through engagement with the work of Hannah Arendt (1968/2003) and Iris Marion Young and literature on collective responsibility, the thesis goes on to show the role played by civil society and advocacy groups in challenging the state to undertake governing responsibilities in ways that promote climate responsibility for justice.

My contention is that there is a *material tussle* among and between *climate matter* – the turbulent shifts, disturbances and exchanges among water, land, oil and air - and the emergence and practice of state responsibility in coastal Louisiana. In sequencing the emergence of the role-responsibility of the state from the matter demanding its attention, this thesis is laying out the basis for a concept of *climate responsibility*. This involves the state taking responsibility for action on climate change - mitigation, adaptation and loss and damage - and for justice. However, just as the matter – *climate matter* - is unstable and shifting so are the forms of responsive state responsibility. In the remainder of this chapter, I present coastal Louisiana as a site of material responses, introduce my research questions and describe the field site. I go on to explain how I came to see 'matter' and 'materials' through the four forces of water, land, oil and air, provide a brief account of how I am thinking 'materially' and conclude with a chapter overview. I next outline the way in

approaches (Vanhala forthcoming). I use the term 'practices' to convey an additional meaning, depending on the context, following Foucault (1991), to mean governing techniques and devices.

[3] Accountability is a concept – and normative objective - that I put in the category of being 'concerned about rather than engaging with.' While using the term only in passing, I follow Derrida in understanding that it consists of "answering to the others, before the other and before the law, and if possible, publicly" (1999/2008 p 28). For climate governance scholarship on accountability, see, for example, Bäckstrand (2008).

which agencies of the state, whether federal, state or parish, have long engaged in responding to and taking responsibility for the materiality of the environment in coastal Louisiana.

State responses in Louisiana

Coastal scientist Don Boesch (2020) describes the biophysical conditions of coastal Louisiana as a young, low-lying, and dynamic landscape that experiences floods from North America's great river basin, tropical storms with strong winds and surges, and extreme precipitation events. The deltaic plain has been subsiding for thousands of years. The fresh sediment spread during the frequent flooding from the Mississippi River and its distributaries, such as the Atchafalaya, compensated for the subsidence by nourishing the land. Before the colonial era, the autochthonous people lived with and adapted to these rivers' tendency to meander, flood and change course. However, with the settlement of the territory, government agencies intervened to change, adapt and prevent the naturally occurring movements of the region's mighty rivers.

Founded in 1775, the United States Army Corps of Engineers (the Corps), became responsible for clearing rivers for navigation, addressing natural disasters and controlling flooding. Taking advantage of the natural raised ground or levees that form along the banks of the Mississippi, the Corps built them up in order to prevent flooding and to encourage fast navigational passage. As local geographer Craig Colten (2005) records, it was the levee system which established New Orleans by 1850 as an exceptional city in a largely rural South. However, despite the raised levees, when the great flood of 1927 threatened to overtop them and flood New Orleans, the authorities authorised the dynamiting of the levee downriver at Caernarvon which spared the city itself, but not the residents of St Bernard Parish (Colten 2005, McPhee 1987). Further infrastructural interventions from the Corps that were intended to manage the river followed. The Bonnet Carré Spillway of 1937, installed in response to the 1927 flood, diverts water from the Mississippi River into Lake Pontchartrain and in 1964 the Old River Control system of locks and dams up river of Baton Rouge was installed. As John McPhee (1987) observes, the Corps now 'controlled' the river because: "For nature to take its course was simply unthinkable. Nature, in this place, had become an enemy of the state."

Perhaps the most notorious of the Corps' infrastructure projects was the 76-mile Mississippi River Gulf Outlet – 'Mister Go' - a navigation canal dredged in the 1950s and 1960s to provide a shortcut for shipping from the Gulf of Mexico to the Port of New Orleans through the swamp and marsh (MRGO Must Go Coalition 2024). Despite enthusiastic predictions about its economic importance, the "outlet" was reportedly used by only a dozen of the ships for which it was designed (Freudenberg et al 2009), yet, like the industry-dredged canals it caused saltwater intrusion into interior wetlands, eroding protective marshes (Renfro 2018). As a local scholar has remarked, in building water projects, the Corps of Engineers has "destroyed wetlands in the name of navigation and flood control" (Hanny 1995 p 59).

With Hurricane Katrina, on August 29, 2005, thought of as the first climate catastrophe (Klein 2014, Stengers 2015), Louisiana is emblematic of the connection between fossil fuels, climate impacts and failed state responsibility. MRGO intensified the impact of the storm by creating a funnel that channelled its surge into the heart of communities in Orleans and St Bernard parishes (MRGO Must Go Coalition 2024). The Corps was also responsible for the hurricane protection systems that failed New Orleans during Katrina.

Colten (2009) strongly critiques what he calls the 'engineering hubris' which encouraged sprawl into flood-prone land and led to the system being incomplete when it faced its greatest challenge. The consequence was the loss of over 1800 lives, 80 percent of the city under water and damages totalling more than $100 billion (National Weather Service 2022, Climate Reality Project 2020). While fleeing residents faced racism and violence, in the aftermath people came together, often with the help of their churches, to rebuild their communities (Solnit 2009, Edwards 2018). Too often this was done without government assistance. As a community leader said at a seminar that I attended, "No one from the government came across the levee to find out how we were until a year later" (PO Lowlander 2020). The failures of government agencies before, during and after Katrina – 'no natural disaster' - are well-documented (Bakker 2005b, Adams 2013, Horowitz 2000). Today, echoing former New Orleans resident, William Faulkner (1951) on the past being neither dead nor past, Katrina lives on in Louisianan places, lives and minds. It remains the exemplar of a climate-impacted future, a harbinger of the 'barbarism' to come (Stengers 2015).

It is reasonable to query research on the notion of state responsibility in Louisiana when it is the epitome of failed responsibility, whether through a lack of response or the wrong or a racist response (Horowitz 2020, Braun and McCarthy 2005, King 2020). In its grappling with the Mississippi River, the federal Army Corps of Engineers has inadvertently caused considerable and lasting damage to which other state agencies have to respond. The state has failed to prevent dangerous pollution and protect people from disaster. Expectations of state support and assistance are low (Burley 2010, Edwards 2018). However, as sociologist Arlie Russell Hochschild (2016) found, the state in Louisiana is still expected to respond to environmental crises; that is the role and responsibility it is supposed to have. In her study she notes that while local people typically want the government out of their lives, as the "government was paid to protect people" they also expected a response when environmental disasters occur (2016 p 108).

Hochschild's insight underpins my research. Notwithstanding reservations about the state in Louisiana, it is active in response to the devastating environmental conditions and constitutes a site of emerging – perhaps emergency - responsibility. In order to explore this matter/state/responsibility relation, I review the governing practices and effects of two particular State agencies: the Coastal Protection and Restoration Authority (CPRA) and the Office of the Governor. The CPRA, whose origins, emergence and programme are discussed in Chapter 4, Water, is the response of the State to the coastal erosion crisis and an attempt to mitigate its worst effects. The state-wide body has a mandated responsibility to undertake "comprehensive coastal protection and restoration" measures under five-yearly 'master plans' (CPRA 2024a). While my focus is on the matter/responsibility relation, I am mindful of critiques that Louisiana's protracted efforts to restore and protect its coastal marshes are undertaken with insufficient regard for the people displaced by those efforts (Colten 2021).

In the terminology of international climate change policy, material and unavoidable losses from climate change are known as and negotiated over as 'loss and damage' (Vanhala and Hestbaek 2016). Given the environmental impacts, coastal Louisiana is a loss and damage site *avant la lettre* where I observed what were the state's adaptation efforts (though confusingly they are often described as 'mitigation,' Vanhala forthcoming), long before the state was in a political position to characterise these responses as related to climate change. Instead, the environmental problems were called 'flooding' and 'coastal erosion.' Unsurprisingly, as a state dependent on its fossil fuel industry, Louisiana is characterised by a conflicted politics on the issue of climate change. A local survey in 2016 revealed its low priority among political

representatives (Bridges 2016). As I was informed in 2022, "there hasn't been a broad movement, the legislature is deeply conservative, like other states in the US, it is generally opposed to action on climate change" (Interview 11). The phrase 'climate change,' what were dubbed the 'double C words,' were avoided in political discourse and policy as being controversial or left wing. One research friend said government agencies did not use the phrase because "it leads to ideas of responsibility" although scholars and journalists did use it (Informal conversation 2018, May). With the wider public, opinions on climate change and its impacts are divided. A recent study undertaken in rural areas found climate denial continues to be prevalent (Crockford 2023). However, across the state more broadly, a poll commissioned by the Restore the Mississippi River Delta coalition of non-profits in 2019 found that of the 71% respondents who 'believe' in climate change, 50% believe it is directly impacting people's lives (Lux 2019). This broader understanding underpinned a change in climate politics within the state government.

In early 2020, with then Governor John Bel Edward's announcement of his climate initiative, the notion of climate action reached a level of importance and legitimacy at the state-wide governing level. The relation between the coastal land loss and greenhouse gas emissions were made explicit in State pronouncements (Governor 2020b) together with a realisation that what happens to the coast affects the whole of the state (Laska 2020). As an official from the Governor's office made clear at the State of the Coast conference in 2021, "climate change is a coastal priority" (PO SOC 2021). The State has been on a journey from climate and environmental impacts to causes. Although Louisiana's climate mitigation plan explicitly accommodates carbon capture (which meant it was welcomed by the oil industry) (CITF 2022), there was a sense of pioneering achievement. As a state official working on it remarked, it was an "opportunity for Louisiana to show leadership … We are the only state in the Gulf South actively talking about climate change much less reducing emissions" (Interview 11).

Recent developments suggest that Louisiana's Climate Action Plan initiative, explicitly responding to carbon emissions as well as land loss and other climate impacts, may be short-lived. In a sign of the political vagaries around action on climate change, Jeff Landry elected governor in November 2023, has described climate change as a 'hoax' (Jones 2024, Feb 7). Early on taking office in 2024 Landry appointed fossil fuel executives to state environmental posts and changed the name of the Department of Natural Resources, the state agency with oversight of the fossil fuel industry, by adding the word "energy" to its title (Jones 2024, Feb 7). For Landry's administration, it appears that the matter of oil trumps the matter of atmospheric greenhouse gas concentrations and the consequential loss and damage in Louisiana. The case of state responses in Louisiana can be set within the wider context of the climate changing world and the thesis' investigation of the relation between climate matter and governing responsibility.

Governing as responses to materialities

Decades ago, French philosopher Michel Serres foresaw that the problem of climate change, now that "[r]iver, fire and mud are reminding us of their presence," was whether humans would take responsibility for addressing it (Serres 1995 p 2). As if he were anticipating the gubernatorial contradictions in Louisiana, Serres illustrated his concern by reflecting on Francisco Goya's painting Fight with Cudgels (1820, see Image 4). He points out that the combatants are fighting each other to the death apparently oblivious of the fact they are stuck in a marshy bog which is in fact their real adversary if only they paid attention to it:

> The painter, Goya, has plunged the duellists knee-deep in the mud. With every move they make, a slimy hole swallows them up, so that they are gradually burying themselves together … [in] the marsh into which the struggle is sinking (Serres 1995 p 1).

Image 4: Fight with Cudgels (Goya 1820)

Influenced by Serres' idea that "the game is no longer played by two parties, but by three" (2006) and pursuing his own metaphor of the 'new climatic regime' as a 'war,' Bruno Latour notes that "landscape has joined the fight" (2017 p 73). While Latour avers that there is no division between nature and society, Serres is saying that Goya's painting shows we don't know that yet. Serres asks, in our preoccupation with our 'pugnacious' selves and the 'bond of combat':

> … aren't we forgetting the world of things themselves, the sand, the water, the mud, the reeds of the marsh … (Serres 1995 p 2).

The fighters' failure to acknowledge their environmental predicament suggests that the water, mud and marsh – they could be in Louisiana - is not yet materially significant, yet they continue to fight each other because, like the recently elected Louisianan governor and his intention to prioritise the state's hydrocarbon industry, they are driven by other material concerns.

It is axiomatic that the state will nonetheless respond when, unlike Goya's bog, matter sufficiently demands its attention. The paradigmatic example is the global lockdown in response to the 2020 coronavirus pandemic. As a microbe of almost incomprehensible power the virus offers itself as the ultimate 'actant' in the Latourian sense of something that 'makes a difference' (2005 p 71). In the absence of commensurate action on climate mitigation at the global level, it is in the particular locations experiencing extreme material conditions that state authorities take responsive action. In those places, the knee, *pace* Goya's fighters, appears to be the anatomical turning point for a state response to matter. A local official in Palm Beach, Florida reportedly said:

> At the local level, I don't have the luxury of engaging in these lofty debates that they do in Washington — when I am knee deep in flooding in my coastal communities (Commissioner Steven Abrams, Palm Beach County Commission, Florida, quoted in Swisher 2017).

Here we can see the establishment of a relation between the matter, the response and the third element in this thesis: state responsibility, the job that the state assumes and is tasked to do. Clark and Dear (1984) have argued that the local state in the United States is caught between a responsibility for crisis avoidance at the local level whilst simultaneously lacking power, authority, jurisdiction and resources to solve such local crises due to its dependence on higher tiers of government. However, it is the explicit, typically statutory, duty of certain public authorities to respond to hazards – material forces like hurricanes, wildfires and floods - that affect life and property within their jurisdictions. In many cases, local authorities deal with materialities like flooding or wildfires because it's in their mandate and jurisdiction - a 'designated responsibility' (Butler and Pidgeon 2011). When these long-existing hazards become redefined as climate impacts, the state response, perhaps reframed as adaptation, continues.

The pragmatic local response can avoid the hurdle of ideology preoccupying central government (Barber 2014). Paradoxically, being non-political is a way of taking on responsibility for action at the same time as being politically accountable. The climate change governance literature is replete with analyses of action taken by cities, local and regional government (Bulkeley and Betsill 2003, Bulkeley and Shroeder 2011, Brody et al 2010, Gerber 2015). That literature shows without being explicit about it that material considerations – hurricanes, flooding, drought, wildfires, landslides and sea level rise - are both a condition of and explanation for local climate governance action. However, climate mitigation action, which involves confrontation with vested capital and energy interests and the matter of oil and may or may not be characterised by 'lofty debates,' has not been in a state's job description. It is notable that the previous Louisiana Governor made it the responsibility of his administration.

The association between the demands of matter and state responses informs my **first research question**: *what is the relation between the materiality of the climate changing world and state responsibility?* From a material politics perspective, the water, land, oil and air in Louisiana are the *nonhuman things, material forces* or *vibrant matter* that the State of Louisiana is in a relation with (Latour 2005, Barry 2001, 2013, Braun and Whatmore 2010, Bennett 2010) and through which its 'governing practices' (Foucault 1991) and 'state effects' (Mitchell 1991) emerge. In developing his notion of 'governmentality,' Foucault was concerned with the 'technology' of power and the ways in which it materialises over a population (2009). While aligning with this understanding of the state as an effect or a practice, I argue that in the exercise of power it is still a responsive actor undertaking a *response responsibility.* This may reveal the state to be not only the source, or a dispersed series of techniques and practices in Foucauldian terms, of governing *power* but also as a set of governing *responses* to material demands through which the exercise of state 'power' may be more formal than substantive. As I discuss below, real power may be associated with the dominant matter in the assemblage.

My argument is that there is a two-stage process: it is from the response to material forces that state responsibilities emerge, a *materialised responsibility.* This means that state responsibility can be understood as something that not only emanates from legal statutes, courtrooms or ethics but also from

the *matter* that the state is dealing with. A notion of authorities governing through undertaking responsibilities differs from Foucauldian governmentality which is largely focused on power. A correlative argument of this thesis is that, in attending to power, the role of responsibility and the potential for accountability with which it is associated has been overlooked by state scholars.

The notion of responsibility emerges in governmentality theory through the way in which citizens can be enrolled in governing practices known by the clunky neologism, 'responsibilisation' (Burchell 1996) which describes forms of governing that foster individual responsibility (Cruikshank 1999, Lemke 2007). Whilst describing evidence of this practice in my fieldwork (Chapter 4, Water), I also reverse the analytical direction by arguing (in Chapter 6, Oil) that there has been a transfer of responsibility from citizen to the state mediated by the dominance – the power - of the matter of oil. The effect is that 'governing practices' can be seen as the sum of the material demands; what I call *hydrocarbon governmentality.* In actor-network terms, this is the outcome of the tussle among all the actants in the network of forces; oil is the one that 'makes a difference' (Latour 2005 p 71).

However, in maintaining a commitment to 'network,' 'assemblage' or 'vital mix' frameworks (Latour 2005, Bennett 2010), I encounter the problem of where the state is located in these theoretical perspectives. If forces, human and nonhuman, are circulating in a network and if the state is conceptualised as an effect and a process, without clear limits (Mitchell 1991), can any boundaries be recovered and what implications does this have for holding the state to account? The irony of scholarship that decentres the state (Rose 1999) is that it risks inadvertently aligning with the neoliberal project which has the same objective. The theoretical issue which forms my **second and ancillary research question** is: *Can the state be distributed in its effects and practices at the same time as being centralised and whole in its responsibilities*? Finding empirically that it can, and seeking a conceptual reconciliation with Jane Bennett (2010) on that point in Chapter 4, Water, I argue that a theory of state responsibility can be recovered in network and assemblage ontologies. The next question is where a notion of what I am calling *climate responsibility* – state responsibility for climate action and justice - sits within existing literature on climate change and (ir)responsibility.

Recuperating climate responsibility

As Chief Parfait-Dardar suggests, the problem for accountability and responsibility is one of impunity. In the age of climate responsibility, when the question of the continuing use of combustible hydrocarbons is put in tension with the concept of responsibility, the "techno-capitalist machine," to use Isabelle Stengers' phrasing, has been enjoying the "right to irresponsibility" (2015 p 9). Not only has the oil industry not taken responsibility for its climate-destroying business activities but it has worked to prevent the state from addressing them (Supran and Oreskes 2017, 2020, Franta 2021). In a neat aphorism, Stengers refers to "what the State allows capitalism to do, and what capitalism makes the State do" (2015 p 134). Indeed, industry in conjunction with the state, has promoted individual not state responsibility, encouraging people to reduce their carbon footprint with minimal effect on reducing carbon emissions (Mann 2021).

Whether an individual is recycling at home, making ethical consumer choices or acting collectively with other volunteers, a sense that the action has value is underpinned by an environmental ethic (Bennett 2010, Cripps 2013). However, as is increasingly recognised, it is this laudable instinct towards personal moral

responsibility driving action at an individual level that has, over recent decades, been exploited by the state and by fossil fuel companies to deflect attention away from the systemic action from institutions that the climate and ecological emergency requires and towards individual action instead (Maniates 2001, Rutland and Aylett 2008, Mann 2021). In the literature, this deflection and redirection of responsibility is known as 'environmentality' (Agrawal 2005) and 'green governmentality' (Luke 1999, Soneryd and Uggla 2015) and is an expression of responsibilisation discussed above. In the next chapter, I outline what I see as three *lines of duty* of individuals observable in the literature: the individual ethic, the responsibilised individual and the requirement to take action collectively (Arendt 1968/2003, Young 2011). I resist these impositions on the individual when framed as a *duty* rather than as support and encouragement to take action because they fail to account for people's differing status and capacity. They also relieve industry and the state, which are better situated in terms of capacity and resources, from the burden of addressing the systemic action that the climate and ecological emergency demands. Where it is proposed that climate responsibility is the *job* of individuals, I argue that the burden of responsibility and the labour of exercising it have been wrongly allocated.

In unpacking responsibility in the climate governance context, I distinguish between various kinds of responsibility, building on taxonomies from Hart (1968), Vincent (2010) and Juhola (2019). My own is simply stated: causal (you made it happen), liability (because of what you did you shall do something about it), moral (you should do something about it), and *role*, the one that I am concerned with in this thesis: it's your job to do something about it. There is a legislative route from morality to role. Something transitions from a good idea or the right thing to do to someone's task to do it and then there is the connection between role and liability, a holding to account for performance of the role. By problematising the concept of responsibility beyond its more familiar categories – causal, ethical and liability - I argue for an approach that understands the state, through its governing practices and effects, to be undertaking responsibility through the assumption of a 'role' and the undertaking of a 'task.' Thinking of responsibility as *the job* also usefully takes us beyond the more familiar ethical stances with which responsibility is usually associated and which inhere to individuals. In addition, these can be contested. As Bennett notes: "the effect of moral appeals can be more to offend and antagonize than to elevate and ameliorate" (Bennett 2020 p 58).

However, the question of responsibility for climate action is often seen as ethical: "the failure of responsible actors to mitigate emissions and facilitate adaptation all make the issue of loss a profound ethical problem" (Barnett et al 2010). I do not contest this, rather I argue that climate responsibility is more than ethical. While governing does concern ethical questions, decisions about those questions transform the governing responses into a role and action creating new forms of responsibility which merit analysis. In pursuing this distinction, I join climate scholars who are increasingly analysing responsibility beyond ethics: as a practice (Haflidadottir and Lang 2020), as a methodology tool (Hansen-Magnusson and Vetterlein 2020), as scientific knowledge (Hartz 2023) and as a legal relation (Walker-Crawford 2022). I seek to contribute to the emerging climate responsibility literature with the material politics argument that climate responsibility is also about the entanglement of the state with the matter demanding its attention. Rather than dwelling on responsibility as avoidance, liability or ethics or as green governmentality, through showing the emergence of state responsibility from matter as role assumption and task fulfilment, I argue the case for rethinking the state's responsibility within the climate literature.

However, as already noted, simply identifying state responsibility as the 'role' or the 'job' is not sufficient as the ways in which the state exercises its responsibility and the risks attendant on a managerial response require vigilance. This brings me to my **third research question***: What forms and practices of state responsibility are emergent from what kind of matter*? Through empirical inquiry in Chapter 5, Land, I show the 'effects' of state interactions with land, technology and communities which reveal forms of *responsibility-as-action* and *techno-responsibility* which are exclusionary and discriminatory and resist other more productive understandings. Similarly, in Chapter 6, Oil, I explore the way in which the state responds to the demands of hydrocarbons and infrastructure revealing the negative consequences of conceiving responsibility simply as a task to be fulfilled. From these two chapters, the thesis argues the importance of paying attention to how the state enacts this kind of responsibility-as-action, who it is for and who is excluded. So, although I argue the case for identifying state responsibility because it is the route to getting "accountability and responsibility going", the anti-political effects where opportunities for challenge may be closed down (Rose 1999, Barry 2001) also need to be acknowledged and resisted.

'Politics' is a capacious term. It includes the production and distribution of societal benefits and risks (Jasanoff 2005) and how things get determined (Braun 2011). As Latour argues, politics are concerned with what is 'at stake' (2004a), associations are not enough, "they should also be *composed* in order to *design one* common world" (2005 p 259 emphasis in the original). Politics also means the 'emancipatory potential' of political contestation Honig (1993) and 'struggle' (Mouffe 2002, 2005), the kind of action that Chief Parfait-Dardar and Tribal communities are engaged in. Andrew Barry's notion of 'material politics' attends to the "ways in which artefacts, activities or practices become objects of contestation" (Barry 2001 p 6). For example, following the MRGO channel's funnelling role during Hurricane Katrina, it became subject to a successful campaign to close it (MRGO Must Go Coalition 2024). MRGO become 'political matter' demanding a state (federal) response through the efforts of community advocates (PO GCCLP 2020).

Although this thesis is primarily about the response of the state to material conditions, communities, advocates and activists play a critical role in engaging with the state. This kind of 'politics' provides opportunities for a more equitable praxis and provides me with my **fourth research question**: *what is the relation between matter, state responsibility and justice?* In Chapter 7, Air, I explore the way in which the matter of 'greenhouse gases' when connected to land loss, deprivation and injustice opened up a political space for communities to argue successfully that the State should include equity considerations in its climate action plan. Following Dewey on the 'public' (1927/2016) and Arendt's notion of 'action' (1958), the resultant argument is that through engaging in this kind of 'material politics,' communities can challenge governing authorities to undertake responsibility in ways that promote justice. I turn now to coastal Louisiana as the field site for this research.

Researching Louisiana

Coastal Louisiana is home to two million people for whom the wetlands act as a protective buffer (CPRA 2024b). They are a buffer too for the city of New Orleans which, below sea level, is 'joined at the hip' to the coast with the fate and future of each inextricably tied to that of the other (Davis 2011). These wetlands are also considered one of the most important economic environments in the United States supporting more than 30 percent of the nation's commercial fisheries, home to five of its top twenty ports and the source or

conduit of 20 percent of its oil and gas (Couvillion et al 2017). The production of Louisiana's 'Working Coast' through the exploitation of hydrocarbons has not only led to land loss but is itself, in an ironic twist, increasingly at risk. Hydrocarbon infrastructure, whether on land or at sea, is exposed to the changing environmental conditions consequent on its activities

Borrowing from Lesen et al (2019), in the coastal parishes of Plaquemines, Lafourche and Terrebonne in south eastern Louisiana where I did my fieldwork reside African American, Hispanic, Native American, Vietnamese and White populations as well as French speakers who self-identify as Cajun. EPA (2021) analysis shows that racial and ethnic minority communities are particularly vulnerable to the greatest impacts of climate change and the most severe harms fall disproportionately upon communities who are least able to prepare for and recover from them.[4] When Hurricane Ida struck New Orleans on the 16th anniversary of Hurricane Katrina in 2021, although the levees held, there was a comparable destructive effect on low-income communities and communities of colour who remain at high risk from hurricanes (Lazetic and Jacobsen 2021). However, maintaining the tradition of Indigenous peoples—including local Biloxis, Choctaws, Chitimachas, Chickasaws and Houmas Tribes – who resisted and challenged the growth of colonial Louisiana (Ellis 2022), through projects like the Lowlander Center (2024) and researcher-community partnerships (Lesen et al 2019), coastal communities are working together to advocate and plan their own futures in dealing with the environmental conditions and the threats of displacement and relocation (Maldonado et al 2013, Naquin et al 2018).

I concentrate my empirical attention on 'coastal Louisiana' by which I mean both the geographical areas of the lower Mississippi River, the delta consisting of the south-eastern coastal and riverine parishes (particularly Lafourche, Terrebonne and Plaquemines, see Image 5) and the city of New Orleans as well as the political, governing and civil society organisations in those places as well as in the State capital, Baton Rouge. In maintaining a generic usage of the term 'state' – in contrast to 'State' by which I mean the governing authorities of Louisiana – I am describing governing in relation to the matter in question. In doing so, I collapse the distinction between the governing levels in the US polity and thereby avoid debates about the federal/state divide and the interplay between them, whether in the state literature (Clark and Dear 1982) or in relation to adaptation efforts in Louisiana (Laska 2020). Nor am I distinguishing for the purpose of the thesis, other than in passing for explanatory reasons, national versus local authority mandates and practices. For information, in Louisiana, the State government, as the primary decision-making entity has responsibility for the coast while public safety is a state and locally incorporated city or parish responsibility (Crutcher 2011, Jerolleman 2020) with the federal government responsible for managing emergencies.

[4] In this thesis I use the word 'communities' as a shorthand to include residents in coastal, bayou and riverine areas. Depending on the context, these may include those described as 'frontline,' 'fenceline' or 'affected' because of their specific relation with water and airborne pollution, storm damage, flooding and land loss. For an exploration of the effect of being designated as an 'affected community,' see Barry (2013).

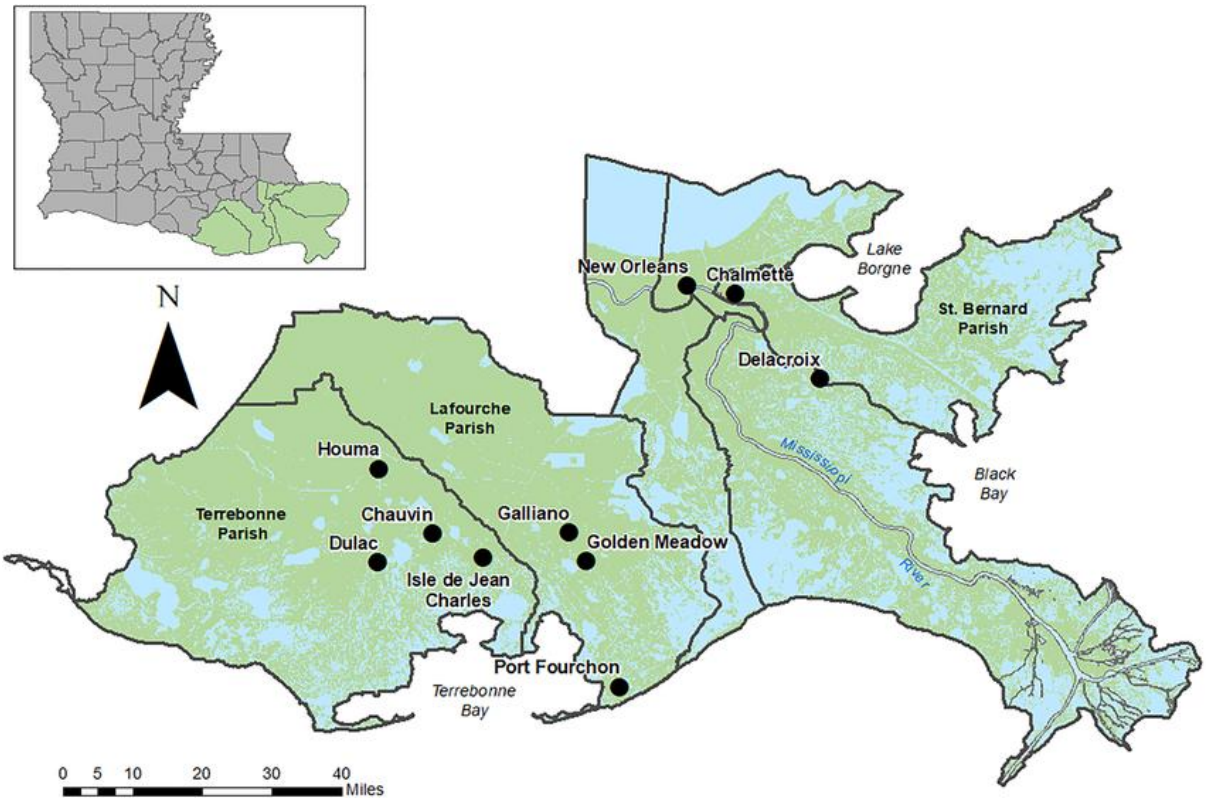

Image 5: Map of Southeast Louisiana showing parishes (Simms 2021)[5]

There are many scholars researching coastal Louisiana, often locally based, with considerable expertise who are focused on practical solutions to the existential threats and intractable effects of eco-destruction on people and communities (Maldonado et al 2013, Dalbom et al 2014, Colten 2015, Van Marter et al 2018, Crepelle 2019, Laska 2020, Jerolleman 2020, Simms et al 2021). Local scholars are concerned with what Sarah Whatmore (2013) calls 'the normative rationale' of environmental 'problem solving' which is explicable given the 'siren urgency' of these 'catastrophic problems' (2013 pp 163, 173). My research on the notion of governmental responsibility may seem esoteric to scholars, practitioners and communities who are focused on pressing local problems. As Whatmore points out: 'being concerned about how such problems are constructed, by whom and with what consequences, 'risks' being seen as 'a trivial / unaffordable nicety' (2013 p 163 and p 173). However, this thesis proposes a way of (re)thinking material politics and governing responsibilities in and beyond the Pelican State. Following Barry (2001), the aim is to tease out discrete ideas about how this field site raises interesting, and possibly useful, questions about where and how state responsibility is produced, performed and compromised at the same time as pioneered.

Matter in four forces

This thesis works through a theory and practice of *climate responsibility* emergent from the relation between state responses and material forces. Although water, land, oil and air correspond with an

[5] The unnamed parish, bottom right, is Plaquemines.

Aristotelian taxonomy of the four compositional, universal elements of water, earth, fire and wind, I have not selected them for their metaphysical properties but because they are the physical matter that is empirically salient in coastal Louisiana. I have attended to what matter is lively or recalcitrant (Bennett 2010, 2004), what is circulating as a potential actant (Latour 2005), how it might be political (Barry 2013), how it might be related to 'governing' (Foucault 1991) or 'state effects' (Mitchell 1991) and, as I have observed, as a series of relations generating responses. In Louisiana I encountered a good deal of matter, nonhuman and human: trees, marsh grasses, oysters, crawfish, barrier islands, pipelines, levees, sediment, flooding, infrastructure, 'master plans,' coastal communities, non-profits and state agencies. Although, following material approaches (Marres 2012, Barry 2013, Braun 2014), I initially thought that these objects would provide theoretical launchpads, at some point during my fieldwork, it became evident that they, together with state agencies in Louisiana, are fundamentally engaged in relations – a *material tussle* - with water, land, oil and air. Oil, in this case, manifesting as an essential commodity at the same time as a combustible hydrocarbon and destructive force and air as heat, wind, hurricane, airborne pollutants and, especially for present purposes, carbon emissions and atmospheric greenhouse gas concentrations (AGHGC). Such interacting geo-forces are increasingly providing conceptual leverage in understanding socio-political environmental relations. As Thomas and Braun (2023) observe, the idea of "geosocial formation" imagined by Clark and Yusoff (2017), which attempts to consider how social and political agency is both constrained and made possible by the forces of the earth itself, provides a resource for thinking about "*how* social-geographic arrangements are materialized in and through the land (air, water, and earth) and its subtending strata," i.e., their interrelations (2023 p 15 emphasis in original).

The empirical discussion is therefore grouped around these four forces – water, land, oil and air - and their relations with human and more-than-human matter with a chapter given to each. In doing so, I am following scholars who have put these forces in combination and contestation with each other and with other related material forces exemplifying their taxonomic usefulness (Ingold 2007, Peters et al 2018, Yusoff 2018). Although I have formally separated them out into their own discrete chapters in order to discuss their relation with state responsibility, I am not suggesting that they are isolated or isolable. I have witnessed them empirically as overlapping, intruding and imbricated with each other and with other forces. For example, defying floodwater so they can remain on land, coastal residents build their houses on stilts (see Image 6).

Building up means very little of the building is actually on "land" – it's just the support struts – the rest of the building is in the air. Likewise, oil is connected to air in the form of carbon emissions while locally it is connected to water and land through the eroding effects of its extraction and distribution. How to distinguish land from water in the Louisiana swamp and marsh? Water is typically classified as area with floating vegetation; where vegetation is permanently attached to substrate that is counted as land (Britsch and Dunbar 1993 cited in Crutcher 2011). So, my experience planting cypress trees should technically be in the Land chapter but as my experience was a wet one - I was up to my knees in water like Goya's duellists and the Palm Beach commissioner - I write about it in the Water chapter. Although the 'field' when I was researching it was marked by too much water, there are also the risks attendant on too little rain in the region, a sign of climate-changing extremes. In October 2022, the Mississippi River's levels dropped to record breaking lows (TUWaterWays 2023) and low levels again in September 2023 resulted in salt water coming upstream affecting drinking water (Sneath 2023).

Image 6: House on stilts at Cocodrie, April 16, 2018, own photo

There is the observable interaction among matter and between the matter and the state governing responses in a 'web of connections' (Bennett 2004). I call this constellation of relational encounters a *material tussle* (see Image 1 on the cover page). By that I mean what I observe to be the elements of confusion – literally a fusion among material and human forces combined with elements of uncertainty and disarray - absorbing Donna Haraway (2008)'s ideas on the intermingling and messiness of the world. I also observe the material tussle as a scuffle – a pushing and shoving – a vigorous activity which may be directed

towards achieving something in the sense of a Spinozian *conatus* or striving, say between water and land and between oil and air. Material tussle is a term capacious enough to include the "materialism … connected with the many struggles" that Stengers (2011 p 371) sees as necessary to understand what ultimately matters as well as 'struggle' in the sense of political challenge (Mouffe 2002, 2005).

In grounding my analysis in water, land, oil and air I recognise that each has its own body of literature that I only touch on because my purpose is to show them as the matter that I found to be in relation with state responsibility. My intention is not to seek new theorisations of these forces but to put existing conceptualisations into play with empirical observations about what responses they catalyse, what relations, generations and resistances exist between them and state governing practices. Acknowledging that these forces are themselves contested and shifting, I follow their connections with governing responses and other matter of significance in coastal Louisiana, such as infrastructure, trees and 'master plans', as routes into understanding state responsibility. There is an element of comparative endeavour as each chapter highlights the way in which each of the forces produces different responses and forms of responsibility from state authorities.

The chapter subjects can be read within the categories used by the International Panel on Climate Change to cover the gamut of required climate change action. Water is about adaptation (and the harm it can do, Laska 2020), Land is about loss and damage while Oil and Air address decarbonisation as mitigation action. The read-across to the international framework illuminates Louisiana as a particular place of climate change origin, impact and action. Hannah Knox (2020) has shown officials seeking to undertake mitigation action before the onslaught of climate impacts in the city of Manchester in the UK but my fieldwork site has shown the opposite. From a climate action point of view, this is the wrong direction of travel but it is what the field shows: mitigating climate change in Louisiana is following long-standing environmental damage which is being aggravated by climate impacts – the matter demanding state attention - rather than seeking to preempt it.

This thesis is about an excess of water and the loss of land to the sea and the state responses that follow but in another place it could have been about drought or the destruction of land through fire with another set of state responses. However, it is argued that the thesis contentions are generalisable from the case of coastal Louisiana - the state will respond to material demands and assume forms of responsibility - and is therefore significant for the climate changing world. As climate impacts increase so will the state responses and those will materialise into more forms of responsibility which merit interrogation.

Material thinking

The thesis works with the relation between matter and thinking in several domains, neatly summarised in Stengers' notion that matter 'forces thought' (2010). First, in attending to the more-than-human in the field there is the provocation from Eduardo Kohn that forests 'think.' Through a semiotic inquiry into living things in the Amazon, he argues that it is because thought extends beyond the human that we can think beyond the human and in doing so he "seeks to liberate us from our own mental enclosures" (2013 p 45). Inspired by this, Knox (2020) proposes climate change as a form of thought that emerges from engagement with responsive matter, such as ecohomes and smart meters. Similarly, in her research among Bangladeshi farmers, Naveeda Khan suggests that "we have not yet come to terms with how thinking is not internal to

humans and may be engaged by nonhuman others in ways that surprise and extend the capacities of such thinking" (2014 p 256). Kohn's argument is also methodological. There is the call from Eduardo Viveiros de Castro (2009/2014) to 'decolonise thought' which Kohn argues as an imperative because of the risk that we project our assumptions onto nonhumans by attributing to them properties that are our own (2013 p 44). This requires the researcher to think how to think with the more-than-human with regard to both methodological approaches and empirical findings. As Bruce Braun explains, rather than understanding that thought and matter co-exist, which retains their essential differences, it is necessary to observe how they are imbricated in practice in ways which "implode into knots of extraordinary density" (2002 p 19).

In the empirical chapters, I also witness the kind of blinkered thinking which allows officials to privilege some matter for consideration and governing action over others. As local journalist Bob Marshall (2023) noted in response to the publication of the CPRA's latest 'master plan,' it is difficult to reduce emissions without talking about them. As Marisol de la Cadena argues, the "unthinkable" is the result of "making some ideas thinkable" perpetuating "hegemonic habits of thought" (2015 p 76). I explore these ideas in Chapter 7 through Hannah Arendt (1963)'s notion of 'thoughtlessness' as interpreted by Haraway who introduces a materialist perspective seeing the notion as involving a "surrender to immateriality" in which the world does not matter (2016 p 36). With regard to ways of governing in Louisiana, rather than Haraway's 'surrender to immateriality,' I see Arendtian 'thoughtlessness' as its converse; a surrender to a dominant materiality through a spatially constructed process of *situated thinking* in which governing occurs through unthinking some matter when or because other matter intrudes.

Chapter overview

In ordering the chapters, I present water first as the principal issue of concern in coastal Louisiana and the one that I encountered first in the field. I turn next to land as that is what the state response is directed towards in relation to water, then hydrocarbons - oil as the most carbon intensive - as the dominant matter and finally to carbon emissions and AGHGC - characterised as 'air' - which became salient during my fieldwork.

In the following Chapter 2, I consider the theorisation of the relations between matter, the state and responsibility across a range of scholarship in geography, science and technology studies, postcolonialism, and legal and political theory. While I find a wealth of literature on matter and the state, this scholarship does not attend to the relation between matter and state responsibility. Seeking a route to connect the theoretical triangle, I draw on the oft-used but little analysed metaphor of the ship's captain in material thinking (Foucault 1991, Serres 1995, Latour 2017) which describes the ways in which the 'captain' is compelled to engage with the material forces swirling around the 'ship.' However, as this scholarship only obliquely characterises this endeavour a 'role' and as a 'responsibility,' I supplement those accounts by drawing on legal scholar H L A Hart's categorisation of 'role-responsibility' (1968).

As the Francophone philosophical literature offers a sparse account either of responsibility or the responsibility of the state, I turn to the new materialism school which explicitly connects responsibility with more-than-human relations (Haraway 2008, Bennett 2010). However, as critics of Bennett (2010) have observed, this scholarship sees responsibility more in terms of the ethics of the individual than in the political or governing sphere (Braun 2011, Lemke 2018, 2021). Further, the notion of responsibility within

an assemblage or network framing suffers from the distributed agency problem already referred to which suggests there is nothing to which responsibility and accountability can stick.

Instead, one can turn to Hans Jonas's 'imperative' for government to take responsibility for destructive technology (1984) which offers a route for understanding the relation between matter and state responsibility. However, there are anti-political and anti-democratic effects where responsibility is exercised as management and process, for which Jonas was criticised as not taking seriously (Bernstein 1995, Coyne 2018). While Jonas explicitly connects technology with responsibility, he also reveals the limitations of his argument which is just as instructive. To avoid that pitfall, I bring the notion of materialised state responsibility into correspondence with literature on 'responsibility for justice' (Young 2011) seeking a theorisation capable of praxis. Putting this scholarship together, I build a framework for conceptualising climate responsibility that seeks to make two contributions to the literature. First, it introduces the concept of state responsibility into material politics and governmentality scholarship and second, it demonstrates the relation between matter and state responsibility in scholarly debates about climate responsibility.

Material and network ontologies with their emphasis on the empirical (Mol 2002), necessarily elide with epistemological considerations. Chapter 3, Researching matter, outlines my methodological approach of learning and practising how to think 'with matter.' Discussing the selection of the fieldwork site and how I address questions of race and colonialism in Louisiana, I situate my qualitative research project within an overarching 'ethnographic sensibility' framework (Vanhala et al 2022). The experience was that conventional methods of archival review, participant observation and interviews do not reflect the blurred distinctions - and mishaps - that occur in the field in practice. Inspired by Locke's emphasis on 'sensation' as the route to empirical understanding (1690/2008), I recharacterize what appear to be those bounded categories as the more sensory and inter-connected practices of reading, walking, observing and listening appropriate to researching materially and the fuzzy borders of the research places (Katz 1994, Massey 1994). These methods in combination form the basis for the empirical findings. Noting the hazards of thinking relationally for making knowledge claims and reflecting on my own positionality, I go on to interrogate the researcher's own responsibility.

Through analysing the relation between the matter that government agencies have been concerned with and manifestations of responsibility, the four empirical chapters (Chapters 4-7) build the thesis argument about the emergence, nature, potential and pitfalls for climate responsibility. In summary, Chapter 4, Water, shows the emergence and materialisation of state responsibility as 'role' or the 'job' in response to the crisis of flooding, coastal erosion and sea level rise (where it comes from and what it is); Chapter 5, Land, shows how state responsibility is being undertaken (what it is like in practice); and how other more productive and inclusive forms are disregarded. Chapter 6, Oil, demonstrates how the state is itself responsibilised by the dominant matter of fossils fuels (how responsibility is subverted and inverted) and Chapter 7, Air investigates the emergence of climate responsibility in governance and the role of political challenge in generating state responsibility for justice (the productive potential for state responsibility).

Starting with the recent widening of the crevasse at Neptune Pass and the response of both the Corps and the CPRA to the effects of water escaping from the Mississippi River into Breton Sound, Chapter 4, Water, addresses the *ex ante* question of the relation between matter and state response showing that matter can

generate a state response and arguing that the response is the source of the responsibility: a *response responsibility*. The chapter then narrates the establishment of the CPRA and its coastal 'protection and restoration' mandate in the aftermath of Hurricane Katrina and following decades of coastal erosion and the advocacy efforts of civil society organisations like the Coalition to Restore Coastal Louisiana (CRCL). I argue that the CPRA is a response to both the matter (water) and to the harm that it is causing (flooding and sea level rise) and it is assuming, following Hart's taxonomy (1968) a *role-responsibility*, a commitment to do something and the burden of carrying it out. This chapter explains the thesis title: state responsibility is evident as *materialising* in the sense of bringing into being but also in the sense that it derives from the matter that the state is concerned with. I go on to seek conceptual reconciliation with the network scholarship on distributed agency (Bennett 2010). Lastly, participating with fellow volunteers in a day that the CRCL organised planting cypress trees in the swamp, I show that the state's role-responsibility is not limited to the state but may be shared and distributed among civil society actors in an expression of responsibilisation.

Having identified that state responsibility can emerge from the relation between the state and material forces, Chapter 5, Land explores its nature and practice, how it is implemented through *responsibility-as-action* and its limitations. Case studies of state plans and action at the village of Isle de Jean Charles, on Island Road and with the CPRA's Mid-Barataria sediment diversions project reveal that matter is not only circulating and entangled but can form *chains of responses.* The case studies also reveal the selective and discriminatory tendencies of state responsibility which exclude local residents from the remit of the state responsibility frame. The chapter discusses how infrastructure is enrolled in state programmes as iterations of responsibility, expressed as *techno-responsibility,* and how other more productive conceptions of responsibility which involve respect and reciprocity are not within the frame of state responsibility as evidenced in this chapter.

The final two empirical chapters represent an analytical shift from, first, the unstable relation between water and land to the tension between hydrocarbons and carbon emissions and, second, from the practices and effects of the CPRA to those of the Governor's Office. Chapter 6 outlines the role played by the oil and gas industry and its infrastructure in fabricating an apparently seamless flow from extraction to export and combustion whilst, at the same time, causing pollution and erosion, tracing how the state enables the former and tolerates the latter. This occurs at the same time as hydrocarbon infrastructure is becoming increasingly vulnerable to environmental conditions for which the state assumes residual responsibility. The chapter argues that the state performs its responsibility *for* the matter of oil in a form of hydrocarbon governmentality. Drawing on but distinguishing from Arendt's concept of 'thoughtlessness' (1963), I witness the way in which the state undertakes carbon governance through promoting carbon capture and sequestration as a form of 'situated thinking.' However, the state's requirement in the Louisiana Climate Action Plan that 'orphan' oil wells and carbon capture projects be dealt with responsibly reveal an emergent form of intended climate responsibility that has yet to materialise in practice.

Chapter 7, Air, provides an account of how, during my fieldwork, with the increase in climate impacts affecting water and land, air, as composed of carbon emissions and atmospheric greenhouse gas concentrations (AGHGC), became matter for which the state took responsibility. Under the leadership of the then Governor, the State responded with a plan to reduce state-wide carbon emissions. The chapter discusses the way in which justice and equity advocates in the equity advisory group participating in the

Climate Initiatives Task Force succeeded in bringing their concerns into the State's climate action plan. The chapter argues that the matter of air, oil, water and land, in generating a state climate action plan also opened up a route to challenge the state to perform its responsibility in a way that promotes justice.

In the concluding chapter, I revisit the four empirical chapters to summarise how state responsibility is differently refracted through the four forces of water, land, oil and air. In responding to the matter demanding its attention, the state establishes forms of responsibility for which it can be held to account but just as matter and landscape are unstable, so too is state responsibility which means other more dominant matter will intrude and disrupt existing forms of responsibility. Interrogating the establishment and effect of responsibility as the role or job of the state in response to matter is novel theoretically as is the finding that forms of state responsibility differ depending on the type of matter with which it is concerned. Responsibility, like power, is an aspect of governing but it introduces the potential for accountability in a way that its counterpart does not. But state responsibility seen merely as the job and as action to be undertaken, while necessary is not sufficient, as in its effects it tends to marginalise and exclude affected communities from its remit leading to injustice. The research reveals that the way in which the state exercise and practice of its responsibilities requires political challenge demanding that state supply a form of *climate responsibility* that ensures *climate justice.*

Chapter 2: Theorising state responsibility for climate matter

Introduction

Writing before the onset of climate impacts but appreciating that "at stake is the Earth in its totality, and humanity, collectively" (1995 p 4), Michel Serres characterised taking responsibility for this predicament as something that involved both human choice and an indeterminate subject:

> … Suppose that … we choose to consider ourselves responsible: if we lose, we lose nothing but if we win, we win everything (Serres 1995 p 5).

The *sine qua non* of the wager for Serres is that what is 'at stake' demands the assumption of responsibility but the challenge lies in whether "we" will "choose to consider ourselves responsible," a framing that not only suggests the unknowable but also the ambiguous (who are "we"?). The debate over who is responsible for acting on climate change is contested. Kathryn Yusoff challenges the notion of 'we,' arguing:

> … this 'we' negates all responsibility for how the wealth of that geology was built off the subtending strata of indigenous genocide and erasure (Yusoff 2018 p 106).

The 'we' has been both problematic and insufficiently problematised. Environmental philosopher, Dale Jamieson, for example, is liberal with the first-person plural pronoun. He has argued that:

> … addressing climate change requires long-term, sustainable changes in the way we live. This will only come about when we take responsibility for our actions (Jamieson 2007 p 8).

He acknowledges that the "transformation that is required is not only personal, but profoundly collective and political as well" (ibid.); see also Castán Broto (2013). However, by spreading the net of responsible agents – the category of "we" - so wide, there is a risk of overlooking the particular role of the state. While some climate scholars regard a focus on the state as primary duty bearers as 'misguided' and 'myopic' (Harris 2010, Sardo 2023), others have assessed the practical challenges for the state in taking climate action (Bulkeley and Newell 2015, Eckersley 2016). Newell et al (2015) insist on the need to consider the relationship between responsibility, agency and capacity and call for climate change action to be reframed as a question of rights and responsibilities. They conclude that policy makers should provide leadership and take responsibility without further analysing what the state's responsibility might be. Likewise, Elizabeth Shove appreciates this lacuna arguing the necessity to "reopen a set of basic questions about the role of the state, the allocation of responsibility" (2010 p 1283). By contrast, international relations scholar, Richard Beardsworth is clear about the existence of state responsibility and its parameters in the climate change context. Adopting a functionalist approach, he theorises that "government is concerned with the effective management of problems and the legitimate wielding of power" (2015 p 72) what he calls 'responsible government.'

What can engagement with the material politics and more-than-human scholarship contribute to understanding the emergence and practice of 'responsible government' in a climate changing world? The philosopher and historian of science, Isabelle Stengers offers a useful starting point. She argues the need to respond to the 'intrusion of Gaia' but writes scathingly of a failure of responsibility on the part of '*nos responsables,*' whom she defines as those who are 'responsible for us' (2015 p 30). ("C'est de nous qu'ils sont responsables …" 2009 p 20.) With this trajectory, she is making linkages which are useful for my

research: climate matter demands the response of responsibility from governing authorities and makes clear for whom that responsibility is directed ('us'). In this formulation Serres's subject has become the object, lifting the burden from individuals and placing it on *nos responsables*.

In this chapter I lay out my journey through the literature searching for a theoretical framework that helps make sense of the triangle of relations between climate matter, responsibility and the state. Despite a wealth of compelling scholarship on these issues, there isn't a scholarly conversation that connects them all. This chapter argues that the relation between climate matter and the responsibility of the state has been insufficiently theorised in a number of intellectual domains: material politics, governing practices, material and network thinking and responsibility for justice. In the following sections, I build on these bodies of work to articulate the emergence of a governing responsibility within a material tussle among state authorities and other human and more-than-human matter, how that responsibility may be practised and how it can be politically challenged to secure justice.

I start by sketching the intellectual foundations of material geography and more-than-human ontologies, the interaction of matter and humans and how that can be political. I then consider the Foucauldian governmentality (1980, 1991, 2009) and 'state effects' (Mitchell 1991) literature which also informs material politics approaches. Here I note the first gap; this scholarship is primarily concerned with politics, anti-politics, power, governing, matter, technology, controversy, knowledge and information and has not yet attended to questions of responsibility within governing. Seeking a route through, I compare the way each of Foucault (1991), Serres (1995) and Latour (2017) illustrate the idea of governing in relation to matter through metaphors (a ship's captain and a general). Seeking a theorisation of responsibility as a 'role' of governing, I borrow the category of 'role-responsibility' from Hart (1968).

However, the notion of 'role-responsibility,' like Beardsworth's 'responsible government' lacks a theorisation of the relation between matter and responsibility. In the second section, I discuss literature on relations as responses drawing on Derrida and his cat and Haraway and her dog, together with Indigenous scholarship, for more explicit accounts of that relation. The connection between matter, response and responsibility provides useful conceptual leverage to be brought into conversation with material politics and governing practices literature. I then turn to discuss Jane Bennett's compelling work on vibrant matter noting how her commitment to a distributive agency model does not allow for a concentration of responsibilities which leaves her to fall back on individual action, or what I see as the first of the three *lines of duty* for individuals in climate action. It also raises the ontological problem of whether state authorities can be distributed in their power and effects while being unified in their responsibilities. I address this conundrum in the third section, which considers the relation between matter and the production of state responses, including state formation, both as a response to Bennett but also to highlight that responsibility can be practical as well as ethical. Examples provided here include Hans Jonas' 'imperative of responsibility' (1984) and the practice of governing individuals known as 'responsibilisation' which is present in the climate literature and what I see as the second line of duty for individuals.

However, those accounts are either limited or unsatisfactory expressions of state responsibility which raises the question whether the state can be mobilised to take responsibility for justice. Moving away from material thinking, in the final section, I discuss the work of Iris Marion Young and how her 'responsibility for justice' argument is framed as the need for people to act collectively, the third line of duty for the

individual. Departing from Young and other scholars in the 'collective responsibility' tradition, instead I follow Olúfẹ́mi Táíwò (2024) and Thea Riofrancos (2024) who argue the state is both needed for climate action and for justice. Politics as contestation and challenge are critical in these accounts. I argue for an approach that theorises ways in which political action can leverage demands on the state to take responsibility for justice.

Matter and governing

In this section I outline the developments in geography and related disciplines of both the appreciation of matter and materials in politics and governing and their modus operandi within an assemblage or network entangled with human, more-than-human and nonhuman forces. Ideas of materials and objects circulating and interacting within networks of other forces, with an appreciation that their capabilities and potentialities may be more relevant than their physical properties, have found a natural home in geography (Castree 1995, Whatmore 2002, 2006, Braun and Whatmore 2010).

Material ontologies

The prominence of 'material' thinking in geography lies in a renewed recognition of the significance of nonhuman or 'more-than human' matter (Whatmore 2002, Braun and Whatmore 2010). Bruce Braun and Sarah Whatmore describe its antecedents as grounded in "geography's historical insistence on understanding human life in relation to its material environments" meaning that "geographers have had a keen eye for the significance of nonhuman entities and energies in the spatiotemporal arrangements of human life" (2010 p xii). Several strands of theory, which emphasise the vitality, relation, circulation, contingency and potentiality of and among things, have inspired this development. Much of the scholarship overlaps but various lines are detectable. One is inspired by Spinoza and the notion of *conatus*, that everything strives to persist in its own being (Spinoza 1677/2020) while affecting and being affected – *affectus* - by encounters with other bodies - *affectio* - with which they form alliances (Deleuze and Guattari 1980/2013, Bennett 2010). Another line follows A N Whitehead (1920/2004, 1929/1978) and his idea that things do not exist in themselves but are constituted through their relations, a process in which they may be reconstituted over space and time (Stengers 2011, Barry 2011). A third is the very influential thinking of Bruno Latour across the social sciences, inspired by Michel Serres' work in particular (Latour 1993, Serres 1995, Serres with Latour 1995). Famously resisting the natural/social divide, Latour proposed the 'actor-network' as constitutive of the relation between the social and the material composed of 'actants' that flow and circulate affecting each other (1999, 2005). A fourth is the equally influential work of Michel Foucault in theorising political power through the process of 'governmentality' involving techniques and practices administrating and arranging 'things' (1991, 2007, Mitchell 1991, Rose 1991, 2000 Barry 1996, 2001, Braun 2000).

In a related and often over-lapping development, though less concerned with the state, emerging from Marxist, feminist and queer scholarship under the rubric 'new materialism' (Coole and Frost 2010), come ideas of Derridian 'performativity' and 'becoming' together with 'posthumanism' which allow a place for matter as an active participant in the world (Haraway 1991, 2008, Butler 1993, Barad 2003, 2007, Grosz 2004, Hird 2009, Bennett 2010, Washick et al 2015). As Braun (2014b) explains, new materialism understands that human and nonhuman nature are "non-dualistic and non-deterministic," meaning the

world is understood as a commingling of humans with tools and organisms marked by instability and "continuous invention … without *telos*" (2014b p 1). Within the new materialist school, political theorist, Jane Bennett (2004, 2010) provides a lively, compelling and much-embraced account of the role of matter and its 'thing-power.' Drawing on the vitalist tradition of philosophy from Spinoza to Deleuze and Guattari, she brings together, among other things, Spinoza's 'conative bodies' with Darwin's 'small worms' to find vibrant collaborative forces (2010). By 'vitality' she means:

> … the capacity of things – edibles, commodities, storms, metals – … to act as quasi-agents or forces with trajectories, propensities, or tendencies of their own (Bennett 2010 p viii).

Within the idea of vital materialism, she regards something complex like an electrical grid as a 'volatile mix' consisting of such components as matter, humans, motives and outcomes (2010 p 25). Complex forces can be thought of as a 'thing' with power at the same time as being within an 'assemblage' of relations, so they can be independent while also being co-dependent (Hinchcliffe 2011). Eschewing any notion of a pre-existing hierarchy of things or of fixed parts that can be externally organised, assemblage and actor network theories do not prejudge what components or 'actants' will have salience at any particular time and in any particular space. Although there may not be 'perfect equality of actants' (Bennett 2010 p 104), it looks like they enjoy some kind of equality of opportunity or at least equality of potential. While scholarly attention is paid to the extent to which matter might have agency, and indeed how agency itself might be defined, (Braun 2008, Abramsson et al 2015), the question for my research on the relation between matter and state responsibility is the role of the human in the assemblage or network.

Locating the human

In Latour's reflections on the discovery of pasteurisation (1988), the eponymous biologist is seen as only one actor in a network of forces inside and outside the laboratory that complement and compete with each other including the microbes themselves. Isabelle Stengers proposes "the possibility that it is not man but the material that 'asks' the questions, that has a story to tell, which one has to learn to unravel" (1997 p 126). For Bennett (2004), bodies, objects, arrangements are always in-the-making and humans are always in composition with nonhumanity, never outside of a 'sticky web of connections.' Following Deleuze and Guattari (1980/2013), the logic of decentring humans means that assemblages are not governed by any central head (Bennett 2010 p 24). The relegated role for humans has an impact on what they can achieve. Bennett suggests, arrestingly, that "to imagine politics as a realm of human activity alone may … be a kind of prejudice" (2010 p 107). Material thinking invites humility about humans' place in the world, avoiding the assumption that all actors are human (Mitchell 2002). For geographers, as Sarah Whatmore puts it, there has been:

> … [a] redirection of effort towards more-than-human modes of enquiry. Such modes of enquiry neither presume that socio-material change is an exclusively human achievement nor exclude the 'human' from the stuff of fabrication (Whatmore 2006 p 604).

This rebalancing of the relation between human and nonhuman helps to disrupt more traditional notions about reified structures of power and wholly human-centred agency. While Heidegger was concerned with

technology and domination observing that a hydroelectric plant installed in the current of the Rhine had transformed the river into a "water power supplier" so that it now appears as "something at our command" (1954/1977 p 16), Latour (1999) opines that Heidegger is mistaken to think of technology in terms of mastery. Drawing on John McPhee's article, *The Control of Nature* (1987), Latour sees that it is the Mississippi river and its distributary, the Atchafalaya, that are agentic (2017). As he puts it, the rivers' agency is so powerful that it is bearing down on the bureaucratic 'agency' - the US Army Corps of Engineers - whose mission is to control the rivers through technological interventions like the ones mentioned in Chapter 1. Andrew Pickering (2013), drawing on the same article, identifies a 'performative struggle' between the Corps and the rivers in which human agency is emergent in practice rather than in control, what he calls a 'dance of agency.'

Several scholars in the material tradition have troubled the question of agency among human and nonhuman seeing a mutual causality (Bakker 2005a), that all entities have roles to play (Marres 2005, 2012) and that they act collectively both as agents and stakeholders (Puig de la Bellacasa 2017). So, while it would be a mistake to presume any exclusivity of human agency, the inquiry should proceed by attending to what forces – human or material – have what effects. However, it is notable that these scholarly developments involving the theoretical dispersal and relegation of humans within the material forces of the world have evolved during the same period – the Anthropocene - as humans as a collective have become a geologic force and revealed their disruptive and excessive influence. For this reason, I prefer the terms 'more-than-human' (after Whatmore 2002) and 'nonhuman' rather than 'posthuman' (Haraway 1991, Barad 2007) as more compelling terms to describe material forces operating in conjunction with the continuing force of the human. As Osborne and Rose (2023, 2024) have been pointing out, we still have to understand and confront both the human and human responsibilities given the future for the fate of humanity (see also Braun 2004 on querying posthumanism). This distinction is important because, while matter may be political, politics depends on human action.

Material politics

Material politics is a burgeoning set of approaches that investigates the relation between material forces and politics. In his influential work on 'political machines,' geographer and STS scholar, Andrew Barry argues the need to distinguish between politics as a practice - a range of forms of action and practice which he argues has an anti-political impulse - and political as an index of contestability and space of dissensus (2001 p 207). Through empirical corroboration drawing on the theories of Latour and Deleuze and Guattari, as well as Foucault discussed below, which privilege the micro, mundane and dispersed, political geographers and scholars in related disciplines study the political – and anti-political - role of objects, materials, devices, organisms and technologies (Barry 2001, 2013, Mitchell 1991, 2002, Painter 2006, Marres 2012, Braun 2014a, Dittmer 2014, 2017). This "materialist theory of politics" which "allows for the force of things" (Braun and Whatmore 2010 p x) has become increasingly well-established in relation to a range of matter and fields, two recent examples being toxic waste disposal (Balayannis 2020) and space diplomacy (Stewart and Dittmer 2023). Materials and technologies, such as fuel efficiency gauges, can bring humans into the functioning of their apparatus and the generation of information (Braun 2014a) resulting in what Knox calls 'responsive personhood,' a "kind of human … being actively produced but within material, relational constraints" (2020 p 256).

The mix of material and politics has various effects. For example, posters depicting light bulbs can generate capacities to mobilise public participation in climate action (Marres 2012). There is not a simple causal connection between 'artefacts' and 'politics' (*pace* Winner 1980) rather they are emergent 'actants' in association and circulation (Latour 2005). Attention needs to be paid to the capabilities, potentialities, processes and connections of forces within a contingent and relational ontology in order to understand how matter may come to have political significance (Whatmore 2006, Bennett 2010, Mitchell 2011, Barry 2013). In putting material politics to work, Barry (2013) brings landslides, documents, information, protests, a pipeline and even the coating on the pipe into political consideration as forces which may be unruly despite being regulated. It's not that materials are inherently political but that they have the capacity and potential to have political effects:

> … the political significance of materials is not a given; rather, it is a relational, a practical and a contingent achievement' (Barry 2013 p 183).

The role played by technology and infrastructure in politics and state formation and practice has garnered a good deal of scholarly attention (Mitchell 2002, Barry 2006, Furlong 2011, Braun 2014a, Harvey and Knox 2015, Gambino 2018). Scholarship has shown that water and infrastructure can play a role in the entrenchment of power (Swyngedouw 2015) while the technology of nuclear power can be imbricated with national identity (Hecht 1998/2009). While pipelines and the risk of landslides can produce sites of contestation, an overload of information has anti-political effects (Barry 2013). Water and city infrastructure can result in exclusionary practices (Anand 2017) while in other places, water cisterns and buckets can generate community empowerment setting limits on state power (Meehan 2014). In this body of literature, there is matter, politics, anti-politics, power and governing but not much theorisation of responsibility though it may be acknowledged in passing as providing a connection with matter and infrastructure. For example, in her recent book, climate anthropologist Hannah Knox assesses the materiality of buildings, carbon emissions and eco-devices as an object of knowledge and intervention revealing "the place of climate change as a redescription of relations of responsibility" though she does not discuss the concept in any detail (2020 p 70). An exception to this lacuna is the work of anthropologist, Hannah Appel (2012) who argues that hydrocarbon infrastructure is the locale from which forms of responsibility emerge and are engaged or disengaged and avoided. In her research on the oil industry in Equatorial Guinea, Appel (2012, 2019) observes the way in which oil rigs and associated equipment became terrain in which the government pushed for shared responsibility with the international oil companies. However, through 'infrastructures of capitalism,' the corporations reframed responsibility as narrow compliance with local laws or participation in corporate social responsibility projects rather than a concept to address broader ethical concerns such as workers' rights, systemic equalities and environmental injustice which are consequently ignored (2019). Appel charts the ways in which responsibility is manipulated into certain directions and not others revealing the concept to be something that is up for grabs and unlikely to land in an ethical or just space.

Scholars in the material tradition, like all scholars, are of course *concerned about* responsibility – both as an ethic and an action - even though they may not *engage with* it conceptually.[6] For Bruce Braun, the turn

[6] This distinction underpins my own approach to concepts like accountability and justice, which I am concerned about as a necessary 'good' but do not subject to analysis.

away from the society/nature binary is necessary because it is through conceiving of the environment as 'social nature' that we can find "resources for thinking about how to live responsibly *in* nature" (2002 p 13 emphasis in original). Following William Cronon's critique of the idea of 'wilderness' (1995), Braun understands these responsibilities to be relational as they involve "taking our connections in the world seriously" and he argues that there are "many other responsibilities that must be considered" including the "vigilant tracking of the operation of *power*" to forestall an irresponsible ecopolitics (ibid. p 263 emphasis in original). While Braun sees responsibility as something that requires active engagement, he does not go on to analyse the mechanics of these processes and upon whom the burden of these responsibilities might fall.

There is space for a reassessment of the relation between material politics and responsibility. As Jeff Popke (2009) suggests, with the significant body of work in geography which has drawn upon the resources of actor-network theory, what is needed is a way of attending to the responsibilities that might be implicated in these assemblages. There is no doubt that Latour was concerned about the ethical responsibilities arising from human/nonhuman interactions (2004a, 2017) and his desire for responsible political action. In a lecture in London (2011), he said that one of the most important yet most difficult challenges in politics is "to assemble a political body able to claim its part of responsibility for the Earth's changing state." However, he does not subject the concept to analysis. Instead, his commitment to the role of nonhuman forces in actor network thinking leaves, in one example, an unsettling conclusion. In an important passage dismissing the subject/object dichotomy in favour of the 'mediating' relations between human/nonhuman actors in *Pandora's Hope*, Latour concludes: "It is neither people nor guns that kill. Responsibility for action must be shared among the various actants" (1999 p 180). Whilst this conclusion aptly illustrates his theory of nonhuman agency, it insufficiently engages with a politics of responsibility as a consequence of the 'politics of things' (2004a), a critique that I also make, as do others, of the political responsibility arguments of Jane Bennett (2010), discussed below.

Latour's theorisation of politics, as the composition of a common world through an ideal 'art of governing' (2004a, 2005) does not address extant forms and practices of governing, as an empirical study by Rutland and Aylett (2008) illustrates. They put actor network theory to work in their research on the city of Portland's climate action programme because, as they suggest, it helps reveal how "political priorities and the capacity to achieve them emerge over time from the dispersed energies of diverse actants, both human and nonhuman" (2008 p 633). Agency then is acquired and relational, rather than inherent and individually possessed and political and policy goals are reached through varying degrees of compromise among materially diverse elements (ibid. p 632). However, the authors argue that actor network theory cannot provide an adequate understanding of precisely how an actor like the state (in their case, the city authorities) attempts to shape the subjectivities and behaviours of other actants. They find this process more cogently explained by Foucauldian governmentality (ibid. and p 643). Material politics scholarship seeking accounts of governing look to Foucauldian 'governmentality' and Mitchellian 'state effects' theories. These share the preoccupation of actor network and assemblage thinking with the interaction between micro and quotidian materials but pay more attention to practices of human direction and manipulation within the mix (Foucault 1980, 1991, Mitchell 1991, 1992, Barry 1996, Rose 1999).

Governing practices

For Foucault, governmentality (1991) is understood not as a set of institutions or central commands, but as a practical activity to be studied at the level of the diverse rationalities, programmes and technologies which underpin it and give it its form and effect (Walters 2012, Jeffrey 2013). Governmentality studies have revealed the mechanisms and techniques by which power is used and distributed (Rose 1999, 2000). As Thomas Lemke (2021) makes clear, for Foucault "to govern means to govern things" (Foucault 2007 p 97). Foucault's notion of the 'effects of power' has been developed by Timothy Mitchell in his theory of 'state effects.' Observing the relationship between Aramco and the US government, he argues that "the line between state and society never marks a perimeter of an intrinsic entity" but is "a political technique to make an internal line look like an external boundary … through which social and political order is maintained" (Mitchell 1991 p 90). This deliberate technique allows companies to lie outside the formal political system and so disguise their influence but in fact they are so embedded in governing practices it is not possible to separate the state and firms into public and private entities.

Political geographers in the post-Foucauldian scholarship on governing and the state attend to 'prosaic practices' (Painter 2006), 'improvised performances' (Jeffrey 2013), how the state operates within rather than on the world (Dittmer 2017) and as an effect of the operation of power rather than as its source (Barry 2020a). However, one effect of the influence of Foucauldian governmentality is that the question of the state which, as Nikolas Rose puts it, was so central to earlier investigations of political power is relocated. The state now appears simply as one element (Rose 1999). As Dittmer (2017) observes, in disavowing the state, a binary in political geography has emerged in which studies are either of the state or everyday politics, but not both. With governmentality and what it has spawned, scholarly attention has shifted away from a quest to trace the functions of the state (Jeffrey 2013). Indeed, that approach is resisted (Mitchell 1991). Whilst 'governing practices' and 'state effects' are theoretically compelling, a question about implications arises. One consequence of pursuing governing as distributed power, as Menga and Swyngedouw (2018) observe in passing, is that understanding the state to be relegated or dispersed, challenges more traditional notions of the state as an entity with fixed contours, an important puzzle addressed in my research. My concern with this trend is that conceptualising the state as only 'one element' (Rose 1999) risks overlooking questions of state responsibility and accountability.

Another reason, as already suggested, for the lack of scholarly attention to responsibility in this literature is, in the Foucauldian tradition, an epistemological concern with power. While power and its adverse effects are a significant problem in the world and merit study, power does not offer a route to praxis. Latour is surely right when he says that "there is nothing to do except to genuflect before it" (2005 p 252). Further, while the relation between power and responsibility – or its absence - are often commented on, it is surprisingly under-explored in scholarship. Put in familiar terms, the dominance of the neoliberal model of governing – its power - has resulted in ecological irresponsibility (Hage and Eckersley 2012). Stengers characterises the relation between power and irresponsibility in terms of the subjection of governing authorities to the force of capitalism which she calls "*radically irresponsible,* incapable of answering for anything" (2015 p 53 emphasis in original). As she opines:

> It is without any mandate that those who are responsible for us have defined the limits of political action by reference to their necessary subjection to what they call the laws of the market (Stengers 2015 p 127).

The question left open is what remains of the responsibility of "those who are responsible for us" beyond their "subjection." While incapable of governing - or taking responsibility - at a level or scale commensurate with the demands of the climate changing world, governing in the sense of Foucauldian 'techniques and practices' involving the exercise of "power at its extremities, in its ultimate destinations, with those points where it becomes capillary" (1980 p 96) proliferates. Using the example of fuel efficiency gauges viewed through the Foucauldian notion of *dispositif* or apparatus of governing, Bruce Braun (2014a) observes how governing is changing in response to the climate 'crisis.' With the installation of the gauge, the act of driving becomes a site of administration in which the driver becomes imbricated with the material co-producing information. So far as 'government' is concerned, Braun emphasises its ad hoc, and ex post facto nature as a set of diverse and loosely connected efforts to introduce 'management' into diverse sites and practices in a piecemeal way. There is a weak signal of responsibility from governing authorities while the population is once again instrumentalised and responsibilised.

In seeking more productive notions of state responsibility, we need to broaden the scope of the inquiry. Mariana Valverde (2017) is concerned with developing a framework for thinking about responsibility and governance in ways that avoid destructive anthropocentrism. She proposes a conjoining of ideas from Indigenous traditions (discussed below) with those of Foucault that decentre the human to see instead 'webs of relationships.' With that suggestion in mind, I draw on the similar metaphors that each of Foucault, Serres and Latour have used to illustrate such relational webs. I go further to show that, within these webs, governing authorities are also assuming and undertaking responsibility by virtue of their role.

Governing as role

Although they differ in their approaches, Michel Foucault, Michel Serres and Bruno Latour theorise that it is through material conditions that governing and the associated challenges arise. However, the position of the 'governor' is somewhat different in the metaphoric and fictional accounts that each of them provide. For Foucault, rather than the 'sovereign in his lofty isolation' (1980 p 97), governing is the business of dealing with all the material concerns that are pressing for attention:

> What does it mean to govern a ship? It means clearly to take charge of the sailors, but also of the boat and its cargo; to take care of a ship means also to reckon with winds, rocks and storms; and it consists in that activity of establishing a relation between the sailors who are to be taken care of and the ship which is to be taken care of, and the cargo which is to be brought safely to port, and all those eventualities like winds, rocks, storms and so on (Foucault 1991 p 94 calling to mind J M W Turner's painting of a storm, reproduced at Image 7).

Image 7: A Storm (Shipwreck) (Turner 1823)

Foucault is making the point that to govern is to govern 'things' and they and the ship's captain are all in a relation. He does not frame this scenario within the concept of responsibility or role but they are implicit in his depiction. Given Foucault's attention to governing power, one is drawn to consider whether the matters that the captain of the allegorical ship is dealing with have equal influence either in the moment or over time. Foucault's account is synchronic, we don't know what happens next. However, we know for Foucault the historical *raison d'être* of political power is to be found in the maintenance of economy (1980). Thus, it is likely that when the ship has 'to reckon with' storms, the captain's focus will be on the cargo which must be 'brought safely to port' and while the sailors are 'to be taken care of,' they are also to be taken 'charge of' as instruments of the captain's power and assignment of priorities (Foucault 1980 p 90). In his interpretation, Thomas Lemke (2021) emphasises the lack of mastery over the forces whereas my own is that Foucault's use of commanding verbs suggests that he deploys the ship metaphor to illustrate that governing 'things' continues notwithstanding the uncertainty and probable lack of mastery.

Serres appreciates the contingency of forces in deploying the ship metaphor without framing the dynamic in terms of taking 'charge.' Instead, Serres (who, unlike Foucault, had a nautical background) sees steering the ship as something that is humanly intended but bound to change course as material conditions change:

> The helmsman governs. Following his intended route and according to the direction and force of the sea-swell, the project of following a route adapts in real time to conditions that unceasingly modify it, in the end the route can be traced through the set of constraints…. (Serres 1995 p 42).

Serres' vision resonates with Bennett's notion that 'things' have the capacity "to impede or block the will and designs of humans" (2010 p viii). For Serres, the outcome of governance, what policy or practice emerges, will have been shaped by the constraints encountered. Serres uses the phrase 'le pilote gouverne' in his original text which the translators render as 'helmsman' which contrasts with Foucault's use of 'gouverneur' translated as 'captain' and which sits well with 'governing.' As Lemke (2021) interestingly points out, etymologically, the verb 'gubernare' denotes the direction of a ship while the "guvernaculum" translates as the helm, perhaps more of a mechanical function. Serres' helmsman suggests less of a controlling role than Foucault's captain in responding to prevailing conditions, involving some diminution of power but still retaining responsibility.

In the example from Latour, we see material forces driving the governance and a relinquishment of real power. Latour shares Tolstoy's dismissal of the idea of the 'great man' and quotes the novelist's depiction of Marshal Kutuzov giving the order to commence a battle he thought pointless because of all the forces that drove him to give his approval to what was already 'the accomplished fact' (2017 p 50 quoting from War and Peace). As Latour puts it, the human subject is made to act by forces he cannot check. This form of governing is a kind of resignation by governing authorities to larger forces. Kutuzov is left with a residuary and purely formal power, simply giving the order, but he also retains responsibility in his role as military leader. In each of these examples, there is matter, governing and some kind of role-responsibility, though in each case it is differently represented. Though there isn't consensus about how governing happens, there is agreement about the pressure from potentially competing forces in a *material tussle* among the forces and the governing authority over the response and the exercise of responsibility. Although post-Foucauldian scholars see the state as relocated or relegated (Rose 1999), these depictions show concentration, albeit within a swirl of forceful matter.

In unpacking the concept of responsibility, Gayatri Spivak highlights Derrida's distinction between *répondre à,* which means a response or responding *to* and *répondre de* which means answering and being responsible *for* (1994 p 22 citing Derrida 1990). This distinction is critical for my project as it makes the theoretical leap from the idea that matter generates responses to the idea that is also produces responsibility with associated accountability. While it is only implicit in the way that the other French philosophers characterise the role of the captain or general, my project investigates the relation between and sequencing of *répondre à* and *répondre de.* As Serres proposes, prepositions are the linguistic keys to understanding relations (Serres with Latour 1995). Their implications can be spelled out as follows. The ship's captain is both responding *to* the forces affecting the ship at the same time as being responsible *for* its safe passage and delivery of its cargo. The foundation of responsibility is that the captain has taken on this role and, in responding to all the material demands, they have to make decisions and follow through on them, taking deliberative action for which they can be held to account, even though that has not been made explicit in the metaphorical accounts. By contrast, Potawatomi scholar, Kyle Powys Whyte does explicitly connect responsibility with role, providing a further set of related prepositions:

> *Responsibilities* refer to the reciprocal (though not necessarily equal) attitudes and patterns of behavior that are expected *by* and *of* various parties by virtue of the different roles that each may be understood to play in a relationship (Whyte 2013 p 519, emphasis in original).

As he goes on to explain, these 'relational responsibilities' belong to larger 'systems of responsibilities' which are foundational schemes of roles and relationships from which more particular responsibilities become meaningful and binding (Whyte 2013). The prepositions *by* and *of* suggest those who are both responsible and accountable.

In order to understand the concept of 'role' better, I borrow from jurisprudence. Legal scholar, H L A Hart set out a taxonomy of the responsibility of the individual in criminal law as follows: role-responsibility, causal responsibility, liability-responsibility and capacity-responsibility (1968 p 212). He described 'role-responsibility' in terms of a task that has been assigned to and accepted by someone, in the following way:

> … whenever a person occupies a distinctive place or office in a social organization, to which specific duties are attached to provide for the welfare of others or to advance in some specific way the aims or purposes of the organization, he [sic] is properly said to be responsible for the performance of these duties, or for doing what is necessary to fulfil them (Hart 1968 p 212).

Hart too finds the captain of a ship to be a compelling metaphor for the assumption of responsibility by virtue of an assigned role:

> A sea captain is responsible for the safety of his ship, and that is his responsibility, or one of his responsibilities (Hart 1968 p 212).

This conception goes further than the French philosophers in making it clear that the assumption by the captain of the role of captain is both the locus and instigator of responsibility. Hart called it both "role-responsibility" and "responsibility as a task" (Hart 1968 p 212) merging the notions of 'role' and 'task.' In a comparable endeavour, moral philosopher Kurt Baier (1972/1991) identified what he called 'task responsibility' where one person has a task to perform for another whether it is assumed or has been assigned. Expanding on Hart's framing and usefully for present purposes, legal scholar Peter Cane (2016) takes the notion of role-responsibility beyond the individual in a criminal justice context into the public institutional sphere arguing that it is derived from authority and power. Following Cane (2016) I explore the distinction between role assumption and task fulfilment within governing practices in my fieldwork, seeing them as operating in sequence and with different effects. As a corollary to the idea that state authorities have role-responsibility is the requirement of what Hart called *capacity-responsibility,* returning us to the question of who "we" are in relation to climate action. As Nicole Vincent (2010 p 22) observes in developing her own taxonomy, the assumption of responsibility correlates with capacity: "people with greater capacities are usually expected to conform to higher standards." Beardsworth (2015) argues that capacity to solve a problem generates the responsibility to do it, what he calls 'task-efficacy.' Bringing capacity into the analysis is a rationale for the focus on state practices rather than individual action.

Although the identification of responsibility as role through these scholars may be plausible, it lacks a theorisation of the relation between matter and responsibility. To do that, I turn to other scholarship which explicitly connects the more-than-human with responsibility but first I consider an *ex ante* question, the relation between matter and response.

Matter and responsibility

My approach to reading the literature has been to see if it is possible to build a theoretical case through investigating relations as responses, how responses relate to responsibility and where that connection is located in the literature.

Relations as Responses

ANT and assemblage theories are concerned with relations: how things are constituted and reconstituted through their relations. That's another way of saying that things respond to each other though relationality within the network and assemblage models does not tend to be theorised like that though some scholars move towards it. Influenced by A N Whitehead, Stengers (2005) discusses her idea of the 'cosmopolitical proposal' through an appreciation of the 'reciprocal recognition' in the interactions between human and nonhuman entities. Bennett brings in the idea of 'response' when discussing the way that Latour (1999) frames political action as the 'call-and-response' (Bennett's phrase) between 'propositions' involving a 'lending of weight,' a pressure in one direction rather than another (2010 p 103 citing Latour 1999 p 288). Latour borrows 'propositions' from Whitehead as a "model for the relations between humans and nonhumans" whereby "propositions are not statements … they are actants … they are occasions given to different entities to enter into contact" (1999 p 141). The effect for Latour, as interpreted by Bennett, is that "any given response to a problem is less the result of 'deliberation' than of the 'fermentation' of the various propositions and energies of the affected bodies" (2010 p 103). Andrew Pickering puts it simply: "The world is too lively. We can interfere performatively with it, and it will respond" (2013 p 79). He sees the human and material as constitutively enmeshed in practice by means of a 'dialectic of resistance and accommodation.' We can put that idea together with wider network thinking, following Deleuze and Guattari (1980/2013) and Latour (2005), on the multiplicity of forms of human and nonhuman material which jostle for superiority through which Pickering's dialectic is played out. However, it is necessary to go to other scholarship for a more explicit account of the relation between the more-than-human and response.

As Jacques Derrida (1997/2002) muses, when contemplating his cat looking at him naked after he steps out of the shower, who responds to whom? Derrida's insight captures a key idea for this thesis: can we think of the relation between human and nonhuman matter - whether it is other living creatures, objects and things or existential environmental changes – in terms of a response? For Derrida, there was both a task and a lesson in attending to the response of the other – the cat – in order to draw forth one's own response. As Bruce Braun (2004) observes, for Derrida, the human/cat interaction and the lines between them make it necessary to consider the ethical and political consequences. Haraway (2008) interprets Derrida as identifying the question as being not whether the cat could 'speak' but whether it is possible to know what *respond* means and how to distinguish it from a reaction. However, she critiques Derrida for not being sufficiently curious about his cat which she calls a failure of the "simple obligation of companion species."[7] Two ideas are playing out here for present purposes, in addition to the debate on the ethical and

[7] As an aside, Mariam Motamedi Fraser (2024) critiques Haraway on her own animal relations (discussed below) for what she argues is an insufficient attention to power dynamics, variability in human/dog relations, nonhuman agency and associated ethical complexities.

political, first, the domain of response and second, that of responsibility. The key is that for Derrida, the response brings responsibility.

The response of responsibility

Influenced by Emmanuel Levinas, Derrida sees responsibility as the required response to others:

> … the call to explain oneself [répondre de soi], one's action, or one's thoughts, to respond to the other and answer for oneself before the other (1999/2008 p 5).

As Derrida (2005) says, in the phrase, j'en suis responsible [I am responsible for it], one always comes back to the *je* or *I.* Derrida makes clear that responsibility is not only ethical but concerns action or practice: "In order to be responsible it is necessary to respond to or answer to what being responsible means" and this involves "involvement in action, doing, a *praxis*, a *decision* or responsible action to answer for itself consciously" linking to "practical" conscience (ethical, legal, political)" (1999/2008 p 27 emphases in the original). This is a cursory summary of a complex thinker but it has usefully taken us from response to responsibility and from ethical responsibility to responsibility as a practice.

In thinking on kinship with her dog (2008), Haraway argues that a relational interdependence creates a debt requiring a response to the entanglement. As she says "response and not reaction is required" (2010 p 55). She explicitly connects the response with responsibility: "Response … grows with the capacity to respond, that is, responsibility" (2008 p 71). Her understanding of responsibility is encapsulated in her notion of 'response-ability' (2008, 2018) suggesting both the response and the capacity to respond. For Haraway, the task is to become capable of response, to make 'kin', to make 'trouble', to stir up a potent response to the ecological challenges (2016). As one of her interpreters has observed, Haraway's notion of response-ability is less about *being* responsible (and here she apparently departs from both Derrida and Indigenous norms though she says she is informed by them) and more about encouraging an awareness of the particularities of situations, paying attention to the call of others and learning how to respond in a more open way (Land 2019). Haraway's notion of 'response-ability' has been influential. For example, anthropologist Noah Walker-Crawford (2019), who centres his research on the idea of climate responsibility, follows Haraway in seeing that the Andean water cycle helps elucidate relations of response and responsibility between people, environments and other beings.

Indigenous scholarship, which Western scholars are increasingly bringing into their thinking (Haraway 2016, Valverde 2017), have always recognised relations between humans and nonhumans as reciprocal and invoking the response of responsibility (Kimmerer 2013/2021, Whyte 2013). Robin Wall Kimmerer (2013/2021) makes an explicit connection between matter and responsibility. She highlights the difference between the English language where 30% of words are verbs with Potawatomi where verbs are 70% of words. For example, 'the bay' in English is 'to be a bay' in Potawatomi, a transition from static object to active force, a recognisable notion in material geography and its theoretical antecedents (see for example, Latour's emphasis on verbs rather than nouns, 1993). Kimmerer goes on to explain how the grammatical categorisation has real world impact. Because both the English language and scientific practice regard nonhuman objects as inanimate and neutered, the effect, Kimmerer argues, is to create a barrier which absolves humans of moral responsibility, opening the door to exploitation. As she describes, in Potawatomi culture, humans take only what is 'given' by nature, which leads to a reliance on natural processes including

sunshine and wind rather than objects like coal. In this ontology, trees, rocks, rivers and animals are all alive, have agency and value and deserve respect and rights. It is these attributes that are arguably critical to making a connection between the nonhuman and the concept of responsibility and this is grounded in the notion of reciprocity (Whyte 2013). Kimmerer explains that:

> One of our responsibilities as human people is to find ways to enter into reciprocity with the more-than-human world (Kimmerer 2013/2021 p 54).

It is the human failure to live responsibly with the planet, to respond with reciprocity which has led the earth and planetary forces to respond to the human action. As discussed earlier, Whyte (2013) has argued that responsibility is not only relational, reciprocal and grounded in morality but also involves the concept of 'role,' a key idea in my research.

Other lines of scholarship connect responsibility with place, relations, care and vulnerability. Doreen Massey finds a relation between responsibility and place. She makes an explicit call for *being responsible* which, borrowing from Gatens and Lloyd (1999)'s formulation of a 'Spinozistic responsibility' based on a recognition of relationality, she grounds in relations that extend beyond the bounds of place. These relations require us "to do something" … be responsible … not because of what we have done, but because of what we are" (2004 p 11, 25). Launching from Latour's 'matters of concern' (2004b), María Puig de la Bellacasa introduces a counterpoint: 'matters of care' because, following Haraway, we are already involved with other objects, animals, organisms and forces to whom we owe an 'ethico-political obligation' (2017 p 42). As she argues, care is *doing* in a way that *concern* is not and is grounded in our material engagement in the world. This kind of 'care' consists of being sensitive to and foregrounding unheard voices or engaging in a 'care ethics' (Lawson 2007). Matter and responsibility are also connected with vulnerability. Citing Puig de la Bellacasa (2010) on how the permaculture movement prompts the idea of 'ethical obligations of care' and influenced by the argument from Robert Goodin (1986) that it is the vulnerability of others that generates responsibilities towards them, Myra Hird (2013) argues that landfills show the asymmetric relationship between geo-bacterial liveliness and humans. She proposes an environmental ethics of vulnerability which calls for a heightened, not diminished, assumption of responsibility. In these ways, scholars are proposing an ethics of responsibility which includes humans as interdependent with nature (Martin 2016) and the importance of learning from place and taking an Indigenous and ecofeminist perspective (Moriggi et al 2020).

New materialism and responsibility

'New materialism' scholarship, with which Haraway is associated and influential, is explicitly concerned with responsibility. In her 'posthumanist performative reformulation' of discursive practices and matter, Karen Barad theorises that reconfiguring these apparatuses is not only about the possibility of agency but also accountability because we remain "resolutely accountable for the role "we" play in the intertwined practices of knowing and becoming" (2003 p 812). In Barad's terms, "responsibility is not a commitment that a subject chooses but rather an incarnate relation that precedes the intentionality of consciousness" (2007 p 392). As Washick and Wingrove put it, Barad's definition of 'inter-action' (2007):

> … compels us to recognize that we are both of the world and responsible for it, in that we play an ineluctable part in its materialization … we are responsible in the sense that we make the world matter (Washick and Wingrove 2015 p 71).

While Barad seeks to remind us of our responsibility as something to be concerned about, Jane Bennett is occupied with how responsibility can be brought into practice. In her influential work, *Vibrant Matter,* she asks how the political response to public problems, particularly ecological ones, would change if the vitality of (nonhuman) bodies were taken into account (2010). Bennett's project of vitalising materials is, for her, as much political as theoretical (2010) and among scholars, she has done the most to bring matter into theoretical dialogue with politics and responsibility. She is specifically interested in whether an understanding of nonhuman agency might "alter established notions of moral responsibility and political accountability" (2010 p 21), though she doesn't clarify what she means by those concepts. Rather, Bennett believes that 'a more ecological sensibility' – a form of eco-responsibility - will be encouraged if we "*experience* the relationship between persons and other materialities more horizontally" (p 10, emphasis in original), rather than starting from the assumption that there is a hierarchical relation between humans and nonhumans. Indeed, her presumption is that "the locus of political responsibility is a human-nonhuman assemblage" (2010 p 36); by 'assemblage' she means an interrelated set of bodies, ideas, objects (Bennett 2015).

However, Bennett has been critiqued for giving an insufficient account of politics, as already discussed, a theoretically capacious concept. As Braun (2011) points out, she sees political activity as a kind of 'ecosystem' which produces 'publics' but, as discussed in the previous chapter, that is only one element of politics. We keep bumping up against this problem. As discussed, and as Braun clarifies in his critique of Bennett (2010), politics and political activity are also about how things get 'determined' (Braun 2011), the kind of politics that resides in 'governing.' Lemke (2018) similarly observes that Bennett (2015), in response to Washick and Wingrove (2015), distances her project (and new materialisms more generally) from an idea of politics considered as an institutional ensemble or a separate sphere characterized by distinct boundaries and norms which leaves open the question of how exactly politics and ethics intersect. As new materialists Washick and Wingrove (2015) put it, politics is "understood as the pursuit of interest or justice, agonistic enactments of difference and identity, or the re-making of collective worlds." Although initially siding with Bennett's critics on her notion of politics, I now wonder whether it is a little unfair as her and her sister new materialists' views on politics are clear so she is not being critiqued on her own - or new materialist - terms. This lively debate about 'politics' is very much open but I suggest that a critique of Bennett (2010) regarding her treatment of responsibility also merits attention.

Although Bennett is concerned with how materiality would affect 'political responsibility' (2010 p 36) and 'political accountability' (2010 p 21) she nonetheless struggles with assigning responsibility or accountability to any particular actants or agents because of her commitment to a flat ontology. For example, although she would like to apportion blame to the energy traders for an electricity blackout, she believes that they are "simply incapable of bearing full responsibility for [the] effects" of the interconnections between people and things (2010 p 37). Consequently, a distributive, composite notion of agency means the energy traders cannot be held accountable, which is, as Lemke puts it "clearly unsatisfactory" (2021 p 52). However, any other conclusion would be an ontological contradiction for

Bennett. In this rendering, as machines and matter cannot be held to account either, her notion of political responsibility can be neither theorised nor, indeed, realised. This produces a dilemma for Bennett's eco-political goals, which she recognises, as the risk is that it lets authorities with capacities and resources off the hook. Such an outcome makes it "necessary to develop a different understanding of responsibility" (Lemke 2021 p 52), the aim of this thesis.

Individual duty

In the final analysis Bennett retreats to individual ethical choices. As she concludes, with an air of reluctance:

> Perhaps the ethical responsibility of an individual human now resides in one's response to the assemblages in which one finds oneself participating: Do I attempt to extricate myself from assemblages whose trajectory is likely to do harm (Bennett 2010 pp 37–8)?

The individual in Bennett's conception emerges as more autonomous than one under the influence of responsibilising practices (discussed below) and is, as I read it, a Kantian deontological move. She is feeling a duty to do the right thing even if she can't be sure that her actions will have the kinds of effects she is looking for. Washick and Wingrove also read Bennett's argument as deontological but in her response to them Bennett (2015) resists their return to a place where the human is again figured as a moral subject. As she says, she wants to find the best way to pursue her *conatus* and to better understand how the parts of the assemblage work, "including the (composite) part that I am" (2015 p 86). This makes sense when one understands her position that "humans are not exclusively human" (ibid.) so it's misunderstanding her ontologically to see her position in Kantian terms. Whatever the philosophical position, her critics have described it as an 'individualized and voluntaristic ethics' which is not only inconsistent given her posthumanist agenda but results in a political dead end (Lemke 2018, 2021). Despite my admiration for Bennett's thinking on the vitality of matter, I agree with this critique and that it is ironic given her stated objective to produce a more ecological politics (Abrahamsson et al 2015, Washick and Wingrove 2015, Lemke 2018) even though her ethical stance might be 'laudable' (Marso 2011 p 426).

As Bennett frames both politics and responsibility as finally concerning the ethical individual, and although she may argue that she is a 'composite' being, there are still human responses to be contended with and fought for and against (bringing us back to the arguments of Osborne and Rose 2024). While this theoretical debate continues, there remains the concern of paying attention to the potential of political accountability in the sense of being answerable to and for, as Derrida saw so clearly. Further, a reliance on moral responsibility for political accountability involves an appeal to values which are open to contestation, as Bennett (2020) acknowledges, as they are variably located and altogether a more haphazard political enterprise. However, as her recent work shows (2020), Bennett's preoccupation is with the individual moral 'self' and its engagement with matter and the world rather than with political in the sense of governing or accountability and that is where, for her, responsibility is located.

Bennett's resort to individual duty (in her personal capacity) is aligned with much of the climate responsibility literature which, in the tradition of moral philosophy, understands the concept of responsibility as a concern of individual ethics and what is the morally right thing to do. From Aristotle,

Kant and Levinas (1998) among others, are inherited norms about taking responsibility for one's own actions and owing duties to others. With those antecedents, studies in moral philosophy do not assume that responsibility for climate change action is vested in the state. The question is instead posed as what individuals should do with this responsibility (Cripps 2013) what I have called the first line of duty for individuals in relation to climate action (though see Butler (2005) who troubles the notion of giving an account of oneself without consideration of the social conditions from which one is emergent).

There are ideas in the climate literature that some individuals or groups have more responsibility to act on climate change than others, ranging from whether those living in advanced fossil-fuelled economies have an 'ethical obligation' to put pressure on industries and governments (Cuomo 2011) to an inquiry into whether scientists have special responsibility by virtue of what they know (Hartz 2023) to advocating the responsibility of professionals in institutions to do what is in their power to influence change (Whyte 2013). As Michael Goodhart (2023) argues, the consequence of responsibility being theorised as ethical is that the politics of responsibility gets obscured or overlooked. Likewise, explorations about the duties of individuals, whether they are acting on their own, collectively or in furtherance of their roles, displace attention from the role of governing authorities.

In sum, Bennett's vitalism raises the problem of material responsibility but it also generates a gap or tension between the distributed – and therefore irresponsible - agency of vibrant socio-material assemblages and a desire to locate responsibility in particular persons or institutions including, in particular, the state. It is to this ontological problem, important to my quest for a role for the state in a material politics paradigm, that I now turn.

Ontological challenges

As critics have noted, where network or assemblage theory insists on connection and association rather than differentiation and where the distribution of power is seen only as a relational effect, it troubles the search for accountability (Kirsch and Mitchell 2004, Bakker and Bridge 2006, Bowden 2020). The problem is not only practical but also presents ontological challenges for more-than-human approaches. As Puig de la Bellacasa astutely asks, "how do we engage with accountable forms of ethico-political caring … without nurturing purist separations between humans and non-humans?" (2010 p 159). Similarly, Tschakert et al (2021) note problems with conceptions of climate justice and its dependence on human exceptionalism. Blanche Verlie (2022) investigates the tension between theories of climate justice and more-than-human or material understandings. Like other scholars cited here, she observes that theories of material agency and posthuman 'becoming' are criticised for offering limited guidance for political practice. As she says, there are concerns that emphasizing relationality and permeable boundaries leads to apolitical ontologies by eroding the distinct subjectivities that politics depends on asking: "If we are all connected, co-constitutive and co-emergent, then how can we trace the exertion of power of one party over another (2022 p 302)? In agreement with this, I can see that ascribing responsibility to the state or governing authorities in a material or network framing potentially suffers from the same human-centred problem.

As with actor network theory, there is also a contradiction between the heterarchy apparent in Bennett's aleatory mix and any hierarchical or defined roles assigned to or assumed by the human actors within it. Accordingly, it's difficult to avoid the suspicion that the fluid mutable components within an assemblage or a network either do not start on an equal ontological footing or at least do not end up like that. Perhaps the

flat ontology within network or assemblage thinking (Dittmer 2014) is not so flat; maybe it has contours after all. However, Hinchcliffe (2011) in his review of Bennett (2010) argues against the binary of discrete agents versus distributed actions and praises Bennett for broadening arguments about thing-power and action. Interestingly, Bennett herself does hint at the idea of discrete agents within an assemblage when discussing Latour's (1999) notion of the 'fermentation' process, outlined above. She observes that this may involve some "managing to ensure … that all the ingredients are in the pot" inferring that it "seems to require humans" to exercise an "executive function" (2010 p 103 fn 19 p 150). Bennett's invocation of 'executive function' as something that may be required of humans, introduces the notion (albeit in a footnote) of responsibility as function or role, though she does not explore it further. This puzzle gives me my second research question and I have examined whether this issue need be such a dead end theoretically - or politically - by exploring the way in which state responses, state responsibility and forms of the state itself may be constructed from the force of matter, as discussed in the next section.

Practices of responsibility

In light of Bennett's rhetorical question about whether "a hurricane can bring down a president" (2010 p 107), I pose the question in reverse: to what extent can the state itself be a response to matter?

Making the state

Actor network and assemblage theories embrace the idea of the production or coproduction between the human and the nonhuman. For Latour (1993), the 'human' is an outcome of various material, technological, and informational networks which define its boundaries, identities, and capacities, and which it can never fully master. Bennett (2010) also sees that human actants will turn out to be confederations of tools, microbes and other materialities. Mitchell (2002) advises that the role of human agency should be treated as a question – something that is made – rather than an answer known in advance. As he argues:

> … as one unravels interwoven forces, human agency appears less as a calculating intelligence directing social outcomes and more as the product of a series of alliances in which the human element is never wholly in control (Mitchell 2002 p 10).

Likewise, Pickering (1993), through observing a scientist wrestling with a problem in elementary-particle physics, finds that material and human agencies are mutually and emergently productive of one another or restructured with respect to the other, what he calls the 'mangle of practice.' In particular, he finds that human agency is itself emergently reconfigured in its engagement with material agency.

These arguments about the way in which materials can configure the human are useful when rethinking what have been thought of as human collectives including the state. These material productions have the potential to generate various political outcomes and these will depend on the type of matter and the conditions of its emergence and circulation. Mitchell (2011) describes how coal, extracted as a collective human enterprise established the circumstances for the evolution of democracy but oil, with its more distributed and isolated methods of extraction and production has undermined it. Here we see the material production of, on the one hand, an opportunity for political participation but, on the other hand, its restriction. Empirical research has shown how the 'state' can be understood as produced from resources,

materials and technologies and as an effect of power (Bridge 2014, Menga and Swyngedouw 2018, Barry 2020a, Allen and Hecht 2001). As scholars have noted, John Dewey recognised the constitutive relation between materials and the human (Braun and Whatmore 2010, Bennett 2010). As he says, in relation to life, "matter and the material" are the "conditions of its manifestation and sustained being" (1927/2016 p 195). While Dewey sees a public emergent in response to a problem, he observes that state institutions may come into existence in response to specific claims of that public. Braun alludes to this notion of state formation from problematic matter in his piece about fuel efficiency gauges discussed earlier. In identifying new forms of political orders forged in the face of climate change, he describes 'government' as an "ad hoc assemblage" coming into being "as a kind of afterthought" as it responds to the changing world (2014a p 51).

As the state may be co-constituted with matter, so dimensions of its role may emerge from the matter that comes to demand its attention. A link between matter, response and state responsibility can be empirically established even if it is not explicitly theorised. In the climate context, there are increasingly places of impact where material forces can explicitly be seen as producing a governing response. The loss and damage literature has shown that the materiality of proximate harms, whether they are rapid or slow onset hazards, is both a condition of and explanation for climate politics and governance at sites of impact. For example, when asked what they think changed politicians' minds in relation to acting on climate impacts in Antigua and Barbuda, Vanhala et al's interviewee replies: "Well, hurricanes have helped a lot" (2021 p 149). It is the materiality of the climate stressors that is producing a response which becomes the assumption of a governing responsibility from the authorities.

However, the climate matter of hurricanes, wildfires, droughts, floods and sea level rise have been in competition with the hitherto more compelling matter of fossil fuels in driving a response. As Latour (2017 p 26) points out, if there was general agreement that CO2, and thus coal and gasoline, was the cause of climate change, it would not be possible to keep the facts from their moral implications: the imputation of causal responsibility would demand a response. As climate change as a problem for political action has been suppressed, material thinking would suggest that it is the more pressing matter of fossil fuels that has, for decades, produced the state's response, maintaining the carbon economy amidst a long-standing programme of climate denialism (Latour 2017, Mann 2021). From a climate politics perspective, fossil fuels are anti-political matter because they close down debate and the possibility for action (Barry 2013). It appears that governing will be driven by the material forces which exercise the greatest leverage within the tussle among climate matter, fossil fuels, governing authorities, various forms of public, state responses and practices of responsibility whatever the cost in relation to other forces and effects, as I explore in my fieldwork. I now turn to the question of what forms of state role-responsibility emerge from matter.

Limitations of role and task model

Although I have identified 'role' and 'task' as routes into theorising state responsibility for climate matter, the model has limitations. First, if responsibility as *role* or as *task* (such as responding to harm) seeks to disengage from and avoid *ex ante* questions of liability for the causes of harm it has consequences for questions of justice and reparations owed to people who have been harmed (Táíwò 2022, McKeown 2021). As Cane (2016) argues, role-responsibility has implications for Hart's other category: 'liability–

responsibility' involving for Cane both 'attribution' (ascription of blame) and 'accountability' (the requirement to do something about it). 'Liability' connects responsibility beyond the 'task' to accountability for how it is performed, an important linkage which needs to be established through mechanisms like legal proceedings or politics. Liability whether emerging from role, task or causation are necessary for accountability at law to be successful, as climate litigation scholarship shows (see, for example, Vanhala 2013, 2022, Fisher et al 2017, Walker-Crawford 2022).

A second limitation is the risk of managerialism. Robert Goodin (1995) noted that 'task responsibility' as advocated by utilitarians is about dictating 'results.' There is a risk that state responsibility is treated as bureaucratic with anti-political effects. These outcomes are evident from the sparse accounts of the practice of responsibility if one reads across from the individual to the institutional. Baier (1972/1991 p 121) is concerned with the need for the task-responsibility to be "discharged" after which "no more needs to be done." Hart's ship captain is "responsible for the performance of [their] duties, or for doing what is necessary to fulfil them" and the remit extends to the "care and attention" needed to perform the task (Hart 1968 p 212). Hart's notion of 'care and attention' seems to apply to the way that the task is performed rather than any particular approach towards those who may be affected by its accomplishment, a bare function. Neo and Chua (2017) neatly bring out this distinction in their research among Singaporean community gardeners. Following Massey (2004) on how spaces produce responsibility, they find that some gardeners devote themselves to the horticultural task of maintaining the garden and others are concerned with providing a welcoming community space. They observe the tension that can arise between creating a 'good' garden as compared with a 'good' community. This distinction in the way that responsibility can be practised by those in authority becomes important in my fieldwork and is also evident in existing accounts, both theoretical and empirical.

Technology and the imperative

Hans Jonas, influenced by Heidegger's interest in technological power, was concerned by its development over the course of the C20. The devastating force of atomic energy and increasing environmental degradation from industrial processes revealed that the 'golden promises' of modern technology were turning into destructive threats in which technology was implicated and which called for new theorisations (Berdinesen 2017). Jonas argued that its expansion to global reach made it necessary to extend traditional conceptions of the ethics of responsibility to an obligation to future generations and to nature – as the condition of humanity (1979/1984, 1982). Jonas called this technologically driven necessity the 'imperative of responsibility' (Jonas 1979/1984). Resisting anthropocentrism, Jonas insisted that technology creates what he called a 'substantial responsibility,' that is to say the knowledge – and a duty to acquire knowledge – and the power to do something about it.

Credited with devising an early formulation of what has since become known as the 'precautionary principle' (Berdinesen 2017, Coyne 2018), Jonas' concept is practical as much as theoretical, requiring a "substantive, goal-committed concept of responsibility" for "the well-being, the interest, the fate of others, [wherever this] has, by circumstance or agreement, come under my care" (1984 p 93). This sort of 'responsible care' connects those responsible for the technology with those – people and biosphere - who are or may become vulnerable to its encroachment, activation and effects. Although he theorised this techno-responsibility as arising from the collective, in his practical application, Jonas recast the state's

duties along ecological lines as the primary responder. He went on to formulate proposals for what he argued was the commensurate governing response to the eco-emergency.

However, it is with his proposals for practical action that Jonas comes unstuck as he advocated 'total government power' provided it is 'well-intentioned' and 'well-informed' (1979/1984 pp 146–147). Unsurprisingly, Jonas' undemocratic prescriptions for state action in response to the techno-imperative have been critiqued as at minimum 'paternalistic' (Bernstein 1995 p 17) and more stringently as a collapse into "eco-authoritarianism" which "is quite clearly objectionable" (Coyne 2018 p 242); though there have been attempts to rehabilitate his thinking into a more productive polis (Coyne 2018). Likewise, Jonas' proposal for a process of 'care' within the state adoption of responsible action also risks the pitfalls of linking responsibility to the kind of 'care,' that exploits unequal relations and masks paternalism and colonial governance (see on this, for example, Murphy 2015, Liboiron 2021, Yusoff 2018).

The unintended consequences of the 'care' approach are increasingly well-recognised. For example, the loss and damage literature, concerned as it is with impact vulnerability, is increasingly framing the responses to the human rights impacts of climate change away from a 'care' approach which focuses on 'needs' (Schinko et al 2019) towards a more empowering rights-based approach (Toussaint and Martínez Blanco 2019, Broberg and Romera 2020). For present purposes, the 'high' of Jonas's theoretical thinking – linking matter and state responsibility - may fairly be contrasted with the cautionary 'low' of his governing solution, illustrating the potential for mis-application of state responsibility in practice. While for Jonas, destructive technology is the trigger for responsibility, for Hannah Appel infrastructure mediates forms of responsibility. As noted above, she has studied how hydrocarbon infrastructure, a different and more subtle kind of destructive technology, enables oil companies to avoid taking responsibility for their activities. The final example of responsibility in action is the governing practice known as 'responsibilisation.'

Responsibilising individuals

For Foucault, governing involves the application of techniques and practices which produce the 'conduct of conduct' among the population meaning governing others and the self (2009). As Rose explains, 'govern' in this conception refers to 'all endeavours to shape, guide, direct the conduct of others' (1999 p 3). From attending to the process by which 'subjects' are 'materially constituted' (Foucault 1980 p 97) and become the 'instruments' of government (1991), governmentality has the effect, though Foucault does not expressly put it like this, of producing responsibility in the 'subject' who is called upon to regulate themselves. Governmentality's attention to management of the population operates at the level of the individual in a comparable way to Foucault's theory of 'discipline' (1977). As he observes, by the use of disciplinary techniques, it was possible to produce: "meticulous control of operations of the body which assured constant subjection of its forces and imposed upon them a relation of docility-utility" (Foucault 2009 p 137, 1977).

For Barry, technology is intrinsic to Foucauldian modes of governing. As he points out, under technological governing practices there is a "demand for ordinary citizens to improve their own technical capacities and knowledge" (Barry 2001 p 4). Rose argues that 'technologies of freedom' have been invented that seek to govern 'at a distance' which mean that individuals are obliged to be prudent, responsible for their own destinies, actively calculating about their futures and providing for their own security (2000 p 323).

Democratic theorist Barbara Cruikshank observes governmental tactics which are aimed at making citizens capable of self-government, which she calls 'technologies of citizenship' (1999). Citizens are 'socially fabricated' as both the effects and the instruments of governance (ibid. p 4). Liberal democracies like the United States cannot force their interests but "must enlist the willing participation of individuals in pursuit of its objects" (ibid. p 39). While governmentality encourages self-governing, it may incorporate disciplinary techniques with the effect that people become simultaneously 'docile and useful' in Foucault's phrase.

In governmentality, individuals become not the ends of government but its means (Foucault 1991 p 100). However, governing humans is not intended to crush their capacity to act, but to acknowledge it and to utilize it for governing purposes (Rose 1999, Cruikshank 1999). Graham Burchell (1996) and others have called this process 'responsibilisation.' It is a technique by which the concept of responsibility becomes, in governmentality terms, an artefact and instrument of governing rather than something to which governing itself is subjected, an important distinction for my research. In analysing these forms of liberal government, Burchell (1996) sees the relationship between government and governed as one where individuals are identified as both the target of government action at the same time as being enrolled as accomplices in achieving it. Empirical research from Oded Löwenheim (2007) is illustrative. When governmental foreign offices produce warnings deterring their citizens from travel to certain countries, the warnings act as a mechanism for aligning travellers with governmental policies which they may not be aware of or have consented to and which have consequences for the warned-against states in terms of tourism and development. Through these travel warnings, citizens become not only complicit in but also the instrument and effects of their home state's foreign policy. In relation to environmental and climate action, there is a wealth of literature on how governments promote responsibilising practices.

Following Foucault, Agrawal (2005) expands the concept of 'environmentality' as the 'making of environmental subjects.' 'Green governmentality' (Luke 1999, Soneryd and Uggla 2015) has evolved to describe the observed 'disciplining' of individuals – often as consumers (Maniates 2001) - towards personal climate and ecological action. This 'individualization' can be observed in official guidance that 'helping the earth begins at home' (Hinchcliffe 1996) and admonition to 'Choose wisely' and 'Say no to paper towels!' (Soneryd and Uggla 2015). Elizabeth Shove's discursive example: `Twelve steps to help you kick the CO2 habit,' as she puts it, places responsibility squarely on the 'individual CO2 addict' (2010 p 1280). In their study of the city of Portland's climate action plan already outlined, Rutland and Aylett (2008) observe that the city did not provide information or encourage citizens to lobby for more effective regulation of large corporations, instead people were directed towards what they as individuals could do to cut their own carbon emissions. This 'self-regulation' created responsible, carbon-calculating individuals (2008 p 642). Not only are individuals given a task to do, they are encouraged away from institutional or systemic action (Maniates 2001, Rutland and Aylett 2008, Shove 2010). As Stengers puts it:

> … our own task is limited to insulating our houses, changing our lightbulbs etc … there isn't anything to discuss … or argue about here … (Stengers 2015 p 31).

State efforts to responsibilise its citizens are comparable to corporate interventions in the public sphere like BP's 2004 carbon footprint calculator (referred to in Mann 2021) which sought to engage the general

public in reducing their own carbon footprint despite the impossibility of doing so whilst inhabiting a carbon economy. The alignment between the state and the oil industry reveals the practice of governing individuals to be a shared endeavour.

As scholars have shown, green governmentality and responsibilising practices extend beyond advice to atomised individuals and into 'regulating' communities (Summerville et al 2008, Bulkeley and Newell 2015). Reviewing central government documents on managing flood risk, Butler and Pidgeon (2011) find that the discursive emphasis is less on attempting to manage flooding but rather on 'governing' the affected communities which means making them aware of their responsibilities to live with flood risk. The authors observe how the `object' to be governed has shifted from flood waters to citizens at risk of flooding. The Kantian conception of the state as protector has been replaced by a demand for self-sufficiency from the population. As Singh-Peterson et al (2015) observe, emergency management has transitioned from a command-and-control civil defence structure to one promoting 'shared responsibility' between government, businesses and local community groups who are perceived to have responsibility for disaster resilience despite capacity and resource limitations. Bulkeley and Newell (2015) point out that the effect of these top-down initiatives is that those with capacity (states and corporations) have shifted responsibility to those with little power to address causes or consequences. If climate and ecological action has become what Jennifer Rice (2016 p 112) calls a "collective, undifferentiated public responsibility requiring attention from an idealized, yet generic citizen," the effect, as Barnett et al (2010) have observed is a retreat from 'proper citizenly politics.' I see this as the second line of duty for the individual in relation to climate action.

Responsibilisation is both an entry point for an analysis of state responsibility (responsibility is in contention) but also a distraction as, through governing practices, responsibility for action becomes the responsibility of individuals. My research redirects the lens of inquiry back towards the state. The responsibilising effects of governmentality produce citizens that both have and act on their responsibility, but it leaves open the question where this leaves the responsibility of the state. Löwenheim's analysis is particularly pertinent for the current research, as, unlike other scholars in this field, he asks what kind of state is produced by responsibilisation. He notes that rather than seeking ways or interventions to ensure its citizens can be kept safe when they travel abroad, governments resort – and retreat - to travel warnings. His conclusion, based on this example, is that governments now consider responsibilising citizens as one of their roles (2007) which is apparently borne out by the climate studies referred to.

These examples of responsibility in practice in the literature, while not exhaustive, contrast with the more productive concepts of responsibility grounded in relation, care and reciprocity already discussed and provide me with my third research question; what forms of state responsibility emerge in relation to matter and governing. However, the thesis does more than analyse forms and manifestations of state responsibility which risks the continuance of paternalist and colonialist practices and is unlikely to promote justice. As Stengers argues, we should refuse the 'relegation to governance' (2015). Therefore, the thesis goes on to consider the relation between matter, state responsibility and politics as contestation to explore the potential for a theorisation of state responsibility for climate justice.

Responsibility for justice

Like accountability, justice is the other weighty concept that I am *concerned about* as a normative objective rather than *engaging with* analytically. In using the term 'justice,' I follow Sen (2002) and others (Táíwò 2022) who have moved beyond a Rawlesian conception of justice as fairness and an ideally just state (1971) towards an emphasis on reducing injustice, through locating geographies of injustice (Harvey 1996, Barnett 2017), particularly the noxious relation between pollution, race, class and colonialism (Bullard 1990/2000, Liboiron 2021), understanding injustice as structural (Young 2011). The concept of 'climate justice' recognises the differential impact of climate change and insists that climate action tackles those injustices (Shue 2014) requiring engagement with intersectionality (Sultana 2021), accountability and reparations (McKeown 2021, García-Portela 2022, Táíwò 2022, Verlie 2022). As Verlie (2022) argues, climate justice must avoid perpetuating (Western, heteropatriarchal) ideals of autonomy, impermeability and sovereignty. The issue of concern here is the "we" in the practice of responsibility, particularly when it is exercised by a collective.

Collective responsibility

By 'collective responsibility,' Hannah Arendt means the duty of individuals to come together and act collectively, particularly in response to political and moral crises (1968/2003). The responsibility stems from past actions by virtue of membership of a group rather than through a causal link. Building on Arendt's thinking and drawing on ideas of responsibility from Derrida and Levinas, political scientist Iris Marion Young (2011) proposes the 'social connection' model of shared responsibility. This requires people to take public stands about actions and events that affect broad masses of people, and to try to organize collective action to prevent harm. Distinguishing herself from Arendt's focus on the past, Young argues for a future-oriented approach to responsibility which she calls 'responsibility for justice.' In recognising that for citizens, the duty could be overwhelming - what she called the "vertigo of political responsibility" - she proposed that her 'social connection' model be "practically manageable" (Young 2011 p 124), though as Patrick O'Mahony (2015) points out, the model depends on people having the power to make an influential contribution.

A number of climate scholars, whether following Arendt and/or Young, conceive of responsibility in a similar way: as political, collective, as a practice and as a shared obligation of citizens (Castán Broto 2013, Eckersley 2016, Ackerly 2018, Haflidadottir and Lang 2020, Bazargan-Forward and Tollefsen 2020, Goodhart 2023, Sardo 2023). Although I draw considerable learning and inspiration from these scholars, my contention is that the requirement for individuals to act collectively does not adequately address either the differential status and capacity of individuals or the systemic institutional challenges in reducing fossil fuel production and the demands for a just transition (Táíwò 2024, Riofrancos 2024). I see collective responsibility as the third line of duty for the individual in climate action and, in view of my research on state responsibility, seek accounts of justice which more explicitly concern the state.

Bringing the state back in

Is the idea that the state can take on role-responsibility for justice viable given evidence of state failure and perpetration of injustice? As is convincingly argued, it is state systems that create and sustain the violence

of environmental injustice and racism (Pulido 2017, Kojola and Pellow 2021). What Gabrielle Hecht (2023) calls 'residual governance' is a purposefully inefficient governance that treats people and places as waste and wastelands and which, in a racist move, abandons them as disposable (Braun and McCarthy 2005, Nixon 2011, Yusoff 2018), a biopolitics of disposability (Giroux 2006). As Michelle Murphy has observed, "the state or companies can put violence into the world without responsibility for that violence" (Srivastava 2021). Noting that the ecological challenges of climate change are entangled with the political obstructions of institutions, Whyte (2013) resists the temptation to think that complexity is an unfortunate state of affairs for which no one is really responsible arguing that obstructive political orders should be seen as part of formal and retrospective injustice against tribal collective continuance (Whyte 2013). As Kojola and Pellow (2021) argue, a dominant narrative among environmental researchers and activists has been that although the state may be a perpetrator and enabler of environmental injustices, it is the primary vehicle for enacting pro-environmental justice changes. This orientation has clear limitations as it relies on the very social forces producing injustices to somehow deliver environmental justice. As Stengers baldly states "the State must not be trusted" (2015 p 74). With these reservations in mind, I seek a way through.

Iris Marion Young and scholars following her line of thought are sceptical of the state's role in promoting justice. In discussing Goodin's theory of the state as a 'moral agent' (Goodin 1995), Young acknowledges that a situation where it is no one's assigned task to address problems is the sort of situation in which it is appropriate for the state to act (Young 2011 p 167). Although she accepts, apparently grudgingly, that often "the best or only way" for social actors to organize collective action to redress injustice is by means of state institutions (2011 p 112), she sees limitations with the state, contending:

> … we ought to view the coercive and bureaucratic institutions of government as mediated instruments for the coordinated action of those who share responsibility for structures, rather than as distinct actors independent of us (Young 2011 p 112).

If Young views the state as not 'distinct' (and here she seems to be in sympathy with Mitchell 1991's 'state effects'), we return to the theme discussed already of whether the state can assume a discrete responsibility and being accountable. As argued already, I am interested in a relation between state responsibility and justice suggesting that while power might be dispersed (*pace* Foucault, Mitchell and others), responsibility is concentrated in the sense that it requires a target or a source of supply – a form of state authority - that is capable of being held to account. While she later concedes that "states are important and powerful agents," she validly points out that not only do they fail but they are not neutral arbiters tending to favour vested interests that run counter to justice (2011 p 151). She also argues that what is missing from the: "It's not my job—it's the government's job" position is the recognition that "the state's power to promote justice depends to a significant extent on the active support of its citizens in that endeavor" (2011 p 169). There are two points here, the need for citizen engagement, which I discuss in the next section, and the notion of the 'state's power to promote justice.' I think Young misses the opportunity to consider the potential for a conception of state responsibility that includes its 'power to promote justice.'

Instead, I follow philosopher Olúfẹ́mi Táíwò (2024) and political scientist Thea Riofrancos (2024) who argue that the state is needed for both climate action and justice. As Táíwò contends, although "carbon has captured the state" the state is still needed as its power "has been decisive for conditions of possibility for broader transformations" and "state politics is the likeliest path forward for successful contention with fossil capital" (2024 pp 5,

13, 21). In the same publication, Riofrancos builds on this approach arguing more specifically, based on her experience of studying activism, that:

> … we need the state both for its disciplinary power (what other institution could enforce a phaseout and eventual ban on fossil fuels) and for its infrastructural capacities (it is hard to imagine an energy transition at scale without public money and even public ownership) (Riofrancos 2024 p 62).

But, as she goes on to ask, "how can the state serve as both executive committee of fossil capital and righteous protagonist for climate justice?" (ibid.). Inspired by these scholars, I find my fourth research question: whether a conception of state responsibility for justice can be resuscitated and the role of civil society in achieving it, not as a duty of the individual but as a coming together as a collective.

Collective action

The literature explicitly addressing the question of climate responsibility provides examples of responsibility as practice. Brooke Ackerly (2018)'s approach to what she calls 'just responsibility' consists of moving beyond the constraints of current community politics and creating new communities. Goodhart (2023) distinguishes 'taking responsibility,' that is to say discharging one's obligations, from 'making responsibility' which he defines as the social practice of negotiating and contesting shared ethico-political judgments, not something we have but something we create. Through a case study among kayaktivists, he seeks to illuminate the dynamics through which practices of responsibility are formed and contested. Other studies analyse the productive potential of collective action within communities (see, for example, Schlosberg and Craven 2019). Félix Guattari argues that these collectives do not need to be a mass movement of like-minded people but can be a cultivated dissensus, a collective production of unpredictable and untamed 'dissident subjectivities,' what he calls a 'unified disunity' (1989/2000 pp 9 and 10). Studies of movements for climate justice and its intersection with racial and other forms of oppression combined with radical resistance abound (Simpson 2017, Riofrancos 2020, Sultana 2021, Bosworth 2022, Mah 2023). Lively debates about whether collective action is more effective outside state institutions and processes or within them are outside the scope of this project (Stears 2013, Riofrancos 2024, Táíwò 2024) though in Chapter 7, Air, I discuss the way in which the matter of greenhouse gases opened up a space for political action to pressure the state to take responsibility for equity and justice.

The question at issue here is scholarship on how this activism connects with the state. When, as Marres (2005) puts it, issues 'spark a public into being,' Dewey expected people to hold their government to account:

> … only through constant watchfulness and criticism of public officials by citizens can a state be maintained in integrity and usefulness (Dewey 1927/2016 p 110).

I propose the relation between citizens and the state as one of *demand* - made on and of the state - and *supply* - a response of responsibility by and from the state. In this regard, the state should be viewed as a site of contestation, rather than as an ally or neutral force in enabling justice (Pulido 2017). This is what 'politics' as contestation and struggle are for and it depends on deliberative political processes and on 'claims-making' (Barnett 2017). These claims need to be leveraged on the source and potential for 'capacity-

responsibility.' As international relations scholar Toni Erskine (2001) observes, without an allocation of responsibilities, calls to action lack specified agents, and, therefore, any meaningful indication of how they might be met. Rather than responsibility being imposed on people without capacity or resources or an obligation on citizens to take action under Young's 'social connection' form of responsibility, it is worth investigating how the demand / supply equation can work in practice.

Walker-Crawford (2019) offers an illustration of a point of engagement, what responsibility can look like when the demand is flipped. In the Cordillera Blanca, authorities are concerned with the degrading effect of livestock grazing on ecosystems in the high-mountain environment. They reportedly call on farmers to act responsibly and remove their animals. As Walker-Crawford puts it, farmers offer an alternative conceptualisation of responsibility, calling on authorities to respond to their needs with increased social support. A theory of responsibility as something demanded of government rather than of individuals (Shove 2010, Walker-Crawford 2019) or as subject to conceptual negotiation between citizen and state (Gill 2011) has important potential for climate justice action. Whyte (2013) does this in proposing a framework that puts systems of responsibilities at the forefront of how one thinks of justice. The question is where, how and among whom the 'demand' is made on the state 'supply.' As Stengers argues in relation to climate inaction:

> … if we addressed 'nos responsables' [those who are responsible for us] … as if they were indeed effectively "responsible" for the situation – that address could have efficacy …that is one of the bets of this essay (Stengers 2009, 2015 p 33).

The notion of 'addressing' governing authorities as 'responsible' is 'one of the bets' of my thesis too and I explore that question through empirical observation in the succeeding chapters.

Conclusions

This review of the literature has attempted to locate a theoretical architecture that embraces all three sides of the triangle: matter, the state and responsibility. There is ample scholarship on the relation between matter and governing and between matter and responsibility but it's difficult to find a conceptual connection between all three. These gaps both create my principal research interest: the relation between them and explain why I have ranged across a theoretically protean range of scholarly sources. Material politics scholarship establishes a relation between matter and politics and matter and power but has not yet theorised questions of responsibility, likewise the 'governmentality' and 'state effects' scholarship on which it is grounded. Although Foucault's governmentality transfers responsibility to individuals, there is little theorisation either in that literature or in network or assemblage thinking of what is left of the state, in particular whether it might be dispersed in its power and practices at the same time as being concentrated in its responsibilities. Like many, I am indebted to Latour and Bennett for their compelling thinking on matter, relations and their commitment to "the politics of things" (Latour 2004a) as opening up possibilities for praxis. However, although they are two of the most preeminent scholars grappling with how to think through commensurate responses to the climate and ecological emergency, they have not given substantive attention to theorising the kind of politics directed at sources of power and responsibility.

The climate and responsibility literature discussed here understands climate responsibility as less about a role for the state than as a practice for individuals whether in their own lives or collectively. While informed by this scholarship and agreeing with it on the need for collective action, I depart company with its reliance on the individual as the bearer of responsibility. All of this literature has helped me think towards a conception of the state's role-responsibility within a material politics framework with climate justice as its objective. I seek to make a contribution to scholarship within both material politics and climate responsibility. I share Verlie (2022)'s 'hunger' for theorisations of climate justice that take human enmeshment with climate seriously yet provide robust politics. To further that goal, I propose a future research agenda inquiring into and theorising the relation between matter, state responsibility and justice.

Theories of material, network and governing practices provide compelling accounts of how things act and react in the world. They are as much epistemological as ontological with a strong commitment to the importance of empirical research. The next chapter explains how I approached the question of researching matter while looking for evidence, not of state power as is so often the case in the literature, but of response and responsibility.

Chapter 3: Researching matter

Introduction

The literature generates important questions and ideas for my research. How does matter materialise in governing? And how does matter relate to state responses and responsibility? The challenge is to make these questions researchable through field encounters: where and how to locate and observe relations between these forces and to understand their emergence, interaction and salience. How in effect is it possible to render visible what matter matters, what 'actors' do indeed make a 'difference' (Latour 2005 p 71). My approach to 'methodology' as described in this chapter is capacious in two respects. First, it is not confined to what the scholar does in the 'field,' the methods used to research the questions, but, following Dvora Yanow (2009), encompasses the whole research endeavour from the conception of the research idea to the submission of the written thesis. I came to realise that everything that I did in furtherance of my research objectives was a 'method' if it was done in an open, inquiring, critical and reflexive way and if my 'whole self' was immersed in it, body, mind and heart, what scholars call 'embodied research' (Horlings et al 2020, Sharma et al 2009, Leigh and Brown 2021). So, it followed that the methodology chapter could, in principle, include all these things and their full materiality as indicative of the approach that I took to the entirety of the project.

The chapter opens with a description of how academic research has 'changed my mind' and what it has been like to engage in 'material thinking' when considering the relation between matter, the state and responsibility. I go on to explain why I selected Louisiana as the place for the empirical enquiry. Louisiana as a site of slavery, colonialism and racism required a recalibration of my research approach, as a privileged white outsider, towards more actively learning from and bringing BIPOC scholarship and experience into my work. That imperative when coupled with the inclusivity deriving from the scholarly theory of attention to the more-than-human, led me to adopt, *in medias res,* an 'ethnographic sensibility' as my over-arching methodology. Drawing on a co-authored research note published during my academic study which describes the different ways such a sensibility can be operationalised in fieldwork through a 'hanging' heuristic, I show how I brought that into my own research activity. Discussing scholarship on what constitutes the 'field,' I consider what it is like to be effectively always 'doing research,' heightened when on one's own in a new place as well as the need to adapt to changing conditions in the field.

In undertaking the research, I describe how I came to find and understand what matter appeared to be salient or less salient and how my research progressed towards an emphasis on the four forces – water, land, oil and air - that I find to be fundamentally constitutive of the site's geography, governing practices and politics. I also observe how the concept of responsibility is concretised through the relation between the state and the matter it is dealing with. Turning to methods, I explain why I have structured the chapter around the sensory mode that I was engaging with during fieldwork, recognising the overlap between the senses. My experience has been that segmenting the methods into discrete categories (content analysis, interviews, participant observation) doesn't accurately reflect my epistemological approach or the way that I engaged with the research field or found that it engaged with me.

I have been researching *'matter-relations'* following Horlings et al's notion of 'place-relations' (2020). These consist of the material world, the practices of human and nonhuman beings, and the meanings that humans attach to practices as they are ordered in particular constellations of relations. The primacy of relations

reprises Lemke (2018)'s argument, following Abrahamsson et al (2015), that it's not just the liveliness of matter but the inter-relations or 'matter in relation' that counts. Through adopting an embodied and relational approach, I characterise my methods as reading, walking, observing and listening as truer to my research experience. I set out my initial difficulty with obtaining formal interviews and how I adapted my 'ask' but also how I revised the importance of interview data within the context of the other sources. The third section deals with how I collated and interpreted the 'data' and how I trouble the question of 'knowledge claims.' I end with a comment on my own responsibility as a researcher.

Throughout the chapter I have sought to show my positionality and reflexivity, being frank about the challenges and how I responded to them. An awareness of the consequences of field developments is needed. For example, in 2019 I was invited to become a Visiting Scholar at the ByWater Institute and when engaging with people, I felt that status and my Tulane University email address gave me some local credibility and reduced, if only by a tiny amount, my outsider role. But being "affiliated with a socioeconomically elite private college" also placed me at risk of being seen as part of an "extractive elite" (Lesen et al 2019 p 5). I needed to be alert to these interpretations as well as find a way to navigate them. This chapter includes what I was thinking, how my thinking changed, what decisions I made, what actions I took or didn't take so that I can be held accountable for it all, a conscious assumption of responsibility for the research. While it is a record for evaluation by others I also believe, following Rose (1997) and Kama (2013), it's the place to be honest about the realities of research practice so that I can take learnings from a process that involves failure as much as accomplishment; in Beckettian terms "I must go on, I can't go on, I'll go on" (1953/2009), so that future projects may be inspired by Beckett's other famous maxim, "Try again. Fail again. Fail better" (1938).

Approaching matter-relations

In her doctoral thesis under the subheading "This is not an audit," Kärg Kama describes her earlier mindset as an auditor and how she had to train her mind to think differently for academic work (2013 p 85, see also Schuppli 2020). Similarly, PhD research changed my way of thinking after decades of variously practising law, undertaking policy research and participating in NGO governance (the latter ongoing part-time during my academic research), each of which prioritises the search for solutions to problems. No longer was I looking for answers to questions, rather I was looking for more questions and eschewing the temptation to simplify issues and problems so that they could be managed but to complexify them so they can be better understood (Barry 2021a). A shift needed to be made from the more familiar normative (how can we solve problems in the world) to the inductive and abductive (what is the world telling us and what can we learn about it). In my policy work, I have written about the concept of state responsibility, but now as an academic geographer I was approaching this question in a way that encouraged me to jettison long-held assumptions about reified structures of power and human-centred agency.

The scholarly literature has opened my mind to new, and I find compelling, ideas about how the world is constituted, in effect new ontologies. It has now become the heady task to 'think with matter' and to appreciate the agency of the 'more-than-human,' that things are circulating in a relational network (Latour 2005), that matter is lively (Bennett 2010), how things can 'force thought' (Stengers 2010), how materials can be political (Barry 2013), how governing is distributed (Foucault 1991), how the state exists through its effects (Mitchell 1991) and how knowledge is 'situated' rather than 'universal' (Haraway 1988).

However, I am also mindful of Zoe Todd's useful corrective: this kind of thinking is not confined, as it would appear from those citations, to Euro-Western thought but has, in different forms, existed for millennia in Indigenous thinking and practice, though it has been excluded from that academy or, if included, has been appropriated, in a form of colonialism (2016). Importantly for my research, as Todd makes clear, Indigenous thinking isn't just an ontological understanding about more-than-human relations but it is fundamentally about the *duties* that come with that understanding, something that Western scholars are increasingly recognising (Haraway 2016, Valverde 2017).

In tandem with encountering matter as a significant political force, what I see as *material thinking*, I am thinking not only about these new influences and their effect on how I approach the research but also what 'thinking' itself might mean. Donna Haraway (2016 p 130) quotes both Hannah Arendt (1977 p 24) on how thinking is "training one's mind to go visiting" and Virginia Woolf's feminist imperative "think we must" (1938/2019 p 187) as inspiring her own drive to "venture off the beaten path to meet unexpected, non-natal kin… to strike up conversations, to pose and respond to interesting questions … to take up … unasked-for obligations" what she calls "cultivating response-ability." Horlings et al (2020) interpret Haraway (2008)'s 'response-ability' not as the liberal humanist obligation to be responsible for one's own choices but the ability to respond ethically to the demands of the many others with whom we share this world. In practising research that was as 'response-able' as possible, I worked with both these ideas in tandem.

Researching materially

Undertaking field work for me has involved transitioning new and exciting concepts from my mind to my research practice. Following Sarah Whatmore (2006 p 604), I was making the shift from attending to what things mean to what they do which, as she notes, has "methodological consequences for how we train our apprehensions." This meant paying attention to questions of action and inaction. In this endeavour, Latour (1993) emphasises verbs rather than nouns, axiomatic in Indigenous culture (Kimmerer 2013/2021). It is also necessary to attend to prepositions, an idea that resonated when considering the question of to whom or for whom responsibility was being practised or withheld, enlivened by Derrida's distinction between *répondre à* and *répondre de* (1990) discussed in the previous chapter.

Following my theoretical influences and my intention to research materially (Barry 2001, 2013, Mitchell 2002, Latour 2005, Stengers 2008, Bennett 2010, Braun and Whatmore 2010, Braun 2014a), I thought of the research site as a potential 'network' or 'assemblage' within which to look for the emergence of circulating forces, nonhuman as well as human, visible and invisible. These theories helped engender a critical, indeed sceptical, mental reframing in which I was guided by notions of encountering, relating, entangling, processing, destabilising, contesting and manipulating which are both ontological and epistemological as I have been actively engaged in these practices myself as a researcher. This has involved a kind of double thinking, first what are they and what are they doing and second, what is the research experience.

Likewise, when researching the 'state' and 'governing,' I was following methodological guidance from Foucault to consider what is happening at the extremities of the state's power – all along its capillaries - and then to conduct an ascending analysis (1980). As Timothy Mitchell has cautioned, you cannot try to "pin the state down" (1992 p 1017). Instead, you have to look to see where it is represented and reproduced, how it

is constituted through its effects and prosaic practices (Mitchell 1991, Painter 2006). Alex Jeffrey observes that it is fundamental to the theories of the state developed by Mitchell and Painter that it is within social processes and interactions requiring investigation that the state establishes its existence (2012 p 25). In other words, the state can only be theorised empirically and one should be alert to "the kind of theoretical coronation of the whole" that Foucault was "so keen to avoid" (1980 p 88). These conceptualisations of matter and governing have come together under the rubric 'material politics' (Barry 2013) which offers a way of looking at how matter can engender both political and anti-political effects.

As discussed in the literature review, existing scholarship emphasises the relation between matter, the state and power whereas I am interested in locating responsibility. I wondered how I could best research that concept in a material politics framework. I was informed by the practical potential of Doreen Massey's 'geographies of responsibility' (2004) which identifies a spatial politics concerned with the relations which run 'into' and 'out from' place. Following material thinking I came to understand during my empirical inquiry that the route into responsibility emerged from the matter itself and that *a priori* I was observing the entanglement of matter and state responses or non-responses and the way in which those responses then did or did not materialise into commitments and responsibilities including the establishment of state agencies to fulfil those roles. My theoretical contribution is to show that matter is engaged in a two-part process: first generating a response and second an expression of responsibility.

Studying a 'case'

Animated by a sense that there were interesting and as yet under-explored connections between the way that matter, like climate and environment and their constituent elements, were in relation with state responsibility, I needed a research design that allowed for the evidence to emerge so that I could discern those relations, what they might mean and their wider relevance. Could the multiple sites, events, materials, programmes and people that I was learning about in Louisiana coalesce into a 'case'? Does the case offer analytical leverage beyond its own confines? The researcher's aim in studying a case, as Andrew Barry puts it, is to find out whether specific forces or events that may not appear to be significant themselves carry greater significance when framed as elements of a larger constellation of forces (2013, Gerring 2004, Berlant 2007). However, to be more than a "merely gestural instance" a case must "bear the weight of an explanation worthy of attending to and taking a lesson from" (Berlant 2007 p 666). With this guidance in mind, I gave consideration to the case study method as the way to make sense and draw learning from my field site.

Case studies are the preferred strategy when 'how' or 'why' questions are being posed, when the investigator has little control over events and when the focus is on a contemporary phenomenon within some real-life context (Yin 2003). They are understood to feature empirical enquiries within their context using multiple sources of evidence (ibid.). Following the material politics methodology already outlined, I took this to involve a detailed and intensive investigation of matter, forces, state practices, effects and, as I intended, responses in a geographical, environmental and political location which would permit the research questions to be studied. Building on this methodological precedent, my own approach for the research phase was to study a 'case' by selecting one place in which I could immerse myself, more than that

seemed to me to risk insufficient depth of engagement within the time constraints of part-time PhD research.

Yanow's description of a single case study speaks to my research ambition: "single-n cases typically entail multiple observational areas within their geographic or political settings; multiple interviews and chats; multiple events observed; multiple passages read in documents" (2009 p 294). This approach seemed researchable, practicable and already well-practised by geographers and fellow materialists; see for example how investigations are undertaken by, among others, Barry (2001, 2013), Mitchell (2002), Mol (2002) Marres (2012), Donaldson et al (2013), Meehan (2014) and Balayannis (2020). The purpose of studying a 'case' then was to see what emerged and what new ideas or concepts could be learned from studying that 'case' in the way I have described.

Why coastal Louisiana

The Introduction provides a sketch of the Louisiana that I learned about and came to know. The question here is why I selected that location for my research. My search criterion was for a place of material politics involving climate impacts and state engagement and, as a human geography preoccupation, people in a relation with their (changing) environment. I selected Louisiana because its long-standing and severe environmental problems are being aggravated by sea level rise, rising temperatures and increasingly forceful and frequent hurricanes. The juxtaposition of fossil fuel production with extreme environmental pollution coupled with a history of state failure, colonialism and racism was compelling at the same time as complexifying. It seemed probable that the relation between matter and state responsibility could be problematised within this context.

In 2017, with its political history of oil and gas dominance and climate denialism, Louisiana might have seemed like an unusual choice for an exploration of climate responsibility. When I selected it, the State did not have a climate mitigation plan though the City of New Orleans published one that year. It wasn't until early 2020, with the Governor's announcement of his climate initiative, that a form of climate responsibility as mitigation and potentially justice materialised in the governing sphere at the state level. So, I first went to Louisiana, like the German student delegation I write about in the Air chapter, thinking of it as a climate-impacted site but what I primarily encountered, and therefore learned was more salient in the location of study, were the pre-existing and fraught conditions of extreme pollution, racism, coastal erosion and hurricane damage trauma with far longer histories (Craig et al 1979, Houck 1983, CRCL 1987, Barry J 1997, Braun and McCarthy 2005, Nixon 2011, Colten 2015, Hochschild 2016, Commardelle et al 2020, Horowitz 2020). I had, therefore, to be alert to how terms like 'climate change' or 'climate impact' are viewed, and viewed differently, by people in the place. While I was attending to ideas of material politics and climate responsibility, local scholars, coastal scientists, policymakers, non-profit representatives and community leaders were occupied with such immediate questions as how to restore and protect some coastal areas and retreat from others and the effects on local communities of those policies and programmes (Manning-Broome et al 2015, Naquin et al 2018, Laska et al 2019, Commardelle 2020). This meant a continual reframing of my research questions to make them relevant to my interlocutors, as I describe below.

Site selection is not only driven by relevance and salience but also by accessibility. Having lived and worked in the United States many years before, including in the American South with its problematic history, I felt

both a familiarity with its culture and reasonably confident about access. However, the deeper inquiry inherent in academic research together with contemporary movements, such as Black Lives Matter and decolonialising the academy, led me to rethink my terms of engagement with the place.

Racism and colonialism

Researching somewhere like Louisiana, a former slave state and site of genocide, racial violence and settler colonialism (Hall 1992, Rothman 2007, Ethridge 2013, Jessee 2022), necessitated not only a land acknowledgement but more active engagement with the notion of 'anti-racism' both for my research and for me personally (Scott 2019). The methodological dilemma I faced was how to centre the persistence of racism and colonialism not only in the field but also in my practice, how I could decolonise myself without misrepresentation or appropriation. As Zoe Todd reminds us, Indigenous thinking (and she is careful not to generalise) is not just a "well of ideas to draw from" but depends on reciprocity and responsibility; as she says it is:

> … a body of thinking that is *living and practiced by peoples with whom we all share reciprocal duties as citizens of shared territories"* and who are engaged in a struggle for recognition (Todd 2016, emphasis in original).

Max Liboiron (2021), driven by an ethical imperative, wants to "focus on responsibility - the obligation to enact good relations" as a researcher. I was inspired but also daunted by the research standards that they set and worried about getting it wrong. (I am thinking of the episode with the student who was required to apologise to lab colleagues for 'collecting data' without first asking for permission, not only the incident itself but the way that the author reported it in their book.) I was alert to the pitfalls for someone with my positionality of privilege, variously framed as white, Global North, Euro-Western or settler, as well as being an outsider not affected by the material conditions of the place through the ability to leave. I needed to be mindful when thinking about 'place-relations' or 'matter-relations' of the embodied expressions of stories, laws and songs in Indigenous Place-Thought (Watts 2013) that they are not my stories to tell. However, Liboiron (2021)'s constructive point is that methodology is a way of being in the world and there are less colonial and anticolonial ways to do that.

To address these concerns, in January 2020 I decided to make a diversity commitment, mindful of the need for that to be substantive and not gestural or appropriative (Ahmed 2012, Liboiron 2019, 2021). My first step was to prioritise literature authored by BIPOC scholars writing on my research area and place (Whyte 2017, Sultana 2022, Edwards 2018, Broom 2019) but also more widely (Fanon 1963, Kimmerer 2013/2021, Eddo-Lodge 2017), so that I could better understand the context and alternative framings. The commitment was driven by the need to seek out and understand arguments from a broad range of sources rather than an investigation into questions of identity. I sought out and started following and learning from Indigenous and Black scholars and themes like #citeblackwomen on Twitter. I maintained tables across the literature and interviewees listing diversity characteristics where they were self-identified. The next step was to ensure an inclusive and diverse citation strategy in my text, understanding that citation is itself a Western construct (Kropiniski 2022) and alive to the risk of the reductionist tendencies of Western scholars (Kermoal and Altamirano-Jiménez 2016). I wanted to foreground community and BIPOC perspectives – both empirically and in the scholarship - but there is a risk of the 'sprinkle of a few words related to Indigenous people' (Sabzalian 2023) or that they are 'superficially tagged on' (Tuck and

McKenzie 2015). As Liboiron (2021) points out, the approach of 'try hard and tweak at the end' probably isn't sufficient but trying hard, seeking to learn and having a respectful sensibility are what I have tried to do and I am aware there is much more to learn.

Ethnographic sensibility

These preoccupations, commensurate with the more inclusive epistemological perspectives I had been developing through reading the theoretical literature suggested to me that earlier iterations of my research design, what I saw as the discrete practices of content analysis, participant observation and interviews, would benefit from more of an overarching framework. As I was 'changing my mind,' I felt empathy with a research approach more aligned with Kant's idea of *erweiterte Denkungsart,* or 'enlarged thinking' which 'makes a shared world possible' (Benhabib 2022) and so I began to think more about the practice of ethnography.

Ethnographic research is necessarily reflexive requiring recognition that social research is part of the world that it studies (Crang and Cook 2007, Hammersley and Atkinson 2007). Such an approach pays as close attention to social practices (what people do) as to social discourses (what people say) (Whatmore 2003 p 93) seeking to understand what may lie beneath more obvious interactions and processes (Vanhala et al 2022). I felt I was definitely going in an ethnographic direction, understood as open-ended, non-linear, multi-perspectival and informed by an ethos of practical experimentation (Strathern 2004, Becker 2009). However, I questioned whether what I was doing was sufficiently 'ethnographic' or could I be said to be researching with an 'ethnographic sensibility'? Puzzling over the meaning of ethnography coincided with Lisa Vanhala's invitation to join her and Angelica Johansson in writing a research note exploring that notion and its potential for climate governance research (Vanhala et al 2022). The consequence was that while we were developing our thinking and argument for publication in a journal, I was simultaneously cross-reflecting and practising this learning in my own research.

First explored by Ellen Pader (2006), the concept of ethnographic sensibility was developed by political ethnographer Edward Schatz who defines it as an approach that goes beyond 'face to face interaction' and "cares—with the possible emotional engagement that implies—to glean the meanings that the people under study attribute to their social and political reality" (2009 p 5). Extending beyond the method of participation observation, an ethnographic sensibility is a 'frame of mind' (Herzog and Zacka 2019) and a means of 'problematising the world' (Corson et al 2014) which extends across all aspects of the research agenda and writing practice (Henderson 2016, McGranahan 2018) informing 'the entire enterprise' (Yanow 2009 p 296).

Inspired by this concept and its resonance with our own research agendas and experiences, my co-authors and I developed a 'hanging' heuristic as a research guide at the fieldwork stage. We interpret the well-established concept of *hanging out* (Clifford 1988, Geertz 1998) as the practice of making oneself available, often in informal and social settings such as corridors and cafes, to develop field relationships (Browne and McBride 2015). These allow time and space for people to contextualize their ideas in the before and after moments of formal interviews, when "the laptop cover was down" (Walsh 2009 p 169). We use the term *hanging in* to characterize the temporal dimension of ethnographic research and how questions of access and participation are navigated. We argue that it is a way for researchers to reflect on and describe

practices of visiting, inhabiting, retreating, and revisiting the field and how that affects their research (Burawoy 2003). Hanging in is comparable to Tariq Jazeel (2007)'s 'abiding' which he sees as being patient and staying with the rigours of the research place.

In addition to the importance of hanging in, we also formulated the idea of *hanging back*, which captures the ethical imperative and reflexivity needed when researching sites of climate impact, risk, vulnerability, and loss. We argue that researchers (particularly 'outsiders') should question whether their research techniques are appropriate and whether their research questions and outcomes are relevant and useful to the people with whom they are engaging. This preoccupation led me to consider how to include the perspectives of people living on the coast who are particularly experiencing environmental impacts, what are known as 'frontline' or 'affected communities.' Coastal residents report being let down by federal and state agencies (Burley 2010). I needed to avoid what Eve Tuck (2009) has called 'damage-centered' research which intends to document peoples' pain and brokenness in order to hold those in power accountable for their oppression but which reinforces a one-dimensional notion of marginalised communities as depleted, ruined, and hopeless. This can lead to what Alice Mah (2014) terms 'dereliction tourism.' As Farhana Sultana (2015) observes, issues of reflexivity, positionality and power relations in the field are even more important in the context of multiple axes of difference and inequalities. Instead, I needed to think with 'response-ability' and 'care' (Haraway 2016, Puig de la Bellacasa 2017) and consider how those obligations could be brought into my research practice.

Affected communities are 'over-researched' (Clark 2008). I was struck by a comment from a research friend that "it seems like every Tulane master's student heads down to the coast to ask people what it's like to lose their land" (Informal conversation 2020). I was learning from local scholars who engage in best practice 'participatory research' techniques and whose work benefits the coastal and riverine communities they engage with (Laska and Peterson 2011, Naquin et al 2015, Lesen et al 2019). My research design proposed interviewing 'professionals,' those who work on coastal restoration, which included community leaders and Tribal representatives whom I met and talked to at events and conferences. My approach to residents was to have casual chats when I met them while visiting coastal areas or at informal gatherings. These provided me with direct and spontaneous perspectives and avoided the need to burden them with a request to be 'interviewed.' I sought to pay particular attention both in research and writing to community voices as part of my diversity commitment, at the same time as, and in tension with, my strategy of *hanging back* from bringing their perspectives into my account through the process of formal interviews.

The final category in Vanhala et al (2022), *hanging around,* highlights material thinking in ethnographic studies. It acknowledges the recent developments in bringing materials and spatiality into the analysis (Billo and Mountz 2016, Ehrenstein 2018, O'Reilly 2018, Cook 2019, Marion Suiseeya and Zanotti 2019, Hitchings and Latham 2020), a key element in my own methodology. Hanging around encourages a sensibility to space and matter extending the researcher's gaze to 'mundane' entanglements between people, place, and materials (Richardson and Thieme 2018). Observations of quotidian spatial practices, beyond official places of interaction, can reveal how those conditions affect access and lead to marginalisation (Marion Suiseeya and Zanotti 2019). My own observation (recorded in Vanhala et al 2022), about chairs being left stacked up against a wall rather than set out for attendees to sit on at a CPRA Coastal

Connections consultation event exemplified how materials can be enrolled as a controlling technique in governing practices, what Latour calls "the transporting power of humble mediators" (2005 p 194).

The 'field'

The state of Louisiana is delineated on a map as a geological protrusion at the end of a continental land mass, yet in the location, its 'reality in practice' (Mol 2002), is unstable, porous and shifting, so much so that maps are struggling to keep up with the transition from land to water (LA SAFE 2017). My field site was changing morphologically, indeed disintegrating, during my research. Apart from that disturbing reality, there are also interesting questions to be asked about what constitutes the field the researcher inhabits, its constituent parts as well as its parameters and how place itself is open and hybrid, always provisional and contested (Massey 1994). Cindi Katz (1994) draws attention to the blurred borders of fieldwork posing boundary questions about when the researcher is in the field and when not. Katz proposes a recognition of the artificiality of these distinctions and acknowledgment of the blurry space of everyday life that also is the field. Being alone in an unfamiliar city and having a lot of time on my own, I found my 'immersion' and 'exposure' to the geography of the field site to be intensive both temporally and spatially (Yanow 2009). Even during the times when I was not physically 'in the field,' my experience during fieldwork and when writing has been that I am cognitively continuously engaged with the place. I take this to be what Massey (2003 p 84) means by operating within 'an imaginary' of the field.

Katz (1994) observes that ethnographers are displaced people yet that displacement is hardly remarked on by researchers. She wants to problematise the displacements scholars engage in when they conduct fieldwork. My own experience is that the displacement is physical (I have taken a long-haul flight and am now living in another city, country and time zone) but it is also sensory and psychological. One period of immersion took place during September and October 2019 when the long heat and humidity of the Gulf summer failed to accede during the weeks when it usually does to cooler autumn weather. For those unaccustomed to it, the wet heat is enervating and whenever you are outside you are primarily thinking of when you can get back inside to the relief – and privilege - of air conditioning. Being indoors is a form of displacement from the natural environment, restricting understanding of place. The difficulty with being outdoors in the heat affected my research schedule as I had to cancel a day volunteering with a local conservation group planting marsh grasses as I did not think I could tolerate working in the forecast 90 degree heat so instead I stayed indoors. Fortunately, I was able to attend on another day, held during the winter, but the experience of being dis-embodied from the field is also a way of contemplating 'matter-relations.' Our bodies affect our ability to find answers to research questions (Leigh and Brown 2021).

In March 2020, because of impending restrictions in response to the coronavirus pandemic I was further displaced from the field physically, and in a sense I have, by going and then abruptly coming back in the middle of my fieldwork been doubly displaced. However, as Massey (2003) argues, the field is not somewhere to go to and come back from but a complex structure being transformed by the researcher and linked through the researcher's chain of production. My record of 'being there' physically is, between 2018 and 2020, five trips for periods ranging between one week (for the 2018 AAG conference) to periods of two and three weeks at a time. On the last occasion, I was scheduled to stay for 8 weeks but Covid intervened and I had to leave early. The duration of my physical presence in Louisiana was a total of 3 months, though

for the reasons already given I am troubling the tension between duration and immersion arguing that it is the quality of the engagement that counts (Yanow 2009, Hitchings and Latham 2020).

Over the seven years I have actively been 'researching' Louisiana, when not physically there, especially during lockdown, I was interviewing people on Teams or Zoom and 'attending' webinars and other online events, either with 'live participation' or, because of the 6-hour time difference, afterwards. This distanced approach became the only method available during Covid restrictions though I was then able to attend more meetings, because they were being held online, than I could have attended in person. (State agency meetings are held in the State capital, Baton Rouge, meaning a Greyhound bus round-trip from New Orleans where I was based). Ethnography as listening and watching rather than physical presence in place with all the senses, means the practice of hanging out and hanging around (Vanhala et al 2022) is undertaken digitally which is a qualitatively reduced experience and requires a workaround, as described below.

Things don't turn out the way you envisage and that means having to (re)negotiate the terms of engagement in fieldwork (Basnet et al 2020). Research in the field involves not finding what you think you might find which requires more thinking and recalibration of research aims and questions while research is ongoing. What was emerging in the field encouraged me towards different and what appeared to be more relevant questions to do with the relation between matter and response antecedent to matter and responsibility, what I noted above as a 'breakthrough,' and I found myself returning frequently to my research questions and refining them as a consequence of what the field appeared to be telling me.

Doing the research

Having described how I approached the research, this section discusses the things that I did while researching and what it was like. Rather than describing the different 'methods' according to their type, I adopt a sensory taxonomy because that was what I experienced. I note with interest that Knox and John (2022) in discussing methods for understanding the social implications of infrastructure – also my research concern - depart from traditional methods to propose a variety of embodied and social interactions such as walks, exhibitions, performances, meetings, and staged performances as ways of thinking about and eliciting socio-infrastructural interactions. Not only did I walk and cycle but I also attended art exhibitions and other cultural gatherings including an evening at The Studio in the Woods and a Saturday morning at a literary symposium where alternative perspectives on the conditions of coastal Louisiana were presented and discussed. By pursuing 'mixed' methods, I don't only mean that they are varied and triangulated but that they and their sensory counterparts commingle. While in the field, I would be reading as well as walking, seeing and listening and each of these modes would inform the other. I distinguish between research with matter (mostly done on my own) and with people (where my observations and thinking were mediated by theirs), again acknowledging their overlap (moments and places where people and matter intersect).

The practical question, deploying all the methods described below, was where and how to locate matter, the state and responsibility within coastal Louisiana. The starting point was the need to gain as much information as possible about what was apparently on the state agenda so I kept a broad lens on the

material forces that the federal, state and parish level were responding to and where the state might be taking on some form of responsibility. I paid attention to what and how materials emerged, looking for patterns, connections and relations between them with an actor-network mindset (Latour 2005), specifically seeking what might be a state response, its relation with the material in question, the relation between the material and the state and the sequencing of that relation. I took 'response' to mean articulations and practical expressions of what the state agency proposed or planned in relation to the matter it was dealing with. I also noted where matter was in relation to other matter, what I came to see as a 'tussle,' and the extent to which that was mediated by the governing practices and state effects.

In addition to 'following' the agendas of state agencies relating to the matter they were concerned with, I adopted a complementary interest in the range of matter that came into my consciousness from what I saw or heard of from other sources or my own observations. Rather than exclusively following an object through its journey (papaya for Cook 2004, mushrooms for Tsing 2015, gases for Forman 2021, pathogens for Smith 2022) which would require prior selection, I observed what materials emerged as a guide to what I should follow. So, I followed, in the sense of paying attention to, matter's emergence and articulation and connections between that matter, other matter, humans, state agency programmes and ideas to see how their relations were constructed (Mitchell 2011). I was also inspired, as both Bennett (2010) and Hay (2010) have been, by Derrida (1997/2002)'s notion that being is always to be following, always to be in response to a call from something. I was researching responses while being in a state of responsiveness myself. Jane Bennett follows up this idea in her recent book on Walt Whitman, where she discusses A N Whitehead's notion of 'prehension,' which posits the idea of a responsiveness to the world. The point that Whitehead is making is that this responsiveness "may or may not be cognitive." As she quotes him saying:

> We certainly do take account of things of which at the time we have no *explicit* cognition. We can even have a cognitive memory of the taking account, without having had a contemporaneous cognition (Whitehead 1927 p 69 cited in Bennett 2020 p 51, emphasis in original).

Whitehead counterposes 'prehensions' with 'negative prehensions,' which are flash-impressions of ingressions into the mind which are received but then immediately rejected or screened out (Whitehead 1929/1979 p 41 cited in Bennett 2020 p 52). As Whitehead explains, experience is necessarily subtractive; not noticing some things is a condition of noticing anything and things can be discerned without necessarily being in focus.

Working with these tensions between the cognitive and non-cognitive, what is included and what excluded, I approached the task of seeking to understand the potential significance of matter. Initially, inspired by the kind of discrete matter foregrounded by material scholars (Mitchell 2002, Marres 2012, Barry 2013, Meehan 2014), I paid attention to what matter presented as important or salient, where it was located and what its role might be in the wider network of other circulating forces. As Barry (2001 p 174) puts it, "air, water, grass, persons and animals are all artefacts" and capable of being subject to political contestation or containment. I paid ethnographic attention to what I was encountering: the presence of water (river, bayou, flooding, rain), its exclusion (walls, levees), the matter encountered visually such as houses on stilts, piles of oyster shells, dead trees at the coast, live trees in the city park, oil and gas infrastructure, methane gas flares, maps showing land loss, oil company branding, matter encountered discursively such as sediment

diversions and 'carbon emissions' as well as all the issues people in the location are concerned with such as restoring wetlands, managing water, insurance, resources, resilience, differing views of the role of the government and the impact of fossil fuel activities. I observed and noted their location and interaction, where the material was large, human-made and intrusive (levees and pipelines) or smaller, naturally occurring and depleting (coastal trees), what was visible (pipeline endpoints and methane flaring), invisible (oil and greenhouse gas concentrations) or a combination of those features (water in relation to land, oil in relation to air). I also noted the extent to which matter was in a relation of response to other matter (fresh water sediment diversions and oysters' need for brackish water) and their relation to state programmes and effects, and whether they were or were not apparently catalysing or inhibiting expressions of responsibility.

I had intended to research these materials as mini case studies or conceptual launchpads but what I found was that everything I observed and learned about responses to coastal erosion was clustered around three types of matter: water, land and hydrocarbons. What I was actually encountering through all these materials were the issues of flooding, sea level rise, land loss, dredged canals, villages outside the levee system and what lay beneath them were these basic forces and their inter-relationship. Those three forces were what became increasingly significant in the research field, the smaller objects, materials and technologies seemed to circulate within those larger elemental contexts. It wasn't until 2020 that another form of matter, variously presented as greenhouse gas concentrations or carbon emissions that I eventually decided to think of as 'air,' emerged more strongly in the polity and which was in a relation with and necessarily informed by the other three types of matter. However, as I proceeded with the four forces as my guide, I was conscious of the need to avoid taking an 'aerial' or reductive view and so continued to investigate and pay attention to the materials, techniques, practices, technologies and effects through which those forces emerged.

My 'methods' were extensive in time and space. In the physical field I felt I was always 'researching,' whether reading, seeing, observing, hearing, listening, walking, riding city bikes, sitting on buses or trams, being driven, being alone, being with people, taking photos, marking my locations with blue dots on my iPhone (see Image 8), standing waiting for a streetcar or bus, sitting with my laptop in a library, café or where I was staying or lying on the grass in the park. While valorising the somatic I was simultaneously thinking and writing (hand-written fieldnotes, online notes, summaries, drafts) whether physically or virtually in Louisiana, paying attention to things, materials, conditions, and 'place-ness' as much as people in those places (Yanow 2009 p 283). I turn now to the method of reading written materials, the first activity in research.

Reading

Documents provide information, whether in hard copy or online, set the scene and help the researcher navigate to places of likely research usefulness. While reading, one is also mindful that documents and recorded information are also, through their discursive techniques (Foucault 1971) artefacts with - and the products of - potential agency and power. This requires attention to what they reveal and obscure and how they interact with other materials (Barry 2013). Reading also involves considering the meta-detail around the contents: their provenance and location, the date they were created, the identity and positionality of author(s), the explicit or implied purpose as well as questions of accuracy, authority, access and

contestation. I started by making online searches of organisations in Louisiana concerned with coastal erosion and sea level rise which either produce materials themselves or circulate those of others. These consisted of federal agencies, State agencies and State government, the State legislature, parish governments, levee boards, port authorities, research institutes, non-profit organisations, community groups, faith groups, consultancies, corporations, partnerships, coalitions, academe (both the coastal science and social science literature), non-academic authors, mainstream media outlets and social media. These searches led me to further organisations and documents being located through cross-references and footnotes. The archival record (included in the References when relied on in the text) included books, articles, scientific data, policy reports, consultations, impact assessments, frameworks, plans, programmes, press releases, agendas and minutes of meetings, the legislative record, organisational mission statements, statutes, rules, newspaper articles, reports and editorials, blogs, polls and surveys.

Included within the 'reading' are not only documents with words and numbers but visual and aural material already produced and available to be reviewed such as maps, photographs, recordings of public consultations, webinars, broadcast media reports, podcasts, videos, documentaries, films, images and more ephemeral matter like Twitter posts and memes. I was seeking to 'read' ethnographically to understand the perspective of the 'author,' to acquire some meaning for my research while attending to 'feel' through the variety of ways in which issues are presented. Following Jazeel (2007) and Robinson (2003) on how to avoid a postcolonial approach to regional scholarship, I read a good deal of local literature (and was privileged to meet several of the authors) which helped me understand the issues of concern, contestation and argument they are addressing. I signed up to various organisations to get advance notices of their meetings and updates on their work. Building on Bonilla and Rosa (2015)'s 'hashtag ethnography' and Zanotti and Suiseeya (2020)'s approach to social media as a 'field site,' I 'followed' organisations like the CPRA who are active on Facebook as well as 'following' a wide range of people providing information and perspectives about coastal Louisiana on Twitter now X.

I made search requests online, on organisational websites and in the documents themselves with the subject areas for investigation including coastal erosion, land loss, flooding, technology, infrastructure, habitats and oil and gas looking for indicators of 'response' or 'responsibility.' I kept the search request wide as it became apparent that issues like 'sea level rise' are often characterised as 'flooding' or 'land loss' and as state responses in the form of projects and plans emerged, the search would broaden to include them, e.g., marsh restoration, sediment diversions, the Morganza to the Gulf levee project. I was searching for recurring themes, repetition, omissions, similarities and differences in the different texts (Ryan and Bernard 2003). As reading progressed, I made online folders and notes identifying and logging the material that I was finding under subject-headings like "CPRA" (for an organisation) or "sediment diversions" (for infrastructure) and "cypress trees" (for organic matter) cross-referencing the organisation and the material issue and adding my own critical evaluations, interpretations and ideas.

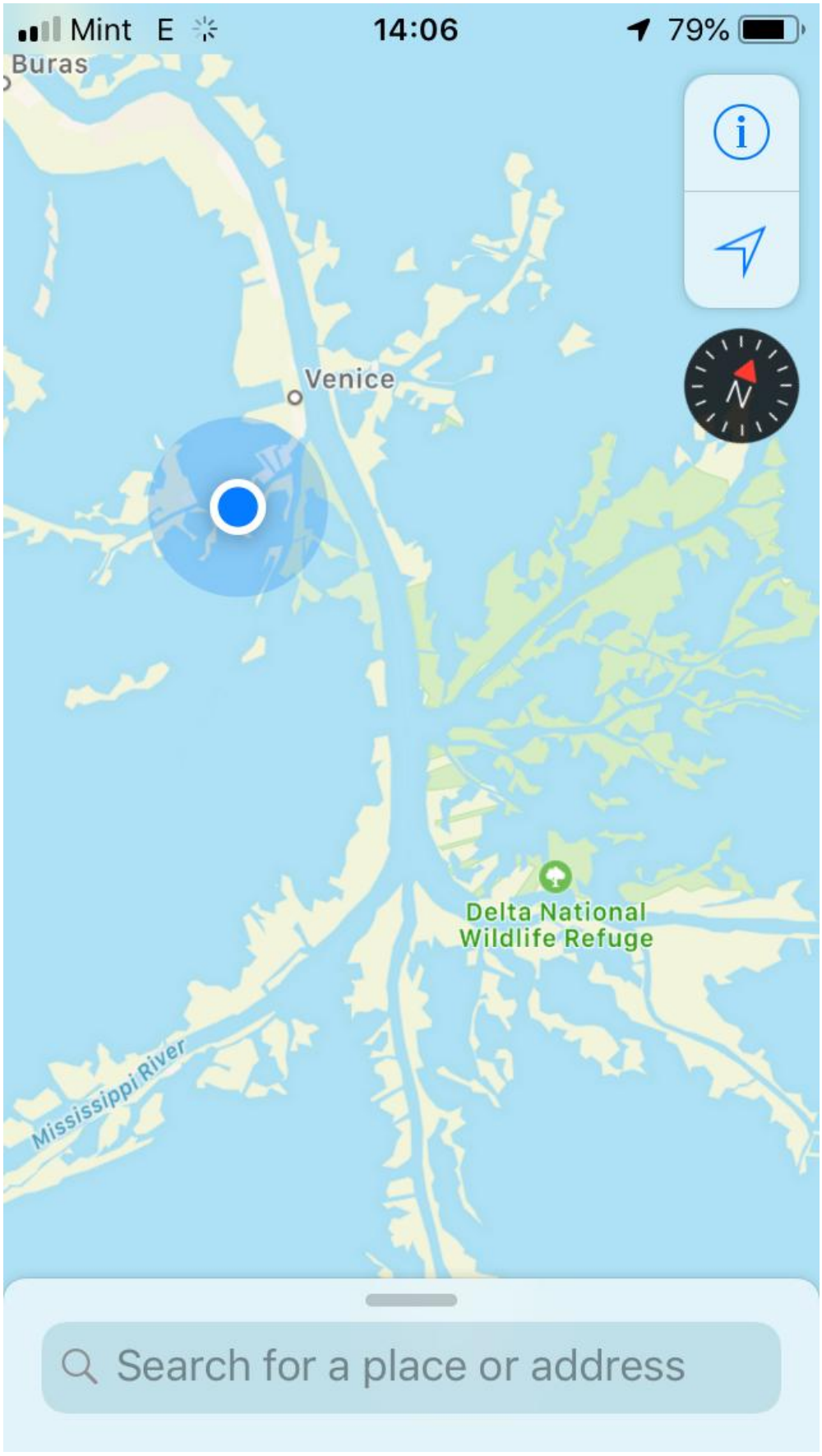

Image 8: Visiting Venice, LA, March 1, 2020, own screenshot

Reading the materials generated by state agencies, the oil and gas industry and certain, usually large or nationwide, non-profits, I was immersed in argumentation, policy making and implementation about excess water and land loss. Although 'affected communities' are often mentioned, references to colonialism, racism, injustice and reparations are nowhere to be 'seen' in the 'governing' archives that I kept finding myself in, at least not until the work of the equity advisory group brought climate justice into the Louisiana Climate Action Plan (CITF 2022). This effective 'erasure' (Smiles 2021), sits within a history of state-sanctioned marginalisation and violence towards Indigenous communities and people of colour. State policies have long prioritised environmental considerations over those of local people (Colten 2015) and scholarship is clear on the practice of active permitting of sites of pollution among Black communities (Bullard 1990/2018). To avoid over-inhabiting those exclusive places and falling into the trap of whitewashed policy-making which made those other factors invisible, it was necessary to ensure a balance by seeking out alternative written materials which disrupted those norms.

My experience of reading is that nearly everything in the field site is interesting when one is in research mode. The archive takes you down new paths, offers new ideas and suggests more material to read. However, you have to keep coming back to your own research questions which involves a process of translation: they are saying it that way, I am looking at it like this and is there anything there in that context? I had to maintain focus while practising a counterpoint of keeping an open mind to learning. Reading can be tiring, you can lose concentration, it is hard to keep a 50-page report open with one hand while scribbling in a notebook or on the laptop, especially in cafes and while travelling. However, while reading is necessary it is not sufficient, you don't get inside track or sufficient texture, you need to get out and about, see and feel things and talk to people.

Walking

Walking was unplanned as a research method. I should have thought about it more when preparing my research design as no geographical study is possible without being out in the environment. Walking as method is gaining traction (Pierce and Lawhon 2015, Taylor 2020, Knox and John 2022), particularly, in a more-than-human world where a critical mode of 'walking-with' engenders solidarity and response-ability (Springgay and Truman 2019 building on Haraway 2016). When I wasn't reading, writing, attending events and talking to people I got out a lot and mostly by walking or renting a city bike. Sometimes I was walking with purpose (to get somewhere) other times I was wandering (Certeau 2011, Solnit 2000), employing *dérive* or drift borrowed from Benjamin (1999)'s interpretation of Baudelaire's *flâneur* now with its feminist incarnation, the *flâneuse* (Elkin 2017).

Where the ground is wet or under water as if often the case in southern Louisiana, walking can be more like dodging water or wading through it reminding one of the material relation between water and land. What I saw while walking - water sometimes going down into drains, other times bubbling up from the drains – illustrated the city of New Orleans' problems with managing water. Other times I didn't know what I was seeing or saw it in one state rather than another. Was the water seeping over the wet slips at Venice marina a sign of sea level rise? I had seen many images of Island Road when it is flooded and impassable so when I walked on it on a day when it wasn't flooded, the water close-up on either side presented as an anticipatory threat. Also absent from what was presented to me on the days that I was there, apart from

road signs in the city advertising 'evacuation routes,' what happens to the places and people when there is a hurricane and storm surges of water which I was reading and hearing about: the storms, the damage, the evacuations, the loss. While walking I was 'seeing' in the sense not only of what is present but also what may be signified (Berger 1972). Inspired by Creswell (2019)'s practice of an 'ethnographic gaze,' I developed an ethic of non-intrusiveness about walking and taking photos on my iPhone. I would avert my 'gaze' and *hang back* not taking photographs in places where I thought there might be a risk of engaging in 'dereliction tourism' (Mah 2014) or employing a 'dereliction gaze.'

A sensibility arising from awareness of people in the place underlined the need to engage with people in order to more fully understand, something that can't be done while researching on one's own or solely observing matter. People add context, explanations, insider perspective, new ideas and offer a course correction for the analyst's own incipient understanding and interpretation. For example, when I asked a state official whether the fact that the city of New Orleans had a climate action plan might have influenced the State governor to adopt one, the answer came that it was if anything a contrary indicator which gave me useful insight into the relations between state and city governance from the perspective of an interested party, a state official (Interview 11). A range of viewpoints is essential as people tend to confirm, refine or contradict each other which informs the way in which the researcher decides what is 'evidence.' Following Barry (2013 p 27), I "moved back and forth across the lines" immersed in differing perspectives and tracing the issues "from as many directions as possible." However, the Latourian actor network approach of waiting to see which actors emerge may be too passive for some data sources. With people you have to actively bring them within your frame. The next two sections describe how I engaged with people during fieldwork.

Observing (and participating)

Observing here means what the researcher does when attending gatherings of people in their own pre-designed contexts, whether indoors or outdoors, what is commonly referred to as 'participant observation' or 'event ethnography' (Billo and Mountz 2015, Henderson 2016). However, I was not researching a selected 'community' (like the arts workers in Rose 1997 p 318) but rather a broad community of people (Crang and Cook 2007) concerned with coastal erosion with different roles and experiences and differing viewpoints. Early on in the research, I diarised events and public meetings which I thought would be useful for my research, especially opportunities to observe the dynamic of state action in practice (meetings of the CPRA, the Governor's coastal advisory commission, the US Army Corps in NOLA and later the meetings of the Climate Initiative task force). Research friends also alerted or invited me to events and I took up opportunities to go to events and conferences as I became aware of them, attending 34 in total (see events list in the appendix).

My practice was to arrive early to an event which gave me a chance, if appropriate, to introduce myself and talk to the organisers. I would then *hang around* as people started arriving taking in the space and geography of the meeting room, who was interacting with whom and during the meeting, who sat where, who spoke, who didn't. Afterwards, I would not rush off but *hang out* in the meeting room or corridor thanking the organisers for including me and participating in ongoing conversations. After one event, I accepted a generous invitation to go for pizza. On sitting down at the restaurant table, I found myself next to one of the Tribal elders who had spoken so powerfully and eloquently during the meeting about what

their community is facing. Afterwards, as we were leaving the restaurant, it turned out that another of the community leaders was driving through the part of town where I was staying and I gratefully accepted a ride home (a good reason for not having a car and being in a place where public transport is patchy). During both of these one-to-one conversations – over pizza and on the ride across town – I was able to listen and empathise gaining a deeper understanding of their perspectives than had been possible when they were presenting their position more formally in a room full of people.

With events that I attended in person, I was a participant in the sense that I was 'at the table' or 'in the room' and my contributions ranged, depending on the event, from silence throughout (state meetings with preset agendas) to perhaps asking a question (public meetings) to chatting to attendees (like at the Coastal Connections event described in Vanhala et al 2022) or, when invited, describing my research (smaller more informal gatherings). However, the smaller the group, the more the risk, as Megoran (2006) points out that the researcher's presence may alter the dynamics of interaction. In Horlings et al (2020)'s terms, I was practising 'place relations' which they see as the ethical responsibility to note the extent to which asking questions and introducing topics for discussion, contributes to raising awareness or inducing changes in the way people think about issues and perceive themselves. However, I wanted to observe each of these 'communities' of people gathered at one event connecting and acting on their own terms and in pursuit of their own agendas as, ethnographically, it was important that my learning came from their framings and meanings.

When invited to explain my research, in some settings, I sensed that my focus on the 'responsibility' of the state either came across as a distraction or on one occasion it seemed to be a trigger for people who are suffering extreme loss and given the long shadow cast by state failures during Hurricane Katrina (Horowitz 2020); communities have had to stand up for themselves without governmental resources (Edwards 2018). I needed to avoid influencing the course of their debate as well as understand the impact of my presence and assumptions on people I was engaging with (Small and Calarco 2022) and so I would adjust the framing of my research to something more neutral and locally relevant like 'the State's agenda for coastal restoration.' However, attending to emotion and resistance, whether in reaction to my research aims or more generally in meetings where sometimes they were heightened is key to this kind of method (Billo and Mountz 2015).

Arguing that the term 'participant observation' is oxymoronic, Nick Megoran (2006) prefers 'ethnographic participant observation' in which the researcher patiently listens and takes part in social interactions that they have not created and do not control. Unlike interviews which are constructed and guided by the researcher, events that researchers can join or join in on are part of the life of the field, they would happen anyway regardless of any role played by the researcher. However, I appreciate the tension identified by Crang and Cook (2007) between needing to immerse oneself in the community and develop 'intersubjective' understandings between the researched and the researcher whilst also maintaining the detachment needed for rigorous thinking. This practice takes conscious work. There is also what I think people thought of me and my research which involves further layers of interpretation. My impression is that people saw me as a foreigner (or as Americans call it, an 'alien') with a research interest in their concerns but which did not necessarily align with the way they looked at the issues. I practised *hanging back* when it felt appropriate such as when discussions turned to loss but also leaned in and expressed empathy, when privileged to be speaking to community representatives. No doubt I came across differently

to participants who were differently situated in terms of power, role or lived experience of environmental crises.

The morning spent planting cypress trees in the swamp with other volunteers, what I describe in the Water chapter as a 'wet ethnography,' was an opportunity for immersive participation observation (PO CRCL 2020). I felt the need to more closely experience the matter that is the constant preoccupation of coastal Louisianans and what I was researching (Hitchings and Latham 2019). As an oysterman I met on the coast said, "you can't know until you have felt the mud between your toes" (Casual exchange 2018). Inspired by this haptic imperative, I was, however, keen to avoid my fieldwork experience becoming auto-ethnographic so this was an immersive participant observation informed by an ethnographic sensibility. In sharing time, space, labour, experience and the warmth of interaction with the other volunteers while planting trees in swampy water, it seems appropriate to include myself by using the first-person pronoun – usually in the plural as we were a group - about the activities I was engaged in. I should also be clearer about my motivations: I wanted that kind of immersion for research purposes but I was also driven by an ethical urge to contribute, if only in a very small way, to efforts to restore wetlands so that I was not solely 'extracting' 'data' from the 'field.'

'Participant observation' as a method changed with Covid restrictions. I gained more access as public meetings went online, especially State ones, but the quality and texture changed with virtual rather than in person meetings. I was now participating in the sense that my presence was recorded in the 'participant' list (whether on Zoom, Teams or Facebook). Under these conditions, I developed a different observational protocol. As being virtually present is not the same as physically 'being in the room,' it required making do with what was available. For example, during webinars, I paid attention to who, in addition to the presenters, were the 'participants' and to the 'chat box' noting what questions and comments other attendees were putting up and whether the convenor did or didn't put them to the panel to be answered. For example, at one webinar hosted by a state agency, their representative did not put a more agitated question about impacts to the panel.

During participation observation and afterwards, I wrote detailed field notes which recorded basic information about the setting paying attention to materials and where they were located (the stacked-up chairs at the coastal connections event that turned out be controversial (Vanhala et al 2022) were at the periphery not the core), as well as who, what, when, and for how long particular events and activities were observed. I also developed a referencing protocol, participants at public meetings did not need to be anonymised in my account as they are a matter of public record but I ensured anonymity for other meetings. My field notes are a mix of descriptive and reflective notes (Creswell 2007) noting who was speaking, what was being said as well as what I observed as the mood of the room, people's interactions and my interpretations of what was being said. Taking field notes was relatively easy when sitting down at a meeting, more difficult at events where people are standing or mingling and I had to find a place to quickly scribble down what I had heard (I could relate to Crang and Cook 2007's reference to the 'ethnographer's bladder').

Listening (and prompting)

By listening and prompting, I mean what I learned from conversations with people on a one-to-one basis about the environmental crisis in coastal Louisiana but of course I was also in the conversation so it was more like a 'call and response' (borrowed from Latour 1999). The interlocution record consists of three types of engagement with individuals during fieldwork where I learned something that informed my research: informal meetings, spontaneous and casual encounters and formal interviews.

Research 'friends'

On my early trips to Louisiana, I contacted and had pre-arranged informal meetings with people who had relevant knowledge: coastal scientists, social scientists, state officials, engineers, environmental lawyers and non-profit representatives (20 people). I thought of them as 'research friends' (Bunnell et al 2012) because they were responsive, expressed interest in my research and offered support, saying things like "happy to help." Crang and Cook (2007) call them 'gatekeepers.' At meetings in their offices or in coffee shops, they talked about the issues, the context, their own work in this area and suggested further people for me to speak to and what I should read, attend and visit. During these sessions, they were content for me to make contemporaneous notes during our conversations. Thereafter, I would come across them again at events and some became 'friends' in the social sense.

Spontaneous encounters

Exchanges occur spontaneously when out in the field, whether while walking, during the break at events or conferences, waiting for buses or riding in cabs. The opening might be: "I'm picking up an accent" or "what brings you to New Orleans" and when I explained what I was doing that would often lead to a conversation about the environmental conditions. I would later make an anonymised note of any particular comment made or insight from that encounter in my notebook. Catarelli (2016) calls these exchanges 'ambient encounters' which occur during the flow of fieldwork. They are part of the practice of 'accidental ethnography' which is the deliberately unplanned moments that take place outside structured methods (Fujii 2014, Basnet et al 2020). As Yanow (2009) says, this kind of improvisation requires a "yes and" attitude that is open to what may occur unexpectedly.

In the literature, scholars refer to how valuable casual encounters can be to their understanding (McConnell 2016, Catarelli 2016, Richardson and Thieme 2018), yet there isn't consensus on how they should be treated. Some authors say explicitly that they brought them into the record (McConnell 2016), although other people either don't make it clear (Katz 2013, Richardson and Thieme 2018) or say that they have been specifically excluded (Kama 2013). I had to think about the optimal and ethical way to exercise my responsibility to people I have met informally, whether through pre-arranged meetings or casually. With their expertise, experience and insight, these respondents have enhanced my knowledge and understanding. Mostly, their ideas find their way into my account as deep background. However, as these are not my ideas but theirs, I have, on a few occasions, felt it appropriate to acknowledge where a specific point came from an 'informal conversation' or 'casual exchange' with someone I met in the field (see References). I do this with an anonymised moniker like 'research friend' or a broad descriptor when using a direct quotation to bring a point alive.

Interviews

Sampling for interviews consisted of identifying people working on coastal restoration – and therefore engaging with state responses - in a professional or representative capacity. These came from three sources: from the archive, following up the leads that people gave me and attending events in order to hear from and ideally meet potential interview candidates. However, for a while, I had a problem with obtaining formal interviews. One reason was what I learned is a common problem in student research (which I had been fortunate enough not to experience in policy research) of poor response rates. Emails were often not answered or became dragged out; an oil company bounced me from one person to another until the exchange dried up. It felt awkward and rather pushy asking people I had just met at events if I could interview them. Another inhibiting factor was having established ways of meeting 'research friends' I found it difficult to switch to more formal engagement with proposed interviewees. People would reply to my 'recruitment' email saying they could meet to "talk about your research" and I baulked at pushing them to sign the 'consent form' as that seemed to be jarring and intrusive. My responsibility, as I saw it, was to make things as easy as possible for them and to avoid taking up too much of their time or headspace. For example, a 'research friend' introduced me to a state official working on coastal issues who agreed to meet me in a coffee shop. Rather than seeking a formal interview, I went with the flow. During the meeting, they agreed to my making anonymised contemporaneous notes and provided much useful information and perspective about state responses (which I have treated as deep background). However, I detected a reluctance to engage more formally and so did not introduce the idea. The most precious commodity in that exchange was anonymity. Asking for a signed consent form would have, as Iphofen (2020) puts it, set up a contradiction between a signature and anonymity as the former risks compromising the latter. I found Latour (2005 p 255) helpful here. As he says, the researcher should recognise people's recalcitrance.

There were other reasons for my reluctance to press people for formal interviews. Coastal Louisiana and the city of New Orleans are in a state of environmental collapse. The situation is difficult, contested and stressful for everyone who lives there, all of whom are already suffering or will suffer loss. Someone at a well-attended event opined that New Orleans has no more than three decades (PO NOCGS 2020). An online interview was cancelled when power went down during Hurricane Zeta in 2020 and after a follow-up email to check in with how my interlocutor was faring, I did not chase to reschedule the interview as it seemed selfish and inappropriate. The crisis in the field seemed to me to require a subdued and respectful approach towards the busy people who are prepared to talk to me. I had an impulse to *hang back*. Another factor was that, as earlier indicated, the literature taught me to see how things evolve in the field rather than seeking to impose formal structures on them. As my research project is itself concerned with 'responses,' I feel a need to be alert to them as they emerged wherever they occur.

From a methodological point of view, all these concerns affected how I approached interview recruitment. I was struggling to *hang in* with this aspect of my research design. I felt inhibited by my outsider and student status asking professional people who are occupied with addressing the crisis and experiencing the impacts in their own lives whether they would spend time talking to me. After taking advice from my supervisors, I developed an approach which gave me more confidence in inviting participants to formal interview and obtaining signed consent forms. A sign that this was working better came when a state official replied to a revised recruitment email saying "thank you for reaching out" and offering dates in their diary. In the end,

I had 16 formal interviews with people with a range of expertise and viewpoints including: coastal scientists, federal, state and city officials, non-profit representatives, policy and planning advisers, environmental lawyers, an oil and gas geologist and a faith leader, all of them giving their personal views and not those of their organisation or community. Given the various perspectives I gleaned through interviews, informal meetings and other encounters, I believe I reached a threshold of sufficient diversity to reflect the ambiguities and contradictions present in the field (Small and Calarco 2022). Interviews were either recorded online with transcripts available (via Teams or Zoom) or I made contemporaneous notes.

Engagements with interviewees were inspired by Stengers' notion of a 'working together' between researcher and researched (1997 cited in Whatmore 2003). This lays the ground for 'ethnographic interviewing' (Heyl 2001) which encourages dialogue as the route to understanding rather than merely seeking 'answers' to pre-prepared questions. I approached interviews with an ethnographic sensibility seeking to understand the interviewee's world, their world view and how they differ from those of other interviewees. I amended my interview guide so that I tried not to be 'asking' questions to 'get' answers which felt extractive and transactional. As Latour (2005 p 41) advises, human actors are not mere informants answering researcher's questions but should be given leeway to define themselves. There was also the risk that my questions might come across as ignorant, irrelevant or intrusive to people's serious concerns and priorities (Katz 1994, Latour 2005). With this guidance in mind, I opened with questions about interviewees' specialist areas and what I knew they were working on before steering the conversation to state responses. That provided a reassurance and allowed the conversation to flow, people like to talk about what they know. The effect of the prevailing environmental conditions, people are inhabiting what is commonly called a 'sacrifice zone,' hung over the discussion about them. Most interviewees spontaneously referred to how difficult they are finding the conditions, some with more emotion and expressions of loss than others. My response was to be as sensitive and respectful as possible. It is also the case that issues like sediment diversions and the role of oil and gas companies in both land loss and climate change are contentious and I had to strike a balance in my own approach between neutrality and empathy.

Although I now had a record of interviews and considerable learning from them, I remained alert to their role in my research. Interviews, which Megoran (2006 p 626) calls 'controlled environments,' are moments of intervention which have been created and are managed by the researcher. They also have an effect on the interlocutor. In March 2020 I was due to travel to an event an hour away with someone who is a leading expert on coastal matters whom I had met several times, as they had kindly offered to give me a lift there. I was looking forward to gaining more insights during an informal conversation in their car. However, Covid intervened, I had to return to the UK and in the end the event was cancelled. I later conducted an online interview with this person and have quoted from them in the text but during the interview I was conscious of the difference in their style. I sensed the formality of the interaction which now required them to give their time to my research interests and think about how to answer questions they may not have previously thought about or which they might have thought irrelevant, not only to their own work but to their lived experience. While informal meetings are open and expansive, interviews are moments of disruption where the researcher risks 'acting on' the researched (Whatmore 2003). In all, the 'mixed methods' approach produced an inter-dependent mix of findings and learnings which required me to design processes of collation, interpretation and analysis.

Working with the material

Through what she calls 'generating materials,' Sarah Whatmore writes of a two-way engagement letting the 'world back in' accompanied by a 'degree of humility' which helps decentre the researcher from the objects of study (2003 pp 89-90, see also Massey 2003). While accumulating information and making notes, I was also inspired by Keats' 'negative capability' which celebrates "being in uncertainties, mysteries, doubts, without any irritable reaching after fact and reason" (1871). For someone long schooled in 'reaching after fact and reason' that seemed like a useful corrective and I proceeded with keeping an open mind on what was occurring within the field and what I was 'collecting' from it. Following Latour (2005), in 'flattening the landscape' (not solely a metaphorical endeavour in coastal Louisiana), it was difficult while 'researching' to know what thing and its relation would help answer research questions or progress knowledge in my field of inquiry more than other things and relations. As Marilyn Strathern advises, ethnography involves a "deliberate attempt to generate more data than the researcher is aware of at the time of collection" (2004 pp 5-6). Likewise, one should avoid making an "a priori [decision] about what is significant and interesting and what … can be ignored" (Whatmore 2003 p 96 quoting Stengers 1997 p 117). For Latour "everything is data" (2005 p 133) though Mike Crang (2003 p 129) distinguishes 'information' from what becomes "dignified as data." It occurred to me that interviewees had been sharing their experience and knowledge and it was their perspectives which now became 'my' data in some kind of implicit transfer of ownership. However, I wasn't simply repeating their analysis (Callon 1986) but making my own interpretation of what I had recorded them saying. What I include as data are what I have absorbed from the archive, observations while walking, from participation observation, informal meetings, casual encounters and interviews and recorded contemporaneously in my field notes.

Analysis and interpretation

Following Creswell (2019) who comments that at some point interpretation becomes part of the endeavour, I too, during fieldwork data collection, engaged in analysis, assessment, weighing, interpretation and decision-making because cognitive processing is human nature. I would put notes about that in brackets to distinguish them from my empirical notes from the 'field.' Having an ethnographic sensibility meant honouring the material, letting the data speak and following its lead. In each case, I asked myself what is the relation between the matter I am observing and first, response and second, responsibility. To what extent did the matter that I was encountering trouble, problematise or resolve these questions. To what extent was I stretching these notions and when did I have to exercise a policy of restraint in order not to over-interpret. I went over the data I had collected again and again, something that I noted, saw as significant then, but couldn't appreciate its significance later or vice versa. I went through my fieldwork notebooks, marking the margins with initials for data that I thought would be relevant for each chapter, W, L, O and A for the empirical chapters and M for this chapter. I tried to keep on top of the material, creating folders and systems, writing chronologies, creating meta documents reminding me what systems I had created and where they were located, inserting cross-references within documents to other documents so I could find them again quickly. One useful exercise was creating a mega table which contained empirical data, its source, its relevance to my research questions, the local literature, what theoretical concepts were engaged, what I thought could be my contribution and where it could be located in my account.

My newly acquired way of thinking and researching the world opened my project up to greater potential for breadth and depth but it also laid the foundations for likely failure. Latour's 'everything is data' means there is too much and you can end up with congeries. However, as he also advises (2005 pp 71 and 154), actors need to make a difference and if they don't then you should 'drop them' but that of course means taking a decision about the significance of a piece of data in a state of imperfect knowledge. I developed a practice of note-taking that addressed this question by suggesting to myself in my notes things like: 'think will need' or 'may not be important.' I was aware that in writing field notes, I was already filtering themes and selecting what data I felt were important to record and what data were not (Ryan and Bernard 2003) and feeling the burden of that responsibility.

How to work with the idea that there is no single interpretation? As Hannah Arendt (1971) said about the Pentagon Papers, like so much else in history, they tell different stories and teach different lessons to different readers. However, as Yanow (2014) argues, interpretation is the only method appropriate to the human, social world when the research question concerns matters of human meaning. So how to understand the process? The difference between researching materials and people and what they have written or said is that with the former the researcher allows the material to, in Whatmore's words 'speak back' (2003), whereas with the latter, the researcher has to interpret existing interpretations, that kind of data is already speaking 'back.' I found Yanow (2009)'s taxonomy of the hermeneutic helpful in understanding my engagement with people and what they think. She sees three stages: first is the interpretation given by the people we speak to, second is the researcher's interpretation of the first as we interact with them and form a view of what they are telling us and the third is after fieldwork during the deskwork phase when further analysis occurs and a narrative is crafted that presents both fieldwork and the analysis. Though this three-stage process suggests linearity, that is not what happens in practice. Reinterpretations supersede earlier interpretations.

Following all the reading, observing, listening, thinking, note writing, interpretation, assessment, analysis and decision-making, time and space are needed to allow the unconscious to bring clarity and insight into the conscious mind in order to undertake the final methodological challenge, writing the thesis. I find this process happens best when outdoors, following Nietzsche's axiom about the value of thoughts conceived while walking.

Writing

The kind of thinking and writing that goes on all the time in one's head and in note form isn't the same as the kind that happens when you sit down at your desk and try to write sentences that will eventually become a whole thesis. At the drafting stage so much of the material seems interesting and important and I often find that I don't know what is or isn't significant or relevant until I start writing about it. My discovery, with some regret, has been that up until that point, despite all my notes, I hadn't done all the work required because, as I have found, you don't really think until you write or put another way, it is writing that makes you think and so in that sense it is methodological. Creswell (2019) talks about writing being his 'primary method.' As Crang (2003 p 130) argues, "it is thinking by writing that tends to reveal the flaws, the contradictions in our ideas, forcing us to look, to analyse in different ways and rethink." It also requires almost continuous decision-making: how to structure a chapter, what to include or exclude, how

to make a point, where to locate it and how to frame the flow of argumentation throughout the text. Nick Bingham (2003 p 151) citing Barthes (1964/1967 p 70) on how writing "forces a choice on the writer," points out that writing requires new judgements to be made and, as I see it, taking responsibility for what goes into the account and what stays outside it. Although writing in the sense of note-taking continues, writing 'up' is arbitrarily finalised at the moment of submission, suspended in that moment when that "final (at least for now) interpretation [has to go] out into the world" (Crang 2003 p 131).

A number of hurdles have to be overcome in the project of writing the thesis. First is how to align materials in the world with the process of reducing them to the written word. As Latour poses, "how do we pack the world into words?" (1999 p 24). He sees the 'gap' between matter and form as a reversible chain of transformation or what he calls a 'circulating reference.' Jane Bennett tries to "give [nonhuman] forces their due while placing them in a wordy, normative milieu that is not really their home" (2020 p xxi). I have tried to honour those ideas in my account. However, paying attention to matter and to thinking has not been to displace the role of emotion which, although not germane to my research aims, is a feature of my research experience and so included here. Building on Guattari (2000)'s connection between mental, collective and earth ecologies, Stengers (2008) emphasises that we are affected by the climate emergency and so we need to distinguish in our own ecologies, both mental and collective, how we are affected. I found how much I was affected and in what ways when writing the thesis which is when I relived the research experience. Each chapter triggered a different emotion, emergent from the matter, the people I had met and from what I was reading at the time of writing. The Water chapter made me fearful though I was inspired by Bennett's interest in the productive relation between matter and responsibility (2010); I felt depressed while writing the Land chapter and somewhat intimidated reading Liboiron (2021) at the same time; my emotion was anger and frustration while writing the Oil chapter influenced by the burden of Foucauldian governmentality and the practices of responsibilisation, together with the oppression of fossil fuel capitalism captured by Stengers (2009 and 2015) and Yusoff (2018), whereas I felt a kind of sceptical optimism when writing the last chapter, Air, and thinking more about the value of civil society activism and justice whilst reading Arendt (1958), Dewey (1927/1991), Young (2011), Whyte (2013) and Táíwò (2022).

A word about my writing conventions. On occasion, I use the pronoun 'they' and 'their' as grammatically incorrect but still useful as a gender-neutral pronoun (Srinivasan 2020) in cases where I do not feel confident about someone's preferred pronouns and usually in relation to informants as a way to further anonymise them. Following Smiles (2021) and Liboiron (2021) respectively I use upper case for 'Black' and 'Indigenous.' In the References, I print the authors' forenames to help me with gender balance in my citation practice (although of course forenames may not reveal gender).

Thesis claims

While Whatmore (2006) proposes a shift from what things mean to what they do during fieldwork, the researcher needs to reverse that shift in order to arrive at 'knowledge' and in order to make 'claims.' Those notions are in tension with scholarship which challenges their associated certainties. I am influenced by Haraway's disavowal of 'the god-trick of seeing everything from nowhere' (1988), Latour's injunction not to jump from the recognition of an interaction to the existence of a social force (2005), Mitchell's not to lend forces a logic or coherence they don't have (2002) and Barry's not to move from problems to causes with

insufficient care (2021a). As Stengers (2008) explicates, as soon as we deal with reasons and causes what actually becomes important is how our own discrimination patterns and habits negatively affect the knowledge we produce - what the 'facts' allow us to claim - which becomes the duty to overcome the 'subjective' attachments that situate us.

Much of what I read in my academic studies emphasises contingency, instability and uncertainty and that has had an effect, not only on my epistemological understanding but on how I treat what I have found in the field,' what 'knowledge' claims I am making. My initial concern was, if everything is contingent and shifting, does that undermine what we can say we know but then came to understand through material thinking that contingency is itself the knowledge. I was also concerned that inhabiting a territory of 'knowledge' too quickly might close my mind to other possible interpretations and reduce my practice of thinking. So, not only is my way of thinking of the world and how to research it influenced by the body of material geography theory discussed in the literature review and the adoption of an ethnographic sensibility but also my own outputs from that research: what I say (I think) I know and what claims I make in this thesis. Starting from a position of nescience, at the conclusion of the research the scholar is hardly omniscient, it is more like *parscience*, a state of partial knowledge. From observing and thinking about *relations* I find that I arrive at forms of knowledge informed by its adjectival counterpart which implies relativity.

In taking responsibility for claims made in this thesis, field work has produced two kinds of knowledge. These are what I have been told, what constitutes other people's knowledge (Rose 1997) (a recognition of the work done by others which I have absorbed, represented and attributed) but also my own interpretations of their knowledge together with what the matter and place appear to be telling me, essentially what I *think,* on which the reader is asked to rely. As Stengers argues "the real issue is … the invention and production of … reliable witnesses" (1997 p 85 cited in Whatmore 2003 at p 97). Although I would prefer, following Plato, to continue to question everything rather than inform, a habit that I have now developed, that is not sufficient for an academic study which requires a contribution to the edifice of 'knowledge.' To that end, in this thesis, I am sharing what I think I have learned from the field, arguing that I think the connection between x and y is worth paying attention to but really my 'knowledge claims' are more like 'thinking claims' – I only know what I think I know. As Haraway (1991 p 195) says about situated feminisms, they are about `interpretation, translation, stuttering, and the partly understood.'

Responsibility as researcher

The counterpart to my diffidence about how and what I have researched and what 'claims' and 'knowledge' I am making is that I feel a strong responsibility as a researcher and writer. As Jazeel and McFarlane (2007) argue in their investigation of how a notion of 'responsible learning' might improve cultures of knowledge production, responsibility is contextual involving ongoing introspection on the part of the scholar. Tariq Jazeel (2007) describes the 'awkward moments' that can occur in the field and what he sees as a responsibility to productively engage with its potential. My own engagement with responsibility is associated both with how I interacted with respondents in the sense that Jazeel is suggesting and how I tried to practise Haraway's 'response-ability' with its 'un-asked for obligations' (2016 p 130) though, *contra* Haraway, I had assumed 'asked-for' obligations. As Liboiron (2021) argues, there is no *terra nullius* for this

work; they want to focus on responsibility - the obligation to enact good relations as scientists, scholars, readers, and to account for our relations when they are not good. Though, as Judith Butler (2005) argues, in holding ourselves accountable we need to understand that our account of ourselves arises from the social conditions from which we emerge.

With those thoughts in mind, it is the case that the responsibility involved in research and writing is extensive. Gillian Rose (1997 citing Sarah McLafferty 1995 p 437) points out that the researcher holds a 'privileged' position by deciding what questions to ask, directing the flow of discourse, interpreting interview and observational material, and deciding where and in what form it should be presented. As she also says, (in this case citing Melissa Gilbert 1994 p 94), the researcher has 'the final power of interpretation' which I see as much about assuming responsibility for what interpretation I take as understanding that it is also an exercise of power. It is the existence of the power that creates the responsibility. But there is also a more fundamental question to do with how to be responsible when studying the effects of climate change.

Whilst the primary aim of this research is to understand state responsibility in response to climate matter, it also intends, as a corollary, to critique the idea of the primacy of personal responsibility as a substitute for that of the state. However, as individuals, we retain moral responsibility for what we do in the wider world and that should encourage introspection. As Iris Marion Young (2004) says, "I share responsibility with the many others who also contribute by their actions to the processes that connect us." Selecting Louisiana as a fieldwork site meant a personal decision to fly frequently across the Atlantic. The impulse behind my research has been to theorise new ways of thinking about responses to the climate crisis but in its execution, I am voluntarily 'causing' more climate change than if I had chosen a research field accessible with low carbon travel. Although off-setting is of dubious value (Child 2020), I did offset my flights, each return flight calculated as using 2.44 tCO_2 (Climate Stewards 2023). However, the fact that my concern is with the concept of responsibility does not *ipso facto* make me a responsible scholar, that is a practice to be worked on.

There is ongoing study and debate about whether academics should fly and if they don't whether it will affect the 'success' of their academic work (Wynes 2019, Kreil 2021) with Kreil and Ullström (2022) offering tips to fellow doctoral students on non-flying alternatives. Hannah Knox, as a climate researcher, considers the question as one not only of personal responsibility but of material engagement with the matter of climate change and also how flying raises questions of access, privilege and extractive colonialism (2020, 2022). As she observes (2022), the act of 'knowing' as a researcher has become part of the act of making the world anew in a very literal, material sense. Her own publicised decision not to fly was made not only as a moral or practical decision but as a form of situated reflexive practice that opened up new questions about participation, access, equity, ethics, intersectionality and the politics of knowledge. As I write this chapter during a climate-stressed summer, I am not convinced I have met Jane Bennett (2010)'s personal 'extrication from harm' test. Looking back at my decision in 2017 to select a field site six times zones away and with Knox (2022)'s reflections in mind, part of me asks: what can I have been thinking of?

Conclusions

This chapter connects the threads from the literature review which set out the influencing scholarship and what I see as the gaps in knowledge through to the empirical chapters, the findings and the claims being

made. In form, it sets out how I approached the research, what was influential, what I thought, what I did, what I learned and what I did and thought with what I had learned. Although this record of labour suggests a confident linearity, in fact the process of researching and writing a Geography PhD has been circular and the material politics and ethnographically sensitive frameworks that I have adopted have changed my ideas of what can be known. They have also changed my own thinking processes. As Rose (1997) says citing Gibson-Graham (1994 p 219), "I am a unique ensemble of contradictory and shifting subjectivities." This insight suggests that we are made through our research as much as we make our own knowledge, and that this process is complex, uncertain and incomplete. And of course, although I tend to emphasise how researching changed my mind, it also changed me as I underwent, following Horlings et al (2020), a 'self-transformation' in my 'whole self' involving my body and heart as well as my mind.

A researcher's intention is to transition from their own ignorance to a state of understanding that makes an original contribution to wider knowledge possible. As Kama (2013) says there is a reckoning to be made with the impossibility of 'knowing' as much as local experts. Hovering over most interactions with other people are thoughts about whether the project is relevant, the research aims comprehensible and the goals useful to those in the field. Being a stranger and not knowing much can feel mentally debilitating and socially inhibiting. I am inspired by Kama's achievements despite her honestly expressed "general sense of failure" during her own fieldwork (2013 p 99) and guided by Latour's argument that leaving open the possibility for failure is important as it opens up the potential to seek new associations and participants (2005 p 251). As everyone I met in the field knows more than I do or ever will about the issues of concern in the field, my research task has been to reposition the site as one of material politics and state responsibility in order to make a contribution to studies of coastal Louisiana.

In this chapter, sometimes I show my journey, times when I changed my mind and shifted my research focus and other times I narrate from the destination, what I did as a summation of trial, error, changing direction and revising decisions. Part of the research learning is how to balance tensions and make them productive. The need to be flexible and open to what the field is 'saying' was in correspondence with the need to be 'researching' it within time constraints. A further tension existed between the desire to decentre myself at the same time as needing to interpose in order to learn and reach understanding. That emphasis on decentring, informed by a sensibility to pay attention, not prejudge and stay humble (Saville 2021), may have led to an earlier reluctance to make the interventions necessary to acquire sufficient 'interviews.' An approach that sees privileging the human as some kind of 'prejudice' (Bennett 2010) taught me that interviews could never be a primary research source anyway. In the end I see them as complementing the other data accumulated through reading, listening, watching, observing, walking and being present. I found the *hanging* taxonomy to be a useful practice as well as strategy for fieldwork where the experience was *hanging out* with people and *hanging around* spaces and materials coupled with the need to *hang in* while also *hanging back.*

I started not knowing what would turn out to be important but I had to start somewhere and so it was helpful to have the material geography framework and its theoretical antecedents in mind. In fieldwork I had to learn how, in practice as well as theory, to bring materials into the analysis. However, there is the risk of 'surface geographies' where research identifies matters in play rather than evaluating their interconnectivity and co-constitution (Tolia-Kelly 2013). The researcher needs to interrogate what effect the materiality has. As Jason Dittmer has put it, what challenges and opportunities do the materials provide

and what is it about the materials that's important (2018)? I felt excited to be observing relations between matter and the state and the belief that framing those in terms of response and responsibility has been under-theorised. The empirical challenge was to understand how, where and under what conditions material forces generate state responses and responsibility and how they may be practised as well as identifying and proposing the conceptual salience of that project of enquiry. The next chapter discusses the way in which the first element that I encountered, water, produces state responsibility in coastal Louisiana.

Chapter 4: Water

Introduction: A state of water

Louisiana is a terraqueous state where encounters with water involve multiple, varied and shifting geographies: river, bayou, swamp, marsh, sea, gulf, aquifer, sky, land and city streets. Water made the geography of the place as the Mississippi River flowed through changing course on its way to the sea, depositing sediment and creating the delta which constitutes the state of Louisiana. But with the more recent coastal erosion, water having made the land is now unmaking it. The ocean is at work reclaiming space for water suggestive of Rachel Carson's observation that "continents are but transient intrusions of land above the surface of the all-encircling sea" (1955 p 15). Place names have been removed from maps because they have become indistinguishable from open water (CITF 2022 citing Jervis 2014). As a coastal scientist told me, "the lower Mississippi delta will fundamentally change, it will be open water, not dry land" (Interview 5). Another resident commented: "We're a boot that has lost its sole" (Interview 8).

The relation between water and land is not distinct but entangled and diffused. As local writers have noted, at the coast, the river, land and sea are barely differentiated, the land is so pervaded with water that it's 'both or neither' (Barry J 1997, Snedeker and Solnit 2013 p 3). My own fieldwork experience was that the litoral idea of a 'coast' - where land ends and water begins - seemed less a destination than a presence encountered in multiple locations (as Image 8, the blue dot locator, in the previous chapter illustrates). The distinction between ocean and river or between ocean and land, commonplace in geographical scholarship, is blurred. Recent geographical studies have considered how to think about the ocean in ways which appreciate its emergence, volume, materiality, instability and reformation (Steinberg and Peters 2015, Peters et al 2018). In the southern parishes of Louisiana, coastal water has those qualities but it is not 'out there' in the ocean, rather it mixes with and permeates inland areas and other bodies of water. Further, the relation between land and water is not static but shifting. As environmental lawyer, Mark Davis has observed, coastal Louisiana is "less a place than a process" (2008 p 424), echoing A N Whitehead's conception that reality is composed of processes of dynamic 'becoming' rather than more stationary 'being' (1929/1978). Water in Louisiana is in a continual state of becoming, inhabiting a liminal spatiality.

Water seeps into daily life in many ways. There are the frequent heavy rains, floods and the city-issued 'boil advisories' about drinking tap water. Then, during hurricane season, come the storms with their frightening surges of water and ability to destroy lives, homes and livelihoods. Hurricane Ida, arriving on the 16th anniversary of Hurricane Katrina in 2021, was second to that hurricane in its intensity and the damage caused. Water is located not only physically but also in the psyche. As "quick, deadly and traumatising events," hurricanes become "mental benchmarks" (Brasseaux and Davis 2017 p 181). In conversation, Louisianans will often frame something as occurring before or after "Katrina." As one interviewee summarised it: "People died, people left, some places have still not recovered. It's the event of people's lifetime" (Interview 4). With increasing volumes of water from storms, flooding and sea level rise consequential on climate change, water is seen as minatory and the threat emerges on different scales of time and degree; "the potential for slow disappearance coexists with the potential for sudden destruction" (Catarelli 2016 p 6). This unstable and unsettling yet constant threat affects the way that Louisianans think of their home and their future: "It's a humanitarian crisis, a slow death, we are living in a dying place" (Interview 8).

However, for the autochthonous coastal people, water has historically been a resource. As an Indigenous leader put it: "the water is our shop" (PO Lowlander 2020). Since the arrival of Europeans, water in the river and the sea has provided the means for such colonising practices as timber logging, slave trading and making what is today known as the 'working coast' with its economically significant seafood and hydrocarbon industries. However, through excessive exploitation and a process of internal colonialism, the coast has become a resource extraction zone and site of extreme environmental degradation (Colten 2014, Ray 2017, Nixon 2011, Hochschild 2016). Water has been enrolled in colonialist and racist practices causing ecosystemic disruption and social injustice (Henry 2022). Indeed, there has always been a tension between water as a resource and as a hazard (Colten 2014, Bakker 2005a) - Indigenous coastal people "live and die by the sea" (Comardelle et al 2020) - but the balance between resource and hazard has been de-stabilised for coastal populations. The areas inhabited by the coastal Louisiana Tribes are the fastest eroding areas in the United States (Rights of Indigenous People 2020). Water has become precarious for frontline communities as the activities of the oil and gas industry have altered, polluted and in many places destroyed the environment on which they depend. These activities are not only changing quantities and locations of water, but also its composition. Industry canal dredging has affected salinity in fishing waters, oil spills and the consequential clean-ups have caused toxicity and site emissions together with downstream combustion contribute to eustatic sea level rise.

In material geography terms, these forces are entangled in ongoing relations. Karen Bakker (2005a) sees a 'mutual causality' in the way in which human activities shape landscapes and waterscapes; and, simultaneously, how the water cycle shapes human societies. This is present in Louisiana where the social and environmental devastation caused by and through water has been driven by a state-sponsored imperative to manage water for the economy, whether embanking the Mississippi River (Barry J 1997, McPhee 1987), allowing canals through the coastal wetlands for industry transport (Theriot 2014, Houck 2015, Colten 2021) or government-sponsored water infrastructure with destructive force like the Mississippi River Gulf Outlet, referred to in Chapter 1, which funnelled hurricanes into New Orleans from Betsy, in the year of its construction, to Katrina, after which it was closed (Freudenburg et al 2009, Lewis and Ernstson 2019, Broom 2019, Horowitz 2020). Jeremy Schmidt describes efforts to manage water like these as evidence of 'normal water,' which involves "the project of gathering water's social and evolutionary possibilities into the service of liberal forms of life" (2017 p 227). In material politics terms, the water, infrastructure and state can also be seen as a series of relations among competing forces. While Foucault (1991) observes that the ship's captain is required to deal with them, I argue that this engagement also constitutes a *response* from the governing authority to these forces. This chapter considers the nature of the material response and how it can lead to state responsibility.

A combination of state control over water and disregard for the effects of that control, particularly through infrastructure projects, is well-established in the literature (Swyngedouw 2015, Anand 2017, Menga 2018). In this chapter, I observe and theorise the reverse process, what I argue is theoretically under-explored, namely the way in which the state responds to matter where control may be contingent or notional. Indeed, the state may be constructed from matter, what Mitchell (2002) calls, the 'product' of the 'alliances' in which it is participating. Although Menga and Swyngedouw (2018) understand the state as a materially constructed expression of power, I argue the value of observing the connection between matter and state response and how that can lead to a mandated responsibility. We can see this in the following examples:

Mississippi River flooding led to the US Levee Commission in 1874 (Barry J 1997) and the Santa Barbara oil spill led to the US Environmental Protection Agency in 1970. As Yao (2022) argues, efforts to tame rivers result in institutions.

This chapter examines the relation between the materiality of Louisiana's changing coast and state responsibility expressed in my first research question: *what is the relation between the materiality of the climate changing world and state responsibility?* I do that through interrogating its constituent parts: first matter and response, second matter and state response, then third how that response becomes a responsibility. To understand the link between matter and state responsibility – the third stage - more fully, I discuss the establishment of the Coastal Protection and Restoration Authority (CPRA) in response to the coastal erosion crisis and Hurricane Katrina. I argue that the state does not only respond to matter but can be constituted by it producing a *response responsibility* which can then be converted into a legislated duty and programme of action: a *materialised responsibility.*

At this point I address my second research question: *Can the state be distributed in its effects and practices at the same time as being centralised and whole in its responsibilities*? I explore this issue through engagement with Jane Bennett's arguments (2010), and those of her critics (Braun 2011, Marso 2011, Lemke 2018), about whether it is possible to locate political responsibility within an assemblage of distributed agency. I argue that the establishment of the CPRA out of the coastal erosion crisis shows that it is possible to locate the emergence of state responsibility and indeed forms of the state itself. In doing so, I seek to resolve, through empirical engagement, the conceptual predicament that she identified. I go on to consider the nature of the CPRA's responsibility as one of 'role' borrowing from legal scholar H L A Hart's taxonomy (1968) examining what 'the job' consists of. The CPRA's mandate is technological and insufficiently addresses the consequences for affected communities revealing that role-responsibility as management of a problem has implications for accountability and justice which are explored in subsequent chapters. In the final section, I return to the role of the influential civil society group, the Coalition to Restore Coastal Louisiana (CRCL) in not only advocating for the establishment of the CPRA but also supporting the implementation of its 'role' through running volunteer restoration programmes. An opportunity to participate in a day spent planting trees in the swamp revealed the way in which civil society can enrol individuals in undertaking action that is otherwise the responsibility of the state. Here I draw on Foucauldian accounts of governmentality.

The crevasse that has recently opened up in the Mississippi River at Neptune Pass and the response of two governing agencies illustrates first that the relation between the matter of water and land is one of response and second, that state agencies are in a responsive relation with matter making an empirical link between the 'response' and the notion of 'responsibility.'

Responding to water

With Covid forcing him to stay at home, distinguished coastal scientist, Alex Kolker, reportedly spent a lot of time reviewing satellite images of the Mississippi River (Tran 2022). He noticed the evolution of a crevasse at Bayou Tortillon, also known as Neptune Pass, which was expanding in size as more and more river water passed through it. At this unpopulated site 55 miles downriver from New Orleans, in

Plaquemines Parish, the levees along the east bank of the Mississippi River are not maintained meaning crevasses occur (Kolker and Weathers 2022a). Researching the site with a colleague, Kolker found that the crevasse had widened from about 150 feet in 2016 to approximately 850 feet in 2021 and that the discharge of sediment-rich water from the river into Breton Sound was creating land in Quarantine Bay (Kolker and Weathers 2022a). Further research the following year revealed that Neptune Pass is the largest distributary to develop in the Mississippi River in decades and that in May 2022, the discharge through the crevasse was approximately 16% of the Mississippi River's flow at that point (Kolker et al 2023, see Image 9).

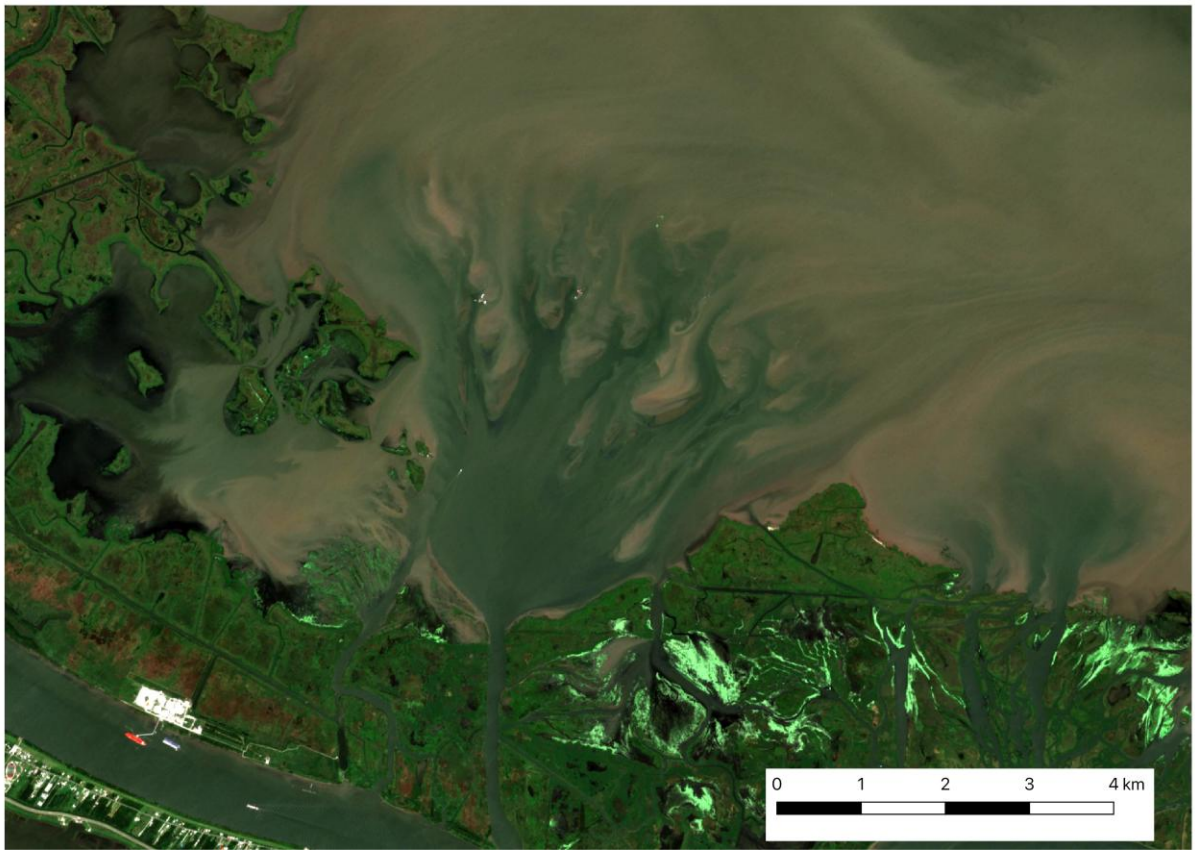

Image 9: Neptune Pass: The Mississippi River's Largest New Distributary (Kolker et al 2023)

Through the medium of sediment and the characteristics of historic natural delta formation, the river water is in a relation with land and the relation is one of response: land is responding to water. A network or 'vital mix' approach envisages that actants circulate (Latour 2005, Bennett 2010). I suggest that the notion of 'circulation' underplays the way in which actants react to each other, how the relation may be one of 'response.' Bennett appreciates this following Derrida's ideas (1997/2002) of the relation between being and following and how it means always to be in response to a call from something (2010 p xiii). So, in relation to some actants and in some contexts, the notion of circulation, as a movement around a system, can be more accurately thought of as a 'to and fro,' what Bennett (2010) calls in passing a 'call and response' or Pickering's 'back and forth' (2013), an idea that I build on in the next chapter's discussion of sediment diversions.

Governmental agencies are also responding to water. With its mandate over the Mississippi River, the federal US Army Corps of Engineers is planning to restrict the flow of water through the Neptune Pass because of its adverse effect on river navigation. However, the ability of river water to create land is foundational to another government agency, the state Coastal Protection and Restoration Authority (CPRA) which has a different response. The work being done by the river mimics the CPRA's land-building plans through the installation of sediment diversion infrastructure for the same purpose (Kolker et al 2023). A planned diversion into Breton Sound, several miles upriver of Neptune Pass, is one of the two sediment diversion infrastructure projects forming the central plank of the CPRA's restoration programme, discussed in the next chapter, Land. As a water lawyer at Tulane University notes, the crevasse at Neptune Pass is "doing for free exactly what the State wants costly sediment diversion projects to do" (TUWaterWays 2022). The two government authorities are, at the time of writing, in discussion over how to accommodate their competing objectives: for the Corps, facilitating commercial shipping on the river and for the CPRA, using river sediment to build land. The CPRA sees the natural breach of the levee as encouraging a "move toward a more holistic management of the river … an opportunity, and not necessarily a problem" (Bren Haase, executive director, CPRA, quoted in Schleifstein 2022).

In a Spinozian endeavour, water will persist in its being and does so in a relation with other beings, the crevasse through the levee, ships on the river, land-building sediment and different government agencies, who are, each of them, also striving to continue their existence and fulfil their – apparently competing - purposes. Spinoza's idea of *conatus,* the essence and the activity of beings, inspires Bennett's theory of vital materialism in which she sees an assemblage of 'vibrant' nonhuman and human actors (2010). Sometimes the interests of the various actants can become aligned. At Neptune Pass, there is a serendipitous relation between the river water and the CPRA constituted by the sediment flowing from the river not only into the physical sites in Quarantine Bay where land is being formed but also flowing into the strategic and programmatic space of the CPRA's 'master plan' for coastal restoration (CPRA 2017). This relation between matter and state agency, an expression of a 'material politics,' is temporally and spatially constructed and therefore, as Barry (2013) observes, merely contingent as the relation and the outcome are subject to future agentic shifts from what the state might at one moment or in one incarnation characterise as an 'opportunity' and at or in another as a 'problem.' While Bennett concedes that assemblages of vibrant matter do not constitute a 'perfect equality of actants,' network thinking emphasises heterarchy. However, whilst maintaining a commitment to the 'thing-power' and without resorting to fixed hierarchies, it is possible to see some actants responding differently from other actants. It is those reactions, what Stengers calls a 'reciprocal recognition' in the interactions between human and nonhuman entities (2005), which anticipate the existence of the differing roles of participatory actants and the emergence of political activity, some processes and institutions emerging and events being 'determined' (Braun 2011).

In John McPhee's writing on the Mississippi River and its distributary, the Atchafalaya (1987), Andrew Pickering identifies a 'performative struggle' between humans and materials where human agency is emergent in practice rather than in control (2013). He observes the 'back and forth' of the Corps and the river where the Corps does something (builds levees, installs river control structures) and the river does something (breaches the levee and causes flooding) so the Corps takes action in response (rebuilds levees, opens spillways). At Neptune Pass, the cycle of responses between the river, the Corps and its infrastructure is complicated by the presence and activity of further actants; another governmental agency, the CPRA,

with competing objectives and the additional matter of sediment with its significant land-building potential. The implication for current purposes of Pickering's interpretation is that he is identifying that the relation between matter and humans is one of response (2013). As matter responds, so humans respond. At the Neptune Pass crevasse, governmental agencies are engaged in responses to the matter that calls for their attention: a *material response.* Government authorities have long been engaged in material responses in coastal Louisiana. Whether it is the levees preventing sediment from replenishing the land or the industry-dredged canals that are causing coastal erosion or which interests are arguing the point are not the questions under review. Rather, it is argued that all these forces are agentic and have roles to play. What is of interest here is the interaction between these forces and the way in which state agencies have responded to each of these differing elements – water, land and oil - constituting a *material tussle* among all these actants that helps in understanding the environmental conditions in coastal Louisiana.

I argue that it is worth paying attention to the way in which state agencies respond to matter because they are what generate state responsibility. Building on existing scholarship on responses, described by Pickering (2013), Latour (1999) and Bennett (2010), together with Mitchell's point about human agency being the product of forces (2002), I argue that these responses can evolve into the establishment of a *response responsibility,* that is to say the response becomes a state responsibility. What the government agencies, whether the Corps or the CPRA, are doing with their responses to persuasive forces such as water moving from one place to another at Neptune Pass is assuming a commitment to do something and the burden of carrying it out. I clarify my argument about the emergence of responsibility from response through a discussion of the long history of state engagement with coastal erosion culminating in the establishment of the CPRA, the state-wide agency mandated to take responsibility for it.

Materialising state responsibility

As Jason Theriot (2014) puts it in his account of Louisiana's 'imperiled coast', the great flood of 1927 and the subsequent governing response to strengthen the levees led to the most significant changes to the coastal environment as it cut off the land-building process that sustained it. As he remarks, the levees along the river "saved urban land at the expense of the coastal ecosystem" (2014 p 9). Contemporaneously, the burgeoning oil and gas industry dug canals for access in the coastal marsh. Both of these actions led to coastal wetland loss which not only became apparent but was recognised as anthropogenic as early as the 1950s (Britsch and Dunbar 1993 cited by Crutcher 2011). Environmental lawyer, Oliver Houck (2015) writes of a conference in 1953 where an official from the Louisiana Department of Wildlife and Fisheries spoke about the ecological damage caused by the oil and gas industry and its impact on fishing and erosion but, as he notes, state officials didn't discuss restricting oil development but only the remedial action needed. A 1979 study from coastal scientist, Eugene Turner and colleagues showed that wetland loss was not only caused by "subsidence, decay of abandoned river deltas, waves, and storms" but also by "flood-control practices" and, controversially at the time, "dredging and subsequent erosion of artificial channels … [and] … spoil disposal upon wetlands …" (Craig et al 1979). By the 1980s, new mapping studies showed a doubling of land loss rates since the previous decade (Theriot 2014). Gagliano et al (1981) demonstrated that coastal land loss was occurring at an annual rate of 40 square miles. A scientific study published in 1988 described coastal land loss at that time as at 'catastrophic proportions' (Templet and Meyer-Arendt 1988).

By contrast with the changing environmental conditions, politics, governing and taking responsibility for its effects, let alone its causes, were stalled. Houck (2015) observes that the state did not engage the oil industry in a conversation about who was responsible for coastal erosion and who ought to pay for it. Although the 'thousands of miles' of canals dug for oil and gas development were contributing to coastal land loss, the oil and gas industry resisted attempts to regulate them and nor would they take responsibility for paying for remedial action (Houck 1983, 2015, Theriot 2014 p 131). According to Houck the state "lacked initiative and the parishes were doing little" and with responsibility at that time limited to the river, the Corps lacked a mandate over the coast (2015 p 267).

The history of the governing response to coastal erosion is apparently one of a non-response to the materiality of land loss to water. Various reasons are given for this in the literature including a lack of effective regulation, economic incentives to manage coastal waters and political will (CRCL 1987). There was also, earlier on, a lack of public concern; land loss being slow meant it didn't get the media attention of a hurricane (Theriot 2014). The downturn in oil and gas revenues in the 1980s, compared with the 1970s boom, meant that the government now lacked resources to take action (Theriot 2014), the irony being that remedial restoration following damage caused by industry depends on sufficient industry revenue. While a lack of state response to coastal erosion might suggest a disconnect between matter and state responsibility, the history of the issue tends to show rather that the state was engaged in a *material tussle* between, on the one hand water and land, and on the other, the dominant matter of hydrocarbons. While this tussle - environment versus oil – endured as conflictual, the state response to coastal erosion was inadequate. It took an accommodation of the forces together with pressure from a coalition of civil society for the state to make a more effective response and take responsibility for protecting and restoring the coast.

According to Jason Theriot, there was a shift in priorities when it became more widely understood among politicians, policymakers and the energy industry that coastal erosion was threatening businesses, the economy and national energy security as well as wetlands and wildlife (2014 p 13), although notably the lives and livelihoods of Indigenous and BIPOC communities do not make it onto this priorities list. An important development in state responses to address coastal land loss was a shift from thinking about who was causing the problem to who would have to take responsibility for tackling it. As Theriot records, at some point during the 1980s coastal restoration advocates argued that "the state had to take ownership of the erosion problem … regardless of its cause and regardless of who helped to pay the bill" (2014 p 160). The most pragmatic way forward for civil society advocates for state action was an alignment with industry interests. As a leading protagonist told me:

> The oil and gas industry didn't want more blame for coastal land loss. We convinced them that was not our agenda, we wanted them as partners. Once industry was onside then it became okay for local government to support our efforts because they wouldn't have industry breathing down their necks (Interview 9).

As Theriot says the choice for industry at that point was whether to "sit on the sidelines or grab a seat at the restoration table" (2014 p 184). The state was now shifting away from attempting to regulate industry to implementing a proactive coastal restoration program in which industry could be a partner (ibid.). The alignment among civil society actors and industry constitutes an accommodation in relation to the previous

adversaries – water and land versus oil - allowing for a consensus to emerge as to the appropriate response from the state.

By the late 80s, as Houck describes, he and other environmental lawyers and concerned citizens "decided to write a citizen plan to save coastal Louisiana" (2015 p 267). With its roots in Terrebonne Parish's religious community (Theriot 2014), the influential Coalition to Restore Coastal Louisiana (CRCL), a diverse group of local fishers, scientists, environmental lawyers, boat builders and faith leaders, was formed (Hanny 1995, Theriot 2014). Their manifesto of 1987 called 'Coastal Louisiana: Here Today and Gone Tomorrow?' - self-described as a "citizen's plea for action" - had nineteen recommendations for policy and legislative changes including the establishment of a state Office of Coastal Restoration with "a clear legal mandate from the legislature" and with "clear public accountability" (CRCL 1987 recommendation 18). In David Hanny's account the CRCL's intervention was instrumental in achieving the legislative action that followed at both the state and federal level (1995).

The state Louisiana Coastal Restoration Act passed in 1989 created a mineral tax on oil and gas to help restore coastal wetlands and a position in the Governor's office to promote coastal restoration and oversee wetland restoration functions. The following year, the federal Coastal Wetlands Planning, Protection and Restoration Act 1990 (CWPPRA or "Breaux Act") created a task force, what Hanny (1995) calls "a historic formation of a state-federal partnership" to develop a plan for coastal Louisiana designed to identify, prepare, and fund construction of coastal wetlands restoration projects with 75/25 federal/state cost sharing (Crutcher 2011, Theriot 2014). The Breaux Act also changed the Corps' mandate to include wetland restoration and protection with a budget increase to pay for it (Hanny 1995). As Theriot (2014) points out the Corps' new mandate at times conflicted with the agency's flood control and navigation responsibilities; as evident in its response to Neptune Pass. Popular support for these measures was confirmed by a poll in 1995 showing that 80% of voters in coastal parishes supported state-funded restoration (Theriot 2014).

However, by 1997 it became apparent that Breaux Act activities in marsh restoration and other projects were insufficient to restore the coast (Crutcher 2011) having what Theriot (2014 p 175) calls a "visible but negligible effect." In 1998, the CRCL issued a second influential report. The question mark in the earlier report 'Gone Tomorrow?' was replaced by the more urgent title, 'No Time to Lose' (CRCL 1998/2000). The report pointed out that "without a substantial expansion of their scope and scale, best estimates are that current coastal restoration efforts will prevent only 22% of the land loss that is projected to occur between now and the year 2050" (CRCL 1998/2000 p v). A key focus in the report was that industry had as much to lose from continued land loss as other coastal users (Theriot 2014). For example, first among the "costly consequences" listed under the heading "Why Everyone Pays When Louisiana Loses Wetlands" is the item "Oil and Gas Infrastructure at the Breaking Point" (CRCL 1998/2000 p 11).

The trigger for the subsequent and more comprehensive state response came suddenly on August 29, 2005. Hurricane Katrina and, two weeks later, Hurricane Rita were slow-moving storms that built up thirty feet surges destroying wetlands and creating 217 square miles of open water, an area the equivalent to ten to fifteen years' worth of land loss (Crutcher 2011). (For present purposes, I focus on the effects on the coastal environment while recognising the loss of life in coastal parishes and in New Orleans, the failure of human-made infrastructure and the racist state response referenced earlier.) In addition to their impact on

communities and land, the hurricanes also halted oil and gas activities, flattening over 100 offshore platforms, which led to a spike in energy prices (DHS 2011, Theriot 2014). The impact on hydrocarbon infrastructure and oil and gas production further entrenched the realisation that the fate of the wetlands was tied to the fortunes and national significance of America's 'energy coast' (Theriot 2014). The devastation and loss of life from Hurricanes Katrina and Rita explicitly showed the vulnerability of the coast, as well as the city, and that attention needed to be paid to what was happening there (Interviews 5 and 8). As one interviewee put it:

> Creative and innovative ideas come from a point of no return, it's do or die. When society's values shift you see government's responsibilities shift, after Katrina and Rita, everyone in the state valued our coast (Interview 8).

Within three months of the hurricanes, the Louisiana legislature 'responded' by creating a new state-wide authority, the Coastal Protection and Restoration Authority (CPRA) to reorganise and oversee all of the state's coastal activities (CPRA 2024c). As Morgan Crutcher puts it:

> The CPRA is a product of crisis…. The storm season of 2005 awakened the public and decision-makers to the very real consequences of wetland loss: loss of homes, livelihoods, and human life (Crutcher 2011 p 40).

The state response to the material 'crisis' was to establish a responsible authority whose statutory duty would be to respond to land loss, storm damage, flooding and sea level rise with a programme that integrates the previously distinct functions of coastal conservation and restoration with storm and flood protection efforts (Davis 2008):

> The CPRA is established as the single state entity with authority to … focus development and implementation efforts to achieve comprehensive coastal protection for Louisiana … For the first time in Louisiana's history, this single state authority is integrating coastal restoration and hurricane protection … (CPRA 2024a).

The hurricanes "helped" produce a political and governing response (Vanhala et al 2021 p 149), in this case a new responsible authority. As Mitchell (2002 p 10) suggests, the human agency may itself be the "product of a series of alliances," here among hurricanes, sea level rise, land loss, civil society advocacy, industry acquiescence and public support. A response responsibility (something is done in practice) becomes an expression of state responsibility (someone is accountable) when an authority with legal powers and mandated duties is established. Both the authority and its mandate have emerged from the matter that it is concerned with, a *materialised responsibility.* The materialisation is a process whereby responsibility emerges from the response to matter into legislated responsibilities under statute and then on into the ongoing duty to implement the mandate. Matter, and as my informant suggested 'values,' have not only generated state responses like legislation and programmes for restoration, protection, adaptation and resilience, but they have also, in the establishment of the CPRA, constructed a new location of administrative responsibility for which the state can be held to account. By turning an analytical eye on state responses, it is possible to see that two things are happening. First, a newly created agency is establishing a relation of accountability between itself as an authority not only with the matter that

demands its attention but also with those who are affected by its responsive actions. Second, that Foucauldian 'governing practices' may not only be an expression of power but of the responsibility that they are statutorily required to perform.

Conceptual reconciliations

How can the emergence of the CPRA as a responsible authority be described theoretically within a material geography ontology? A number of conceptual puzzles present themselves. Can this kind of state responsibility be found among actants within a network, assemblage or 'vital mix' (Latour 2005, Bennett 2010)? Is it possible to see the state as administratively responsible at the same as seeing it as distributed and imbricated with society within a 'governing practices' or 'state effects' framework (Foucault 1991, Mitchell 1991)? As Menga and Swyngedouw (2018) observe, the prevalent notion of the state as conceptually dispersed challenges more traditional notions of the state as an entity with fixed contours. The question is whether these approaches can be reconciled.

Jane Bennett's commitment to the distributed agentic nature of all matter in an assemblage, forecloses, for her, the possibility of ascribing political responsibility to any particular human actants (2010). She concludes that a "theory of vibrant matter presents individuals as simply incapable of bearing *full* responsibility for their effects" apparently answering her own question about whether you can "hold officials accountable to the public" (2010 p 37). Bennett's conclusion is unsatisfactory in the case of structural and systemic problems that call for a political and governing response. As Lori Marso (2011) points out in her review of Bennett (2010), while British Petroleum's deep-water oil well spewed millions of barrels of oil into the Gulf of Mexico devastating Louisiana's coast, the political importance of distinguishing between various levels of human responsibility became critical.

Responsibility is often thought of conceptually in terms of causality and avoidance: the US power blackout (Bennett 2010), the Deepwater Horizon disaster (Hinchcliffe 2011, Marso 2011), Chernobyl (Barry 2021b). Both matter and humans may have played their part in causing these disasters but there are concepts of responsibility beyond causality attaching to the human actors that do not apply to the material ones. In discussing the role of the energy traders in the blackout and because of her commitment to her theory of 'vital materialism', Bennett finds it "hard to assign the strongest or most punitive version of moral responsibility to them" (2010 p 37). Bennett does not address the difference between responsibility as cause, which she sees as distributed, with the role-responsibility of the human actors which is more specifically located. In short, they failed *as part of their job* to ensure safety.

Having examined this conundrum empirically, I argue that it is possible to identify the emergence of a responsible state authority from a human/nonhuman assemblage. Human actants can and do construct roles through legal frameworks ascribing duties in response to the matter that demands their attention. As I argue from my research, it is possible to hang onto a theory of vibrant matter and distributed agency while apportioning different functional responsibility among the various actors in the collective. Bennett's 'mix' may be aleatory but its constituents will respond differently according to their roles as she explicitly recognises, though only in passing. As noted in Chapter 2, despite her conclusion about political responsibility being finally an issue for the individual, she does allude to the idea of administrative or

responsibility by virtue of role when she acknowledges that only "*some* bodies" can turn an association among forces into a "*task* force" and that humans may be required to exercise an "executive function" (Bennett 2010 p 102, emphasis in original; p 103 fn 19 p 150). Likewise, Latour (1999 p 198) lists the 'distribution of roles' as one of the features of a collective of humans and nonhumans without further explication. Network or assemblage scholars do not dismiss the idea of 'roles' or 'responsibility,' it's just not what they're interested in.

In contrast to Bennett's view of distributed agency, Foucault's work and subsequent scholarship show that the exercise of power occurs both within and beyond the state (Foucault 1980, Cruikshank 1999, Rose 2000). The salience of the governmentality framework is that it makes possible a recognition of differential status among actants and their unequal power relations without falling into the trap of restoring the 'sovereign' to power or seeing the state as a free-standing agent issuing orders (Foucault 1980, Mitchell 1991). If the state can exercise power differentially from other actants, it can also assume different responsibilities. This idea is consonant with the recognition that both Latour (1999) and Bennett (2010) make in passing that actants have different 'roles.'

What is notable about Foucauldian governmentality is that governing practices include responsibility though the significance of this is under-articulated. Although scholarship since has attended to the way in which the 'population' can be 'responsibilised' through governing practices (Burchell 1996, Cruikshank 1999), discussed below, less attention has been paid to the effect on governing in these processes (though see Löwenheim 2007). However, Foucault's metaphor of the ship's captain having to respond to the storm, the cargo, the rocks and the sailors, is a clear - if implicit and under-explored - recognition of the state's responsibility *qua* state (1991). That responsibility is recognisable as a 'role' (Hart 1968) and is qualitatively different from other forms of responsibility, such as causal or ethical.

Responsibility as the 'job'

The CPRA describes its 'role' as follows:

> Working with federal, state and local political subdivisions, including levee districts, the CPRA is working to establish a safe and sustainable coast that will protect our communities, the nation's critical energy infrastructure and our bountiful natural resources for generations to come (CPRA 2024a).

Legislation creates duties for state agencies in which the responsibility consists both of the role or the 'job' but also tasks to perform, what Kurt Baier (1972/1991) calls 'task-responsibility.' Under its mandate, the CPRA is tasked to develop, implement, and enforce a five-yearly comprehensive coastal protection and restoration 'master plan' (CPRA 2022); a 50-year programme for coastal restoration and hurricane storm surge protection with a budget of $50 billion (Schleifstein 2017) only half of which is funded (Interview 3) and which "makes no promises after 2070"' (Marshall 2023). The plan shifts the state's focus from post-disaster storm recovery to planning for proactive flood risk reduction actions (Laska 2020). The successive plans, the most recent was approved in 2023, propose - and are engaged in implementing - a range of interventions such as barrier island rebuilding, marsh creation, vegetative planting, dredging and, its most consequential and controversial project, sediment diversions (discussed in the next chapter) in an effort to

control water and restore land. In pursuit of its restoration programme, the state is using matter – earth, grass, sediment to respond to the matter of excessive water. These plants constitute 'nature as infrastructure' and are pressed into service not to repel storms but to absorb them (Braun 2014a). However, the CPRA has a Sisyphean task in seeking to protect the coast from the sea. At an online webinar, a CPRA official remarked about creating marsh from dredging sediment:

> We can get wetlands on the ground very quickly but they sink and we have sea level rise … sea level rise converts them to open water, we get about 20 years (PO CPRA 2020, April 15).

In its 2023 plan, in which reducing risk from sea level rise is its major concern (Marshall 2023), the agency concludes that under modelled 'higher scenarios' of coastal erosion, "the benefits of early projects diminish as they can no longer keep pace with subsidence and accelerated rates of sea level rise" (CPRA 2023a p 16).

The tussle among the water, land and governing response is complicated by the presence of oil to which the state is also responding as the mandate with its reference to "the nation's critical energy infrastructure" shows. The CPRA and its role are a response to both the matter (water) and to the harm that it is causing (storm surge, flooding and sea level rise). But the water is a symptom of the harm caused by the oil and gas industry, locally with salt water intrusion caused by canal dredging and globally with increased greenhouse gas concentrations leading to eustatic sea level rise which is experienced locally and at higher rates than other places (Jankowski et al 2017). Coastal erosion and rising seas are material conditions to which the CPRA is responding by accommodating the causes and effects in a combined mandate. The CPRA is engaged in an exercise that seeks to meet many objectives without an explicit recognition that they are incompatible. It is the ambiguous framing that allows the project to emerge, gain support and endure. As Vanhala and Hestbaek (2016) describe in relation to the emergence of 'loss and damage' within the UNFCCC processes, ambiguous language allows stakeholders to attach different meanings to the framing of a policy or programme and this process is deliberately constructed to manufacture consensus. So, while the coastal restoration programme is directed towards environmental goals it is also accommodating the energy interests whose activities are undermining those goals.

The response to water has not only had to be co-constituted with the response to oil, it is also dependent on it for task fulfilment. Under the federal Gulf of Mexico Energy Security Act (GOMESA 2006), coastal restoration efforts are funded by revenue sharing among the four Gulf oil and gas producing states and therefore depend on high oil and gas revenues (Theriot 2014). According to an industry source, Louisiana's oil and gas revenues fund 34% of the State's coastal restoration budget (LMOGA 2020). The State is dependent on the fossil fuel economy to fund its environmental restoration programme the need for which has been contributed to by the demand for a fossil fuel economy. Under the federal Resources and Ecosystems Sustainability, Tourist Opportunities and Revived Economies of the Gulf Coast States Act (RESTORE Act 2012) 80 percent of Clean Water Act penalties from the BP Deepwater Horizon oil spill are allocated to Gulf Coast restoration activities. However, the funds available from the oil spill recovery fund face a 'fiscal cliff' when they expire in 2032 (PAR 2022). As one interviewee commented, "when you're waiting for calamity to deliver necessity then you have a problem" (Interview 3).

As has been argued, the State's current approach to slow the disappearance of Louisiana's coastline in fact rationalises the very practices sinking it (Randolph 2018), what Bakker calls a "tragically ironic example of

Louisiana's oil economy coming full political-ecological circle" (2005a p 519). Fossil fuels were and continue to be materials of greater political clout than excessive water, so the outcome with the role of the CPRA can seem less like a *material tussle* among the forces and more like a smothering by one over the others as I discuss in Chapter 6, Oil. However, there is a temporal aspect to this relation between forces as storms, sea level rise and land loss are all increasing and engaging more strongly in the tussle with hydrocarbons; they "are reminding us of their presence" (Serres 1995 p 2).

What are the effects of a state mandate focused on the management of material conditions through restoration and technology? With all the emphasis on the state's relation with matter like water and oil, the human element is under-articulated and therefore insufficiently addressed. State and federal water management schemes while directly affecting coastal residents have long been criticised for failing to factor in those impacts in their design and implementation or consulted communities about them (Colten 2015, 2017, Brasseaux and Davies 2017). Instead, state coastal planning is seen to protect cities and industry (the core) while sacrificing coastal dwellers (the periphery) (Dalbom et al 2014, Colten 2021). This approach is reflected in the CPRA's mandate: "working to establish a safe and sustainable coast that will protect our communities (CPRA 2024), which can be construed as delegating the work of protecting communities to the coast rather than the agency. Included within the objectives of the CPRA's 2017 coastal master plan to "promote a viable working coast to support important businesses and industries" is to "sustain the coastal ecosystem, safeguard coastal populations, and protect economic and cultural resources" (CPRA 2017). People (expressed as 'coastal populations') are on the list but not the priority. Contrast the duties of the Terrebonne Levee and Conservation District, whose mission, according to its website**,** is explicitly focused on protecting people:

> … to protect lives and property during times of emergency by using the available manpower and equipment in a safe and timely sequence, while maintaining the integrity of the levee systems and flood control structures (TLCD 2017).

Here a governing authority's mandated priority is to 'protect lives.' Given the weakness of the CPRA's mandate in relation to a 'sustainable *coast* that will protect … communities' (emphasis added), it is not surprising that the CPRA's 2017 coastal master plan has been critiqued for being insufficiently about people:

> People [on the coast] think the policy is about protecting the environment and not people (Interview 5),
>
> It's a science and engineering-focused plan and not enough of a social plan (Interview 2), and
>
> There is no investment in justice or transition (Interview 3).

As Craig Colten has argued in relation to the 2017 plan which was in force during my fieldwork: "It is "defensive. It lacks a foundation in related social science research on the communities it will ultimately impact (PO SOC 2021, see also Colten 2021). The State has given itself a limited role in taking on responsibility for restoration and protection programmes. Hart's notion of *role-responsibility* is concerned with the case of a role:

> … to which specific duties are attached to provide for the welfare of others or to advance in some specific way the aims or purposes of the organization (Hart 1968 p 212).

The CPRA duties fall short of Hart's standard as there is no explicit duty to 'provide for the welfare of others' and the aims of the organisation are in tension with each other. The other element of the role-responsibility is the requirement to fulfil it. As Hart says:

> … he [sic] is properly said to be responsible for the performance of these duties, or for doing what is necessary to fulfil them (Hart 1968 p 212).

Where a person or an organisation assumes this kind of task-responsibility, the emphasis is on the execution. A 'role-responsibility' which is focused on completing technical projects is critiqued for not being sufficiently concerned with people. It also provides cover for the interests causing damage as it becomes a way for them to avoid accountability.

Responsibility without blame

In Louisiana, as the causatively responsible agents – the oil and gas industry - would not take what H L A Hart (1968) called 'liability-responsibility,' it became necessary to create a state agency that would take on the *role* of managing the problem without ascription of blame or liability instead. In reflecting on who might be responsible – and take responsibility - for the power blackouts following the failure of the electrical grid in North America in 2003, Bennett (2010) considers responsibility in terms of blame. According to her account, the task force report found that the directors of FirstEnergy corporation were not to blame and so they did not – and did not have to - take responsibility (2010 p 37). Bennett is discussing a case where the assumption of responsibility is resisted, as with the oil and gas industry in Louisiana (Houck 1983). The way to do that is to avoid blame. As Lemke argues, Bennett seeks to avoid the 'blame game' because she fears that a politics that engages in moral condemnation will obscure the "web of agentic capacities'" that she wants to foreground (2018 citing Bennett 2010 p 38). Instead, influenced by Dewey's political pragmatism which emphasises consequences more than intentions, Bennett shows how responsibility can be understood more as a matter of responding to harms than of identifying objects of blame (2010 p 101-2). However, as the literature on liability and 'blame' shows (Goodin 1995, Eckersley 2016, Goodhart 2023), this approach has adverse consequences for accountability and justice.

The management of a problem through a non-political governing response to harm that avoids blame flattens responsibility as the emergent responsibility is one that is directed to fulfilling practical and technical tasks and is less about equitable outcomes for frontline communities. *Responsibility-as-task* or *responsibility-as-action*, discussed in the next chapter, disengages from and seeks to avoid *ex ante* questions of liability for the causes of harm (from the actions of the oil and gas industry) and consequential questions of justice and reparations (owed to people who have been harmed) (Táíwò 2022). As a leading justice advocate in Louisiana has argued, when considering reparations, "you need to start at the root cause and include responsibility, not just what we need to do" (PO SOC 2021, remarks by Colette Pichon Battle). However, in Louisiana, the 'just what we need to do' approach not only underpins the state's role-responsibility but is prevalent among the larger environmental non-profit organisations. These organisations and coalitions are both influential in state policymaking and also engaged with the state in performing its role-responsibility whether through advocating large-scale infrastructural projects like

sediment diversions, conducting polling which supports their roll-out (RMRD 2021) or as I experienced, in practical participation in coastal restoration.

Responsibilising restoration

As recorded by local scholars (Hanny 1995, Theriot 2014,), the CRCL, the non-profit coalition of concerned citizens, played an influential role in pressuring the state to take responsibility for coastal restoration and protection action culminating in the establishment of the CPRA and its coastal programme. The CRCL can be seen as a Deweyian 'public' emerging in response to a problem (1927/2016) and, in actor network terms, is an important actor in the network of relations with matter, the state and responsibility. In addition to its advocacy work, the CRCL runs its own restoration programme staffed by volunteers, an exercise in support of the CPRA's programme under its coastal master plan. The CRCL's Native Plants Program enrols volunteers in days spent planting trees in the swamp, grasses in the marsh and bagging oyster shells, all of which are designed to help restore Louisiana's coastal habitats (CRCL 2022). The program invites "volunteers and stakeholders to be a part of the solution" (CRCL 2022). Among the listed project "stakeholders" who are "part of the solution" through sponsoring volunteer days are Cheniere Energy, Marathon Oil, Phillips 66 and Shell (CRCL 2022).

Image 10: Dead trees near Isle de Jean Charles, April 16, 2018, photo by Talitha Richmond

Native swamp trees like the bald cypress, Louisiana's state tree, were first cut down for timber and have since been destroyed by salt water incursion from oil and gas canals (Bass and Turner 1997). As Theresa Dardar, a member of Pointe-au-Chien Indian Tribe, records:

> The activities that have altered our homelands started in 1891 with the cutting and floating of cypress trees. In 1905 a well was drilled on the edge of the marsh a few hundred yards from Bayou Terrebonne. That was the beginning of the oil companies cutting canals, which caused the saltwater intrusion, erosion of the land, and kills trees (quoted in Comardelle et al 2020).

Dead trees with their few bare branches are a common and bleak site in southern Louisiana (see Image 10). Classified as 'snags,' dead trees are sources of greenhouse gases (Martinez and Ardón 2021) in contrast to their emissions of oxygen when living and their potential for enrolment in carbon mitigation projects (Ehrenstein 2018). Local author Sarah Broom observes that they are "everywhere in the water like witnesses, evidence of vanquished cypress forests" (2019 p 71). In their state of petrification, trees are material witnesses to environmental violence (Broom 2019, Schuppli 2020, Barry 2021) in the place where it has occurred. They are the visible embodiment of industry activities and regulatory failure and in their dying, the trees are responding to these realities. However, planting young trees is one of the coastal restoration measures in which local people are invited to take part. As a counterpoint to her inability to locate political responsibility, Jane Bennett proposes that individuals should consider entering "into the proximity of assemblages whose conglomerate effectivity tends toward the enactment of nobler ends" (Bennett 2010 pp 37–8). The notion of participating in more productive 'assemblages' with 'nobler ends' became empirically available when I signed up for a day of planting cypress trees in the swamp with other volunteers organised by the CRCL (PO CRCL 2020).

Early one morning at the end of January 2020, I arrive at the location specified in Violet, a town on the Mississippi River in Plaquemines Parish, historically a site of logging (Interview 4). I'm early because rubber boots are said to be of limited availability on a 'first come first served' basis and my trainers don't feel swamp ready. After picking up a pair of boots, I chat with the CRCL organisers and await the arrival of my fellow volunteers, a group of about twenty of us. (As already mentioned, the use of the first-person plural pronoun emphasises my participation and is not a foray into auto-ethnography). We then watch as a pick-up with a trailer full of cypress saplings arrives and we assemble ourselves in a human chain so that the saplings can be passed up onto the levee in an action that involves swinging handfuls of saplings from one hand to the other as they are received and then passed on. The young trees are then allocated to sledges - plastic containers on runners - which are ideal for pulling along the surface of the swamp. I get myself into a pair with another volunteer, and after receiving our instructions, we take our sledge with about 20 saplings lying in it, spade, plastic shields and ties and we head down the other side of the levee, through a small gap in a hedge and out into the swamp.

Quite quickly I sink into the water and am squelching around with my boots full of water. My partner and I drag our sledge to a place not yet occupied by other volunteers and we start planting trees in the swampy water as we have been instructed to do. We make mistakes at first (you need to tie the plastic shields protecting the young trees in 'burrito' rather than 'taco' style) but we learn as we go and after several hours of physical work, there is an atmosphere of good spirits and industriousness and expressions of accomplishment from the volunteer pairs planting trees around us. We are all doing what we can, in our small way, to help restore the coast and "be part of the solution" (CRCL 2022).

During lunch (eating sandwiches sitting on the levee with our socks laid out to dry in the winter sun), people from CRCL talk to us explaining how the trees' dense root systems encourage land growth and

how vital our work has been in helping to reduce erosion and protect local communities from the frequent storm surges during hurricane season. In inviting us to reflect not only on the saplings we have been handling but the root systems of the trees and their important protective role, trees emerge as matter that is not only 'alive' but, in their relations with other matter, are 'thinking' (Kohn 2013). More prosaically, it was evident that the purpose of the talk was not only informative but designed to encourage volunteers to believe that their contribution is worthwhile.

According to CRCL's website, since its inception in 2000, the Native Plants Program has engaged "more than 14,500 volunteers and directly restored more than 4,500 acres of coastal wetlands in Louisiana" (CRCL 2022). The website does not address questions of significance or durability. Whether the saplings will survive depends on future salinity levels (Interview 2) which is increasingly affected by storm surge sea water and sea level rise. Restoring 4,500 acres over 20 years equates to a total of 7 square miles (miles^2), in my calculation, which needs to be set within the wider context of a land loss rate of 16.6 miles^2 per year (Couvillion et al 2011). Trees are being enrolled, as Véra Ehrenstein (2018) observes in a different context, in 'peculiar transactions.' Volunteering has limited physical impact given the difficulty in keeping up with the changing environmental conditions and is considerably less than what the CPRA can achieve through its more systematic and resourced coastal restoration programme. Participation in a project where the contribution is relatively minor and the lasting value is uncertain constitutes a form of performing responsibility beyond the state known as 'responsibilisation.'

Foucault's idea of governmentality involves the population being governed through techniques and practices which produce the 'conduct of conduct,' meaning governing others and the self (1980, 2009). The state achieves its objects by enrolling citizens in its governing practices whereby individuals become not the ends of government but its means (Foucault 1991 p 100). Responsibilisation involves acknowledging peoples' capacity to take action and utilising it for governing objectives directing them to take responsibility for 'small things' (Rose 1999, Cruikshank 1999). Indeed, for responsibilisation to be effective, people need to be encouraged to take part, as in the case of the Native Plants Program so long as they have the luxury of time (it was a weekday) and are sufficiently able-bodied. The CRCL encourages volunteers by suggesting that their help is not only useful but necessary:

> You can make a difference on our coast! Spend a day with us in the marsh, on the beach or in the forest by volunteering with our Native Plants Program. Only with your help can we accomplish hands-on restoration across the state (CRCL 2022).

Through the talk given to volunteers sitting on the levee during the break, volunteers were educated about the programme and its value which helped make them better informed. Governing practices rely on the existence of the 'informed citizen' (Barry 2001 p 48), a group of individuals who can be mustered, together with information to help perform the state's responsibility.

In the process of 'responsibilisation' individuals are identified as both the target of government action and accomplices in achieving it (Burchell 1996 p 23, Rose 2000, Cruikshank 1999, Soneryd and Uggla 2015). Responsibilising processes are not only targeted at individuals as atomised consumers (Maniates 2001) who are given discursive advice on how they should behave (Hinchliffe 1996, Rutland and Aylett 2008, Shove 2010, Soneryd and Uggla 2015). They can also include civil society programmes bringing groups of people together to perform a responsibility that is also a statutory responsibility of the state agency. The

acts of responsibility performed by the volunteers are both practical (planting trees) and representative (doing something to help the environment and local communities). Crucially and in contrast to the collective action discussed below in Chapter 7, Air, this was a non-political activity. 'Action' in this context means planting trees, it does not mean 'action' in the Arendtian sense (1958/1998) of political engagement or efforts towards systemic institutional change (Maniates 2001, Rutland and Aylett 2008, Shove 2010, Stengers 2015). We volunteers applied ourselves to the task of planting all of our assigned saplings in the way we had been instructed in the time allocated to us without querying the project's usefulness. With our focus on compliance (Soneryd and Uggla 2015), in Foucauldian terms we were being both 'docile and useful' (2009 p 137).

As the role played by the non-profit CRCL and the fossil companies in promoting and supporting these programmes show, the responsibilising process may not (need to) be driven by the state but by actors who, as in coastal Louisiana, have both helped create the state authority and its mandate and then help to implement its programme. There are new actors 'on the scene of government' (Lemke 2017) further blurring the line between state and society (Mitchell 1991). As Barbara Cruikshank (1993) puts it, governing practices can be applied outside the state apparatus to enhance, maximize, and stimulate the subjectivities of the population. The conflation of roles present in responsibilising practices is antithetical to ideas of holding the state accountable. An essential feature of these practices is that they be presented and performed as ones of value. My fellow volunteers gave the impression that what we were doing was uplifting and fulfilling. A sense of contribution and purpose for individual participants - 'making a difference' and being 'a part of the solution' - is fundamental to the success of responsibilising under governmentality practices and needs to be maintained to ensure continuing enrolment.

Conclusions

This thesis is concerned with circumstances in which the state takes responsibility. Rather than following existing scholarship in material geography that theorises the relation between state and matter primarily as one of power, this thesis advances the argument that it is also one of responsibility, a *response responsibility*. The ubiquity and urgency of excessive water in coastal Louisiana makes it a major concern for the state and it is therefore a useful element for exploring matter/state relations. Identifying that actants in a network may be in a relation of response whether among matter or between humans and matter, this chapter has gone on to show that new forms of both state institution and of state responsibility emerge from the state's response to the matter calling for its attention, *a materialised responsibility*. Although the state is concerned with water and loss of land, it is also concerned with the hydrocarbon industry. The chapter shows the *material tussle* among these forces as oil is present as matter that disrupts water and land in Louisiana at the same time as setting parameters around the state's responsibility, an issue more thoroughly explored in Chapter 6, Oil.

The concept of role-responsibility borrowed from legal literature is distinguished from causal responsibility, appreciating that this way of thinking about responsibility is under-explored in geographical scholarship. The chapter argues that it is theoretically possible to situate this kind of responsibility within a 'governing practices, 'state effects' and 'network' framework. My answer to the conundrum discussed above is that a network or state effects approach is compatible with state responsibility when one thinks

of it as emergent, responsive and in terms of roles - the taking on of a function and then the performance of it - rather than responsibility as seen through causality, liability or morality.

However, role-responsibility if implemented as technological and technocratic avoiding both blame and politics has implications for accountability and praxis. The emerging duties may be limited and focused on executing the tasks rather than fully addressing the effects on frontline communities with consequences for equity and justice, as discussed in Chapter 7, Air. Meanwhile, one of the non-profits which advocated for a state role-responsibility is also engaged in assisting the state in fulfilling it when providing for volunteers to undertake remedial restoration action through a form of responsibilisation. The next chapter, Land, looks at ways in which the state is exercising its role-responsibility and with what effects, particularly on frontline communities, seeking to bring people back into the frame. In identifying the limitations of the state's *responsibility-as-action,* it considers alternative more productive models of responsibility.

Chapter 5: Land

Introduction: Land as giving (in)

In coastal Louisiana, land is matter in issue - is arguably the issue - as it is increasingly becoming everywhere in a climate changing world. Latour's (2017) titular question - *où atterrir* [where to land] – is pertinent just at the moment when "land is slipping away" (2018 p 4). Coastal Louisiana, a border zone between the 'adjacent biologies' of grasslands and wetlands (Nixon 2011), also interacts with tides, floods and storms meaning land and water continually give and take from each other, though land is now giving more to water. Between the land and the water are the inland swamps and coastal marshes which were seen by early Europeans as worthless and pestilent (Colten 2018) and by escaping enslaved people as a refuge (Wilson 2006) which, together with barrier islands, now perform the labour of acting as buffers against storm surges protecting cities and oil and gas infrastructure. Land is needed in one place to protect land in another place from encroaching water.

However, as the land increasingly 'gives' to water, land becomes matter that is geomorphologically challenged. Its claim to be *terra firma*, or, as the southern parish Terrebonne nominatively claims, land that is 'good,' is diminishing as it engages in the process of becoming liquid matter. This loss of land reverses the natural deltaic processes in which sediment from the Mississippi River established the fertile ground. As Mark Davis remarks (2008 p 424): "In geologic terms, the area is … a process of land building and retreat that defies our normal notions of land as a solid, permanent thing." As Latour (2018) observes, with climate change, the Earth has stopped absorbing what humans have done to it and is now responding so that land, or what he calls the *Terrestrial,* has become socially and politically agentic. Through this lens, land is a material and vibrant force within a network of competing forces including water, oil and gas and the effects of carbon emissions.

As land ceases to be stable, conceptions of land become theoretically challenged. In Western or settler scholarship, land is well-established as stable territory that forms the object and instrument of governance - a way of ordering the world - and subject to a range of techniques which seek to render it legible and governable (Foucault 2009, Mitchell 2002, Scott 1998, Elden 2010). Staying with the notion of governing, land in Louisiana needs also to be thought of in the context of the long and brutal history of genocide, colonialism and racism with their imposed displacement and relocation of Indigenous people (Jessee 2020, Maldonado 2014, Tuck and McKenzie 2015). Places like coastal Louisiana, at the extremities of the continent, are where Indigenous people found refuge after being driven from their homes and lands (Austin 2006, Smiles 2021). Not to see land in Louisiana in terms of struggles for self-determination and justice would be ahistorical - the appropriation and dispossession are ongoing - contemporary and evolving land relations are themselves continuing expressions of colonialism and decolonial resistance (Comardelle et al 2020, Liboiron 2021, Simpson 2017). Land also offers its learning as 'first teacher' as Indigenous knowledge is inseparable from land and landscape despite being disrupted by colonialism (Zinga and Styres 2011, Kermoal and Altamirano-Jiménez 2016).

The established way of thinking about land as something that is subjected to governing practices may be necessary but it is not sufficient as it fails to account both for the increasing instability and disappearance of land, that is to say its agentic quality, but also the intersecting roles, relations and responses of people

and more-than-human matter with regard to land. The mutability of land that is disappearing resonates with Liboiron's (2021) idea, following Tuck and McKenzie (2015 p 57), that land is 'a verb rather than a noun' as it is something that, because of its continuous and shifting relations, never settles but is always in action. Following Liboiron (2021 p 45), the land that is discussed in this chapter constitutes 'Land' as it is specifically located and the subject of its own relationships and responsibilities. These include, the 'combined living spirit' of soil, plants, people, histories, culture and identity (Liboiron 2021 p 5, Zinga and Styres 2011) resisting the human/nature distinctions imposed by colonialism (Watts 2013). Land in this way of thinking is already connected to responsibility (Kimmerer 2013).

In this chapter, I draw on three conceptions of land: as forceful and agentic (Latour 207, 2018), as the repository for the tension between ongoing colonialism and decolonial efforts (Liboiron 2021) and as the foundation for understanding relations of responsibility (Kimmerer 2013). The chapter progresses the thesis' investigation into the establishment and practice of state responsibility from the matter that calls for its attention. The previous chapter considered water as a form of matter that, as it encroaches on and undermines land, provokes and produces a *response responsibility* from the state, a *materialised responsibility.* In doing so, the state is assuming the obligation to take responsibility, Hart's 'role-responsibility' (1968), which is then implemented as a 'task-responsibility' (Baier 1972/1991) meaning that the state will take on the job of being responsible for the response and then act on it. In this chapter, I explore the ways in which state *responsibility-as-action* is undertaken in practice and how it can be experienced by those affected by it. In doing so, I address my third research question: *what kind of state responsibility is emergent from what kind of matter and what forms does it take in practice.*

The chapter opens with reference to the resettlement plans at Isle de Jean Charles, what is known in climate change discourse as a 'loss and damage' site. As an example of the state undertaking *responsibility-as-action*, the process of relocating the community reveals different understandings of - and tensions among - the relation between land, responsibility and the role of the state. Responsibility-as-action is seen to be a 'doing to' which contrasts with more expansive notions of *responsibility-as-reciprocity* invoked by relations with land understood by the islanders. The discussion about the island acts as a bridge to exploring the way in which the state has responded to the road that connects the island to the mainland. The recently installed fishing piers on Island Road open up a discussion of the way in which state responsibility in action favours some people over others, a practice of *selective responsibility.*

While, as the previous chapter shows, the preoccupation in Louisiana is with state attempts to control water and prevent it from flooding and eroding land – from turning land into water – this chapter goes on to describe state plans to put that process in reverse. The state's proposed sediment diversions are an infrastructural device to use sediment from the waters of the Mississippi River water to build land, mimicking natural deltaic processes. Rather than emphasising circulation, as in network thinking, it is also possible to see a *chain of responses* within the network of people, land and related and shifting material forces. The ensuing discussion about the Mid-Barataria sediment diversion is concerned with the nature of governing practices of *techno-responsibility.* These have limited prospects as a 'solution' to the land loss crisis while causing significant adverse effects for riverine communities revealing not only the discriminatory tendencies of *responsibility-as-action* but also the limitations of *responsibility-as-care* which

emerges as paternalistic and colonialist and stand in contrast to *responsibility-as-relation* and the productive potential of *responsibility-as-reciprocity*.

The "ordeal of being deprived of land"

Latour's characterisation (2018 p 6) is keenly felt at Isle de Jean Charles. Since 1955, the island has lost 98 percent of its area (from 22,400 acres to 320 acres) (OCD 2016, Dermansky 2019). Chantel Comardelle, Tribal executive secretary of the Biloxi-Chitimacha-Choctaw Tribe, describes the island and its history as follows:

> Isle de Jean Charles is a small ridge of land in southern Terrebonne Parish, Louisiana. "The Island," as locals call it, is home to the Isle de Jean Charles (IDJC) Biloxi-Chitimacha-Choctaw Tribe of Louisiana. The IDJC Tribe settled the Island in the early 1800s, having been pushed into "uninhabitable" lands by European settler colonialism, slavery, and social inequality. Long before climate change challenged the IDJC Tribe's homeland, systemic discrimination and racism towards Indigenous people challenged their universal rights. The IDJC Tribe adapted to life on a secluded island, accessible only by boat, by living solely off the land and surrounding waters (Comardelle 2020).

The Island's website describes its cultural significance:

> For our Island people, [Isle de Jean Charles] is more than simply a place to live. It is the epicenter of our Tribe and traditions. It is where our ancestors survived after being displaced by Indian Removal Act-era policies and where we cultivated what has become a unique part of Louisiana culture (IdJC 2021).

From sustainable livelihoods fishing, hunting and growing crops, living with the land, the water and the seasonal weather conditions, the islanders now face an extreme environmental challenge: "Today, the land that has sustained us for generations is vanishing before our eyes" (IdJC 2021). In 2020 it was reported that only approximately 80 of 700 Tribal citizens still live on the Island, while others form a diaspora in nearby communities (Rights of Indigenous People 2020). A number of state and state-supported interventions are responsible for this devastation. The installation of a small levee to protect the island during high tides led to the bayou becoming stagnant, destroying the ecosystem on which the islanders depend (IdJC 2021, Red Road Project 2021). The 2010 BP oil spill and its clean-up devastated the island's fishing economy and islanders are now threatened by new oil and gas drilling just offshore of Terrebonne Parish after the Biden administration reopened leasing (Madeson 2021).

Over the past 75 years, the island has been transformed by the oil and gas infrastructure and pipeline canals that surround it in a process involving land seizure and exploitation - 'wrestling land from the swamp' - repeating the earlier practices of the sugar and timber industries (Austin 2006, Randolph 2018, Jessee 2020). Oil and gas extraction has exacerbated coastal erosion land loss at Isle de Jean Charles just as it has all along the southern coast of Louisiana (Bass and Turner 1997). Blaser and de la Cadena (2018) see 'extractivism' as continuing the historic and notorious invocation of 'terra nullius' as it actively creates space for the tangible expansion of the one world by rendering empty the places it occupies and making absent the worlds that make those places. Rob Nixon (2011) sees the loss of land and resources from inhabitants as 'displacement without moving.' As oil and gas extraction continues its environmental

depredations, the land on which the islanders' future depends is disintegrating and disappearing into the sea.

The most threatening planned intervention is the combined federal and state Morganza to the Gulf (MttG) Flood Protection System. The 98-mile levee and integrated infrastructure system is being built at a cost of $6.6 billion to protect economic interests and coastal communities (Louisiana Government 2024). However, it will pass north of Isle de Jean Charles, along with certain other coastal villages, because in 1998 the US Army Corps of Engineers determined it was not cost-effective to include the island (IdJC 2021). 'Passing north' is a geographical euphemism for selection and exclusion leaving certain named villages, like Cocodrie, outside the zone of protection from hurricanes, storm surges and flooding coming in from the Gulf of Mexico (see Image 11).

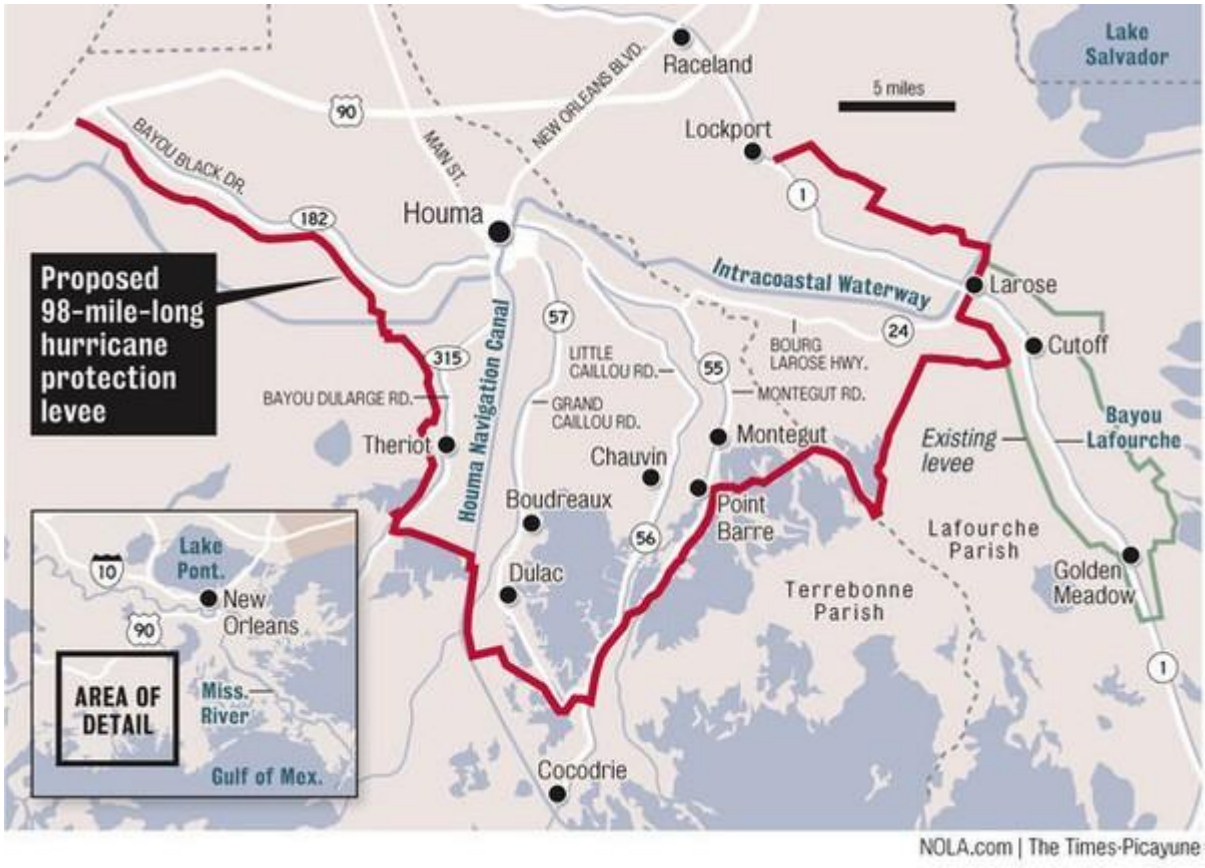

Image 11: Morganza to the Gulf levee system (NOLA 2018)[8]

However, it is not just a question of being left outside the levee protection system and subject to storm and flood damage, there is also the increased risk of flooding that the new levee itself will bring. In its environmental impact assessment, the Corps concluded that the MttG levee project "has the potential" to increase flooding in communities outside the protective system, including "all of Isle de Jean Charles … by

[8] The house depicted in Image 5 is at Cocodrie, a village outside the proposed MttG protection system, as is Isle de Jean Charles, not shown on this map.

as much as 3 to 7 ft" beyond present day storm surges and anticipated sea level rise (Corps 2013 p 8). Affected Tribal communities are also excluded from the federal planning processes as, although they are recognised by the state, they do not have federal recognition, despite efforts to acquire it since the 1990s (Rights of Indigenous People 2020). Federal recognition would give Tribes the right to be consulted about government projects like MttG but, as reported, their applications are opposed by the oil industry (Crepelle 2019).

Frontline communities have to deal not only with the changing environmental conditions brought about by industry operations and state interventions or failures to intervene but further government projects in response to those conditions. In its execution, the state's response to harm results in harm. The consequence of "a half-century of irresponsible oil and natural gas extraction practices" is the loss of protective marsh leading to greater exposure to severe damage from storms (Northern Arizona University 2017). Hurricane Ida is the most recent hurricane to devastate the island with reportedly all but one of the 25 island homes "wiped out" (Madeson 2021) and lack of federal recognition meant the Tribe was not able to access federal funds direct (Chavez 2021).

More hurricanes will undoubtedly follow as the loss of land translates directly into greater exposure to hurricane risk (CITF 2022). While physical dangers challenge lives and home places, the stress and uncertainty challenge culture and identity and the Island's "life ways" and need to be seen as part of wider socio-political and historical contexts (IdJC 2021, Marino 2015, Maldonado 2018). Drawing on the scholarship discussed above, land is seen in the first two dimensions: it is active as it is moving and giving itself to water and to oil and it is also a continuing object of colonial power expressed through the actions of the oil and gas industry enabled by the state. The state materialises its role-responsibility through the need for fossil fuels and the need to protect land against flooding. However, it is in the relation between the state, the islanders and land that other forms of responsibility emerge.

Following the Corps' determination in 1998 about the location of the MttG levee and its destructive potential for Isle de Jean Charles, the following year islanders started making plans for resettlement (Comardelle et al 2020). The federal government responded to the coastal community's predicament with the award of a $48m grant in 2016 (HUD 2016). As a State official engaged in the process has noted, it is intended to create a model for managed retreat at a scale not previously attempted requiring both the consideration and balancing of competing desires (Sanders 2018). Islanders reportedly expected the resettlement to be a shared responsibility through a partnership with the State but, because the Tribe does not have federal recognition, the federal grant had to be awarded to the State to administer (Baurick 2022). The state authority responsible for allocation of these funds is the Louisiana Office of Community Development (OCD) which, as Shirley Laska (2020) explains, functions primarily as the agency administering federal disaster response funds while also seeing itself as the state agency responsible for resiliency enhancement. The state government purchased land upstate for the proposed resettlement of the islanders and implemented a consultation process with the community about their relocation (OCD 2016, OCD 2021a).

From the IdJC Tribe's perspective, they have been actively working since 2002 to implement a Tribal-led resettlement to bring both Island residents and the diaspora together in one place that ensures the Tribe's

safety and cultural survival (Rights of Indigenous People 2020). However, as the community and commentators have noted, the innovative approach for resettlement proposed and led by the community has been overtaken by the State's own emerging framework for coastal resilience and attempts by the community to take responsibility for its own future are being thwarted. Amidst criticisms expressed by the Tribal community the relationship between the state authority and the islanders has deteriorated (Bisschop et al 2018, Crepelle 2019, Comardelle et al 2020, Laska 2020, Jessee 2020, 2021).

A community leader sees what was "supposed to be a pilot for sustainability, being wasted by the state" as "[t]hey turned our vision into a subdivision" (Secretary Comardelle quoted in Comardelle et al 2020). An interviewee described the relocation project as a "complete failure" opining that government is not equipped to relocate a community as a community. The process is too transactional and bureaucratic and there is deep distrust among the Native American community who are reminded of governmental processes used when their land was stolen from them (Interview 8). The pressure to relocate challenges Tribal 'collective continuance' risking loss of community and culture further exacerbating impoverishment and injustice (Whyte 2013, 2018, Maldonado et al 2013). The proposed relocation increasingly represents something being 'done to' the community who are now described as 'stakeholders' rather than as partners as initially envisaged (Jessee 2020). Not to have control over the plans and the funds for their future and the future of their land means the islanders have lost what Shiri Pasternak (2017 p 3) calls 'jurisdiction' meaning the "apparatus through which sovereignty is rendered meaningful."

Different forms of responsibility are playing out through the diminishing land of Isle de Jean Charles and the plan for resettlement. The way in which the State is exercising responsibility in relation to the resettlement is very different from and in tension with the conceptions of responsibility that the islanders expected to implement. The State's exercise of *responsibility-as-action* is experienced as proposals, consultations and decisions for action rather than the kinds of engagement anticipated by the islanders. The First People's Conservation Council (FPCC) sets out how it sees its responsibilities at Isle de Jean Charles as follows:

> Being a First People, we again try to set a precedent and a model for the many communities, who too will suffer with the issues that now affect us. In coming together to form FPCC our goal is to work across agencies; state, local, and Federal, as well as private and other non-profits to find solutions and take action while also taking matters into our own hands and being an accountable voice for our people (FPCC 2023).

The notion of responsibility as a working together and being accountable is reflected in Kyle Powys Whyte's definition of 'responsibilities' as the reciprocal (though not necessarily equal) attitudes and patterns of behaviour that are expected *by* and *of* various parties by virtue of the different roles that each may be understood to play in a relationship and these *relational responsibilities* belong to larger 'systems of responsibilities.' (2013 p 519). Land is intrinsic to these relational and reciprocal responsibilities. As the Indigenous Rights and Responsibilities Framework states, it is "based not solely on the notion of inherent rights, but on the responsibility and obligations of Indigenous Peoples and Tribal Nations to the land itself" (Indigenous Environmental Network 2021). Michelle Murphy argues that "thinking in … territories" is not just an ecological connection but also an ethical relation … a responsibility" (quoted in Srivastava 2021). As

Robin Wall Kimmerer (2013) explains, communities take responsibility for their land and all that it includes because of their respect for and reciprocal relations with it.

Responsibility-as-reciprocity is conceptually compelling and offers a way of understanding land and responsibility free from colonialism and exploitation. However, it is not what is experienced as the 'state effects' (Mitchell 1991) for the people of Isle de Jean Charles. Carol Hunsberger's case studies (2022) showing the way in which corporations and government agencies in Canada use space and scale as devices to evade responsibility in relation to Indigenous lands, prompt her to reflect on how governments and Indigenous communities interpret responsibility differently. As she notes, government's 'selective embrace of responsibility,' above all for attaining capitalist economic growth, contrasts with Indigenous expectations of assuming an expansive responsibility for 'all our relations' (LaDuke and Cowen 2020) within a non-hierarchical ethic of responsibility which includes reciprocal obligations to nonhumans and future generations (McCreary 2020, Estes 2019). Whyte (2016) observes that climate impacts, pollution and using land as a sink – and in coastal Louisiana the land is both a sink and sinking - reveal that the ways in which communities perform their responsibilities to other humans, nonhumans and the environment are systematically being erased. As Vanessa Watts (2013) argues, colonial tactics of violence against Indigenous territory and people operate in a limited space of human-only thought and agency. Effectively, in performing its own form of responsibility-as-action, the State is preventing the exercise of long-standing relational and reciprocal responsibilities of other communities. While the resettlement remains unsettled, another arm of the State is taking action that also affects the island community; it concerns the road that connects the island to the mainland and illustrates Hunsberger's notion of selective responsibility.

Responsibility as selective

One sunny April morning, my daughter and I drive out to Isle de Jean Charles. The two-mile road is straight for a while and then makes a sharp bend to the left as it approaches the village, cutting through the water all around barely suspended above it. The water laps up against the road as if it were the tide coming in to swallow up a causeway. Hydrocarbon infrastructure nestles in the shallows abutting the edge of the road with its unfriendly signs warning of danger (see Image 12). The road appears differently depending on when you encounter it; the 'field' of study is in flux. The day I was there, it was a solid connective bridge from one parcel of land to another (see Image 13) but at other times as many photographs and videos show, it is under water. The road is giving its land to water.

Historically, Isle de Jean Charles was accessed by flat-bottomed pirogues, or, at low water, along a ridge. The authorities constructed a road through the marshland connecting the island to the mainland in 1953 after the first local oil rigs were installed (IdJC 2021, Rush 2018). Since then, the marshland has eroded and turned into open water on either side of the road ("expanses of water so new that neither has a name," Rush 2018 p 19) leaving the road vulnerable to erosion and flooding. Tribal elders believe that the construction of the road was unwise and that it has contributed to the erosion of the island (IdJC 2021).

Image 12: Oil pipeline sign on the side of Island Road, April 16, 2018, own photo

The road floods regularly and incurs damage during storms and high tides and is at risk of washing away altogether during extreme weather (IdJC 2021). The islanders who never requested the road, have suffered the adverse environmental consequences of its construction at the same time as becoming dependent on it as it becomes increasingly precarious. Requests of the State to invest in repairing the road for the benefit of islanders were reportedly refused (Comardelle et al 2020). However, islanders now observe the State making a new investment in the road for future use by others in a programme of responsibility-as-action for selected populations.

Tribal leaders were told that if residents moved off the island, access to it would still be protected, "no corporate development would take place" and the island would be "left to nature" (Chief Naquin, quoted in Jessee 2021). For most Island residents, this was non-negotiable (Simms et al 2021). However, the State's relocation contracts require islanders to agree that they will use Island property only for "recreational use" (OCD 2021b, Jessee 2021). The State has determined that land whose purpose has long been to provide a home and 'life way' to villagers is now decreed as a place of recreation not only for residents but for other people for whom 'recreation' is the motivating force. The emphasis on 'recreational use' has become visible with recent upgrades to Island Road. In 2020 (two years after I was there), the State installed fishing piers, parking and a boat launch for 'public use' costing $3m and funded from 2010 BP oil spill funds in order to "enhance fishing opportunities by creating safe recreational areas along Island Road" (CPRA 2020,

Image 13: Island Road, April 16, 2018, photo by Talitha Richmond

NOAA/DHNRDAT 2021). In a CPRA press release about the works, the Terrebonne Parish president is quoted as saying, "we … need to remember this is the Sportsman's Paradise" (CPRA 2020).

Island Road is described in CPRA's press release in terms of its potential as a site of recreational fishing and no mention is made of the residents of Isle de Jean Charles who depend on the road for access to the mainland. The project has been designed to maintain the road and exploit the waters for 'public use' rather than for that of residents. Presumably this is because the State's programme is for them to relocate to the new purchased site inland. From the State's governing perspective, the islanders have 'gone' and even though some of them reportedly don't intend to leave (Brooks 2021), they have departed the consideration of the State in relation to the road. Instead 'sportsmen' are the people for whom the State is concerned with, *for* whom it exercising responsibility. As an interviewee observed, the new piers have reinforced the belief among residents that white people want their land for recreational fishing (Interview 8). As Secretary Comardelle describes it:

> Because a small ridge of land is only good and profitable for the oil or as a "sportsman paradise," so then let's invest in that, now that the Indians are gone. And let's profit by learning about how to move these Indians. Managed retreat is another form of assimilation and colonialism (Comardelle et al 2020).

Through the construction of a 'paradise,' parish and state authorities are encouraging a future place for settler industries and leisure, what has been dubbed climate 'adaptation privilege,' while the migration of Indigenous peoples is treated as a foregone conclusion (Marino 2018, Comardelle et al 2020). In his

taxonomy of American landscapes of violence and tragedy, Kenneth Foote (1998) categorises sites into those which have been sanctified, dedicated, obliterated or rectified. In this case the obliteration is succeeded by rectification as an 'official landscape is imposed on a vernacular one' and 'Land' is 'usurped in place' (Nixon 2011, Liboiron 2021). This development is on the continuum of racist land practices where Indigenous land is appropriated and commodified with access to it reserved for (white) settler goals and Indigenous relations with Land are erased (Pulido 2017, Liboiron 2021, Smiles 2021). As LaDuke and Cowen (2020) observe, infrastructure has long been central to the destruction of Indigenous life and the making of settler colonial futurity.

The new fishing piers along Island Road are being enrolled in selective and discriminatory practices as the road transitions from essential usage for islanders to consumption by visiting fishers (Swanton 2010, Mitchell 2002). In this process, the road, becomes a 'Resource' and land relations become managerial rather than reciprocal (Liboiron 2021). The road is ceasing to be a road in the sense of a place that goes places and, in particular, as a bridge to an island (Steinberg 2007). Indeed, the road was never really a road to the island that residents call home, it was always a road for other purposes: to service oil and gas infrastructure and recreational users. Island Road is in a state of unbecoming as a road or a bridge to an island while it is in a state of becoming as a destination for recreational fishers. The residents have not only been erased from the State's press release and its consideration, but are now being excluded, unlike recreational fishers, from relations with the materiality of the road. Harvey and Knox (2015) see the construction of roads as attempts to stabilise but Island Road is being reconstructed and stabilised for one community rather than another in a process of discriminatory stabilisation. At the same time, the road is being destabilised by what the storms and water do to it always in a process of unmaking the road while the State remakes it again, imposing its discriminatory infrastructure.

As Baier (1972/1991) clarifies, 'task-responsibility' is performed *for* someone but the question is *for whom*. As the fishing piers on the road show, responsibility-as-action is performed for some and not others. *Selective responsibility* on Island Road, like with the proposed MttG levee, operates an inclusion and exclusion policy. Responsibility is exercised *by* the State *for* a privileged class. Other groups of people are not so privileged. As Tribal leaders of the United Houma Nation have commented:

> What we have recently learned, above all other lessons, is that the government will not be there for us with the solutions we need (T Mayheart Dardar and Thomas Dardar 2010 p 132).

Unlike Haraway (2016)'s notion of response-ability involving an opening up of inter-dependent relations, this 'responsibility for' is functional in its exercise and discriminatory in its effects. The reciprocal responsibilities discussed by Whyte (2013) that are expected *by* and *of* the parties by virtue of their different roles is not within the State's understanding of its 'task-responsibility' or the way it engages with the islanders in contrast to the 'sportsmen.' The preposition *for* with its discriminatory potential – "the government will not be there for us" contrasts with Whyte's preposition *of* which implies relation, mutuality and reciprocity. The kind of responsibility – as action and selection - undertaken by the State regarding the installation of fishing piers along an eroding road offers an entry point to exploring the connection between technology and responsibility through the example of an ambitious technological

project: the State's plan to construct 'sediment diversions' – an installed breach in the Mississippi River levee - as a mechanism for building land.

Making land from water

In Louisiana, the land comes from the water; it is the sediment from the Mississippi River – the 'annual gift' - that established the deltaic plain (Burley 2010). Looking into the Mississippi River from his canoe, Thomas Turnbull (2020) reflects on the array of fine matter, minerals, particles, clays, microbiota, and more novel sediments such as plastic suspended within its flow as it journeys down the continent to where it meets the Gulf of Mexico. Turnbull's canoe surfed not just layers of water travelling at different velocities but also a thick repository of interactions between Earth and human history (2021). Sediment travelling with the river water represents land in the making, here the water is giving to land in a mutual agentic interaction. As the river flows, it deposits sediment that establishes ridges of land along its banks and these natural levees were built up into the humanmade structures in place today (Barry J 1997).

During a flood the energy and force of the river's water can make a hole in the levee and spill out laterally depositing sediment in a process known as a crevasse splay (Yuill et al 2016). As discussed in the Water chapter, the forces of the river have recently widened the canal at Neptune Pass and the carried sediment is creating land in Quarantine Bay (Kolker and Weathers 2022a). Deliberately breaching the levee at certain points – called 'diversions' – can be done to divert the river water and its sediment load into surrounding areas restoring natural processes and replenishing the land. Diversions are the State's technological response to the problem of land loss and to historical geological knowledge about generative deltaic processes. Diversions are designed to be adaptable to conditions but, as coastal scientists have pointed out, they need careful attention in order to maximise sediment deposition and retention, reduce flood risk to neighbouring communities and provide optimal conditions for delta growth (Keogh et al 2019, Peyronnin et al 2017). As a coastal scientist remarked, too many nutrients will lead to weaker wetlands and there are "no clear tidy answers" to the problem (Interview 5).

These infrastructural interventions (diversions) are designed to correct for the earlier infrastructural intervention (levees) that, while tackling the problem of flooding of land, caused subsidence and an erosion of land problem instead. Technological fixes are needed to correct the effects of earlier technological fixes (Kolbert 2021). While assemblage and actor network theories see material and human forces as actants circulating in a network, as discussed in the previous chapter, these can also be seen as a 'to and fro,' a 'call and response' (Bennett 2010) or a 'back and forth' (Pickering's 2013). Seen in the context of 'response,' this disruption to the notion of circulation in network thinking, which suggests aleatory endeavours, the sediment diversions project introduces the idea that actants may be involved in *chains of responses* within a network paradigm. These involve material action, reaction, response and responsibility within the network of activity.

The diversions are a response to the potential of sediment in response to land loss which was caused by levees which responded to the problem of river flooding and canals which responded to oil and gas transportation needs. These collective human and material responses are themselves both producing and responding to the State's planned response to the natural environment's response to the effect of earlier human interventions. As already noted, Pickering (2013) sees a 'dance of agency' which consists of a back

and forth / to and fro movement between the river, the levee, the flooding and the Army Corps of Engineers. With *chains of responses*, rather than actants bumping into each other in continuous free-flowing circulation, they can be seen, through their relations and responses, to coagulate in linked and sticky formations to produce further connected interactions which remain fractal and unstable.

The Mid-Barataria Sediment Diversion (MBSD) is one of two river diversions that the CPRA is planning to install and operate (CPRA 2021 MBSD). The Corps, which is responsible for the permitting, describes it as a controlled multi-component river diversion system consisting of an intake structure and conveyance channel complex (Corps 2021 DEIS). Budgeted at over $2 billion the MBSD is being funded by the Deepwater Horizon fund as the mid-Barataria Basin was badly affected by both BP's oil spill and the clean-up response (NOAA Fisheries 2021, Corps 2021 DEIS, NOAA 2023). In its promotion of the project, the CPRA state:

> It is time for an innovative, science-based solution ... Sediment diversions are controlled structures that use "engineering with nature" to mimic the natural land building processes. These projects offer a unique solution to strategically re-establish hydrologic flows, carry land-building sediment, nourish marshes, and sustain land (CPRA 2021 MBSD, quotation marks in original).

The diversions project is seen to have national ramifications. The CPRA go on to state that it is "… a first-of-its-kind coastal restoration project that … could become one of the largest environmental infrastructure projects in the history of the United States" (CPRA 2021 MBSD). A federal official observed at an infowebinar that I attended, "there is no other project like this in the world" (PO RMRD et al 2021). A proposed 'solution' to a local problem has become an expression of national achievement and a matter of pride (Menga and Swyngedouw 2018). River sediment diversions, as the kind of infrastructure that holds the promise of transformation, have the capacity to enchant (Harvey and Knox 2012, Anand et al 2018).

Repetition of the word 'solution' on the CPRA's website suggests that the project has a redemptive quality. Both a problem requiring resolution and an impetus or intervention are needed for governance to be capable of being 'accomplished' (Bulkeley 2016). Technology is enlisted as the 'solution' to the 'problem' in a deceptively simple triad though the constituent parts merit problematisation to be more fully understood. Rethinking the concept of environmental problems, Barry (2021a) seeks to avoid an account of problems as merely obstacles to be overcome but rather as involving relations and encounters between disparate materials and processes which can generate novel effects as well as multiple responses and solutions. These more complicating factors can be seen to emerge both within the remit of the project itself and in its relations with other forces. Discussing the hydroelectric dam in the Rhine, Heidegger sees technology as a way of 'revealing,' which happens when the energy concealed in nature is unlocked and then transformed, stored up, distributed and 'switched about ever anew' (1954/1977 p 12, p 16).

With one of the highest rates of land loss in Louisiana, Barataria Basin exemplifies the effects of human interventions: levees, oil and gas infrastructure, oil spill and clean-up damage. The project area contains 22,364 oil and gas wells and over 2,600 miles of crude oil, petroleum product, and natural gas pipelines (Corps 2021 DEIS). Approximately 29 percent of the total land area in the Barataria Basin was lost between 1932 and 2016 (Couvillion et al 2017). The introduction of approximately five to seven million tons of sediment transported through the diversion and deposited in the Barataria Basin annually is projected to establish about 27 square miles of land in the mid-Barataria Basin by 2050 (Corps 2021 DEIS, see Image

14). However, when the continuing and expected land loss in the basin and across the region is taken into account, the revised projection is that by 2070, land gained from the diversion will be approximately 20.9 square miles (Corps 2021 DEIS, CPRA 2023b).

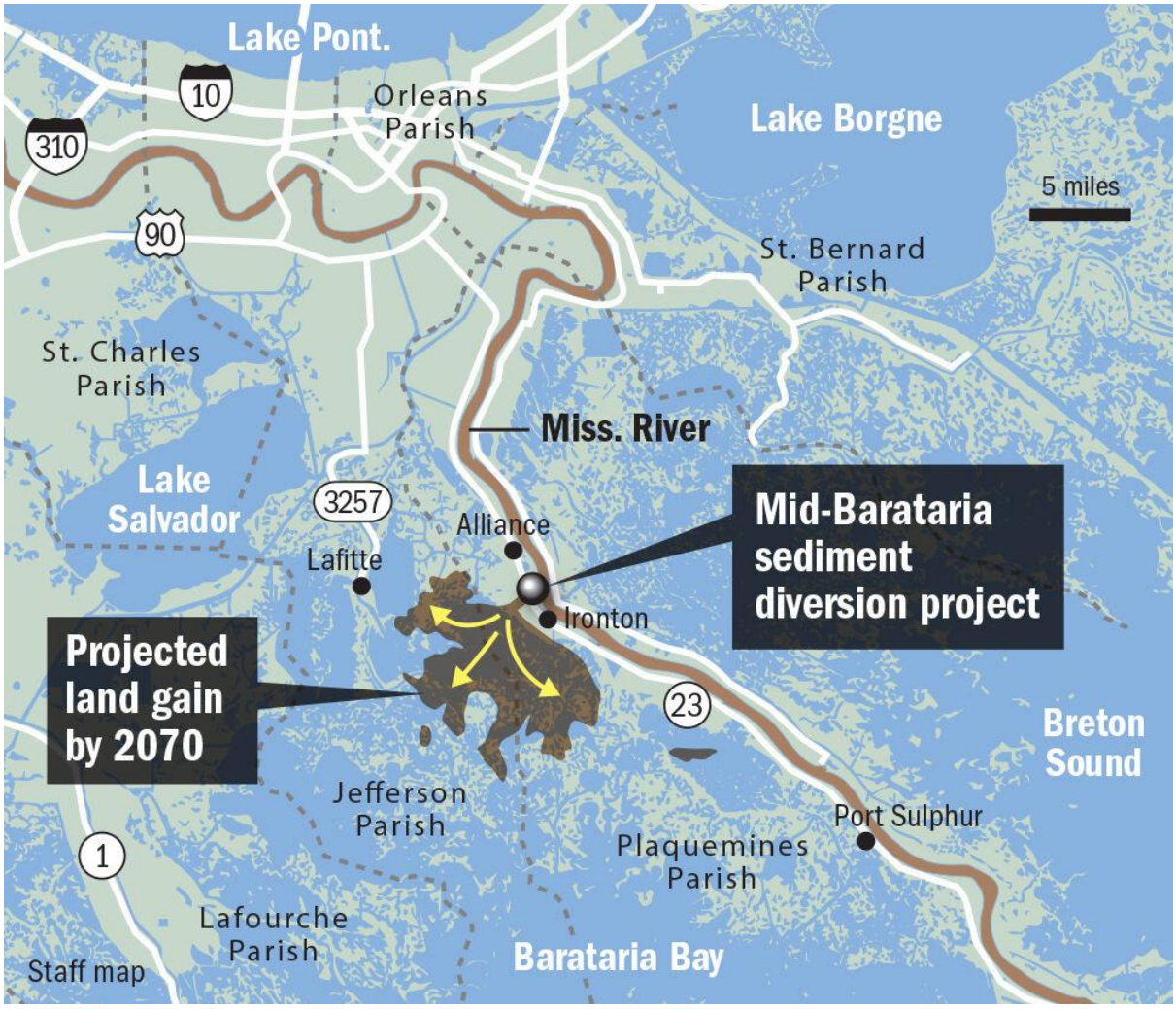

Image 14: Map of the Mid-Barataria sediment diversion project (Swenson 2021)

The State governor characterised this ambition as follows: "If the science is right and all projects complete, we will create more land than we are losing" (PO CPRA 2020, October 21). 'Creating more land than we are losing' can be quantified spatially and temporally as follows: the expected total gain of 20.9 miles^2 in the Barataria Basin by 2050 needs to be set in the context of the state of Louisiana losing land at the rate of 16.6 miles^2 per year between 1985 and 2010 (Couvillion et al 2011), though the loss rate is unstable, not least as a result of there being fewer wetlands to lose (Couvillion et al 2017). The conditions are further destabilised with increasing sea level rise. As a coastal scientist explained to me, whether marsh restoration can keep pace with sea level rise depends both on the amount of sediment obtainable from the diversions, where it goes and how well it is retained as well as on rates of sea level rise, as marshes can adapt to small but not higher rates of sea level rise (Interview 2). Sediment diversions can only do so much land building. Coastal scientist Torbjörn Törnqvist is quoted as saying, "… we have to be very clear about what we can realistically expect. We're not going to be able to do more than maintaining small portions of the coast" (Wright 2019).

As discussed in Chapter 3, there is a tension between knowledge and thinking that I have experienced in the process of thinking 'with matter' or 'material thinking.' It is also challenged by other cognitive imperatives. Historian John Barry discusses how the civilian engineer James Kemper opposed the US Army Corps' decision to close Cypress Creek in 1921 under their 'levees only' policy because it would increase the volume of the Mississippi River waters raising the flood height by six feet (Barry J 1997 p 160). Barry quotes Kemper as saying "it is so much easier to believe than to think." Over a decade ago, coastal scientist Eugene Turner, concerned about the lack of available scientifically-based estimates of land gain or loss for areas in the path of proposed sediment diversions, put the dilemma differently. He posited the tension between ignorance and knowledge when trying to control the Mississippi River and called for an open-minded 'ignorance-based world view,' which he called a 'signature strength of science', in preference to a 'knowledge-based world view' which, when combined with an 'urgency to do something,' 'flattens the intellectual landscape' (2009 p 1054). Ignorance allows space for thinking while belief overwhelms it.

My argument is that materials like technology and matter like storms, flooding land loss and sediment are fundamental to these cognitive processes and the responses that they generate and that there is a material tussle among them as to which will succeed in attracting and driving the response of the state. However, state responsibility materialises from the dominant matter, which as the next chapter shows is hydrocarbons. As a coastal scientist working for a local non-profit opined to me: "Industry is controlling the agenda ... It does not make any sense that we would be spending billions of dollars on sediment diversions that will not create that much land (Interview 15). Here we see state responsibility manifesting not only as selective regarding the object of its actions but also with regard to what matter succeeds in driving those actions.

Sediment diversions are a technological response presented as a 'solution' to an environmental 'problem' through 'engineering with nature' (CPRA 2021 MBSD). State power and its hegemonic expression may be constructed from matter including water and its infrastructure (Swyngedouw 2015, Menga and Swyngedouw 2018). Allen and Hecht (2001) argue that technologies themselves become forms of power as people embed their authority in them. As Heidegger observed, in conditions where technology threatens to slip from human control, the 'will to mastery' becomes more urgent (1954/1977 p 16). As a counterpoint to this preoccupation with power, Hans Jonas saw in technology an 'imperative of responsibility.' This responsibility emerges from the technology by virtue of its capacity to cause harm, an ethical question. My own interpretation goes back one step and is driven by the empirical evidence: I see the relation between responsibility and technology as a material question. It is the technology itself that is bound up with the governing responsibility because it is both the cause and the source of responsibility, just as other scholars have seen it bound up with power. *Techno-responsibility,* a form of techno-governance (Barry 2001), is the state's material response to the material demands of the environmental crisis it has a role-responsibility to deal with. It's what the state knows how to do so it does it; responsibility-as-action through infrastructural intervention.

People affected by responsibility-as-action

Infrastructure may appear to be solid but it is not static, rather it is dynamic as it is built on relations between people and matter (Anand 2017). Riverine communities in Louisiana are differently situated with regard to the diversion and the sediment it will bring. Some will benefit from the diversion's capacity and

potential to produce land but others will experience it as infrastructure that will destroy homes and livelihoods. Large quantities of freshwater will alter the salinity of the brackish waters of the bay and the conditions of the wildlife and ecosystem with considerable implications for the fishing industry (Corps 2021 DEIS). As a coastal scientist explained, the science and the policy are not aligned. It "takes a couple of decades to figure out what a diversion actually does" while policymakers are challenged with so many different opinions, what's best for science and wetlands is not the same as for fishing and other local populations who have different concerns (Interview 5). Diversions are divisive. The State's plans have the strong support of many coastal scientists, engineers, non-profits and the media (Schleifstein 2021, Karst 2021) and, according to polling, the public (RMRD 2021). However, there is strong opposition from those who will be adversely affected by the changes: fishers, local communities, Plaquemines and St Bernard parish governments and coastal authorities in the neighbouring state of Mississippi (O'Byrne 2020).

Although the Corps granted the permit in December 2022 and $2.6 billion was provided for construction (Corps 2022, CPRA 2023b), the CPRA has recently ceased work on the project under a 'stop work' order issued by Plaquemines Parish amidst doubts about the State's continuing support for it under the newly elected gubernatorial administration (RMRD 2024). If the diversion were to proceed, the predicament for the fishing community would be dire (O'Byrne 2020), with one interviewee remarking that, whether through sea level rise or sediment diversions, they "will lose out anyway" (Interview 3). The consultation event where chairs were not put out for the fishing community attendees but remained stacked up against a wall described in Vanhala et al (2022), illustrates how the State performs what feels like the formal and narrowed task of consulting with the affected fishing community about the proposed sediment diversions, the procedural component of bare responsibility-as-action. In addition to the impacts on commercial fishing set out in the Corps' impact assessment and the subject of opposition from fishers and local parishes is the impact of the diversions on riverine communities close to the infrastructure. The sediment diversions will build land for some but take it away from others.

Grand Bayou Village is one of several Native American communities which are adversely affected by both coastal erosion and the governmental projects designed to remedy them (FPCC 2020). The village, home to the Atakapa-Ishak Chawasha Tribe, is located in Plaquemines Parish, downriver from New Orleans just over the levee. In common with other coastal Southeastern Louisiana Native American tribes, like those at Isle de Jean Charles, it is "in a fight for survival" without the federal recognition that would mean access to resources (FPCC 2020). As I saw when visiting in March 2020, the village consists of a number of houses on stilts, most of them surrounded by water with boats used for access together with a community centre and dock on dry higher land near the levee. As with the infrastructural interventions that have damaged Isle de Jean Charles, while the marshland established as a result of the diversions will help protect the cities of New Orleans and Baton Rouge from hurricane damage (CRCL 2021, RMRD 2021), other communities downriver will experience the deleterious effects of the infrastructure in addition to the existing conditions of loss.

As part of the environmental impact assessment within the permitting process, the Corps has assessed that the diversions project is expected to cause "minor to moderate, permanent, adverse impacts" such as an increased percentage of days of inundation due to tidal flooding and increased risk of storm surge for

communities outside of flood protection near the immediate outfall area (within 10 miles north and 20 miles south). These impacts will adversely affect certain named communities:

> … disproportionately high and adverse on some low-income and minority populations such as the communities of Myrtle Grove, Hermitage, Grand Bayou, and Happy Jack, to the extent that affected populations lack resources to avoid or otherwise respond to the impacts (Corps 2021 p ES-14).

"Disproportionately high and adverse" makes residents of these villages, in Nixon's term 'goners with nowhere to go' (2011). The response to this finding, according to the Corps' impact statement, is that named communities with "Minority and/or Low-Income Populations" have been "considered and selected for Environmental Justice Impact Analysis" (Corps 2021 p 3-216). While some communities will benefit from techno-protection, others are selected for exclusion from protection and for 'impact analysis' instead. Responsibility-as-action and -as-selection are limited to procedural justice only. Despite the 'promise' of infrastructure, an attention to their ongoing processes and effects reveals how infrastructures are made with fragile and often violent relations among people, materials, and institutions (Anand et al 2018).

At an informational online webinar on the diversions project, a federal official confirmed that the diversions will make "significant changes" and "there will be collateral injuries" which the LA Trustee Implementation Group are proposing to mitigate (PO RMRD et al 2021). Although most homes are raised, there will be flooding impacts to roads and community infrastructure like docks and septic systems (PO RMRD et al 2021). (There were no presentations or representations from riverine communities at that webinar that I could observe.) There is an assumed access to and entitlement over Indigenous land and a call for it to be 'governed' (Liboiron p 8-9). As Liboiron (2021) puts it, value flows in one direction and space is rearranged. The diversions will rearrange space by determining where land, the Resource, will be created, who will benefit from it, where it will be located and who will have 'land relations' in the future (Liboiron 2021).

The Corps reported on the communities who will be adversely affected by the diversion in its draft environmental impact statement but in other locations, communities are not referred to or have been cognitively and discursively nullified. During a tour of the CPRA's new Center for River Studies in Baton Rouge, built with funding from Chevron, one visitor reportedly asked how the multiple engineering projects in the State's coastal plan would affect local communities and the tour guide reportedly answered "… well, with the diversions, nobody really lives down there" (Comardelle et al 2020). The erasing of BIPOC communities (Smiles 2021) from the mind of an official exemplifies what Nixon calls the active production of 'unimagined communities' through 'spatial amnesia' (2011 p 150-151). Communities can be readily 'unimagined' when their voices are hardly heard and their ecological knowledge not included in governmental planning (Crepelle 2019, Whyte 2013, Brasseaux and Davis 2017). Opportunities for participation are limited. As one resident of an affected community explained at a seminar hosted by the Lowlander Center:

> … we [the community] have limited resources to engage. For government, it's their job. For the community we have to take a day off work to attend a meeting … it's a very daunting process … we bring one person, they bring ten (PO Lowlander 2020).

There is a historical pattern to the effects of interventionist responses on communities in Louisiana. In 1817 William Darby noted the potential to move water in one direction to benefit one community (plantation

owners) but how it would also create a 'sacrifice zone' with the effect that it would be "ruining one part of the community to benefit another" (Darby 1817 p 60 quoted in Colten 2014 p 57). As the distinguished local historical geographer Craig Colten (2005) describes, there is a history of state management projects that have sought to alter local hydrology and topology and consequently local racial geography. This is part of a wider pattern of activity enabled by the Mississippi River. As an 'Anthropocene river,' with industry and infrastructure, it continues to be a vehicle for the dispossession of Native land and marginalisation of African American communities (Adamson et al 2020).

With the diversions project, the people in affected communities are waiting for the attritional violence of delayed destruction (Smiles 2021) and, as Hannah Knox (2020) has identified, barriers to participation are grounded in racism. These are actively produced outcomes furthering structural and racial inequality. In her recent study of the intersection among sediment, race and large-scale restoration projects along Louisiana's disappearing coastline, geographer Monica Barra (2021), providing empirical ballast to Yusoff's notion of 'geosocial registers' (2018), argues that coastal restoration is a geophysical and social process upon which racial inequality is forged and contested. As wider studies have shown, state and corporate practices, policies and infrastructure are designed and located to maintain the health of highly valued populations – people and species who matter – at the expense of those whose lives matter less and are differentially valued by the state (Bullard 1990/2000, Kojola and Pellow 2021, Hardy et al 2017) provoking the idea that certain people are disposable citizens (Solnit 2009, Horowitz 2020). Abandonment and disposability are characteristics of institutional racism (Braun and McCarthy 2005, Bullard and Wright 2012, Horowitz 2020) producing ever increasing layers of injustice. My contribution is to see these repeated practices as ways in which the state assumes and undertakes its responsibilities.

State-sponsored infrastructure plays an enabling role in the practice of exclusion and promotion of injustice (Anand 2017, Nolan et al 2020, Liboiron 2021p 5). It is also enrolled in and an expression of the state taking responsibility. However, techno-responsibility reveals the limitations of responsibility-as-action. When technology is proposed as a 'solution' to an urgent 'problem' it 'flattens the intellectual landscape' (Turner 2009) producing a form of responsibility that is also flattened as it excludes not only other considerations but also certain communities from its zone of protection. A governance response, like the sediment diversions project, may be publicly welcomed by the majority (as evidenced by supportive NGOs, opinion polls and media reports) because the state is taking, what is argued to be, necessary and urgent action in response to the environmental conditions notwithstanding the consequences for affected communities. Liboiron (2021) calls this practice 'colonial work' done with 'good intentions.' As they have been quoted:

> … if you skip over colonialism, then you think things that are good and well-intentioned are automatically not colonial …. There [are] … environmental goods that are also colonial bads" (Srivastava 2021 quoting Max Liboiron).

However, the fulfilment of the responsibility-as-action approach can be managerial and technocratic, closing down debate with anti-political and exclusionary effects (Barry 2001, 2013). As Barbara Cruikshank notes, "the deployment of technology" can avoid "the noise and irrationality of political conflict" (1993 p 7). Other voices, homes and livelihoods (such as fishers and riverine communities) are marginalised or dismissed when the state response is that "nobody really lives down there" (Comardelle et al 2020).

Responsibility-as-care and as relation

We see the state 'taking' responsibility for a 'problem' and pursuing a 'solution' according to a bounded and limited conception of what 'role' and 'task' responsibility entails. These limitations are evident in H L A Hart's limited account of role-responsibility. Hart's ship captain is "responsible for the performance of [their] duties, or for doing what is necessary to fulfil them" and the remit extends to the "care and attention" needed to perform the task (Hart 1968 p 212). In Hartian terms, the state is merely applying 'care and attention' to the task it has set itself, that diversions are needed to build land. In his own account of the matters that the ship captain must deal with, Foucault does recognise those affected by the action when referencing "the sailors who are to be taken care of" (1991 p 94) but his metaphor lacks an account of how, when called upon to "reckon with winds, rocks and storms," the captain responds – or should respond - to what may be the different demands and ascribed values of the cargo and the sailors or even, if lifeboats are insufficient, among the sailors themselves.

In the case of land loss, flooding, oil and gas interests and the other demands on the government of Louisiana, unlike the open-ended dilemma facing Foucault's ship captain with the enumerated list of concerns (weather, boat, sailors, cargo), any questions about who or what to prioritise have been resolved or flattened through the state's exercise of its *responsibility-as-action* through a programme of techno-governance and selective responsibility. Instead, a more substantial account of the object of the care is needed. To do that would concomitantly involve a shift in the meaning of responsibility as the word would cease to mean simply the assumption and taking of an action under a pre-assigned or agreed obligation (Hart 1968), which manifests in practice as the exercise of discriminatory power, but instead the taking on of the obligations of consideration and care, that come with that exercise of power.

The relationship between technology and responsibility evidenced in this case study is far removed from Hans Jonas' ideas about the 'imperative' that their association brings (1984). Although Jonas was preoccupied with technology with global reach, the essence of his ideas is useful for thinking about the effects of smaller scale technology. In particular, Jonas goes beyond Hart's limited descriptions of role-responsibility in his ethical preoccupation with the people who may or will be negatively affected by the technology. In his view, technology produces a responsibility that is concerned with the characteristics of the object of the action and it is necessary to develop a 'heuristics of fear,' which is the capacity to take in the possibility that future people may be negatively affected by our actions (Jonas 1984, Berdinesen 2017). Just when the state performs the responsive action of installing technology and infrastructure, projects that will displace and flood communities, is the technologically induced moment of responsibility. As Jonas argued, technology imposes a duty to find out about and take responsibility for its effects (1984). This responsibility is directed towards the 'object' of the action and is an 'imperative.' Both Jonas (particularly) and Foucault (less so as he was concerned with other theoretical insights) expressed the need for the governing entity to take 'care of' people who are subjected to its governing actions.

In the case of the sediment diversions, the state is providing for 'environmental justice' assessments and 'mitigation plans' for affected communities as part of its response responsibility yet it is still proceeding with the diversion project and the harm that it will cause. This 'taking care of' is what this kind of responsibility can look like in practice and it can be paternalistic or even dictatorial, something Jonas has been strongly critiqued for (Berdinesen 2017, Coyne 2020). It is far removed from the 'matters of care'

(Puig de la Bellacasa 2017), a 'care ethics' (Lawson 2007) or an 'ethic of vulnerability' that Myra Hird (2013) proposes, following Goodin (1986), is what generates responsibility. Instead, following Liboiron (2021), 'taking action,' 'doing to' and even 'taking care of' need to be seen as situated in the context of the history of colonial interventions.

These forms of responsibility – as action and as paternalistic 'care' - are sparse accounts of responsibility as they fail to contemplate the notion of *responsibility-as-relation*. Foucault saw 'governing' in terms of "establishing a relation" between, in his metaphor, the sailors, the cargo, the ship and the storm (1991 p 94). The relationship is established but Foucault does not go on to discuss what it involves or how it is performed. As with the earlier discussion of the newly installed fishing piers on Island Road, the state's exercise of responsibility *for* may be experienced as a selective responsibility privileging some communities over others without troubling the question of establishing meaningful relations. Absent too is any sign of the kind of world that Donna Haraway (2008, 2016) seeks with her idea that the relational interdependence between humans and nonhumans creates a debt requiring a response to that entanglement. Following Haraway, María Puig de la Bellacasa (2017)'s concept of 'matters of care' depends on an 'ethico-political obligation' arising from our involvement with other objects, animals, organisms. Western scholars exploring ideas of responsibility have argued the importance of Indigenous scholarship in this respect (Haraway 2016, Valverde 2017, Moriggi et al 2020). This brings us back to the Indigenous scholarship discussed above which understands responsibility in terms not only of relation but also of reciprocity requiring both *by* and *of* in its exercise (Whyte 2013, Kimmerer 2013). State responsibility expressed through forms of selective responsibility, responsibility-as-action and techno-responsibility show their limitations as they do not allow space for alternative and more productive forms of responsibility based on relation and reciprocity in a more-than-human world.

Conclusions

The matter of land and its interaction with water, sediment, technology, infrastructure and people and their 'life ways' reveal state responsibility in action. Land is both agentic in its relations or tussle with other matter but it is also the repository for neo-colonial governing responses and programmes in which people experience the 'ordeal' of being 'deprived' of their land (Latour 2018). As the land continues to disappear, it gives itself not only to the water but, as the next chapter discusses, to petro-colonialism. The 'state effects' observable on the 'ground' and from the perspective of the 'field' (Mitchell 1991, 2002) reveal how state responsibility is undertaken, on whose behalf and with what outcome.

Responsibility-as-action is seen to be discriminatory, utilitarian, managerial and bound up with the 'promise' of infrastructure and technology (Anand et al 2018). As Liboiron notes, relations and obligations regarding land tend to be obfuscated from view by environmental rhetoric and industrial infrastructures (2021 p 5). Some people are selected over other people, some matter is selected over other matter in order for governance to be 'accomplished' (Bulkeley 2016). Technology is seen to be the 'solution' to obtain 'mastery' (Heidegger 1954/1977) over natural processes while, as Julietta Singh argues following Fanon (1963), it is only through 'unthinking mastery' that we can begin to change fundamentally our thinking and practices (2018 p 20).

Communities in places like Isle de Jean Charles and Grand Bayou Village experience state responsibility, not as enactments of prevention, precaution, equal protection and care but more as deliberate endangerment (Bullard and Wright 2012). However, coastal communities are resisting these governing practices and proposing community-led alternatives for their lands (Naquin et al 2018, Lowlander Center 2024). While land may be giving in to water, people are not giving up on their land. As Secretary Comardelle has said:

> If we allow ourselves to be moved or relocated to other places … Other people will say this is an abandoned area …We need to occupy our lands, so that our voices and the voices of our non-human relatives will continue to be brought forward … We are not just communities pushed to the edge (Comardelle et al 2020).

Notwithstanding community intent, manifestations of state responsibility-as-action revealed in this chapter do not engage alternative rendering of state responsibility involving relation and reciprocity – Whyte's notion of 'by and of' as compared with 'by and for.' To do that with state plans involving moving communities or deliberating flooding community places, it would be necessary to think not just *of* but also *with* the people affected and to participate in the kind of partnership which the community of Isle de Jean Charles were expecting with their resettlement plans (Jessee 2020). It can feel hard to imagine what *responsibility-as-relation* or *responsibility-as-reciprocity* would look like or how it would come about within existing understandings and expressions of 'governing practices' and the exercise of state responsibilities.

The way that land and people interact under climate impacted conditions needs a re-theorisation of both land and responsibility that encourages reflection on the different manifestations of responsibility emerging from land relations. There would have to be a shift in understanding responsibility not as merely action or paternalistic 'caring' but a genuine engagement and relation involving mutual respect and reciprocity (Kimmerer 2021). These questions are revisited in the final empirical chapter, Air, which explores the way in which responsibility 'for equity' is expressed in the State's plans for emissions reduction. The next chapter discusses the relationship between oil and the state revealing contrasting forms of responsibility in action.

Chapter 6: Oil

Introduction: The recalcitrance of oil

Oil is matter in which the question of state responsibility is acutely posed. So far in this thesis, oil has been the absent presence, the matter that is fundamental to the relation between water and land and its manifestation as flooding, coastal erosion and land loss. Not much discussed in this thesis with its emphasis on climate responsibility but present nonetheless in Louisiana, is oil manifesting as extreme pollution and damage from everyday transportation and refining and from sudden devastating explosions like Deepwater Horizon. The locally experienced damage is reflected in the global combustion of fossil fuels, particularly oil with its high carbon intensity, which returns to Louisiana in the form of rising sea levels and increasingly forceful heat and hurricanes.

While conventionally understood as a resource (Bridge 2011) awaiting its own extraction and exploitation (Knox 2015), oil is better understood in Louisiana as the curator of extractive exploitation among the communities from which it emerges. Louisiana's refineries are located on historic sites of colonialism, slavery and violence (Forensic Architecture 2021) forging a continuum from the slave plantation to the oil facility (Yusoff 2018) - with petro-chemical 'plants' a suggestive diminutive of 'plantation' - exposing neighbouring communities to toxicity and contamination (Brown 2020, Rise St James 2023). A recent study tracing the flow of oil and gas found that minority groups residing in Louisiana's coastal zone have been increasingly disproportionately impacted by the development of the offshore oil and gas industry (Hemmerling et al 2021).

With these kinds of effects, critical social scientists argue that oil manifests as a 'curse' and instigator of 'petro-violence' (Watts 2004, 1999) engaged in struggles over identity, territoriality, Indigenous politics and legal liability (Sawyer 2004, 2022). Indeed, the oil economy is integral to, arguably causally responsible for, colonialism, racism, violence, displacement, pollution, climate change and death as many recent theoretical and empirical accounts have demonstrated (Watts 2001, Mbembé 2001, Nixon 2011, Haraway 2015, Hochschild 2016, Davies 2019, Davies and Mah 2020, Liboiron 2021). Extractive violence is not an accident or side effect, but rather a core logic foundational to extractivism (Shapiro and McNeish 2021) with noxious sites located within BIPOC communities (Bullard 1990/2000, Forensic Architecture 2021). Imani Jacqueline Brown (2023) identifies a continuum of extractivism spanning from colonialism and slavery to coastal erosion and climate change. As Kathryn Yusoff argues:

> While Blackness is the energy and flesh of the Anthropocene, it is excluded from the wealth of its accumulation. Rather, Blackness must absorb the excess of that surplus as toxicity, pollution, and intensification of storms. Again, and again (Yusoff 2018 p 82).

Politically, oil interests are dedicated to influencing governing regimes (Sampson 1975, Mitchell 1991, 2011) which permit and protect its ongoing operations with their colonial, racist and violent effects, a form of 'necropolitics' (Mbembé 2003). Communities are mobilising against oil, engaging in local site battles in Louisiana (Rise St James 2023, Lakhani 2021) and more widely in multiscalar activism often around pipelines (Mah 2023, Bosworth 2022) as oil manifests as a locale for struggle and resistance.

There is a long-standing tension between the production of oil and the resultant environmental degradation and devastation and where the State sits in relation to it. Lines of causal responsibility are

reasonably clear: the production of oil directly causes environmental damage while supplying the economic engine, but the State rarely holds industry accountable for cleaning it up (Houck 2015). Meanwhile, oil has effectively been uncoupled from responsibility as the oil industry is not held accountable for the damage for which it is causally responsible (Houck 2015). As environmental lawyer, Oliver Houck notes in describing the process leading to the State's commitment to coastal restoration, "oil and gas responsibility was not on the table" (2015 p 273). As a community leader at a seminar said:

> The oil and gas industry came in and raped the environment making billions of dollars without being accountable for the damage they have done (PO Lowlander 2020).

It is difficult to "get accountability and responsibility going" (Killer Red Fox 2021) when as Latour puts it, "lobbyists say carbon is innocent and must be scrubbed free of all accusations and responsibility" (2017 p 27). As Isabelle Stengers puts it forcefully, fossil fuel capitalism is:

> "… *radically irresponsible,* incapable of answering for anything" and it rejects any "calling into question" of its "right to irresponsibility" (Stengers 2015 p 53 emphasis in original, p 9).

Instead, oil extracted in Louisiana, 'America's very own petrostate' (Luke and Heynen 2020), is critical to the interests of the nation and its development has been governed by what Kärg Kama calls the 'contending geo-logics' of resource making, energy security and marketisation (2015, 2016). An industry geologist told me: "The fact is that cheap energy has lifted more people out of poverty than anything else" (Interview 7). In addition to its national significance, oil is fundamental to the economy, society and politics of Louisiana. As Houck (2015) phrases it, "oil and gas … had built the economy of Louisiana how could that have been wrong?"

With these manifestations and in this environment, how is the matter of oil to be understood? With her ontological commitment to 'thing power,' Jane Bennett characterises nonhuman material as expressing 'vitality, wilfulness and recalcitrance' (2004). In her subsequent work, the emphasis is often on the 'vital' or 'vibrant' attributes of materials (Bennett 2010) with an accompanying sense of optimism. In view of its destructive tendencies and tenaciousness, oil appears more imbued with 'wilfulness and recalcitrance' than 'vitality.' Rather than matter like water, trees, land and air which are lively and which respond (Pickering 2013), oil appears to be a kind of matter to which other vibrant matter responds. Indeed, its recalcitrance can be seen as a refusal to respond.

Over the arc of its history of causing contamination and planetary changes, oil can be seen not only as wilful but also necrotic, both in its effects and its essence. Oil is not only literal dead matter brought to the surface to be further distributed and burned in its zombie state but even when oil spills, slicks, contaminates, burns and emits and when it is transformed into inert 'forever' chemicals which infect bodies (Murphy 2017) and seep into courtrooms (Sawyer 2022), it is both deadly in its effects and in its nature because it is the matter to which other matter or bodies are forced to respond. However, oil's recalcitrance is being challenged as its infrastructure becomes more vulnerable to environmental changes and as oil as a fossil fuel is transformed into 'carbon' (Knox 2015), into offsets, markets and allowances (Ehrenstein 2018, Ehrenstein and Neyland 2021) and forced into a reckoning with the energy transition.

As infrastructure performs the work of oil, epistemologically, it is infrastructure which offers the route to understanding oil and its relations with state responsibility in coastal Louisiana. Following Hannah Appel (2012) who argues that hydrocarbon infrastructure is the locale from which forms of responsibility emerge and are engaged or disengaged and avoided, in this chapter I investigate the relation between oil and state responsibility through both its 'hard' and 'soft' infrastructure (Appel 2012, Appel et al 2015), taking a broad definition of the latter to include government plans and programmes, that is to say the state responses to the matter of oil. The question, as addressed in relation to the different matter of land in the previous chapter (and which continues the investigation pursuing my third research question), is what forms and practices of state responsibility are emergent from matter.

The chapter is structured in two parts: first it investigates oil, its infrastructure and effects through three understandings of oil and then it considers the forms of state responsibility that emerge in response to these. It starts by following the oil (Mitchell 2011) from its frontier origin in the seabed offshore into the 'hard' infrastructure involved in bringing it onshore for refining and distribution and its flows into the 'soft' infrastructure of society, culture, the local economy, politics, governing techniques and what emerges from these entanglements. The first incarnation of oil is the deliberately constructed seamlessness of the infrastructure which is designed to ensure the smooth production of the 'resource.' However, this is a pretence as it overlooks what the destructive machine of oil operations are causally responsible for - pollution, violence, racism and climate change - for which there is little accountability, the second way of understanding oil. Finally, there is the effect on oil infrastructure of the changing environmental conditions to which the production of oil contributes. Here we see oil in a third incarnation; as precarious and needing the protection of the state.

The chapter goes on to explore the relation between the state and oil through hard and soft infrastructure and how these produce new ways of theorising the concept of responsibility not yet discussed in this thesis. I identify forms of state responsibility evinced by this relationship through case studies identifying practices of *hydrocarbon governmentality* and *residual responsibility*.[9] The final case studies - the State's climate action plan and proposals for carbon capture and sequestration, are arguably the products of *situated thinking* in the age of climate change. However, through invoking the concept of responsibility in relation to both leaking 'orphan wells' and the potential for carbon capture, the State is potentially changing the way it has historically related to oil in light of the material tussle with the pressing matter of land, water and greenhouse gas emissions. The next section opens with the 'hard' infrastructure of oil, its quantity, reach, journey and related dependencies.

Hydrocarbon entanglements

From its origins bubbling up from flooded land (Pope 2017), oil was first extracted in the state at the beginning of the C20. In the middle of the last century oil exploration went offshore into the Gulf of Mexico, first drilled below state waters and then, in the 1990s, below the federal waters of the 'outer continental shelf' (OCS) (LMOGA 2021, BOEM 2021). Louisiana and the Gulf of Mexico became a 'frontier of accumulation' (Watts 2012). Gulf offshore oil production, accounting for 15% of total US crude oil production (EIA 2022), is fed from over 600 oil platforms within a 40-mile radius of Port Fourchon (World

[9] I use the term 'residual' differently from Hecht (2023)'s idea of residual governance of waste that leaves people and places as residual – or residue – I mean residual in the sense of what is left or who is left to step in.

Port Source 2022) and 90% of OCS pipeline landfalls are received in the state of Louisiana (Greater Lafourche Port Commission 2021). The smooth apparently uninterrupted flow is hardly visible at the point of extraction and distribution from the ocean. As Solnit and Snedeker (2013) observe, conventional maps show the Gulf of Mexico as a large expanse of blue water whereas in fact, the Gulf is crisscrossed with innumerable pipelines, drilling platforms and other pieces of petroleum architecture (see Image 15).

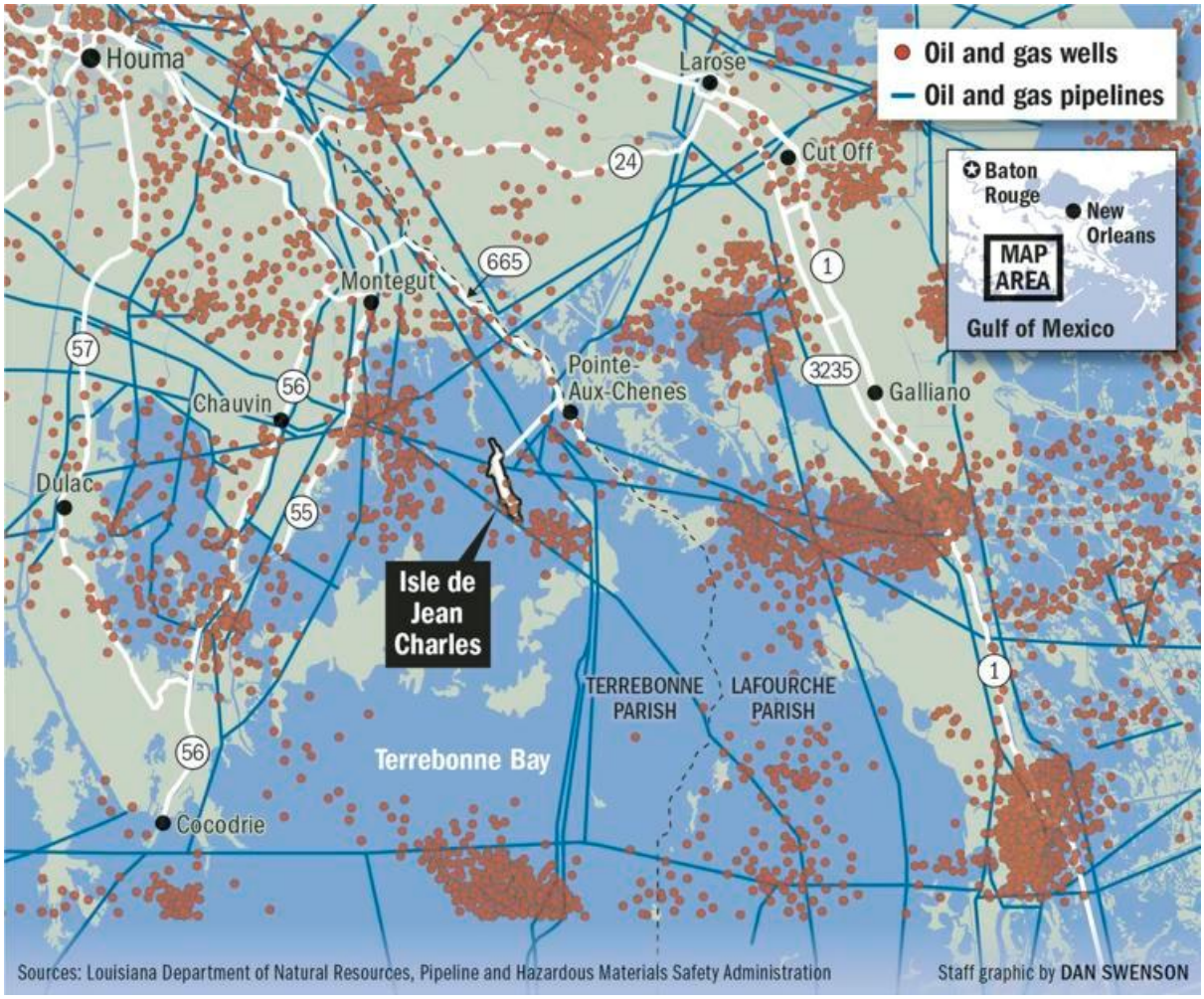

Image 15: Oil and gas wells and pipelines (Swenson 2022)

Imani Jacqueline Brown and Forensic Architecture (2021) make this infrastructure visible through their interactive 'unraveling industry' cartographic project. There are over 93,000 miles of pipelines in operation supporting the Louisiana oil and gas industry on land and at sea (American Petroleum Institute (API) 2020), nearly four times the circumference of the earth (a fact not cited by the API). Over 47% of total US petroleum refining capacity is located along the Gulf coast (EIA 2022) much of it in Louisiana. From its depository beneath the seabed oil is transported via a series of linked pieces of infrastructure from drilling platforms to pipelines, ports, refineries, supply vessels, aeroplanes, trucks and, crucially in southeastern Louisiana, one road.

Situated at the mouth of Bayou Lafourche, where it empties into the Gulf of Mexico, Port Fourchon is the land base for transporting oil through the port and on to the wider continent and is a hub of related dependencies (Greater Lafourche Port Commission 2021). According to the 'Port Facts' (ibid.),

approximately 15,000 people per month are flown to offshore locations supported by Port Fourchon, over 400 large supply vessels traverse the port's channels connecting with up to 1,200 trucks per day travelling in and out of the port. Hanging around outside the port authority building (built high above the ground to protect it from flooding) waiting for the presentation from its officials during the 2018 AAG fieldtrip, I watched oil tankers passing by on their way to and from the port (see Image 16). They were travelling on LA Highway 1 which connects Port Fourchon to inland areas and cross-country transportation routes. As the only land route to Port Fourchon, LA 1 bears the weight of the infrastructural support that Port Fourchon provides to the distribution of oil and gas to the rest of the United States. It has been designated as a 'high priority corridor' for its critical infrastructural role in the nation's energy supply and generation of OCS revenues (LA SAFE 2019 p 126). In 2011, to avoid flooding, a section of Highway 1 from Leeville to Port Fourchon was elevated, however the remaining section of the roadway, from Golden Meadow to Leeville, remains level with Bayou Lafourche and is vulnerable to frequent flooding (Kennedy and Dahlman 2015).

Image 16: Oil tanker passing on LA 1 outside the Greater Lafourche Port Commission office, April 10, 2018, own photo

The entirety of this body of infrastructure provides a conductive mechanism on which the extracted liquid and gas depend to fulfil their economic potential. The material but also sociotechnical network (Appel et al 2015) of hydrocarbons, drilling platforms, pipelines, offshore and onshore ports, the road, refineries, together with the dependent labour, the consumer economy demands and all the 'regulations, calculative arrangements and other technical procedures,' constitute what Barry (2006) calls a 'technological zone' in which flows like oil and gas become transmissible and manageable through what is designed to be continuous seamlessness through both hard and soft infrastructure (Appel et al 2015, Gambino 2018).

Oil depends not only on the uninterrupted transmission through the infrastructure of its production and distribution but on its seamless relations with place. These can differ depending on location. Drawing on ideas from James Ferguson (2006) and Andrew Barry (2006) on infrastructural 'ring-fencing, Hannah Appel (2012) finds in Equatorial Guinea that the expatriate oil industry seeks to exclude itself from the local economy and society, establishing what Barry (2006 p 246) identifies as a 'border' to show that it is governed according to global rather than local standards. By contrast, whilst the major international oil companies (Exxon, Chevron, Shell and BP) physically located in Louisiana are headquartered elsewhere, it is also the case that the oil and gas industry in Louisiana is embedded in the local social, economic, cultural and political life.

Large hydrocarbon facilities are major, if not the largest, employers in the Louisianan communities in which they are located and often among the largest taxpayers (CITF 2022). The significance of the industry to local jobs was brought home to me in a conversation with my Lyft driver on the way to the airport. He told me that in addition to driving the cab he worked as a diver repairing offshore platforms. When I asked him what he thought might happen to the industry with action on climate change, he replied, "you can't just close down oil and gas, people have jobs, it's going to take time" (Casual exchange 2020). Aside from the local jobs sustained by the energy sector is a deeper connection and harmony between oil and fishing which "grew up together" (Freudenburg and Gramling 1994 p 76).

The annual 'shrimp and petroleum' festival celebrates the history of these two local industries including the festival's 'marriage of shrimp and oil' in 1967 which is said to emphasise "the unique way in which these two seemingly different industries work hand-in-hand culturally and environmentally" (Shrimp and Petroleum 2022), what Priest (2016) calls an intimate and complementary evolution. The devastating effects of the 2010 explosion of BP's Deepwater oil rig along with more regular and frequent water contamination from oil infrastructure provide evidence of how the oil industry works "hand-in-hand" with the fishing industry "environmentally." But, as one interviewee explained, while the fishing community experience the environmental devastation from industry operations, they don't blame the oil and gas industry as many of their family members work in it (Interview 6, see more widely Huber 2013).

Like the 'marriage' between shrimp and oil, jazz and oil emerged within a year of each other at the beginning of the last century and have retained close connections; the New Orleans Jazz and Heritage Festival is 'presented' by Shell (Jazz Festival 2022), exemplifying the relation between oil and the 'spectacle of culture' that Andrew Apter identifies in Nigeria during its oil boom (2005). Shell also 'marries' the football team close to New Orleanian hearts with funding for the local non-profit organisation dedicated to coastal restoration discussed in Chapter 4, Water, offering: "For every rushing yard this season, @Shell will donate $25 to the Coalition to Restore Coastal Louisiana!" (New Orleans Saints 2019). As I wondered out

loud about what I saw as the paradox of this deep embeddedness, a research friend advised me that in Louisiana it would be a "mistake" to see oil and gas as "the enemy" (Informal conversation 2018, November). This entrenchment and entanglement are fundamental to the construction of intended seamlessness that is needed to ensure the smooth extraction, distribution and production of oil.

While in Equatorial Guinea international oil companies deliberately maintain separation from the 'web of socio-political relations' (Appel 2012 following Callon 1998), in Louisiana, the oil industry is at the heart of the web of socio-political-economic-cultural relations. Adopting the opposite strategy to its sister corporate entities in Appel's field site, in Louisiana entanglement is the oil industry's objective, deployed as a mechanism to ensure that it is able to maintain its embeddedness and the seamlessness of the workings of its infrastructure. While Appel (2012 p 461) argues that entanglement would be productive of responsibility: a "relationship that prevents oil companies from escaping the web of relations," in Louisiana by contrast, industry embraces the entanglement without assuming any substantive responsibility and it does so by reframing and limiting the remit of the concept. Here I join company with Appel (2019) again as expressions of 'responsibility' are made on oil industry terms such as 'corporate social responsibility.' In Louisiana, these include gestures of caring for the environment.

Strolling through Audubon Park, you encounter a plaque under a magnificent live oak thanking Chevron Corporation for funding the planting of 20 trees in the park (see Image 17). Drawing on Giorgio Agamben's conceptualisation of gesture where "nothing is being produced or acted, but rather something is being endured and supported" (2000 p 57), Gisa Weszkalnys understands infrastructural practices as a 'gesture' which, while not tokenistic, lacks productive potential and yet has a sustaining force. These nominatively determined and gestural trees stand in contrast to the dead cypress trees seen in coastal areas and they bear 'material witness' (Schuppli 2020) to the way that the hydrocarbon industry chooses to insert itself into protected and privileged places, like city parks in wealthy uptown areas, with its virtue-signalled trees marked with corporate logos. These forms of 'soft' infrastructure are designed to establish inter-dependent relations between society and industry to enable industry through selected sites of managed and manicured visibility to maintain entrenchment and influence.

Meanwhile, in coastal regions, the bare branches of the dead trees, free of corporate logos, are 'ecological witnesses' (Brown 2022) to the contribution made by the oil industry to the destruction of the lives and livelihoods of their human neighbours occupying less privileged but still cherished land. The previous chapter discussed the theoretical weakness of *responsibility-as-care* as proposed by Hans Jonas (1984) as paternalistic (Berdinesen 2017, Coyne 2020) and how 'taking care of' can be a colonialist project (following Liboiron 2021). Chevron's trees demonstrate this kind of self-selected paternalism producing small incommensurate gestures without the labour of establishing a relation involving a substantive performance of responsibility as scholars like Massey (2004) with her notion of responsibility emergent from place envisage. Ideas of responsibility as care or relation are tested to their limit in the case of what oil is responsible for in Louisiana.

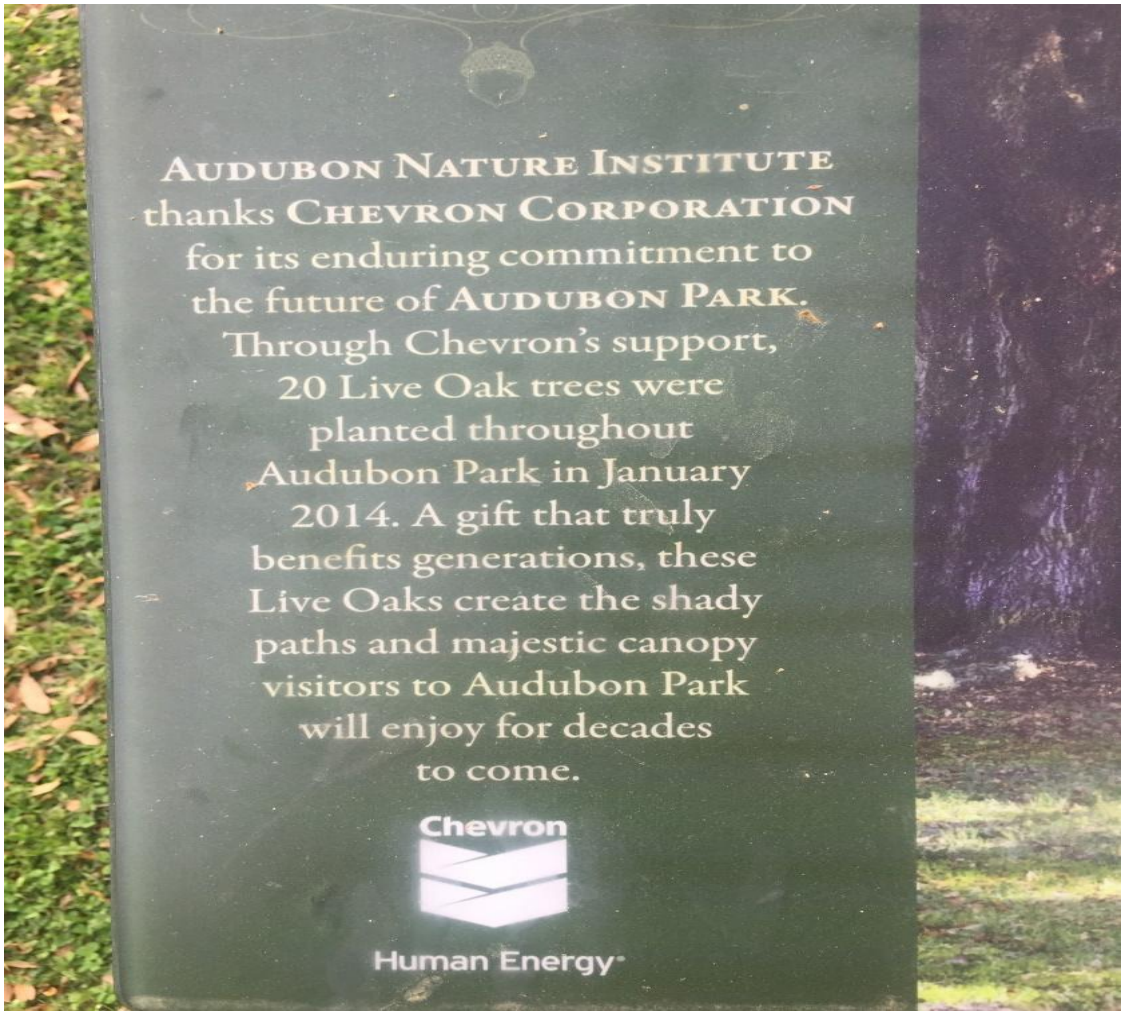

Image 17: Plaque thanking Chevron Corporation for its gift of 20 live oak trees, Audubon Park, March 7, 2020, own photo

What oil and its infrastructure are responsible for

All hydrocarbon infrastructures – 'hard and soft'– play their part in ensuring the smooth and timely extraction and transmission at the same time as being the embodiment of this programme. The handling and distribution of these extracted fossil fuels must be – or at least appear to be - seamless, predictable and reliable for it to meet the preconditions of its existence and, notwithstanding its recalcitrant and necrotic nature, its continuing acceptance, what is known as the 'social licence to operate' (Interview 7). This licence is deliberately constructed (Westervelt 2022) and it is maintained by the integration of oil in society. The social licence provides cover for the violence that industry operations also generate. While the process of extracting and transporting oil through its supporting infrastructure is supposedly seamless and bounded, in reality it is porous and leaking; there are 'overflows' (Appel 2012 p 461 following Callon 1998). From the window of the Greyhound bus between New Orleans and Baton Rouge, strung along River Road, the area known as Cancer Alley and more recently as Death Alley (Forensic Architecture 2021), and while travelling around Plaquemines and Terrebonne Parishes, I saw many of the 150 oil refineries and chemical plants, which unlike the 'blue' expanse of the Gulf are visible factories of fumes, spewing out black smoke and red flares, toxifying the air, polluting the water and increasing greenhouse gas emissions.

Hydrocarbon infrastructure 'overflows' into people's lives, homes and memories producing and disseminating pollution and violence, primarily affecting front line or 'fenceline' BIPOC communities (Yamashita et al 2022): "Our people are sick, our communities are dying - they're actually sick because of the industry that we have here" (Colette Pichon Battle quoted in Wendland 2021). The racism, the dying and the sickness are the inevitable outcome of the violence and pollution generated by the deliberate siting of hydrocarbon infrastructure in places – 'sacrifice zones' (Lerner 2010) – largely occupied by majority Black populations accompanied by inadequate government regulation (Bullard 2011, Yusoff 2018, Cagle 2020). Local photographer, Virginia Hanusik (2022) calls out the discrimination emergent from siting polluting plants where Black people live: "Infrastructure is not neutral, it's a physical manifestation of societal beliefs that protect certain communities over others."

Whether it is the 'slow violence' (Nixon 2011) of persistent life-threatening air pollution from emissions, water contamination from faulty or abandoned infrastructure, land erosion from a failure to back-fill canals after dredging or the sudden violence of explosions like the Deepwater oil rig in 2010, there has been a failure from industry to take responsibility for what it and its destructive infrastructure has caused at coastal Louisiana (Houck 2015). An illustration of how 'causal-responsibility' has been uncoupled from both 'role-responsibility' and 'liability-responsibility' in Louisiana in the decarbonisation era is provided by evidence that came to light during the US House Oversight Committee's recent investigation into oil industry 'greenwashing' (US House Committee 2022). According to press reports, an email revealed that major oil companies are either selling high-GHG emitting facilities to other companies or they are holding onto them, reportedly in the words of a Shell executive, "in areas where they aren't that politically sensitive about such matters: China, Singapore, Malaysia, Louisiana" (Aronoff 2022, Westervelt 2022). Louisiana is a repository of hydrocarbon irresponsibility. However, there are consequences for industry of its irresponsibility; its own infrastructure has become vulnerable to the effects of continuing fossil fuel operations.

Infrastructural vulnerability

As Barry (2013 p 183) observes, materials like operating pipelines cannot be isolated or 'purified' but exist in a contested environment where their integrity is threatened by environmental hazards and technical failures. Infrastructure needs to be thought of not only spatially but temporally (Barry 2020b, Mitchell 2020). This way of thinking draws on A N Whitehead's theory that the existence of an object over time cannot be assumed, but depends on the endurance, density and strength of its relations with other entities and on the changing environment of which it is a part (Whitehead 1929). Falling outside the protective confines of the 'technological zone' in coastal Louisiana are increasing quantities of water, rapidly diminishing land, more frequent and intense seasonal hurricanes together with rising sea levels consequent on global heating. Partly as a result of salt water intrusion from industry-dredged canals, pipelines are increasingly crossing wetlands or open water, conditions they were not constructed for and which put them at greater risk of leaks and spills (Bisschop et al 2018), a space of situated encounters between disparate and 'unruly' materials resisting and assisting efforts to contain them (Barry and Gambino 2020). While the oil industry remains closely tied to place, its infrastructure operates in environments where place is continually reformed by the movement of water and all that moves with it and through it (Phillips 2018).

In 2005, Hurricanes Katrina and Rita destroyed 113 offshore oil and gas platforms and seriously damaged 52 others as well as damaging 457 oil and gas pipelines (DHS 2011 p 19). As industry sources record, those and subsequent hurricanes like Gustav and Ike (2008) and Isaac (2012) damaged processing plants and flooded refineries causing falls in oil production (LMOGA 2021), a pattern of infrastructural vulnerability to the interaction of sea level rise and hurricane storm surge that is now well-established (Bradbury at al 2015). Hurricane Ida, in 2021, resulted in further damage to infrastructure with devastating effects on fenceline communities; as Yusoff points out, this happens "again and again" (2018 p 82).

Hydrocarbon infrastructure is increasingly exposed to changing and threatening environmental conditions that the oil industry has a share of responsibility for creating; in specific locations the necessary conditions for its use have become the agents of its own destruction. As Matthew Huber observes, a 'contradiction of capitalism' is its inherent tendency to degrade the conditions of production (2013 p xvii), what Nancy Fraser (2022) is calling 'cannibal capitalism.' These conditions situate the infrastructure in the centre of an assemblage of environmental forces disrupting the smooth operation intended by industry (Barry 2013). The notion of 'carbonscapes' as unstable and contingent (Haarstad and Wanvik 2017) or even of Louisiana's "fragile oil lifeline" (Theriot 2014 p 196) shift ideas of fossil fuels from both the pretended seamless system and the destructive machine already discussed to new incarnations of precarity, criticality and a need for protection, a deliberately constructed and gradual process of reframing (Colten 2017). As Singh (2018) observes, following Michel Serres (2007), the 'condition' of 'mastery' involves the debilitation and potential destruction of the object that the master yearns to govern.

Because of its situation in the heart of low-lying vulnerable wetlands, Port Fourchon's significance is measured in terms of the cost when operations are disrupted. A leaflet that I picked up during my visit to the port authority headquarters in 2018 emphasises the port's criticality according to a 2011 study by the US Department of Homeland Security (DHS):

> A recent DHS report states that if Port Fourchon was not available to service the energy industry in the Gulf, all other substituted port facilities *combined* would only be capable of fulfilling 25% of national need of such services (Greater Lafourche Port Commission 2013, emphasis in original).

The emphasis in italics highlights the national economic dependency and that is, in turn, subject to the environmental conditions periodically affecting localised infrastructure. The port is dependent on the road and the road is particularly vulnerable. Tropical storms, hurricanes, and other tidal events pose increased risks to LA Highway 1 impacting both commerce and hurricane evacuation (LA SAFE 2019 p 126). They also affect the future viability of Port Fourchon as Highway 1 will be closed whenever 5% of the road has been inundated (NOGS 2015 p 3) which is predicted to occur year-round "sometime before the year 2066" (DHS 2011 p 17). As Harvey and Knox (2012) observe, the promise of stability offered by a road is disrupted by mundane engagements with unruly forces.

On the sixteenth anniversary of Hurricane Katrina, Hurricane Ida made landfall at Port Fourchon causing extensive flooding damage to the unelevated section of Highway 1, observable from drone footage (NBC 2021). More than 95% of Gulf oil production was temporarily suspended and about 60 square miles of protective marshland lost (Hampton 2021). The storm surge breached the internal levee wall of the

Alliance Refinery near Belle Chasse and left much of the site under about five feet of water (McAuley 2021). At Shell's refinery at Norco, hurricane winds blew out the flares used to try to burn off toxic emissions so they continued to emit unabated (Sneath 2021, September 4). Out at sea, the hurricane resulted in multiple oil spills that, according to Healthy Gulf scientist, Naomi Yoder, are difficult to find and clean up as the responsibility is "harder to pin down" (Schleifstein and Baurick 2021). While the performance of its infrastructure shows oil to be recalcitrant, necrotic and inherently irresponsible, there is a relation between oil, its infrastructure and the state in which forms of state responsibility materialise. These emerge from state responses to oil and its infrastructure in the three manifestations already discussed: seamless, destructive and vulnerable. The principal and long-standing state response to oil has been one of accommodation and alignment with the goal of ensuring the smoothness of production and distribution.

State responses to oil

The economic history of Louisiana is one of extraction of value and co-option of the state to support business interests. As James Scott (1998) has observed, the C18 European state was largely a machine for extraction. This was particularly the case in its colonies. During that century, the preoccupation of French kings was how to make the territory of Louisiana profitable (Cummins 2014). After the Louisiana Purchase of 1803, the state government was under the control of plantation owners, New Orleans bankers, brokers and merchants (Schafer 2014). Substantial businesses were often based out of state and they sought to have elected public officials who would work to create and maintain an environment conducive to increased business and industry (Haas 2014, Colten 2014).

Legendary Governor Huey Long, elected in 1928, grasped this reality in the age of oil and instituted a new model for state governance: public works would be funded by oil revenues, the corollary being that so long as these revenues could be harvested, "the goose would be left unmolested" (Houck 2015 pp 190-1, Colten 2014, Haas 2014). According to Houck, the "oil money for free rein" arrangement became embedded like a faith or a reflex impacting state governors, legislators, regulators, levee boards and the courts (2015 p 222, Interview 3). The commitment went to Washington where US Senator Bennett Johnson, representing Louisiana from 1972 to 1997, was known as the "Senator from Oil" (Houck 2015 p 227). This relation is apparently ongoing.

According to Houck, a report from the US EPA commented on a **"**culture in which the state is expected to protect industry" (2015 p 16). He refers to the 'taboo question' in Louisiana – why isn't the oil and gas industry being asked to pay for the damage they have done to the wetlands - and how, when that question is asked in public forums (as he has done), it embarrasses politicians who remain silent (2015 p 186). As respected local journalist Bob Marshall (2023) has recently observed, Louisiana politics is "still largely under the financial sway of the oil, gas and petrochemical industries." Along with the shrimp, jazz, football and live oak trees in the city park, the political authorities in Louisiana are also in a 'marriage' with oil in order to protect the resource, constituting another piece of 'soft' infrastructure in which oil is embedded to maintain its intended seamlessness. The effect is that, within its territory, the state government does not have a monopoly over the legitimate use of violence (Weber 1920/1947), the oil and gas industry is licensed for the kind of violence described above which is legitimated by the state.

In contrast to the disguised embeddedness which Mitchell (1991) observed between Aramco and the US government where the oil company maintained distance from the formal political system, within the state

of Louisiana, the explicit petro-political imbrication is "a practical achievement" (Barry 2013, p 183). However, this achievement is a form of politics directed towards 'anti-political' ends (Barry 2001, 2002) fostering and sustaining a lack of socio-economic, environmental and legal accountability. Louisiana has been researched as a case study of what happens when a state 'uncritically hands' the oil and petrochemical industries 'everything they desire' while the state ranks at or near the bottom of the fifty US states on 'virtually every' social, economic and environmental metric (Zebrowski and Leach 2014), what Ray (2017) calls a case of extractive, internal, colonialism. The consequences were summarised by a lawyer and climate justice advocate at the 2021 Louisiana State of the Coast conference:

> No one wants to talk about corporate accountability … the industry that has given us so much and the environment that sustains us, now we are in a life or death situation. We have sold our state to the highest bidder. Industry and its infrastructure have caused these losses and the burden is on communities to figure out what to do (PO SOC 2021).

In Louisiana, oil has materialised irresponsibility in the perpetrator – the fossil fuel industry - and communities are assuming the 'burden,' the requirement to do something about it in the absence of state responsibility for action. Observing the relation between the US government and oil companies in the Aramco consortium, Mitchell (1991) sees, rather than the exercise of state 'policy' towards industry, that firms used the US government to further their own corporate goals, what is called 'regulatory capture' (Luke and Heynen 2020). Following Mitchell (2011), the state in a place like Louisiana can be seen as an 'effect of carbon' and where "carbon has captured the state" (Táíwò 2024 p 5). The state responds to the fossil fuels that cross its territory demanding its favourable attention. Oil is extracted from the ground and also from the state producing a 'carbon democracy' (Mitchell 2011), as is evidenced by the 'effects' of the relation between the state and hydrocarbons.

The State of Louisiana has long been situated in the centre of competing claims between environmental protection and fossil fuel-based economic development. The State's response is to articulate its intention to balance those claims though the relative weighting of the claims is not clarified. Instead, the 'balance' is emergent from the effects of its governing practices. That process is explicit in state agency remits, see for example, the Louisiana Department of Natural Resources (DNR, now the DENR):

> Our goal is to provide a fair, predictable and effective regulatory system that allows opportunities for development and economic growth through the use of our natural resources while at the same time ensuring protection of public safety and the environment. That balance is the focus of our role as stewards of Louisiana's bountiful natural resources (DNR 2021).

Like the DENR, the Coastal Protection and Restoration Authority's task-responsibility is to balance competing objectives. Its mandate is to "establish a safe and sustainable coast that will protect our communities" at the same time as "protect the nation's critical energy infrastructure" (CPRA 2024a); an expression of Pickering's 'dialectic of resistance and accommodation' (2013). State officials make executive decisions that require a balancing of economic and environmental claims. Two proposed potentially competing infrastructure projects, one to build land as a measure to forestall coastal erosion and the other to produce hydrocarbons, provide an example of how the balance is implemented. While the CPRA's $2.26 billion Mid-Barataria Sediment Diversion, discussed in the previous chapter, was undergoing impact

assessment, Tallgrass Energy was planning to build a $2.5 billion, 20-million-barrel crude oil export terminal adjacent to the diversion site.

The CPRA was required to conduct a 'consistency determination' aimed at protecting the major coastal restoration and hurricane protection projects within its master plan, including sediment diversions, from the adverse impact of economic development. A Water Institute of the Gulf study from 2012 reportedly raised concerns that the docking facility for the new oil terminal would reduce the sediment captured by the state's planned sediment diversion project by 17 percent with a consequential negative effect on the CPRA's land-building efforts (Schleifstein 2019, April 26). However, after consideration, the CPRA decided that plans for the new oil terminal were "not inconsistent' with its coastal restoration master plan provided certain conditions were met (ibid.).[10] The decision results in an imbalance as the approval of the carbon claim produces a material outcome (on water, land and greenhouse gases), whilst the commitment to the community and environment remains discursive and consequentially immaterial. Further, the balancing required in state mandates operates in the context of an imbalance with on the one hand extreme environmental degradation and on the other a steep decline in state revenues from hydrocarbons; from 56% in 1964 to around 4.5% in 2020 (Bridges 2020).

In Louisiana it appears that the state is unlikely to find oil and gas industry projects to be incompatible with environmental protection. That oil interests shape political outcomes is well-established (Watts 2009, Mitchell 2011, Yusoff 2018), indeed the resource-state nexus not only produces the resource but also the state given the state's enabling role (Bridge 2014), as the renaming of the Department of Natural Resources to add 'energy' to its title suggests. It is observable that although formal governance and regulation, what is called 'power' in the sense of state approvals and authorisations (Mitchell 2020), remain within the role-responsibility of the state, in the case of oil, actual power has been dislocated from those formal functions and sites. Rather than the state governing oil it is the other way round.

In Foucauldian terms, the effective governing practices lie beyond the state and within the techniques and practices of corporations. So, it is not only that the boundary between state and company is eroded (Mitchell 1991), but that the state has ceded substantive power and authority whilst retaining formal decision-making functions which it tends to exercise in favour of the dominant matter of hydrocarbons. Like Latour's reading of Tolstoy's general who, though he has formal power to give the order for battle, he is "made to act" by forces that he "cannot check" and so is "powerless in his power" (2017 p 51). The consequence through this accommodation is that the state is inhabiting Steven Lukes' third dimension of power involving acquiescence in its own domination (1974/2005). The state adopts as its role-responsibility, the job that it is tasked to do, the duty to 'accommodate' (Crouch 2011) the interests of oil. In effect the state is taking responsibility *for* oil with its selective and discriminatory potential. This type of responsibility is located not only at points of decision-making on 'balance' in relation to a specific

[10] In an interesting development subsequent to the CPRA's 'consistency determination,' the energy company pulled out of the project citing climate, economic and cultural concerns following strong community resistance to the plans which reportedly risked destroying a historic slave burial site (Rubiano 2021). This outcome illustrates the importance of community action discussed in the next chapter. While the relation between matter, industry and activism are outside the scope of this thesis, the state's original decision 'accommodating' oil, in determining a 'balance' or 'consistency' between environmental protection and economic development, remains.

infrastructure project but also at more dispersed points along the trajectory of infrastructure and its overflows and leaks.

Following Hurricane Katrina, state officials folded the necessity to protect existing energy infrastructure into their long-term strategy for coastal restoration (Randolph 2018). Coastal restoration projects to restore barrier islands like East Timbalier Island and the Caminada Headland appear designed to protect Port Fourchon (Nost 2018). A CPRA engineer was explicit about the role that the latter, the construction of 12 miles of beach using bulldozers, was playing: "Katrina blew sand onto the marsh … if we lose the shoreline, then Port Fourchon is really at risk" (PO CPRA 2020, April 15). Barry (2020b) observes that the temporality of infrastructure generates new political processes, what he calls 'second-order infrastructures' of expertise and regulation that are explicitly concerned with infrastructure's endurance. These 'second-order infrastructures' (Barry 2020b) are illustrated by the additional materials, equipment, labour, expense and danger undertaken by the CPRA in dealing with poorly mapped active as well as abandoned and decaying oil wells and pipelines (Baurick 2017, Interview 15). During a webinar hosted by the CPRA I learned from an official that:

> Almost all marsh creation projects overlap with oil and gas infrastructure … construction activities around the infrastructure can be very dangerous … to transfer material from the borrow source we typically use a cutterhead dredge. As you can imagine we do not want to hit a pipeline with this type of equipment … we have developed guidance on marsh creation design, we use the SONRIS database from DNR … but data is not always accurate and may be hard to verify (CPRA 2021 November).

Rather than industry taking direct responsibility for preventing and remedying coastal erosion or the State requiring it to do so, instead the State steps in to the responsibility gap, as it does in the case of disasters as the repository of responsibility. Through exercising its *residual responsibility*, the State designs and seeks to implement a plan for coastal restoration in the places where the oil and gas industry has contributed to the need for it. The result is that the state is required both to intervene and then to navigate around hydrocarbon infrastructure that industry is not taking responsibility for.

Appel (2012) notes the Spanish word that local people in Equatorial Guinea used most often to describe how the local authorities approach their relationship with the oil industry: *compinchados* or accomplices deriving from *pinche* or helper. If we see the state as an effect of the needs and demands of the oil and gas industry, then the state becomes subject to a form of 'responsibilisation' in which state agencies in their various manifestations and decisions have themselves become 'docile and useful' (Foucault 1991) for the 'governing practices' of the oil and gas industry; effectively a *responsibilised state*. This is a reversal of traditional understandings of Foucauldian governmentality which attends to the effects on the population of governing practices. The resource and its dependent infrastructure when manifested as seamlessness and precarious produce a state as accomplice, inverting established accounts of the association between the state, infrastructure and power (see e.g., Swyngedouw 2015, Menga 2018). Instead of the familiar 'green governmentality' of individuals (see e.g., Soneryd and Uggla 2015), what is observable is the *hydrocarbon governmentality* of the state. I turn now to the response of the state to the matter of carbon emissions and greenhouse gases in the material tussle among oil, water and land.

Decarbonising with carbon

In the age of climate change, oil is forced into a relation with greenhouse gases with the risk of disruption to its intended smooth operations. What has been the response of the State of Louisiana? When I started my PhD fieldwork research in 2017, the State did not have a climate mitigation plan. Instead, the Louisianan polity was replete with decades of oil influence and climate denialism. However, extreme land loss, increasingly forceful hurricanes and frequent widespread flooding became matter that required more of a state response (under the then gubernatorial administration) than the adaptation approach of coastal restoration and protection under the auspices of the CPRA. Shortly after being elected to his second and final term, in February 2020, Louisiana governor John Bel Edwards announced his "coastal priorities." These included a Climate Initiatives Task Force (CITF) which would recommend:

> … a suite of balanced policy solutions that can reduce Louisiana's greenhouse gas emissions while appreciating Louisiana's economic and energy profile (Governor 2020a).

This is a further iteration of how the state responds by suggesting a balance of competing interests but only the 'economic and energy profile' is subject to 'appreciation,' which bears more than one interpretation in favour of oil. The announcement was followed up with an executive order establishing the task force and its mission as:

> … a group of stakeholders who will study and make recommendations to reduce economy-wide greenhouse gas emissions with emission reduction targets of 26-28% by 2025, 40-50% by 2030, and 100% by 2050 (Governor 2020b).

Subsequently, the Louisiana Climate Action Plan, published in February 2022, set out the roadmap for state-wide mitigation (CITF 2022). However, reducing greenhouse gas emissions is acknowledged to be a challenging agenda in Louisiana (CITF 2022). The state's industrial CO2e emissions consist primarily of chemical manufacturing, petroleum and coal (refining) and natural gas processing which make up 94% of the state's industrial CO2e emissions (CITF 2022 p 12). Industrial emissions as a percentage of overall emissions are 66% in Louisiana compared with 17% for the United States as a whole (CITF 2022 p 11, see Image 18). Although emissions from electric power generation have decreased from 2005 levels, industrial emissions (inclusive of natural gas and oil systems) rose by 14% over the same period (CITF 2022 p 14) and "many" industrial expansions or new facilities have been announced across the state, though others are closing (CITF 2022 p 13, Bridges 2020).

As the climate action plan puts it: "The math problem of how Louisiana confronts its emissions is difficult" (CITF 2022 p 14). Nevertheless, ambition for climate leadership and responsibility is expressly stated in the plan:

> No state has ever attempted to tackle industrial emissions at this scale. This aggressive plan offers the opportunity for Louisiana to lead the way in climate action, particularly industrial decarbonization, and set a global example (CITF 2022 p 14).

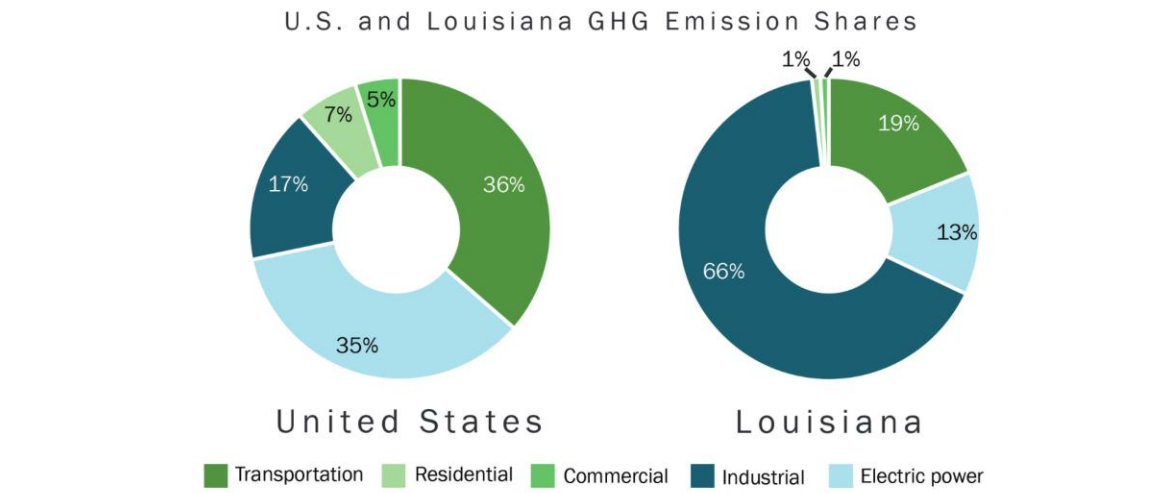

FIGURE 4. SUMMARY OF U.S. AND LOUISIAN GHG EMISSION SHARES. NOTE: FUEL COMBUSTION VALUES ARE FROM FOSSIL FUEL COMBUSTION ONLY. SOURCE: U.S. ENVIRONMENTAL PROTECTION AGENCY, INVENTORY OF U.S. GHG EMISSIONS AND SINKS: 1990-2018; AND STATE CO_2e EMISSIONS FROM FOSSIL FUEL COMBUSTION. FIGURE DERIVED FROM FIGURE 4 IN THE LOUISIANA 2021 GHG INVENTORY.

Image 18: US and Louisiana GHG emission shares (CITF 2022 p 11 sourced from Figure 4)

Like the environmental threats to oil infrastructure, greenhouse gas emissions are the kind of 'information' that, for a governing authority, is not merely knowledge of its existence but becomes a demand for attention precipitating new forms of politics (Barry 2001 p 153). After decades in which the scientific connection between atmospheric greenhouse gas concentrations and carbon emissions were not capable of being acknowledged politically, there has been a shift towards acknowledging the existence of carbon emissions and transforming them into an object that can be manipulated for political and industry ends with the potential for carbon production to continue. This is suggested by the representation on the Governor's climate initiative task force of oil and gas interests, including one petroleum executive who is stated to be the "designee for the Speaker of the Louisiana House of Representatives" (Governor 2020c, Sneath 2021, October 7), the latest iteration of the Louisianan tradition of embedding oil in politics. It is also suggested by the Governor's announcement of cuts to "net greenhouse gas emissions" (Governor 2020b) where, as is often observed, the word 'net' does a lot of work. As one person close to the Governor's climate initiative process told me, climate action advocates tried to get 'net' removed, but they were unsuccessful (Interview 8). 'Net' allows carbon to be maintained and managed as the focus turns to a reduction in emissions rather than industry production of carbon as commentators have noted:

> … many in the oil-and-gas industry … argue that it is not fossil fuel that is bad, but only the carbon dioxide emissions. [Their] solution is to keep burning carbon and to use new technologies to capture carbon dioxide. "Fossil fuels aren't the enemy," Rep. Garret Graves, R-Baton Rouge, likes to say, "It's emissions" (Verchick 2021).

There is a perpetuation of the idea within industry and state politics that fossil fuels can be uncoupled from carbon emissions. Following Barry (2001, 2005), this uncoupling depends on technology (carbon capture and sequestration, discussed below) but also on the production of 'information' entailing a transformation in the object which is informed about (fossil fuels) so that it can be manipulated into a new object (carbon emissions) for governing practices (Barry 2001 p 153). As has been noted, the preoccupation with

emissions ignores the "roles and responsibilities" of governments in relation to the production of the predominant source of these emissions (Stockholm Environment Institute 2021). Instead, as an interviewee explained, with a focus on emissions, industry can continue to be a stakeholder while the State can continue its role of listening to industry (Interview 16), what I am calling hydrocarbon governmentality.

In relation to the State of Louisiana's proposed climate action, state and industry public pronouncements are aligned and their timing apparently coordinated. On the same day as the Governor's announcement of his coastal priorities, the Louisiana Mid-Continent Oil and Gas Association (LMOGA), which represents industry, welcomed the Governor's initiative and stated its proposed plans in response to it:

> As part of industry's efforts to lead the way to climate solutions, LMOGA members have established a Carbon Committee to promote the advancement of CCUS technology (LMOGA 2020).

Just as the Water chapter described how industry came onside in supporting the establishment of the CPRA, so too industry and the state are aligned in the Governor's climate initiative. While the climate action plan anticipates that some refineries will close because of reduced global demand and/or costs undermining profits (CITF 2022), 'net zero' is important for Louisiana's oil and gas industry as it opens up opportunities for sequestering carbon and shifting from supplying fossil fuels as a form of energy to using petrochemicals for plastics (Interview 2, Earthjustice 2024) which, as Mah (2022) argues, will continue to fuel the ecological crisis. Although the hydrocarbon industry has shifted its rhetoric so that now it is positioning itself as being part of the 'climate solutions' (LMOGA 2020, PO DSCEJ 2022), rather than talking about transitioning away from fossil fuels, the oil industry is focused, according to a coastal scientist interviewee working for a non-profit, on how it can 'justify' its existence (Interview 15). The answer for industry is carbon capture, utilisation and sequestration (CC(U)S),[11] a hard infrastructure 'solution' to which the state responds.

Places of hydrocarbon extraction offer the geological potential for the re-insertion of that matter after it has been used. As one of my interviewees put it, the "pipelines will go into reverse" (Interview 8). Pipelines are a kind of technology that can be part of a set of political problems at the same time as presenting solutions to those problems (Barry 2001 p 19). They appear as a technical fix to the problem of reducing emissions; infrastructure is enrolled in performing the role-responsibility of the state. The State's climate plan states that "CCUS is anticipated to play a critical role in decarbonizing the global economy by addressing high-intensity and hard-to-abate emissions that will be necessary to reach net zero" (CITF 2022 p 60). Carbon capture and sequestration (whether with or without 'utilisation') is the response to climate action from both the fossil fuel industry and the state government illustrating the dominance and persistence of hydrocarbons. Returning carbon below ground allows the matter of oil to retain its quality of seamlessness and endurance.

However, studies are sceptical about the role that CC(U)S can play in the scale of decarbonisation that the climate emergency requires, both globally and within Louisiana (Robertson and Mousavian 2022, Larsen et al 2021, Marshall 2022). The development of CC(U)S also raises concerns about increasing existing

[11] The state and industry call it carbon capture, utilisation and sequestration (or storage) (CCUS), while others, including those who oppose it and who do not recognise the 'utilisation' function, refer to it as CCS. I adopt the somewhat unwieldy "CC(U)S" as neutral yet sceptical ground between the two iterations.

threats to the environment and perpetuating climate injustice by foisting the risks and burdens of this technology on the state's historically marginalized communities (Sokol et al 2021, Sneath 2021, October 7, Interviews 13, 14, 15). A group of non-profits, mainly locally based such as Rise St. James, Better Bayou and Healthy Gulf, has formed a coalition to oppose what they call the 'false solution' of this technology (LAFS 2024). As a justice attorney and coalition member commented at a seminar:

> CCS is extending the life of burning coal, oil and gas. It will perpetuate harm and environmental racism. We need to call out our governor (PO DSCEJ 2022).

A coastal scientist, also at non-profit coalition member, commented on the Governor's role in promoting CC(U)S while giving voice to the equity advisory group within the Climate Initiative Task Force, discussed in the next chapter, as follows:

> The Governor has created this whole progressive arm that's contributed in a huge way, and then they just say, OK, well, carbon capture … it goes right through our environmental justice communities. Oh well (Interview 15).

One interviewee close to the Governor's climate initiative opined that, CC(U)S "defies good policymaking, it is uncertain, expensive and makes no sense" (Interview 16). The way in which it makes 'sense' for industry is, as another interviewee explained:

> There's not much else they can do … CCS means continued industry jobs, plus new industry jobs … there are multiple multibillion dollar CCS projects on the table in Louisiana right now (Interview 14).

However, as the documents produced to the US House Oversight Committee's inquiry revealed, whilst industry is relying on government to set applicable tax credits at an incentive level, it is acknowledging that "the window for CCS to remain relevant with governments and society is closing quickly" (Westervelt 2022).

Carbon is expected to play a central role in Louisiana's decarbonisation plans, an oxymoronic (il)logic that is capable of underpinning a planned governance and policy response.[12] The State's climate action plan, a form of soft infrastructure, represents an attempt to respond to extreme climate impacts affecting the state of Louisiana while simultaneously responding to the needs of the hydrocarbon regime, another example of role-responsibility as accommodation in perpetuating the oil programme of apparent seamlessness and protecting against the future precarity of oil interests. As one interviewee informed me: "The Governor is open to everything except shutting down industry" (Interview 11). As anticipated, the results of the gubernatorial election in October 2023 have put the climate action policy at risk (Interviews 11, 14) and at the time of writing the new governor's plans are unclear. The State of Louisiana's continuing commitment to oil reflects the context of industry's global intentions. Recent studies show that most major oil and gas producers are planning on increasing production to 2030 or beyond (Stockholm Environment Institute

[12] In making this juxtaposition, I continue to treat carbon here as the 'villain' rather than the 'remedy' that Bensaude-Vincent and Loeve, who remind us of carbon's multiple modes of existence, propose it could be in its nano state (2024 pp 4-5).

2021, Oil Change International 2020). The prevalence of what Randolph (2018) calls 'extractive thinking' within the state government invites consideration of what this 'thinking' represents.

In the age of climate responsibility, the 'balance' framework which results in the state prioritising industry over the environment is disrupted amid the material tussle between oil, water, land and more recently atmospheric greenhouse gas concentrations and the resulting state responses. The tussle among forces presents a new challenge for how thinking emerges from those relations; how matter 'forces thought' (Stengers 2010), *material thinking.* As one interviewee, an academic, put it, in Louisiana where the fossil fuel industry's approach is "you can't survive without us," there is a "wilful blindness on the part of policymakers" regarding an energy transition powered by hydrocarbons (Interview 16). Hannah Knox (2020) writes of the "impossibility of reconciling climate thinking" with the centrality of fossil-fuelled infrastructure to national economies (2020 p 269). It's the nature of the thinking that is of interest here.

Witnessing the trial of Adolf Eichmann, Hannah Arendt (1963) developed the concept of 'thoughtlessness' by which she meant an inability to think from the standpoint of somebody else. This invites the idea that the way that Eichmann was 'thinking' depended on where he was 'standing' compared to other people, a spatial consideration invoking, for geographers, a relation between place and thought. Thoughtlessness then is not, as it might at first seem, an absence of thought, rather it is a spatially constructed medium allowing for resistance to other logics or rationalities contemporaneously with alternative planes of thought. This way of thinking, for example, allows oil companies to express sympathy to those affected by hurricane damage. Following Hurricane Ida, under the hashtag #LouisianaStrong, Exxon Mobil tweeted "thoughts and prayers" to "Gulf Coast colleagues, friends and neighbors in Louisiana" (Uteuova 2021).

For an oil and gas state to plan to decarbonise with the assistance of carbon, demands not so much thoughtlessness in the Arendtian sense of not understanding other viewpoints but a kind of unthinking some matter in order to privilege another (de la Cadena 2015) that is engendered from the logic of the outcome of a tussle between oil and the other significant forces and how they are governed in Louisiana. Borrowing from Donna Haraway (1988) and extending my notion of material thinking as evidenced in fieldwork, just as knowledge is dependent on being 'situated,' so do the forces present in a location foster 'situated thinking.' The kind of thinking that matter, places and situations invoke produce particular and various kinds of responsibility. In Manchester, Hannah Knox saw city officials working on climate action as 'thinking like a climate' (2020) while Louisiana's climate action plan complements that with simultaneously 'thinking like carbon' as if the two lines of thought and the matter being thought about can be reconciled. However, in relation to some infrastructure, the State is explicitly bringing the issue of responsibility into the frame.

Introducing 'responsibility'

'Orphan wells,' abandoned oil and gas wells with their destructive potential for leakages, reveal a possibly changing approach – or response - from the state. These wells are, according to the Governor's climate action plan, 'orphans' because no one can be identified as a responsible party or the responsible party has failed to maintain the infrastructure (CITF 2022 p 65). According to a coastal scientist interviewee, because of a sunset provision, responsibility for this infrastructure returns to the State but sometimes the operating company will say that it would like to plug the well in order to keep it as an option for later use (Interview

15). The problem is that orphan wells are, according to this interviewee, leaking hydrocarbons at rates that no one "has a clue about" and they have not been a priority for the regulatory agencies (Interview 15).

In signs that the State is resisting its more traditional assumption of residual responsibility in the case of this obsolete but far from inactive infrastructure, the Louisiana Climate Action Plan states its intention to "hold former well operators accountable for orphaned wells" (CITF 2022 p 65). The Climate Action Plan uses the word "responsible" or "responsibility" 8 times in one paragraph of 182 words proposing legislative and regulatory measures to ensure former operators are held responsible for abandoned wells recommending a new definition of "responsible party" (CITF 2022 p 65). Orphan wells with their unruly leakages intrude on the seamlessness of oil while also disturbing the balancing process between environment and economy and the boundary between state and corporation. Both the intention and emphasis on responsibility in the Plan suggest a shift in practices of state responsibility relative to industry and its infrastructure away from accommodation and towards accountability under the then governing administration.

A further potential shift in the relation between oil and state responsibility is the way in which CC(U)S is presented in the Climate Action Plan. While CC(U)S is promoted as an opportunity for industry, the way in which the State is proposing it in the Plan does not suggest the confidence with which it was initially trailed. This is shown by CC(U)S's apparently declining status in the State's climate initiative. It was given prominence in the Governor's executive order of 2020 and the task force interim report in February of the following year (Governor 2020, GOCA 2021). In June 2021, in a presentation by a coastal scientist close to the work of the task force, the first of the listed "fundamental objectives" were "minimise greenhouse gas emissions, maximise greenhouse gas capture and sequestration" (PO SOC 2021). Given its prominence in the early working of the task force, there was an expectation it would be similarly addressed in the eventual Louisiana Climate Action Plan published in early 2022. Instead, in the plan CC(U)S is no longer a 'fundamental objective' and the first substantive discussion of it appears on page 60 of the 177-page document. As one interviewee explained, the downgrading of CC(U)S in the plan was not accidental but a result of community organising (Interview 13), a form of political action and citizen influence discussed in more detail in the next chapter.

Another indicator of possible reservation about CC(U)S is that the State's proposal for it is qualified by the concept of responsibility, which has the discursive effect, in the plan, of aligning it with the nefarious leaking orphan wells. The climate action plan states it will:

> Support the safe and responsible deployment of carbon capture, utilization, and storage for high-intensity and hard-to-abate emissions" (CITF 2022, Action 5.3, p 60).

In the succeeding notes, the plan explains what is meant by "safe and responsible":

> Louisiana … needs to be assured that the deployment of CCUS technologies in the state be pursued in a safe and responsible manner that does not negatively impact communities, ecosystems, and cultural resources (CITF 2022 p 60).

Five non-industry members of the task force objected to this action (the highest number of dissents to any proposed action in the climate plan), citing concerns over high project costs, low project success rates, perpetuation of community harm and injustices, and environmental degradation. At a seminar a month

after the action plan was published, a participant reiterated these concerns and commented that "CCS is being promoted irresponsibly" (PO DSCEJ 2022).

If CC(U)S is fundamentally irresponsible then the 'net' zero policy as a way to maintain the production of fossil fuels continues to evade responsibility. However, the fact that in the climate plan the State is requiring that any CC(U)S be "responsible" offers various possibilities for interpretation. Is this a sign, like with the orphan wells, that the State is now requiring industry to take responsibility for its destructive activities in a departure from the hydrocarbon governmentality and residual responsibility discussed above? Are the devastation of hurricanes and existentialism of land loss the trigger for a new form of climate responsibility from the State? At minimum, the State is now invoking the concept of responsibility as a condition of industry infrastructure and operations; it is no longer "off the table" (Houck 2015). Or has 'responsibility' become the concept *de jours,* available for invocation and sought-for credibility and the licence to operate? The newly appointed Louisiana Secretary of Natural Resources, who had previously been the president and general counsel of oil and gas association, LMOGA, at the time of the Governor's climate initiative, has the following message on the department's website:

> Welcome from DENR Secretary Tyler Gray and the men and women of the Louisiana Department of Energy and Natural Resources who work every day to ensure and promote sustainable and responsible use of the natural resources of our state so that they are available for the enjoyment and benefit of our citizens now and in the future (DENR 2024).

In the context of the State's repetition of the need for responsibility from oil in the climate action plan, it is as if a discursive reference to responsibility might constitute its performance (Butler 1990). However, a link has been explicitly made between oil and state responsibility.

Conclusions

This thesis is concerned with forms of state responsibility emerging from the matter demanding the state's attention. Through an investigation of relations between oil, infrastructure and the state, this chapter has explored the way in which oil generates both familiar but also different forms of responsibility from those explored in the previous chapters. Oil as recalcitrant, necrotic and irresponsible has been explored through three manifestations of its infrastructure producing differing state responses. First is the constructed seamlessness in a conduit economy in which the oil industry is embedded not only in the 'hard' infrastructure of its extraction, production and distribution but also in the 'soft' infrastructure of its entanglement with local economy, society and culture and crucially its politics and government. In accommodating industry, the state performs responsibility *for* oil, an extraction from underground and an extraction from the state. In its second incarnation oil is the destructive machine of pollution, racism and violence in which the state does not hold the industry to account. Rather, what is demonstrated is that power is not located in the same place as responsibility. Both these manifestations of oil produce markers of acquiescence within the state representing a form of *hydrocarbon governmentality,* inverting Foucauldian notions of governmentality which is assumed to come from the state. Instead, the way in which the state performs its responsibility for hydrocarbons is that the state itself is being responsibilised.

In its third form, as it becomes increasingly subjected to damage from environmental conditions it is causatively responsible for, oil and its infrastructure is seen as 'vital and vulnerable' (Mitchell 2011p 67)

requiring protection from the state which fulfils that need through exercising a *residual responsibility.* Oil's vulnerability is its power. Hannah Appel describes the way in which the concept of responsibility is passed back and forth between the government of Equatorial Guinea and the oil and gas companies and how they use infrastructure as a frame to abdicate responsibility (Appel 2012). In Louisiana infrastructure exemplifies the role-responsibility that the State plays in accommodating oil to ensure its ongoing seamlessness. In a confrontation between coastal restoration and economy interests, the state sided with industry.

However, increasing atmospheric greenhouse gas concentrations and the devastating effects of climate impacts suggest that the long-standing accommodation is being disrupted. In a climate changing world, oil is becoming entangled with responsibility and potentially new relations with the state. As I argue, *situated thinking* underpins the navigation of forces demanding the attention of the state. While carbon dependence is being reconstituted through programmes like carbon capture that perpetuate the fossil fuel economy, at the same time the state was discursively introducing the notion of responsibility, if not the practice, into those carbon futures, whether in relation to CC(U)S or to orphan wells. The State's acknowledgement of, at minimum, a relation between oil and responsibility contributes to developing this thesis' aim of locating a theory of state climate responsibility in which the state takes responsibility for progressing a transition away from hydrocarbons.

Nevertheless, oil as wilful, recalcitrant and necrotic is also persistent and sticky and Louisiana is a difficult place to envision the end of oil. As one interviewee forecast, Louisiana will keep sinking and the state and industry will keep promoting carbon capture and sequestration, "both of these things will happen" (Interview 14). However, as Hannah Knox (2015) puts it, "theories of anthropogenic climate change reconfigure fossil fuels as the primary source of carbon emissions into the atmosphere" which unsettles existing relations between oil, technology and political power (2015 p 309). This chapter has shown that these relations are also generating new forms of responsibility. The next chapter considers state responsibility from the perspective of atmospheric greenhouse gas concentrations and discusses the role of citizen advocacy in challenging the dominance of oil and seeking responsibility for justice.

Chapter 7: Air

Introduction – Air in multiple manifestations

This chapter is called 'air' but it took a while to settle on the title. I was struggling to comprehend what matter I was encountering when the Governor's climate initiative emerged late during my fieldwork. Following further devastating flooding and storm damage, 'carbon emissions' and 'greenhouse gases' have recently appeared on the State's governance agenda as an additional material contribution to the longer-standing politics of water, land and oil. For a while the chapter was provisionally called 'greenhouse gases' as these seemed to be the proximate cause of the State's new climate initiative, what had apparently 'come to matter,' and in relation to which a performance of responsibility was being attempted. However, it was too simplistic to assume the significance of greenhouse gases beyond the emergence of their political articulation. It felt more appropriate to situate the findings within the more capacious concept of 'air' which, in its various manifestations, has come to be an active force with political and social implications in Louisiana. Although 'airy' connotes a lack of substance, the title 'air' also seemed appropriate to the current status of the State's climate action plan as it is far from implemented.

Adopting literary scholar Eva Horn (2018)'s notion that air is a *medium* as much as matter, air in or from Louisiana emerges in multiple dimensions. The emissions profile of the State set out in the previous chapter includes those generated by the State's reliance on natural gas for power generation (71% compared with a US average of 45%, CITF 2022 p 12) visible in the ubiquity of natural gas infrastructure. Air manifests as toxic pollution from refineries and chemical plants as well as the greenhouse gas emissions from those sites. Air also consists of atmospheric greenhouse gas concentrations, the consequence of emissions and the measure of climate change, which account for the increasingly forceful tropical storms and higher temperatures. There is also the productive physical force of wind. For although renewable energy was only 1.6% of the State's generation mix when the climate action plan was published (compared to the US average of 15%) (CITF 2022), air is increasingly playing a part as Louisiana develops offshore wind energy in the Gulf of Mexico (Governor 2020d, Daughters 2022).

Yet air in other manifestations is also deeply relevant matter for the people and habitats of Louisiana. While there is air conditioning, conditioning constructing the conditions for liveable atmospheres for the privileged indoors, outside are the damaging effects of air. Louisiana is frequently and increasingly struck by airborne climate impacts such as the insidiously dangerous air of increasing temperatures in a humid climate and the forceful destructive air of increasingly frequent and strengthened hurricanes and tornados (Climate Reality Project 2020, CITF 2022 p 25). At the same time, air as matter fundamental to life, is severely and continuously threatened by local sources of toxic chemical production, including ethylene oxide, chloroprenen and other carcinogens, which are increasing (Perkins 2024, Song and Younes 2022, Baurick et al 2019). A recent EPA study reportedly disclosed that the region has a 95 percent higher risk of cancer due to air pollution than the rest of the country (Yamashita et al 2022). The pollution can have cascading effects. During Hurricane Ida there were a series of consequential and compounding 'natech' events as hurricanes produce a "second storm" of toxic air, poisoned water, and chemical fires (Cagle 2020), what Rob Nixon calls a 'threat multiplier' (2011 see Image 19). Some industrial facilities tried to burn off toxic chemicals through flaring but the hurricane blew out the flares leading to emissions of harmful pollutants which, because of power outages, air quality monitors were unable to track (Sneath 2021, September 4).

Image 19: A resident inspects the damage to his home next to Shell's refinery and chemical plant after Hurricane Ida (Dermansky 2021)

Air pollution has long caused extreme ill-health, endemic in particular places, including Cancer Alley, the riverine stretch between New Orleans and Baton Rouge the site of former plantation lands and slavery and now the location of polluting industrial plants. Chemical pollution forms part of a wider geography of racial injustice in the state, as studies on the location of polluting sites adjacent to Black and impoverished communities show (Terrell and St Julien 2022, Song and Younes 2022, see more widely Bullard 1990/2000). Forensic Architecture (2021), which has mapped this geography, sees 'air' as having been 'weaponised' against majority-Black communities whose ancestors were enslaved on the same grounds where they are now breathing the "most toxic air in the US." They call it the "chemical gassing of 'fenceline' communities" invoking the notion of deliberate or negligent poisoning by chemical companies which is tolerated by the State as it repeatedly fails to regulate toxic emissions adequately (ibid.). Air as poisonous and deadly airborne matter has sparked the emergence of remarkable community-based environmental justice organisations which challenge the petrochemical industry and campaign for a "healthier, pollution free future" (Louisiana Bucket Brigade 2024, Rise St James 2023, Misick 2022). The geographical relation between sources of local polluted air and greenhouse gas emissions was confirmed in a scientific study by Kolker and Weathers (2022b). Their research found that over the past 50 years 26% to 55% of Louisiana's greenhouse gases were emitted from the industrial plants concentrated in Cancer Alley (Parker 2022, see Image 20). However, as the authors note, the interrelation is potentially positive: reducing carbon emissions at industrial sites will reduce air pollution, help relieve the suffering of local people and contribute to mitigating climate change.

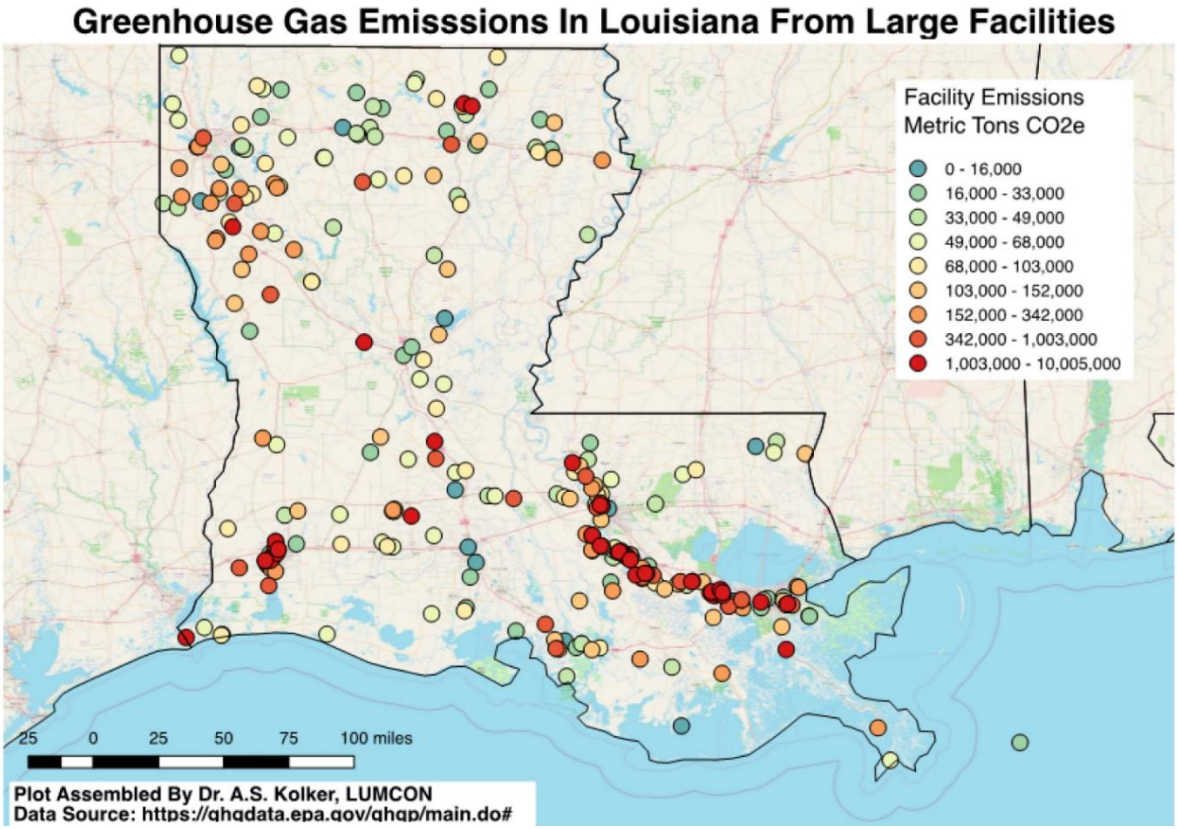

Image 20: Greenhouse gas emissions in Louisiana from large facilities (Kolker 2022) showing concentration along Mississippi River corridor

Air therefore is not an empty void or invisible presence (Tammemagi 2009), but a form of matter from which humans and other creatures seek – and struggle - to breathe and derive life. Scholarly attention is being paid to breath and breathing (Mbembe 2021, Serres 1995, Verlie 2022). As Lucy Sabin (2022) proposes, air is better thought of as an 'airscape' in which 'air quality' is not an abstract property that inheres in air but a complex relationship between diverse breathers and dynamic pollutants. Through her experience of Australia's chronic bushfire smoke, Blanche Verlie (2022) reflects that bodies are both subject to the toxicities of the atmosphere as well as active manufacturers of climatic conditions meaning that bodies-and-climates are constantly co-emerging and differentiating themselves. Latour expresses the idea of the atmosphere being 'manufactured' when he observes that it is no longer simply an environment in which humans are located and in which they evolve, it has been coproduced by humans through their own actions (2018 p 76).

In a climate changing world, greenhouse gases are being remade as pollutants as the US Supreme Court has established (SCOTUS 2007). However, carbon dioxide is also being 'made' as a gas with economic potential in its capture. As Gökçe Günel (2016) finds, in the world of 'CCS professionals,' rather than seen as waste and or a dangerous material, carbon dioxide is being reconstituted as a neutral material that can be traded as a commodity. Air in its many dimensions is neither separate nor isolated from other matter but as a vector or conductor of heat, storms, pollutants, emissions and greenhouse gas concentrations, it circulates in a 'web of connections' (Bennett 2004) with the other forces explored in this thesis.

Despite the multiple impacts of extreme industrial pollution and ill-health of communities, air has not had the political or governing salience in Louisiana of other more pressing matter like water, land and oil. However, with increasing political connection being made between flooding and climate breakdown that is changing and as a 'contingent' force the political significance of varied forms of air have become increasingly realised (Barry 2013). Taking inspiration from Latour (2011)'s concern with assembling a political body capable of responsibility for the Earth's changing state, Horn (2018) asks how air could be conceived of as a novel political entity that demands new forms of knowledge, decision-making and consensus. This chapter offers an empirical illustration of that question through an exploration of the state response to air as greenhouse gases.

This thesis has interrogated first, the emergence of state *role-responsibility* from the matter demanding its attention (Chapter 4, Water) and second, the type of responsibility manifested by reference to the matter (an anti-political *responsibility-as-action* in Chapter 5, Land and accommodation with oil as *hydrocarbon governmentality* in Chapter 6, Oil). In investigating the relation between air as greenhouse gases and the state's *response responsibility,* this chapter continues the trajectory in the thesis of establishing responsibility from salient forces but goes further by exploring a new type of responsibility emergent from this kind of matter which addresses the fourth research question: *the relation between matter, state responsibility and justice.*

The chapter opens with the difficulty in locating greenhouse gases in Louisianan politics and society when the principal concerns of many communities are with the materiality of extreme environmental degradation, not least from air pollution and hurricane damage. This is illustrated through an exploration of a discussion at a seminar attended by German students, who came to Louisiana, as I did, expecting to find 'climate change' but who encountered a more complex picture involving pollution instead. Engaging with Hannah Knox (2020)'s arguments about the relation between matter and thinking, I show how although 'climate change' struggled to gain salience in the context of pollution in communities and climate denialism within the polity, carbon emissions and greenhouse gases emerged as matter driving a governing response with the Governor's Climate Initiative and the Louisiana Climate Action Plan.

The chapter then turns to the way in which the plan to reduce greenhouse emissions opened up a space for community advocates to push for and succeed in achieving a place for equity considerations in the plan, showing the important role of these actors; both in material geography terms as actants in the mix of matter, state and responsibility but also in climate justice terms as the outcome of collective action and organising which engage the state within its own processes. Countering the arguments of Iris Marion Young (2011) and others that 'responsibility for justice' is grounded in a responsibility on individuals to act collectively, I argue the potential for community groups, to come together voluntarily yet without being burdened with a responsibility to do so, to challenge the state towards a form of *climate responsibility.* This involves the state making a commitment to take responsibility for action, not only on climate mitigation but also for justice.

Climate change as an additional burden

Air in the form of carbon emissions and greenhouses gas concentrations has not been a political priority in Louisiana and, indeed, the State was seen to be a 'laggard' on climate mitigation as the polity was infected by climate denialism (Bridges 2016, NRDC 2011, Hochschild 2016). The non-response to the matter of

climate change was, as the previous chapter argued, a response to the dominant matter of hydrocarbons. Although the issue of 'climate change' had been 'up in the air, it was not obvious when, where and how it could or would 'land' as something that a 'petro-red' state like Louisiana might seek to assume responsibility for. Climate denialism is a resistance to an understanding of air as greenhouse gas concentrations resulting from anthropogenic carbon emissions and therefore as something that might require a governing response. However, despite long-standing political resistance at the State-wide level, there has been wider understanding that the environmental conditions manifesting through air, water and land are increasingly extreme and already constitute climate impacts. The City of New Orleans published a climate action plan in 2017 stating: "climate change is not a future scenario, but a current reality" (NOLA 2017 p 9). As a long-term Louisiana resident working for a non-profit put it: "I don't need to read an IPCC report to know that it is hotter now than it was when I was a kid" (Interview 13). Nonetheless, for many people, particularly those experiencing devastating environmental challenges, climate change has arrived on top of everything else and it has not necessarily been a current priority in places of impact. In this context 'climate change' is over-shadowed by extreme concerns about the prevailing environmental conditions.

In Louisiana, with its continuing history of colonialism, racism, and the legacy of slavery, the problems of how to live with air pollution, flooding, land loss and storm damage are some of the most significant, immediate and urgent issues for residents living in these damaged areas - 'affected communities' - and their advocates. It often seemed during my research when listening to people speaking about these crises, at events and talking to them afterwards, that 'climate change' lacks salience. For local people, hurricanes, flooding and pollution are more proximately experienced as loss, destruction, ill-health, death and failed racist governance (Maldonado 2018, Horowitz 2020). As one non-profit interviewee posed: "How do you convince someone who has toxicity in their backyard to care about polar bears and ice caps?" (Interview 6). In those terms, 'climate change' has not been so obviously located in Louisiana and even climate impacts experienced locally like sea level rise, the increasing heat and force of tropical storms are an intensity in degree to already experienced environmental catastrophes and injustices and come at the end of a long list of environmental hazards. As Chief Shirell Parfait-Dardar puts it in the National Geographic documentary:

> We're dealing with all the man-made damages and now we have climate change too (Killer Red Fox 2021).

The sense that people have too much to deal with in the present to contemplate what might come in the future is reflected in a comment from a state official working on coastal affairs:

> When people are constantly recovering from disasters it is hard for them to think ahead … Tribal groups say they are constantly in recovery mode … the question is how to get beyond that (Interview 11).

As discussed in previous chapters, the plight of Louisiana's coastal, bayou and riverine people did not start with global warming, rather it is the result of misguided levee projects and irresponsible oil and gas extraction practices (Crepelle 2019). I had an opportunity in my fieldwork to understand this context more fully.

In February 2020, I was invited to a seminar hosted by the Lowlander Center at Tulane University (PO Lowlander 2020). Post-graduate students were visiting from Germany under the auspices of an educational

charity and the seminar was designed as an opportunity to share experiences and learning. On the Louisiana side, there were community representatives, faith leaders, academics and technical people and they came together in a pre-meeting which I also attended. The discussion during the pre-session among the home crowd focused almost exclusively on the extreme environmental degradation of toxic pollution and damage from hurricanes and flooding, the failure of federal and state responses, particularly after Katrina which has a long and painful legacy, and the efforts that communities have had to make to support themselves despite few resources and notably without sufficient help from government. For a number of particularly eloquent attendees these events were personally and viscerally experienced. It was apparent that the matter that required a response wasn't necessarily conceived of as climate change and indeed to do that probably wouldn't be productive as climate change had not had political traction. My fieldwork notes from the session record:

> The conversation is all about environmental damage and not about climate change. There are just too many issues affecting communities – water pollution, air pollution, land loss, erosion, flooding (Fieldnotes, February 28, 2020).

The student delegation arrived late as their previous meeting with state officials working on coastal resilience overran. As the students explained as they entered the room and took their seats, they had had a lot of questions to ask the officials. The students were invited to give their impressions of what they had seen and learnt from their visit to Louisiana so far. One of them remarked on the difference between, as they saw it, climate governing in their home country, Germany which hadn't, at that point (this was before the floods of 2021) experienced severe impacts but where climate change was accepted politically and Louisiana which appeared to show the opposite. Another student confessed that they had "not seen sinking cities before", another said "here it is so real, it's not yet in Germany." A third explained "climate change feels so abstract in Germany, people are not confronted with it, in Germany it feels far away." A fourth saw that Louisiana is focused on adaptation strategies while in Germany "we are focused on mitigation, the sources of climate change" (PO Lowlander 2020). In responding to the students' observations, a community leader at the front line of impacts summarised this distinction with clarity:

> In Germany climate change is not at the crisis level like it is here in Louisiana. Louisiana is a heavily impacted place, you're not there yet, we are, we are losing so much so fast. In Germany there is no discussion about whether climate change is real within government even though there are no seas rising at their doors. In Louisiana government signs the permits that created the problems in the first place (PO Lowlander 2020).

Someone else from the Louisiana group added:

> We are in a sacrificial zone. You could not get a worse situation. We have not yet been harmed by sea level rise as much as by the petrochemical industry's actions. We're contrary to mitigation, we're pumping carbon (PO Lowlander 2020).

The seminar took place a week after the Governor announced his climate initiative and intention to address the environmental conditions through reducing carbon yet it was only mentioned in passing. A paradox exists where a place apparently without the materiality of climate change is taking responsibility for

attempting to govern it, while another place experiencing its impacts has been struggling to do so. In Knox's (2020) framing, the students, and in their estimation, their own government, are already 'thinking like a climate' whereas the Louisianans subjected to pollution, floods and storms are 'thinking like pollution' or 'like harm and loss' where there is so much else to think about that climate change simply has to be added to the list of already existing demanding priorities.

The German students appeared to be representing the idea of thinking about matter without matter's material reality. They were comfortable with climate change as an abstraction from experience and their government had apparently assumed climate responsibility before climate impacts are realised. The state responsibility had apparently emerged from the matter that will come as predicted by climate models and scientific reports. The scientific evidence about global climate systems has been produced as knowledge, thought about, imagined and brought into politics in Germany, as the students reported and into governance in a city like Manchester, as Knox (2020) has shown. However, in other places, like Louisiana, the existing materiality of flooding, hurricanes and decadal land loss has had to be rethought of in terms of 'industrial emissions' causing 'global warming' which can then become capable of being governable. As the water and land chapters have shown, it is possible to seek to govern impacts (adaptation and loss and damage) but it has been difficult to make a political connection between the impacts and their causes (mitigation), not least because the impacts have many other causes, such as deltaic subsidence and canal dredging, as previous chapters have highlighted. It is also because, as the previous chapter showed, the state is in an accommodation with oil and exercises its responsibility through 'situated thinking' where the state is, again to borrow from Knox, 'thinking like carbon' rather than 'like a climate.'

Knox (2020) notes that predictions of climate futures call, not only for action, but for another kind of response; for a preparedness for an uncertain future that humans may not be able to change. To demand a response to this future is to ask people to engage with something that is deeply material but whose material absence or visibility in the present often seems to contradict the very messages that climate models convey (Knox 2020 p 129). As she puts it, the politics of weather reimagined as anthropogenic climate change is undeniably material but it is sustained as politics only through an ongoing engagement with a realm that is usually thought of as inherently immaterial, that is the future (2020 p 131). Though Knox doesn't expressly make this point, this predicament requires a kind of thinking *before* or *about* climate matter as impacts rather than *with* it. Instead, Knox proposes climate change as a form of thought that emerges from engagement with the matter that is responding to it (ecohomes, smart meters) showing the connection between thought and matter and consequential responses.

In commenting on Arendt's theory of 'thoughtlessness' (1963) discussed in the previous chapter, Donna Haraway (2016) through her reading of Valerie Hartouni (2012) sees Arendt's interpretation of Eichmann on trial as the inability to make present what was absent, a lack of what she calls 'response-ability.' Bringing that idea into what she calls the "geohistorical conjuncture called the Anthropocene," Haraway argues:

> In that surrender of thinking lay the 'banality of evil' of the particular sort that could make a disaster of the Anthropocene with its ramped-up genocides and speciesides come true … this outcome is still at stake … think we must!" (2016 p 36 quoting Virginia Woolf 1938/2019).

Inspired by Haraway (2016), what is needed is 'staying with the thinking.' Thinking with climate matter, or *material thinking,* requires a commitment to the material when its materiality may not be fully or immediately present or recognised as such or even, as in climate denialist politics, where it is in contention. While records of atmospheric greenhouse gas concentrations may appear remote and carbon emissions more readily manifest as toxic air pollutants, it is the materiality of matter, what is physical, visible, somatic, haptic, ingested and above all present through the experience of pollution, flooding, land loss and damaged bodies that emerge as the material effects in Louisiana. The rest of the chapter describes how greenhouse gases, though not experienced materially, emerged as matter in a relation with those effects and so became matter capable of being governed and the kind of state responsibility that emerged in response to them.

Responding to greenhouse gases

At a certain point, 'thinking like a climate' become politically salient and officials in Louisiana found it possible to speak openly about 'climate change' without the proverbial "code words and winks" often deployed by officials working for climate denial state governments (Goodell 2018 p 200). Not only could 'recurrent flooding' become described as 'relative sea level rise' but there was a political thought leap that fostered the cognitively and spatially material connection between sea level rise and atmospheric greenhouse gas concentrations and their source, industrial emissions located in the State of Louisiana. As with other US states with fossil fuel dependencies and conservative politics, the idea of climate change and doing something about it took a while to take hold in Louisiana's polity. That changed when the Louisiana governor announced the establishment of the Climate Initiatives Task Force and two years later produced Louisiana's Climate Action Plan which sets out the pathway for the state to reduce its greenhouse gas emissions, as already discussed. For an 'oil and gas state,' setting carbon emission limits is a bold move, aligning the State of Louisiana with international norms for climate mitigation. In addition to heat, storms and pollution, the air in Louisiana, now consists politically, as it has done scientifically over past decades, of greenhouse gases. The politics has apparently caught up with the science and greenhouse gases have produced the response of responsibility.

Although as recently as 2016, Governor Edwards was reportedly expressing climate scepticism (O'Donoghue 2016), by 2000 the Governor had, according to one of his officials been "on a journey" (Interview 11). The increasing environmental catastrophes have meant that the Governor's office has been in a perpetual state of disaster response and not able to be proactive. As a non-profit adviser close to the Governor's office put it: "How can you be creative and plan 10 years ahead when you're always playing catch up?" (Interview 8). As they reported, the Governor's office needed something to happen and it was felt that a consensus around it would now be possible (Interview 8). Other interviewees commented that it helped to have both a governor in his final term of office and the newly elected Biden administration's expressed commitment to climate action at the national level (Interviews 10, 12).

My interpretation of the Governor's act in launching the climate initiative is that it was less a case of Weberian charismatic leadership than of a public official being driven by the forces swirling around him to which he responds with pragmatism, more a case of Weber's 'ethic of responsibility' in governing (1919/1965). The Governor's determination to continue the governing trend of 'balancing' competing interests is reflected in his announcement that the intention is to reduce state greenhouse gas emissions "while appreciating Louisiana's economic and energy profile" (Governor 2020a). As one community

interviewee said, "the Governor is highly political … I believe he has one foot with us and the other with oil and gas" (Interview 8). While the Governor is like Foucault's ship's captain responding to all the forces – cargo, sailors, storm - affecting the ship (1991), he is also like Michel Serres' helmsman (1995) who has to adapt the intended route because of the constraints of the prevailing conditions.

Despite the 'intended route' of the climate action plan the performance of state responsibility is likely to be swayed by the stronger of the competing logics as the fossil fuel economy operates as a 'set of constraints' modifying the route so that carbon dependence is maintained within a plan to reduce carbon. As the discussion in the oil chapter about 'net zero' and carbon capture has shown, greenhouse gases are now in a *material tussle* with hydrocarbons and both are entangled with excessive water and land loss and state responses. There is also the tussle within air between greenhouse gas emissions and resultant atmospheric concentrations. These forms of matter in their profusion and confusion force political thought and produce a governance response, the running theme of this thesis.

The State established the Coastal Protection and Restoration Authority and has approved a series of coastal master plans in response to the disruptive materiality of land and water. It established the Climate Initiatives Task Force (CITF) as an explicit response to the greenhouse gases driving that disruption:

> With our Coastal Master Plan, Louisiana has led the nation in adapting to environmental change … It is time we take a more proactive stance on one of the largest drivers of that change: greenhouse gas emissions (Chip Kline, the Governor's Executive Assistant for Coastal Activities and Chairman of the CPRA, Governor 2020b).

The Governor's decision to tackle greenhouse gas emissions came from the urgent matter of multiple forces - hurricanes, flooding, sea level rise, loss and damage - affecting the State (Governor 2020b, Schleifstein 2020). According to interviewees, the extensive floods in Baton Rouge and surrounding areas upriver in 2016 showed that the extreme conditions were not just a coastal problem (Interviews 10, 11). There are more extreme and frequent weather events as well as markers such as the Mississippi River Bonnet Carré spillway being open for a record number of days in 2019 together with the fact that in the past evacuations for hurricanes were rare whereas now, they occur every year (Interview 10). The materiality of proximate harms, whether they are rapid or slow onset hazards are both a condition of and an element of the explanation for the emergence of climate politics and a governing response.

An important development in the task force's work came from the production of knowledge. The task force commissioned an inventory of state greenhouse gas emissions from scientists at Louisiana State University (Dismukes 2021) which formed the basis for the emissions data published in the Louisiana Climate Action Plan and cited in the previous chapter (CITF 2022). Through a process of calculation and recording, the majority of emissions became officially (re)located at specific sites along the Mississippi River corridor (as indeed they had long been - and been known about - Interview 15). The newly published scientific evidence, commissioned by the State government, became the knowledge that made it politically possible for governing action to be focused on those sites (see also the independent research done by Kolker and Weather 2022b referred to above and Image 20). The materiality of greenhouse gas emissions from identified sites becomes knowledge which, when combined with climate matter – land loss, storms,

flooding and sea level rise, can drive a governing response. Vanhala et al (2021) work with this idea in their research on how experiences of extreme weather brought about political knowledge enabling governance responses. A further implication of the Dismukes inventory is that the target of climate action became the source of production of emissions rather than the dispersed locations of consumption in implicit recognition of the systemic changes needed. That geographical and spatial shift – from multiple gas stations, air conditioning units and home cookers to discrete refineries and chemical plants - had an effect on the argument that it matters what individuals do in relation to their consumption. As a local journalist commented, "using less electricity or cutting down on car emissions isn't going to be enough" (Wendland 2021). The evidence of industrial contributions, when it emerges publicly from scientific calculations as a form of knowledge produced by the state, is capable of challenging and undermining the long-standing and alternative 'governing' project of responsibilising individuals.

Locating the emergence of climate responsibility

Under the then Louisiana Governor's leadership, the knowledge about the connection between environmental impacts, atmospheric greenhouse gas concentrations and carbon emissions, which in other places is either axiomatic or still denied has, in this place, become capable of being thought of politically and therefore responded to. Chapter 4, Water discussed the way that the State responded to local materialities by establishing a new authority in 2005 with statutory responsibility for coastal restoration and protection. The relation between the climate initiative and the coastal restoration programme can be seen in two ways. First, it helped make the connection between impacts and causes. As local lawyer, Robert Verchick (2016) put it, the considerable body of coastal science, particularly emanating from the coastal science centre, LUMCON, with its long experience of environmental impacts can operate as a 'cognitive gateway' to addressing climate change through mitigation action.

Second, the coastal impacts legitimise the processual route to tackling climate causes at the State level. As a coastal scientist explained to me, the climate initiative was officially done under the guise of the 'coast' as the Governor has authority over 'coastal affairs' and "that's how he justifies it … that positioning is not an accident" (Interview 2). The Louisiana Governor's climate initiative is a further illustration of the mitigation action initiated by regional, state and city authorities long-established in the climate governance literature (see, e.g., Bulkeley and Schroeder 2011). For this thesis, the Governor was creating a new role-responsibility for state climate action that had not previously been within the governor's job description but was now within its remit. Air – atmospheric concentrations and local emissions - has materialised responsibility in the state.

The Louisiana Climate Action Plan was published in February 2022 (CITF 2022). What had originally been intended as the task force's final report to the Governor, emerged in the end as a fully-fledged 'climate action plan.' According to a state official, task force members advised that a 'report' would "end up on a shelf" but a 'plan' lays out a roadmap so the officials thought they "might as well go all the way" (Interview 11). With considerable deftness the Governor's office provided space in the plan for those who wished to express dissent to any specified action, adopted by both community and industry representatives on either side of a particular proposal. This approach enabled the overall plan to receive unanimous consent from task force members, widely regarded as an achievement. As one interviewee, now at a non-profit but

formerly an energy engineer said, “everyone is proud, even industry is proud” (Interview 10). An interviewee who in other respects was critical of state government remarked:

> I will give the Governor credit. We are the only Deep South state that has a climate action plan. And that is significant whether or not the climate action plan is actually going to get us anywhere (Interview 13).

At a public meeting of the CPRA shortly after the plan’s publication, the Secretary of the State’s Department of Environmental Quality commented:

> My counterparts across the country are all in awe that something like this can happen in the State of Louisiana (Dr Chuck Brown, PO CPRA 2022).

However, a climate scientist at a non-profit was less enthusiastic saying: “It’s a step towards what we need to be working on but it’s nowhere near enough,” critiquing the lack of reference to the energy transition and the need to transfer thousands of jobs to the renewable energy industry (Interview 15). An environmental law academic commented that the LCAP, “isn’t a plan, it’s a menu of options and it could be implemented in a myriad of ways” (Interview 16).

Whatever the critique, the difficulty that Stengers (2009) describes with getting ‘nos responsables’ to take climate responsibility in the form of mitigation action had, at least in the form of the initiative and the published plan, apparently been answered for the remainder of the gubernatorial term. However, since Governor Landry took office in January 2024, the task force, which usually meets quarterly, has not, at the time of writing, convened a meeting (Governor 2024). The plan may not be implemented given the need for legislative sign-off in a state where the legislature is generally opposed to action on climate change (Interviews 11, 14) even though that may no longer be what the public supports. As local journalist Bob Marshall (2021) has pointed out, even though a 2019 poll showed more than 70% of Louisiana voters believed in climate change and a majority would pay higher taxes to address coastal issues, they keep electing legislators who don’t share their concerns and who, many of them supported by oil and gas contributions, spend their legislative time addressing the needs of industry.

Knox (2020)’s research site (Manchester, UK) is a place where officials have climate change mitigation on their agendas and are finding ways to bring it into their planning and practices. These officials are already taking responsibility for climate action whether as a present, imminent or future materiality and they seek to perform their responsibility through a variety of projects (2020 p 27). In my fieldwork site, greenhouse gas emissions appeared in the State-wide governance space and they emerged from significant material damage and the thinking that went into a political understanding that damage and emissions could now become sufficiently politically connected to permit a governance response and the assumption of state responsibility. This was both a response to the materiality of land loss and sea level rise and a response to the causes of those impacts – greenhouse gases - with the Governor’s climate initiative. The state governor created a novel role-responsibility, apparently seeking to reduce carbon emissions at their source or at least capture and sequester them, whereas Knox’s officials are working with material devices and the ways in which residents can engage with them, within their existing role-responsibilities. The former is seeking to address systemic change, a more significant endeavour, the latter, changes in local patterns of behaviour.

While Knox sees climate change as a form of thought that is embodied in materiality, I see a materiality that over a course of time produces climate change as a form of thought that at a particular moment becomes capable of demanding a response. It had not demanded a response before because it was seen to be 'too political' and was marginalised from the governance agenda, but emerging from the urgency of climate matter, it became acceptable to politics, the kind of politics that is favourable to a governance response, at least under that administration.

In Louisiana, local threats and impacts together with their proximate cause – greenhouse gas emissions - have produced a response to a global threat which has been allowed political articulation. The Governor's executive order refers to how "reducing greenhouse gas emissions can slow global warming" (Governor 2020b). The modal verb in the Governor's executive order is firmed up in the climate action plan which sets out a programme for reducing emissions because that is necessary to address global warming (CITF 2022 p 15). Serres had comparable ambitions for his helmsman whom he envisaged acting in the moment "on a local circumstance from which he counts on obtaining a global result" (1995 p 43). The Governor's initiative also acts on Hans Jonas' 'imperative' of responsibility which extends spatially from the local to the global (1984).

For Knox, 'climate change' had to change shape in anticipation of its materiality – become a matter of carbon emissions reductions in buildings (2020 p 84) - in order to become something amenable to governance. In Louisiana the idea of climate change has arrived after material reality, *ex post facto,* where the *facta* are the devastating environmental conditions and social impacts already being experienced. As a press article about the New Orleans' 2017 climate action plan noted, the city "is doing things backward by developing a mitigation plan after the fact" (Feldman 2017). Likewise, the Governor's climate initiative, three years later, was a reversal into climate change. A reversal in the sense of switching the politics from climate denialism and scepticism to climate action but also a reversal in the sense of going backwards into something. When Knox says there is no stable object called 'climate change' but an emergent shape-shifting form that has capacity to affect and be affected by what it comes into contact with (2020 p 106), I would agree with her about the instability and shape-shifting but suggest there are also places where the process can go the other way. Climate change can be brought into being and given shape by other forces, in this case greenhouse gases, which emerge in a form, emissions, that is both calculable and apparently governable. In some places, climate change is politically agentic, in others it is experienced as an effect reminding us that governing is not a matter of implementing solutions to predefined problems, but rather of the constitution and configuration of what is capable of being governed (Bulkeley 2016).

Both the task force and the action plan are ostensible assumptions by the Governor on behalf of the State of responsibility for mitigating climate change – what Bulkeley (2016) calls "accomplishing" climate governance - whatever the performance of that responsibility is likely to become. Following the discussion in the previous chapters, which introduced the idea of the *response of responsibility* to climate matter, with the climate initiative the Office of the Governor has taken a 'role-responsibility' and the climate action plan with its enumerated 'actions' represents the transition of the role-responsibility into *responsibility-as-action.* This kind of administrative responsibility is something for which the state can be held to account whether politically, through public expectation or legal proceedings. The existence of a 'plan' with its 'strategies' and 'actions' (CITF 2022 p 41) empowers and provides a lever to people outside government to call for the proper performance of this responsibility from those officials who have taken on this task. A

conceptualisation of responsibility as something demanded of government rather than of individuals (Shove 2010, Walker-Crawford 2019) has important potential for both mitigation action and climate justice. Role-responsibility and responsibility-as-action are necessary conditions for action but on their own, as discussed in the Water and Land chapters, they are insufficient because they fail to address the needs, interests and rights of affected communities; perpetuating injustice. By contrast, the climate action plan demonstrates an understanding of that limitation by foregrounding equity considerations suggesting a link between matter, responsibility and justice.

Equity in the climate action plan

Over recent decades, climate justice considerations have moved to the centre stage of the calls for climate action (UN 2024). Building on the longer history of environmental justice, climate justice is commonly understood to mean the recognition that: "Those who bear the least responsibility for climate change are the ones who will suffer the most." (Giovetti 2019 quoting Mary Robinson, see also Jamieson 2010). Using that definition though without expressly using the phrase 'climate justice,' the State of Louisiana responded to greenhouse gases and climate impacts with a plan that includes justice considerations within its proposed mitigation action described as 'equity.' Under the side-heading 'Creating a More Equitable Society,' the LCAP explains its approach:

> In Louisiana and around the world, climate change and GHG emissions disproportionately impact low-income, Black, and Indigenous communities. These communities are the least responsible for emissions but bear the highest costs in health and environmental degradation (CITF 2022 p 36).

This statement centring impacts on people contrasts with the State's Coastal Master Plan which is critiqued for not being sufficiently people-centred (Colten 2015, Interviews 8, 13) and to the federal Army Corps of Engineers who address the impacts of sediment diversions on local people after those on fish and birds in their impact statement (Corps 2021). In the LCAP, the State is expressly including 'equity' considerations in its programme of action:

> By deliberately considering climate equity at the forefront, Louisiana's Climate Action Plan aims to ensure that the costs of mitigation or adaptation actions do not to fall unequally on the already disadvantaged, and that the opportunity to advance climate mitigation and adaptation addresses long-standing inequities while promoting new opportunities for a more inclusive, low-carbon economy in the future (CITF 2022 p 37).

In this iteration, 'equity' is framed as a challenge to inequity but also as an opportunity for improving human outcomes (Humphreys 2023). Many interviewees gave the Governor and his administration credit for the inclusion of equity "at the forefront" of the climate action plan (Interviews 10, 13, 14, 15, 16). However, some were sceptical about the extent to which it would be implemented or even whether the State was taking equity seriously (Interview 16). A balance between consideration of equity and the interests of industry was established within the process with task force membership including equity and Indigenous people as well as oil and gas people (Interview 8) and the establishment of an equity advisory group (alongside industry advisory groups) (GOCA 2021). During the two-year process of the task force's work programme, community groups and policy advocates challenged the State to take responsibility for

communities as much as for industry, because, as one interviewee put it, "it does it for industry a lot" (Interview 12). The State created a more meaningful balance between the interests of communities and industry in the process – both had advisory groups – and in the process by allowing the voices of both in the contents of the plan. The framing of 'equity' in the plan also went further than other comparable iterations in other US governing documents.

As at February 2022 when the LCAP was published, the US Environmental Protection Agency defined environmental justice as follows:

> Environmental justice is the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income, with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies (EPA 2022).

The Corps use the EPA definition in their draft environmental impact assessment of the impacts of the proposed Mid-Barataria sediment diversions on riverine communities discussed in Chapter 5. The EPA definition echoes Rawlsian notions of fair equality of opportunity (1971). By contrast, the equity advisory group developed the following definition of 'climate equity' for the Governor's task force which includes historical harms, accountability and equality of outcomes and it was this framing that was included in the plan:

> A people-centered approach to addressing the global climate crisis through action that seeks to achieve long-term equality of outcomes by acknowledging institutionalized harms to historically marginalized people and communities and by holding accountable those who benefit from the root causes of climate change that disproportionately impact the most vulnerable (CITF 2022 p 131).

The word 'equity' is then further defined in terms that foreground 'justice' and the need for adjustments to imbalances:

> Fairness or justice in the way people are treated, recognizing that we do not all start from the same place and must acknowledge and make adjustments to imbalances. This can be achieved by expanding access to opportunity, quality of life and prosperity (CITF 2022 p 131).

The LCAP definition resonates with the Biden administration's statement on environmental justice, which is stronger than, and arguably ahead of, the EPA definition. It states its recognition that "too many communities" have born the "brunt of toxic pollution" and "disproportionate exposure to the impacts of climate change" requiring that justice considerations be addressed in applications for federal funds under the Infrastructure Law (White House 2021). As the state official told me, the fact that "Biden is pushing on climate equity" (Interview 11) reportedly gave political cover to his Democratic counterpart in the Governor's office in the State of Louisiana.

The LCAP definition goes beyond existing procedural policy framings of justice as fair treatment and participation towards substantive outcomes for affected communities. As one policy adviser interviewee commented, "we are no longer in the equal opportunities conversation, we're holding ourselves accountable for outcomes" (Interview 12). Another interviewee noted that the acknowledgement of historical harms opens up the possibility of steps toward "remediation and reparation, even though the definition does not use those words" (Interview 13). In 'justice' terminology, there has been a move from

procedural to distributive and reparative (Táíwò 2022). I was trying to make sense of the way in which definitions and understandings are evolving and the significance in the field of the distinction, if any, between 'equity' and 'justice' so asked interviewees about that. One policy expert interviewee was clear about where priorities lie:

> Terms like equity and justice are in flux. We need to get out of the entanglement of language and get agreement about results" (Interview 12).

This emphasis on results is reflected in the wording of the LCAP which states:

> … an equity advisory group was formed to specifically consider the potential outcomes of policy proposals for advancing or negating progress toward a more equitable society ... and [it] evaluated the potential impact of climate actions on the three equity-centered fundamental objectives aimed at reducing disparities, addressing historic and structural inequities, and increasing participation for Black, low-income, historically marginalized, and Indigenous peoples across Louisiana (CITF 2022 p 36).

A policy adviser close to the process reported that the equity advisory group reviewed existing definitions of equity across the country and emphasised that it shouldn't be theoretical, it must be practical and embedded in all processes so that meetings involving industry and finance were conducted with an equity lens (Interview 12). They explained that the way to do that was to present equity data and require that it be treated on a par with industry or emissions data providing an opportunity for a different kind of governance model in which government investment and support are not only for the private sector but also for communities (Interview 12). A state official reflecting on this process commented that having environmental justice leaders at the same table as industry had never happened before in the State of Louisiana, "it wasn't the most successful but it was the first time" (Interview 11).

In this conception, 'equity' in the climate action plan moves on from the recognition statement that is the foundation of the climate justice definition quoted above. It becomes something that is practicable and capable of being implemented. Whether that happens or not is the important question for Louisiana. As an interviewee close to the process opined, "it's an awesome definition but the devil is in the implementation, it has to be operationalised" (Interview 16). And of course, there has been the change of direction with the election of the new governor which interviewees anticipated. Comments at the time (during 2022) included the risk that a new governor could either "obliterate" the plan entirely or remove the equity provisions from it though there was a sense that there was now momentum with the plan and there would be a backlash if equity were taken away (Interviews 10, 11, 16). For this thesis, the inclusion of equity considerations in the plan reveals the potential for the state to take responsibility for equity, a form of state response that goes beyond mere 'action' and towards 'justice.'

State responsibility for 'equity'

Equity and justice, like responsibility, emerge from the force of matter with political and governing effects. Greenhouse gases opened up a space not only for State responsibility-as-action but for communities and advocates to pressure the State to redefine responsibility for climate action to include justice considerations, the strongest form of *climate responsibility*. Equity, therefore, is no more theoretical than

responsibility, both emerge from the urgency of matter as arguments, techniques, processes, plans and practices that are claimed, enacted, ignored or resisted; and when resisted can be challenged. As the evidence shows, these practices are located and produced in the places where injustices occur and where claims for justice are made, an axiom in line with Clive Barnett's theory of justice (2017). The question is how and where to locate the emergence of justice considerations. One source is with state officials working within state institutions.

Although this research considers the assumption of responsibility by public authorities as organisations (within a 'governing practices' and 'state effects' ontology, Foucault 1991, Mitchell 1991), that is doubtless influenced by the way in which individuals within those institutions see their own role-responsibilities. Interviewees were clear that the inclusion of equity in the LCAP came "from the top" and also credited the officials in the Governor's office for carefully listening to equity advocates (Interviews 10, 13, 14). The Governor, the officials, the people sitting on the task force, committees and advisory groups have apparently answered Kyle Powys Whyte's call for policymakers, planners, scientists and professionals who work within institutions, who, because they have some capacity to make changes within those institutions are "*responsible to do what is in their power to seek"* to make changes where they can (2013, emphasis in the original).

Similarly, for Iris Marion Young, her 'social connection model' of responsibility means that people who "act within unjust structures have a responsibility to try to make them more just" (2011 p 180). The notion that individual officials or other people working within public institutions have a particular responsibility raises interesting questions that are only touched on in passing here. Employees have responsibilities under their assigned roles. These are administrative but the suggestion from Whyte and Young is that they should do more than that because they have a moral responsibility to act, possibly beyond their job description. There is well-established literature on what officials do in practice when implementing policy and how they respond to challenges, particularly at the 'street level' (Valverde 2012, Lipsky 1980 and 2010). An apposite study comes from Nina Hall (2016) who explores the circumstances in which officials decide to extend their mandates but she does so without considering the question of responsibility. These intriguing questions are outside the scope of this thesis.

Equity in the plan did not emerge, however, because of the sympathetic positions of some state employees. As interviewees from the community and state confirmed, it was achieved through the commitment, data, organising, intervention, advocacy and persuasion by and from community leaders, justice advocates and policy experts who made the equity case to which the State responded (Interviews 10, 13). The state official confirmed that, in response to the advocacy, the Governor's office appointed community representatives to the task force membership, established the equity advisory group and encouraged a process that incorporated the concerns of equity as well as industry stakeholders (Interview 11). The officials reportedly adopted a process of listening to and being influenced by public comment and grassroots activity (Interviews 10, 13). According to the state official, it is the result of it being a people-centered process that there is a people-centered perspective in the plan (Interview 11).

In Chapter 4, Water, I discuss the way in which the Coalition to Restore Coastal Louisiana brought together the range of interests advocating for coastal restoration. That initiative, together with the matter of excess

water and land loss, played a significant part in producing an exercise of state responsibility: the establishment of the Coastal Protection and Restoration Authority and the coastal master plans. The focus there was principally on the environment and 'saving' the coast and although the advocacy was strong it was not political in the sense of challenge and contestation and, as a community protagonist explained, it was achieved in accommodation with the oil industry (Interview 9). By contrast, the LCAP was influenced by the collective action of the climate justice community arguing for a recalibration of the policy agenda in state policymaking. This is an expression of what Bonnie Honig (1993) sees as the emancipatory potential of political contestation and the disruption of settled practices.

While greenhouses gases were the matter to which the State responded with a plan for *action*, it was justice advocates who pushed for and succeeded with a formulation of state responsibility for *equity.* A politics of collective empowerment producing a state responsibility that is called upon to recognise and respond to that empowerment, is a long way from the flattening effects of 'responsibility-as-action' or 'responsibility as care' with its paternalistic tendencies focusing on 'needs,' discussed in Chapter 5, Land. Unlike the anti-political regime of sediment diversions discussed in that chapter, politics has been opened up and state responsibility is expressed, and potentially performed, differently and with progressive potential. Responsibility within the state is apparently not only *for* oil and industry interests but, mediated through the force of greenhouse gas emissions and collective action, potentially *for* communities. Although not explicitly framed as a 'rights' argument, perhaps because proponents thought that would be a step too far, the reference to "holding accountable those who benefit from the root causes of climate change" (CITF 2022 p 131) within the definition of 'climate equity' situate it within an assertive rights-based discourse and speak to Chief Parfait-Dardar's call to "get some accountability and responsibility going" (Killer Red Fox 2021).

The practice of collective action politics - advocating, engaging, listening, thinking and influencing - when leveraged on the state can produce a response from the state to the calls that are made on it. Scholars have drawn on Jean-Luc Nancy's 'collective ontology' that asserts a 'being-in-common' or 'being-with' which encourages the construction of 'collectivities' that increase people's capacities to act and which act as a riposte to the 'individual' of liberalism (Braun and McCarthy 2005 p 808, Popke 2009 citing Nancy 2000). As explored here, political spaces can be opened up where individuals voluntarily organise themselves to act collectively in order to put pressure on the state, to seek to turn the 'conduct of conduct' on its head by persuading the state to take responsive action which is more aligned with justice objectives. As Goodhart (2023) argues, the 'social practice of responsibility' among the collective is *made* through political processes of negotiation and struggle. The extent to which the achievement of the equity advisory group was informed and aided both by the history and experience of mobilising for environmental justice from decades of fighting against pollution and racism in Louisiana (see, e.g., DSCEJ 2024) and the process of bringing community advocates into state processes through the equity advisory group, which is a live question in the literature (Stears 2013, Riofrancos 2024) but beyond the scope of this thesis. The relevant question for my inquiry here, as it was in the Water chapter, is what kinds of state responsibility emerge out of material conditions when individuals voluntarily come together and act collectively.

The scholarly focus on 'collective responsibility' has been on the *duty* of individuals to gather and act together, particularly the compelling work of Hannah Arendt (1968/2003), Iris Marion Young (2011) and Vanesa Castán Broto (2013). In arguing that individuals have a responsibility to act collectively these

scholars attend to places in civil society where the political action is being generated, what might be called the 'demand side.' Whilst both empowering and essential for the practice of democracy in action (as the efforts of the climate equity advocates illustrate), I note two implications. First, their arguments are framed as a duty on individuals which I resist, not only for the reasons already provided (in Chapter 1) but because of learning from the field that communities in Louisiana are already doubly burdened; from the losses caused by industry and its infrastructure and from the "burden … on communities to figure out what to do" (PO SOC 2021). Second, and more relevantly given my focus on the state, is that their notions of collective responsibility, like an intransitive verb, are in my opinion insufficiently theorised in terms of engaging an object. My argument is that the political action of a group of people, when seen more like a transitive verb, can also be theorised as something that is directed at an object on the 'supply' side, namely the state. There has been insufficient engagement from these scholars of responsibility with the role of the state and the relation between *demand* and *supply*.

As discussed in the literature review, Young is sceptical of the state in conceptualising shared responsibility. Her acknowledgement, following Goodin (1995), that the state should step in when it is no one's assigned task to address problems is exemplified by the Louisiana Governor assuming a role-responsibility for climate action in launching the climate initiative and delivering the action plan. Likewise, her acceptance that the state may be the "best or only way" to redress injustice is evidenced by the inclusion of equity considerations in the plan. However, Young does not consider the implications for the state or alternative conceptions of responsibility when the assumption of a moral duty (something must be done about injustice) is turned into a role-responsibility (the state now has an obligation to do it). Instead, she argues that "the state's power to promote justice depends to a significant extent on the active support of its citizens in that endeavor" (2011 p 169).

I make three points in seeking to extend Young's argument from the evidence of equity considerations in the climate plan. First, when she refers to the state's "power to promote justice" I argue the value of theorising the way in which the state is taking responsibility which shifts from a response to the matter it is dealing with to a defined responsibility. Second, although she does not regard state institutions as "distinct actors independent of us" (Young 2011 p 112), the assumption of role-responsibility is 'distinct' in the sense that it is required to take effect through administrative and statutory state mechanisms, public expectation and avenues of accountability. Third, when she rightly says that government policy to promote social justice usually requires the "active support of its citizens," I would go further and say that community action can be supportive, as the role of non-profits in the establishment of the CPRA showed or it can be challenging and yet constructive as the role of the equity advisory group in the LCAP shows.

The evidence suggests that it was the latter approach which produced the commitment of the state to take responsibility for equity in the climate action plan. However, further research is needed to better understand the relation between collective action and the response of the state and the factors involved which can contribute to current debates about the role of citizen action in pressuring the state to take action for justice and the way that can be achieved (Táíwò 2024, Riofrancos 2024). For present purposes therefore, rather than debate whether individuals have a responsibility to pursue collective action, contra Arendt and Young, my argument is that if and when they do, the evidence shows that there can be effective outcomes (see Riofrancos 2020 and Bosworth 2022 for recent examples). To that extent, these empirical findings further support the contentions and research of scholars like Táíwò (2024) and Riofrancos (2024)

who argue the necessity of the state in climate justice action. However, they focus their attention on the role and types of citizen action rather than on the nature of state responsibility, the subject at issue here.

Conclusions

This thesis has concentrated its attention on the relation between matter, the state and responsibility but appreciates the role and influence of other actors, the oil industry in the previous chapter and community advocacy in the Water chapter and this one. In this thesis, I do not propose 'leaving it all to the state' as Young was concerned about. Rather, I argue for a conceptualisation of responsibility that recognises first that the state will assume responsibility for matter calling for its attention and second that the nature of that responsibility can be claimed and negotiated within the institutions and processes of the state. As I hope to have made clear, see *passim,* in interrogating the different forms of responsibility of the state, I am not suggesting that the state is a benign force but that it is a force with authority, resources, power and responsibilities which is in the habit of responding to the material demands on it, frequently from industry and vested business interests but also community advocates when a political space opens up as this chapter shows. However, this chapter is not suggesting that the state will succeed in achieving equity or justice objectives if and when they appear on the governance agenda. Even without the election of the new governor, the tension between industry and communities – between oil and greenhouse gases – between hydrocarbon governmentality and responsibility for equity - would further emerge if the plan were to be implemented.

From the perspective of material politics, it was the matter of greenhouse gases and their relation with the climate impacts on water and land that led to the Governor's climate initiative. While the climate action plan seeks to accommodate oil with plans for carbon capture, as the previous chapter described, that project has become saddled with the need to be 'responsible.' As this chapter shows, air is the mechanism whereby oil comes into a reckoning with greenhouse gases and air in the form of pollution, storms and heat. Air is also where communities come back and have a voice, a voice that was lacking or marginalised in the previous two chapters allowing for the potential alignment between the kind of responsibility for equity emergent here with notions of *responsibility-as-reciprocity* (Kimmerer 2013, Whyte 2013), discussed in Chapter 5, Land. Air as greenhouse gases together with climate impacts and community advocacy have shaped the response of the state creating new forms of responsibility. State responsibility is not necessarily limited to taking on the job – *role-responsibility* – and the governing practices in pursuit of that role – *responsibility-as-action* - but it can emerge as a Deweyian instrument of democracy, something that is demanded by citizens and acted upon by the state, however imperfectly. Air has materialised the potential for the state to undertake climate responsibility for justice but the forces of water, land, oil and air are unstable and shifting and their future relations are uncertain.

Chapter 8: Conclusions

Understanding climate responsibility

Earth is "quaking" as it is "being transformed by our doing" (Serres 1995 p 86). In what Serres calls the third "Cartesian act," "*we ourselves … depend, and increasingly so, on things that depend on actions that we undertake"* (2006 emphasis in the original). Yet, like Goya's duellists oblivious of the mire (Serres 1995), humans are not yet implementing commensurate responsive action. Nation-state mitigation efforts remain insufficient to reach the Paris Agreement goal of limiting global temperature rise to 1.5 degrees Celsius by the end of the century (UNFCCC 2022). The United States is not only responsible for the highest cumulative level of emissions among nations but, as environmental lawyer Gus Speth (2022) has meticulously charted, since the middle of the last century successive US administrations have had both clear evidence of global warming and pathways for commensurate responses yet still failed to act. Meanwhile, studies - and this research - show that state agencies do respond to material conditions in their localities, whether attributed to climate change or not. As the materiality of climate impacts increases, so will the response of states, whether local, regional or national.

This thesis shows how the state responds to the demands of climate matter - in Louisiana water, land, oil and air; in other places heat, drought and fire – and how those responses become practices of responsibility. Prioritising the matter of oil may be irresponsible in the climate changing world,[13] yet state authorities are also responding to climate impacts through the assumption of responsibility for mitigation, adaptation and loss and damage. The research shows that this type of responsibility goes beyond ethics to practice and is based on the state's role. This practice of responsibility heeds Derrida's distinction between *répondre à,* a response or responding to, and *répondre de,* answering for and being responsible for (1990). My argument is that state responsibility is important because of the potential for "get[ting] some accountability … going" (Killer Red Fox 2021) - whether that can be realised in practice or not.

My contention is that responsibility as the *job* of governing authorities has been under-theorised. Recent work in material politics, more-than-human geography, anthropology and new materialism has entered the thought space of the climate and ecological emergency responding to it in different ways. However, while such emerging approaches have addressed the political significance of matter or the relation between matter and responsibility, the emergence of forms of state responsibility from matter has been overlooked. Bruno Latour writes of a lack of responsibility associated with the "rampages of the moderns" and their:

> … fabulous energy, inventiveness and creativity. They are no longer held by any constraints, any responsibility (Latour 1999 p 288).

Preoccupied in his later work on the 'new climatic regime' under which "nature is active and humans inert" in a "reversal of agency" (2017 pp 73-74), Latour does not theorise responsibility in terms of the state. Instead, in one of his last works, he muses on what seems like a personal burden for its protagonist:

[13] Recent industry data analysis reveals that under the Biden administration, the United States issued 20% more oil and gas licences than under its predecessor (Milman and Lakhani 2024) resulting in the US producing more crude oil than any nation at any time over the past six years (EIA 2024). Louisiana plays an essential part in the continuing national fossil fuel economy.

> Even with the water falling from the clouds, he has the unpleasant feeling he's somehow responsible for seeing that it arrives … (Latour 2021 p 1).

Likewise, Jane Bennett (2010), who goes further than any other thinker on the connection between the eco-emergency and political responsibility, falls back on an ethic of individual action. By contrast, Isabelle Stengers turns her sceptical gaze on 'nos responsables,' those who are – or should be - responsible for us, and, like Latour, is scathing about what she sees as an absence of responsibility for climate action (2009, 2015) without analysing the concept. However, in her earlier work which has been influential on material thinking she identifies a 'reciprocal recognition' in the interaction between human and nonhuman entities (2005) which helps me theorise the observable evidential progress from response to responsibility. Also privileging relations with the more-than-human world, Donna Haraway (2008, 2016) sees responsibility as something that can be enacted positively, calling for a 'response-ability' which involves a 'sym-poesis' or 'making together' as a route to 'becoming' and living together in the world. This way of thinking in Western literature aligns with (though, as Zoe Todd (2016) and others argue, insufficiently gives credit to) literature from Indigenous scholars who define responsibility as both relational and reciprocal (Whyte 2013, Kimmerer 2013/2021).

One way that material thinking has addressed the question of state responsibility has been obliquely via the metaphor of the ship captain (Foucault 1991, Serres 1995, Latour 2017). After all, the captain is a figure with responsibility to sustain the passage of a ship in the face of fluctuating and powerful material forces which stretch the limits of human control. The ship's captain does not just need to consider the strength and behaviour of an isolated nonhuman actor, but the properties of a system or environment in which they are entangled. Borrowing from H L A Hart's taxonomy (1968), I have empirically explored and expanded the concept of 'role-responsibility' in investigating the tangled relation between forceful matter and governing responses in the state of Louisiana.

Coastal Louisiana is home to oil and gas extraction, refining and distribution and a site not only of extreme pollution but also land loss, flooding, hurricanes and sea level rise. Louisiana is a place where matter is vibrant, unstable, recalcitrant, hazardous and often deadly. It bears collective witness to the interaction among and conflict between these forces and their relation with state responses, what I see as a *material tussle.* As the locus of Hurricane Katrina, exemplifying the 'barbarism to come' (Stengers 2015), it is a place where the question of state responsibility is particularly acute. While trust in government is low in Louisiana, the governing authorities are expected to, and do, respond to the material conditions (Hochschild 2016). As the evidence shows, it is the proximity and severity of impactful matter that catalyse the response and the response is the precursor to the assumption and practice of state responsibility.

This thesis has shown how various state authorities in Louisiana have taken responsibility for managing water, resisting water, restoring land, jeopardising land, protecting oil and gas interests and latterly, seeking to accommodate all those material forces in what may turn out to be a short-lived project to reduce carbon emissions to 'net zero.' What is observable and remarkable in Louisiana, which has until recently been regarded as a 'laggard' in climate mitigation action (Bridges 2016, NRDC 2011), is that adaptation and dealing with loss and damage arising from environmental and climate impacts are prioritised before reducing emissions, the preventative action. In arguing the relation between climate matter and state responsibility, it is acknowledged that in other jurisdictions it is the threat of climate impacts that drives

state mitigation action (PO Lowlander 2020). By contrast, in Louisiana, the already existing materiality of flooding, hurricanes and land loss, which has existed before more recent climate impacts, is catalysing the state response. The relation between matter and state responsibility can exist whether it is understood as threatened or as experienced.

Seeking to resist the pitfalls of anthropocentrism (Valverde 2017, Yusoff 2018), the study adopts a 'material politics,' 'more-than-human,' 'governing' and 'state effects' perspective (Barry 2013, Whatmore 2002, Foucault 1991, Mitchell 1991). It follows scholarship that understands matter as active, relational and capable of being political (Braun and Whatmore 2010, Barry 2013, Dittmer 2017) where 'politics' can be both a process of, as Bruce Braun argues, 'how things get determined' (2011) but also as struggle and contestation (Mouffe 2002, 2005, Honig 1993). I argue that matter can produce, enable and disrupt not only structures of power but also forms of responsibility within state authorities.

By exploring the relation between matter and state responsibility, this thesis has sought to expand existing thinking on the relation between materials and politics. The purpose is not just to show that material effects produce state responsibility but to understand more about how the relation between matter and responses emerges and how that relation is constitutive of both forms of state responsibility but also forms of the state itself. These forms need then to be interrogated to understand what matter produces what forms of responsibility, who it is exercised for and who is excluded. The thesis also shows how different forms of action from an engaged public and affected communities result in different forms of state responsibility ranging from managerial and manipulable (as seen in Chapter 4, Water and 5, Land) to the potential for accountability and justice (as seen in Chapter 6, Oil and 7, Air).

This thesis provides an alternative theoretical account of responsibility from those outlined in existing scholarship on matter, governing, responsibility and climate action. I build on existing literature in material, political and governing geography proposing the relation between matter and state responsibility in a manner that goes beyond Foucauldian accounts of governing practices, known as responsibilisation. This has been both a geographical project of locating responsibility in matter and place but also a political project of attending to the way in which state authorities respond to different kinds of matter. Just as the matter is more or less unstable so the state exercise of responsibility is contingent and dependent on the way in which matter makes demands on the state to respond.

As a counterpoint to scholarship on climate action as an ethical imperative, the thesis argues the value of theorising state 'effects' and 'practices' as a series of responses to matter which may produce a 'role-responsibility' with associated accountability and opportunities for climate justice praxis. In this endeavour I engage with climate scholars' increasing interest in notions of climate responsibility as 'practice' as well as wider scholarship on responsibility 'as justice.' With this empirical and theoretical journey, the thesis leans towards a definition of *climate responsibility* consisting of governing responses to climate matter which include mitigation, adaptation, loss and damage and justice.

In the following three sections, I synthesise the research findings and present the concluding arguments through the narrative arc of the thesis. In the first empirical chapter, I showed the relation between matter, response and state responsibility and how civil society may assist the state in its performance of responsibility (Chapter 4, Water). In the succeeding chapters, the research goes on to reveal different modes of state responsibility practices emerging from different kinds of matter including the way in which

the state undertakes responsibility as *action,* particularly through infrastructure (Chapter 5, Land), how the state responds to dominant matter like hydrocarbons and its infrastructure (Chapter 6, Oil) and its response to atmospheric greenhouse gas concentrations through a plan to reduce carbon emissions (Chapter 7, Air). A key finding of the research is the instability, not only of the forces, but also of the emergent forms of state responsibility which, I argue, provide opportunities for civil society and frontline communities to intercede and interact with the state in formulating its responsibility. In the final section, I conclude with questions for further research on the relation between matter and state responsibility for justice.

A materialised state responsibility

In coastal Louisiana, the material realities of excessive water (river flooding, storm surge and now sea level rise) are forms of matter that have come to demand state attention. In Chapter 4, Water, I address the relation between matter and response*,* focusing on how the governing authorities respond to the materiality of the crevasse at Neptune Pass. The establishment of the Coastal Protection and Restoration Authority (CPRA) shows how the response has the capacity to become a responsibility - what I describe as a *materialised responsibility* in the sense of being brought about and as being derived from matter. The CPRA has a mandated responsibility to protect and restore the coast and its effects can be seen in a series of projects, master plans and practices, like barrier island restoration, marsh planting and sediment diversions which constitute a collection of responses to coastal erosion and land loss. This *response of responsibility*, which is functional and administrative – the *job* that the state is tasked to do - corresponds with 'role responsibility' (Hart 1968) and 'task-responsibility' (Baier 1972/1991). This connection between climate matter and state responsibility seeks to introduce the notion of climate responsibility being a 'role' of governing authorities into the climate responsibility literature.

Although the failed responsibility and lack of accountability of governing authorities before and especially after Hurricane Katrina is notorious (Bakker 2005b, Colten 2009, Horowitz 2020), the interaction between climate matter, other forms of matter, materials, infrastructure and technologies in the environmentally devastated areas of coastal Louisiana has produced governing techniques and plans that constitute forms of responsibility from state authorities. This thesis' answer to the first research question on the relation between the materiality of the climate changing world and state responsibility is that matter is capable of producing state responsibility. This finding sits as a complement to empirical research on the establishment and entrenchment of state power from matter (Swyngedouw 2015). As climate impacts increase, the relationship between the state, technology, infrastructure and the climate matter, whether in the form of flooding, hurricanes, drought or wildfires, is more a manifestation of state responsibility in relation to this matter and less about state power and control over it.

Material politics is an empirically grounded conception that nonhuman things, technologies and techniques can have political effects. Objects like pipelines, fishing piers, oysters and trees are key to understanding political responses in Louisiana, especially how they interact with governing and whether they are enrolled in it, resistant or bear witness to it. My own conclusions about the empirical evidence observable in coastal Louisiana have been that these and other objects, while contingently political, are refracted through the underlying forces and elements that they connect with and to which the governing authorities respond. This is not surprising as water, land, oil and air are increasingly the stuff that state authorities have to deal

with in a climate-changing world. I argue that these forces are as significant to material politics theory as the more discrete objects, materials and technology typically found in its scholarship. Particularly so, as matter, with its fuzzy boundaries, is in correspondence with the contingency and instability of political responses.

One of the most influential accounts of the relation between matter and responsibility is developed by the political theorist, Jane Bennett. However, her search for 'eco-responsibility' (2010) is disappointing politically and normatively because of her position on the distribution of agency within a network or assemblage. She is unable to find that human actors have any particular responsibility; likewise, Latour (1999) and his observations about responsibility being shared among the human and the gun as both are 'actants.' In pursuit of my second research question on the tension between distributed and unified responsibilities, I investigated the relations within the material tussle of elements, forces, matter and governing practices and found a two-stage process. Rather than emphasising circulation and entanglement which suggests aleatory endeavours, my findings from the field suggest that actants in a network (Latour 2005) are in a relation not only of contingent co-production but also response.

As I argue, particularly in Chapter 5, Land, these forces are sticky, adhering to other matter or peeling off, rather in the way A N Whitehead considers where Cleopatra's needle begins and ends and whether the London soot and dirt are part of it (1920/2004). This stickiness can lead to *chains of responses* with discernible outcomes, as one encounter (industry-dredged canals) leads to another (salt water intrusion) and another (land loss) and another (the establishment of a state agency to protect and restore land) and subsequently formal designations of state responsibility. These findings lead me to conclude that the state can be distributed in its effects and practices at the same time as being centralised and whole in its responsibilities.

However, these chains of responses are volatile and unpredictable. There are also the clashes among actants as they struggle seeking an unstickiness from other forces and release from the chain, such as the intended 'seamlessness' of hydrocarbons described in Chapter 6, Oil. This struggle may be among the forces: water and land, hydrocarbons and atmospheric greenhouse gas concentrations as well with the state as evidenced by its differing responses. These responses may evolve into a 'role-responsibility' for governing authorities, what Bennett (2010) conceded might be a 'task force.' This 'role,' and the way in which it is constituted and produced by matter, emerges from observations about the material conditions that the ship's captain (Foucault 1991, Serres 1995) or Tolstoy's general (Latour 2017) are required to address.

The evidence also shows that the performance of the state's response responsibility is not exclusive to the state. Chapter 4, Water, analyses how the CRCL, the locally-based non-profit which strongly advocated for the establishment of the CPRA as the responsible state authority, is not only aligned with its objectives but undertakes, through volunteers, to perform aspects of its mandated responsibilities. I see this as a familiar form of Foucauldian governmentality of the individual, one aspect or vector of state responsibility in action.

State responsibility in action

Through investigating various expressions of state responsibility, Chapter 5, Land addresses the third research question – how state responsibility manifests in practice - by revealing the consequential

limitations of the 'role-responsibility' model. The responsibility *for* restoring and protecting the coast *by* the CPRA appears as an expression of Benthamite utilitarianism *for* the citizens of cities, towns and other places away from the coast, for the nation's energy security and consequentially for the profits of fossil fuel companies and political donations. However, the evidence shows that this responsibility is insufficiently *for* the people who live there and their way of life. Responsibility *for* has discriminatory potential as the way that the state exercises responsibility is evidentially *contra* those who most need it to take responsibility and protect them from pollution, storms and the rising seas. It's an administrative responsibility which means it involves state function and accountability but it is a bare responsibility. Foucault takes things further than Hart's simple taxonomy when positioning his ship's captain in relation to all the competing forces affecting the ship. This is a valuable theorising of the interaction between matter and humans but to understand that the captain is in relation to all the pressing matter, does not assist with understanding the nature of the response that is required or demanded. The relation is the condition not the explanation of the response.

The research investigated state agency action at Isle de Jean Charles and Island Road and the consequences for hamlets like Grand Bayou Village of the proposed sediment diversion project. These findings show that the intersection between land, responsibility and infrastructure can produce forms of state *responsibility-as-action* which may be both selective and exclusive and contested and harmful. The kind of administrative or role responsibility that I have been discussing is necessary but insufficient as it risks being discriminatory and exclusionary. The practice of responsibility as action avoids more productive and inclusive modes of responsibility as one of relation invoking reciprocity and mutual respect. Rather than seeing responsibility as *by* and *for,* Whyte (2013) characterises reciprocal responsibilities as not only *by* the participants but also *of* them by virtue of their roles which lays down an expectation of how those responsibilities will be undertaken. The accountability is critical but Whyte is arguing a point *ex ante*, it is the way that the responsibility is exercised that matters, not just the potential to hold to account afterwards.

Another way of understanding state responsibility in action in Louisiana is in relation to oil. Here, the response is quite different from that observable in relation to the case studies in the Land chapter. The importance of hydrocarbons to the state's economy, local people's livelihoods and to the nation's energy needs and the embeddedness of these interests in the local society and culture means the governmental response to oil has largely been one of accommodation. There is a zone of compromise in which the state has been protecting the sources of climate change from the need to mitigate its effects. Oil is matter in which certain kinds of politics in Louisiana are directed in favour of its continuation and defence from challenge. Following Mitchell (1991, 2011), the state's practices of enabling, supporting and protecting oil are revealed.

While my findings accord with Mitchell (1991) on the lack of boundary between oil and the state and others on the 'carbon capture' of the state (Táíwò 2024), they also show how the question of responsibility has been inverted and subverted. As argued in Chapter 6, oil is matter controlling the state under a regime of *hydrocarbon governmentality* in which the state is itself effectively *responsibilised* by the force of that matter, *contra* understandings of Foucauldian governmentality as emanating from state practices and leveraged on the population. However, although oil is embedded, powerful and controlling its infrastructure is isolable and vulnerable requiring protection from the effects of its own activities producing a *residual responsibility* from the state. While it appears that oil is smothering other matter

through its 'marriage' with politics, shrimp, jazz and the New Orleans Saints, yet climate impacts are 'reminding us of their presence' (Serres 1995) and challenging that hegemony. The likely outcome of the tussle among forces remains unclear. On the one hand, as Chapter 6, Oil revealed, through *situated thinking* that decarbonisation can be achieved with carbon, the State set out proposals to facilitate carbon capture and sequestration within its Louisiana Climate Action Plan. On the other, following successful advocacy, the plan includes the requirement that CC(U)S be 'responsible,' establishing an explicit and apparently new relation between oil and responsibility (CITF 2022).

Towards state responsibility for justice

The Louisiana Climate Action Plan is the location – and current encapsulation - of the planned exercise of state responsibility in response to the matter of water, land, oil and air. The Plan brings oil into explicit relation with climate matter. While it was politically possible to keep oil separate from 'climate change' by arguing that the latter concept is controversial or even leftist while oil is about the economy, jobs and energy security, when oil and climate impacts become physically and politically connected, those relations can coalesce in responsive governance programmes. Oil became capable of being thought of, in this oil and gas state, as another matter entirely: greenhouse gases and carbon emissions. Rather than 'black gold,' combustible oil also became a force threatening the territory of the state and, by extension, the planet. With the former Governor's climate initiative, the State was apparently inhabiting a zone of ambition and assuming a role-responsibility for climate mitigation action.

Climate responsibility has materialised from a series of encounters between rising sea levels, land loss, extreme flooding, hurricane damage and atmospheric GHG concentrations. However, these state effects are more emergent from matter than in control of it as, for the time being, hydrocarbons continue to dominate state responses. As Serres observes, the helmsman's "route can be traced through the set of constraints" to which they are subject (1995 p 42). In the puzzle as to whether climate responsibility will prevail over hydrocarbon governmentality in the struggle between the competing materials is the political reality of the new gubernatorial administration in Louisiana which has made clear its priority to expand the oil and gas industry (Jones 2024, Feb 14).

At the time of writing the future of Louisiana's Climate Action Plan is not known. Whatever the fate of the climate initiative and the plan, they have important implications, not just for Louisiana but more widely. Not only did they open up a pathway for 'accomplishing' climate governance (Bulkeley 2016), they also provide theoretical insights into how climate responsibility is produced and practised and the role of matter in governance. Even though the land loss, flooding and hurricanes may not yet be as politically powerful as hydrocarbons, these climatic elements are dynamic, relational and forceful and increasingly capable of producing a state response as the Governor's climate initiative demonstrates.

As these empirical chapters have shown, 'state effects' and 'governing practices' can be seen as a series of state responses, disjunctive, inchoate and not necessarily coherent, emerging from the matter calling for its attention. Different matter produces different kinds of responsibility dispersed among different state agencies and emerging in differing ways through governing practices. The instability of the matter and the landscape and their interaction with each other and with the state is being continually refigured. Abstracting from the findings, it is possible to argue that the state will respond to the matter demanding its attention though the response will depend on the force and persistence of various competing types of

matter which may be in material tussle with each other and with the governing agencies. While Louisiana is a site of fossil fuel extraction and ongoing pollution, colonialism and racism, the severity of the environmental conditions affecting the Pelican State have led to governing responses which offer a way of understanding how state agencies respond to climate matter, whether now or in the predicted future of significant impacts. Louisiana, is also, as the evidence in the Oil and Air chapters show, providing moments of leadership through expressions of responsibility, suggesting forms of leadership *as* responsibility.

This thesis argues that climate responsibility extends beyond the normative idea of a moral obligation to respond to the realm of a practical response and the role of matter in engendering responsibility. Yet, matter is not neutral, it can have political and anti-political effects. The installation of fishing piers and proposed infrastructure to divert river sediment into surrounding areas discussed in Chapter 5, Land show forms of techno-responsibility that perpetuate exclusionary practices. As critics of Hans Jonas's 'imperative' (1979/1984) have argued, attention needs to be paid to the kind of responsibility arising from technology and whether they generate politics or authoritarianism. However, the ultimate and ambitious question in this research is whether there is potential for state responsibility for justice, how it might be achieved and how, as my fourth research question posed, it might be related to matter. Here, I argue the political potential of material effects, like climate matter, which are unstable, contingent and yet entangled in politics and governing. The instability of both matter and governing responses provides an opportunity for citizens and community advocates to intervene to hold the state accountable for the way in which it performs responsibility in response to material forces. This is the role of material politics as challenge and contestation familiar in the literature (Barry 2013).

This research has concentrated on the state response and not on the role of civil society or affected communities in fostering, procuring, co-producing or challenging it. Yet, it is evident that there are different kinds of citizen engagement with varying levels of influence on governing authorities. These range from non-political alignment to the more 'political' challenges, for example from the equity advisory group discussed in Chapter 7, Air. The research has shown large non-profits aligning with state authorities (Water and Land), these are the types of NGOs included in Jessica Green's recent taxonomy of the 'climate establishment' (2024) together with locally-based influential citizens groups who persuaded the local oil and gas industry that they "wanted them as partners" (Interview 9). These practices may also encourage forms of responsibilisation from concerned citizen groups who wish to take action whether as individuals or collectively, for example planting marsh grasses and trees and bagging oyster shells to help prevent erosion.

There are also community groups, particularly on the front- or fence-line, who are not so close to government or industry who frequently invoke the concept of 'responsibility' (participants at PO SOC 2021 and PO DSCEJ 2022), challenging government to pursue a more reciprocal relation and equitable direction, whether that is seen to be unsuccessful (as in Ch 5, Land) or more successful (in Ch 7, Air). This thesis' concentration of attention on matter and state responsibility tends inadvertently to downplay the role played by civil society or community advocates. I have referred to these groups where empirically demonstrated but the research focus was not on them but on the response of the state. While Táíwò (2024) considers the question whether social movements should work inside or outside the state in pursuit of

justice, for material politics and post-Foucauldian state scholars, this leaves open the question of the relation between matter, state responsibility and justice and what political challenges may be required.

Engaging Goya (again)

As Goya's Fight with Cudgels has captured the attention of several scholars (Serres 1995, Latour 2017, Knox 2020), I decide to go and see it. Arriving in Madrid late one November afternoon I walk past the Prado on the way to where I am staying. When I arrive and check my phone, I find that while I was on the train, two activists from Futuro Vegetal had already engaged with Goya that day. They had written "1.5º C" in black marker pen on the wall between Goya's famous pair of paintings La Maja Desnuda and La Maja Vestida and then glued themselves to the picture frames (Futuro Vegetal 2022, see Image 21). The following morning on arriving at the Prado I start with the Majas. Apart from some nervousness among the gallery staff, there is no visible sign of the disturbance of the day before, the wall is quite clean. There is no "1.5º C" to be seen though it remains, for a while at least, an absent presence. The subjects of the paintings, the majas, continue to recline nonchalantly in both dressed and undressed representations.

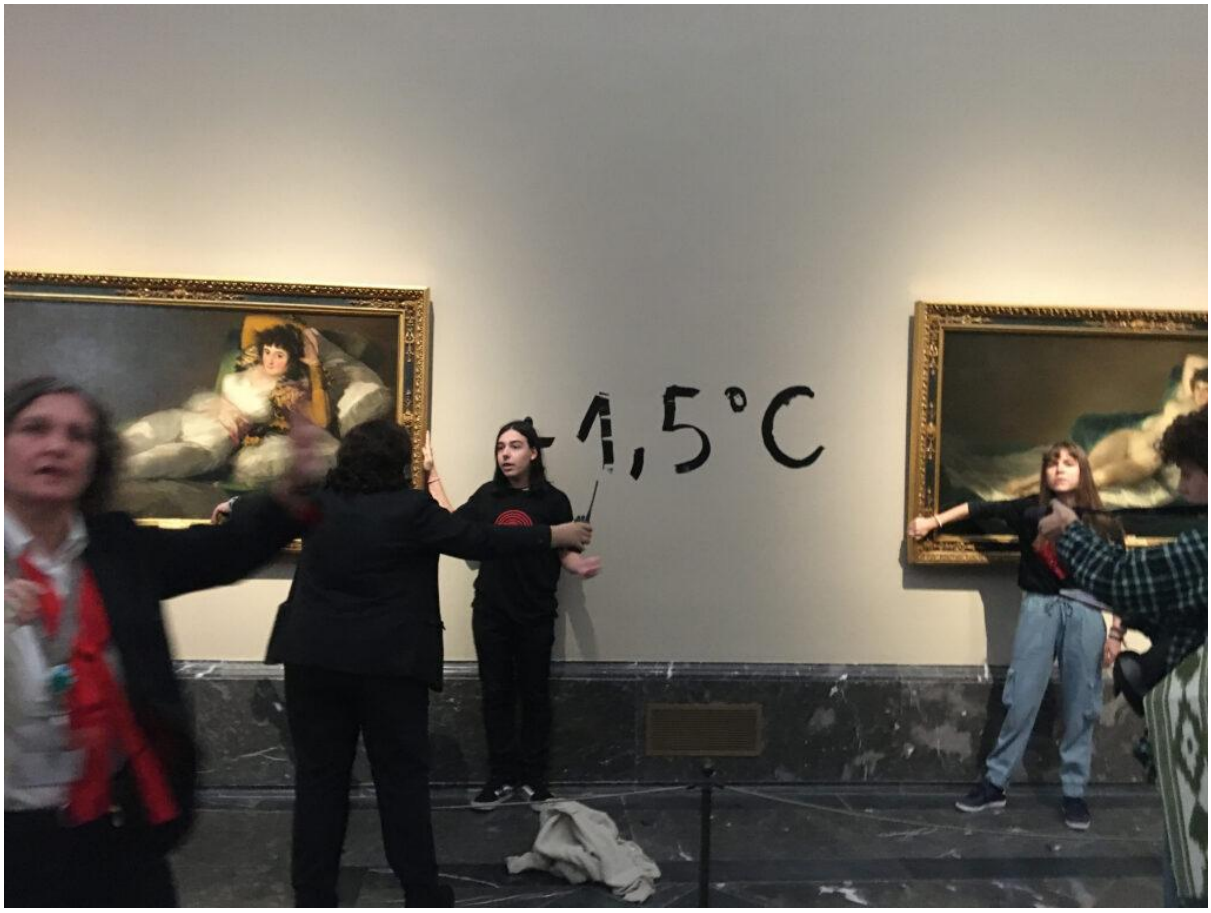

Image 21: Futuro Vegetal sticks to Goya's "Las Majas" to warn about the climate emergency (Futuro Vegetal 2022)

Goya's subject, the 'majas,' young women in C18 Madrid, were characterised by their extravagant dress and bold insouciant attitudes. As art critic Robert Hughes observes, they were "tough, sharp and not to be pushed around" (2003 p 243). They share that characteristic with the two young women from the Spanish activist group who established their temporary yet bold attachment. Decades after Serres was inspired by

Goya's image of the duellists to reflect on how it is that we can pretend to be oblivious to the climate crisis, two protestors show that it is also possible to bring it sharply into focus and for it then to be removed from our vision entirely. This innovative, though fleeting, work of protest bringing the majas into correspondence with climate semiotics embodies Alfred Gell's idea of art as 'social technology' mediating new forms of action and agency (1997).

The Goya protestors are calling for action; as their group says "the necessary measures have not been taken to correct" the reality of the climate emergency (Futuro Vegetal 2022). Their action can be theorised as 'material politics' in the sense that matter signified by '1.5° C' becomes an object "of contestation" (Barry 2001 p 6). These demonstrations are both "sights and sites" in and through which protestors not only protest but also enact complex relations with the materials and politics with which they are engaged (Barry 2001 p 175). Here, objects like paintings, glue and a marker pen are enrolled in an attempt to mobilise the 'public' through 'material participation' (Marres 2012).

In addition to attracting public attention, climate protests appear as an expression of Foucauldian counter-conduct (2009) in which resistance does not simply refuse or resist power but seeks to enact new relations with governing practices (Binkley and Cruikshank 2016). Through the lens of responsibility, this kind of oppositional political action is, as Jane Drexler (2007) argues, closer to Arendt's theories of disruptive political action (1958) than to Young's social connection model. Like Goodhart's kayactivists (2023), these protestors are both 'making responsibility' through their actions while engaged in wider performative struggles to determine who will be held responsible for taking action in response to the climate crisis. This is the critical question in this thesis, it is not only the struggle *against* power that matters but also the struggle *for* acts of responsibility.

In calling for climate action responsibility, the Futuro Vegetal activists are making a demand that has not yet been supplied. If the symbolic number for a safe limit for life on earth inserted between Goya's famous paintings couldn't summon it, then where, they seemed to be asking would it come from. It is difficult not to share their preoccupation with the connection between the materiality of climate change – whether existing impacts or threatened - and the inadequacy of responsive action and to consider that the question of responsibility is one that not only needs urgently to be answered but also needs to be better understood within the frame of material politics. Effectively, through their political and creative act, the activists are calling for a relation between matter (1.5^0) and responsibility. However, as this and other spectacular protests at famous paintings and their aftermath suggest, the difficulty is in establishing a relation between the material and a governing response; how to get 'nos responsables' (Stengers 2009) to do the *job* of taking responsibility. It was Stengers' "bet" that addressing 'nos responsables' "as if they were indeed effectively "responsible" for the situation "… could have efficacy" (2009, 2015 p 33). This thesis has attended to that 'bet' by exploring situations of direct engagement with governing authorities.

The approach of the equity advisory group discussed in Chapter 7, Air, suggests that a *demand* or what Clive Barnett calls 'claims-making (2017), needs to be made directly on a source of *supply*, i.e., an engaged state with potential to undertake 'role-responsibility.' This brings us back to the question of what kind of politics and political advocacy are effective. These depend on the governing contexts, whether there is a "sympathetic state" through which action can be mobilised (Dauber 2013) like the Louisiana gubernational administration in the early 2020s. Alternatively, if there is a resistant state polity, as currently in Louisiana,

the demands and claims are likely to require action outside the governing system. Meanwhile, while "the burden is on communities to figure out what to do" (PO SOC 2021), affected communities are shouldering this responsibility by trying "to set a precedent and a model for the many communities, who too will suffer with the issues that now affect us" (FPCC 2023). This kind of leadership as responsibility is characterised in the words of Rosina Philippe, Tribal Elder of Grand Bayou Village who has counselled in terms that remind us of the relation between more-than-human matter and state responsibility:

> Think and ask questions. Hold those in power accountable to how they wield that power. Advocate for and speak the truth. Remember life is precious, and not just human life. Our lives are intricately tied to, and depend on, the survival of other life forms in our world. Our survival is tied to how we live with this planet (quoted in Comardelle et al 2020).

The burden of thinking, asking questions and holding those in power accountable is in addition to the burden that communities on the front- or fence-line, affected by impacts that they have not caused, already bear. This thesis shows that state dependence on oil and gas interests - hydrocarbon governmentality – continues to be in tension with notions of state responsibility for equity rather than resolution of those tensions. However, continuing failures of state responsibility is not a reason to stop making demands on the state to take responsibility.

There is political potential for communities and advocates in negotiating the tensions among oil production, carbon emissions, climate impacts and governing responses. Following Bonnie Honig (1993), issues within politics and governing are never closed and remain open to contestation. This thesis' argument that climate matter engenders the state response of responsibility has implications for praxis. A future research agenda within climate and material scholarship engaging with the state (Táíwò 2024, Riofrancos 2024) could attend to understanding how and where the issue of responsibility can be effectively demanded and accountability brought to bear on governing authorities to undertake climate responsibility for justice.

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Appendix

A. Interviews

Anonymised interview record, also recording other or prior interests disclosed and a diversity assessment (to the extent these characteristics were presented). As discussed in Chapter 3, I also had informal conversations in person and online with an additional 20 people which are treated as deep background.

Number	Date	Anonymised descripter	Where employed at time of interview	In person or online	Woman of colour	White woman	Man of colour	White man
1	10.2. 19	City official	City of New Orleans	Café, NOLA	x			
2	11.13.20	Coastal scientist	University	Online				x
3	11.16.20	Academic lawyer	University	"				x
4	11.23.20	Former federal official	Federal agency	"				x
5	1.19.21	Coastal scientist	University	"		x		
6	1.30.21	Coastal scientist	Non-profit	"	x			
7	2.24.21	Oil and gas geologist	Industry	"				x
8	2.25.21	Planning adviser	Non-profit	"		x		
9	3.3.21	Civil society / faith leader	Retired	"				x
10	3.14.22	Non-profit/former industry engineer	Non-profit	"		x		
11	3.18.22	State official	State employee	"		x		
12	3.24.22	Policy adviser	Non-profit	"	x			
13	3.31.22	Campaigner	Non-profit	"		x		
14	4.6.22	Environmental lawyer	Non-profit	"				x
15	5.4.22	Coastal scientist	Non-profit	"		x		
16	5.31.22	Academic lawyer	University	Online		x		
total	16				3 WOC	7 WW	No MOC	6 WM
					10 women		6 men	

Range of roles

Officials (state, fed, city):	3	City, state and federal
Coastal scientists	3	Academic and practising
Policy / planning advisers	2	Local and national

Environmental lawyers	3	Academic and practising
Non-profit / civil society	3	Mix of coastal science, campaigning & engineering background
Local or Indigenous community	1	faith leader
Industry	1	O&G geologist (and perspective from non-profit representative)

B. Participation observation

Events attended in person:

1. Bonnet Carré spillway at Mississippi River, remarks from US Army Corps engineers, made during American Association of Geographers field trip April 10, 2018
2. Port Fourchon (remarks from the deputy director), ditto, April 10, 2018
3. South Lafourche Levee District, April 2018 (remarks from the general manager), ditto, April 10, 2018
4. Institute of Environmental Communication, Loyola University, session of the Fellows Program, invited by Prof Bob Thomas, Sept 24, 2019
5. Institute of Environmental Communication, Loyola University, session of the Fellows Program, invited by Prof Bob Thomas, Oct 1, 2019
6. A Studio in the Woods, Artist Salon with kei slaughter and ChE, October 23, 2019
7. New Orleans Center for the Gulf South (NOCGS), Tulane University, literary symposium, January 25, 2020
8. Coalition to Restore Coastal Louisiana, planting cypress trees, Violet, January 30, 2020
9. ByWater Institute coastal convening, seminar with Tulane faculty and invited external speakers, January 31, 2020
10. Lowlander Center & coastal community representatives, seminar with delegation of German students from Heinrich Boll Foundation, February 28, 2020
11. Loyola Law Climate Justice conference, March 6, 2020
12. Tulane Enviromental Law & Policy two-day conference, March 6 and 7, 2020
13. CPRA Coastal Connections event, March 12, 2020

Events attended virtually while being aired so identified as being present in the list of 'participants' in contrast to watching on catch-up when I wasn't recorded as 'present':

14. CPRA webinar, Deepwater Horizon 10: A Decade of Restoration, April 15, 2020
15. CPRA webinar, Restoration of the Terrebonne Basin Barrier Islands, July 1, 2020
16. Environmental Law Institute webinar, A State Approach to a Just Transition, July 10, 2020
17. US Army Corps and CPRA Public Scoping Meeting (Mid-Breton Sediment Diversion - Session 1) July 14, 2020
18. CPRA webinar, Deepwater Horizon 10: A Decade of Restoration, Facebook Live Webinar, April 15, 2020
19. Governor's Advisory Commission on Coastal Protection, Restoration and Conservation, August 12, 2020
20. GCCLP, Katrina15 to Rita15: Natural Systems Protection – the role of our coastal wetlands in mitigating flood risk, Gulf Coast Center for Law & Policy, Sept 17, 2020
21. CPRA Webinar Wednesday, Harnessing natural processes, Dr Mike Turner, October 14, 2020
22. CPRA Board meeting, October 21, 2020
23. CPRA webinar, Sediment retention, Prof Alex Kolker, November 4, 2020
24. The Climate Museum, Second Fridays, Talking Climate Displacements, January 8, 2021
25. CPRA Board meeting, January 20, 2021
26. Governor's Advisory Commission meeting, February 9, 2021
27. CITF meeting, February 24, 2021
28. RMRD and others, Mid-Barataria Sediment Diversions, informational webinar, April 20, 2021

29. CPRA Board meeting, May 19, 2021
30. State of the Coast conference, June 2 – 4, 2021
31. CPRA Board meeting, February 16, 2022
32. PO DSCEJ (2022) Webinar: The False Promise of Carbon Capture in Louisiana, Deep South Center for Environmental Justice and Center for Progressive Reform, March 10, 2022
33. Tulane Environmental Law & Policy summit, March 11, 2022
34. Tulane Environmental Law & Policy summit, March 17 – 18, 2023