

The treadmill of protection: How public finance constrains climate adaptation

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Abstract

As the physical impacts of the Anthropocene begin to make themselves felt around the globe, maintaining current levels of economic prosperity, in many communities, will consume an increasing portion of public finances. This is because existing investments in property and capital will require new forms of protection if they are to continue generating stable streams of public revenue. Since Anthropocene impacts are unevenly distributed, some territories will be under more pressure than others to shift limited public spending to cope with growing levels of exposure. The sinking of Louisiana's coastal wetlands provides a clear example of this trend of accelerating local vulnerability due to human-induced environmental change. With the bulk of state revenue tied to activities concentrated along Louisiana's coasts, the state's Coastal Protection and Restoration Authority has launched an ambitious plan of government-backed expenditures that seek to defend the economic viability of these zones. Yet, many actions aimed at preventing immediate loss also work to secure incumbent extractive industries, such as offshore oil and gas drilling, which themselves contribute to the very vulnerabilities requiring state intervention in the first place. This paper, borrowing from the environmental sociology of Allan Schnaiberg, considers the social consequences of this dynamic, dubbed the "treadmill of protection."

Keywords

climate risk, extractivism, public finance, sea level rise, treadmill of production, vulnerability, wetland restoration

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“Well, in our country,” said Alice, still panting a little, “you’d generally get to somewhere else—if you run very fast for a long time, as we’ve been doing.”

“A slow sort of country!” said the Queen. “Now, here, you see, it takes all the running you can do, to keep in the same place. If you want to get somewhere else, you must run at least twice as fast as that!”

—Carroll (1865), *Alice’s Adventures in Wonderland*

Outrunning the Anthropocene?

The environmental changes associated with the Anthropocene are expected to inflict significant impacts on societies around the globe (IPCC, 2018; Steffen et al., 2015a). In this paper, I argue that responding to the physical threat of these impacts, which are both abrupt and incremental,¹ will require massive increases in public spending on programs of protection and adaptation (Bapna et al., 2019; OMB, 2016; Reidmiller et al., 2018; WEF, 2020).² Accelerating change will put added pressure on authorities to protect existing sources of public revenue, which make protective expenditures possible in the first place (GAO, 2019; Shi and Varuzzo, 2020). In areas where state and municipal revenues depend heavily on the economization of environmentally exposed forms of natural capital (i.e. commodity extraction, agriculture, tourism, and real estate development), it will be hard to avoid using public money, at least in the short-term, to protect resource-dependent activities, even if those activities contribute to growing social vulnerability. I call this paradoxical situation—when the material conditions that support public financing of protective measures are linked to the root drivers requiring those measures to begin with—the “treadmill of protection.”

Protection treadmills exist where policymakers mitigate the negative effects of the Anthropocene without fundamentally trying to shift society’s status quo relationship to natural ecosystems. They are treadmills insofar as environmental threats and vulnerabilities persist, with “protection” really serving as ephemeral damage control. One element affecting governments’ running of the treadmill, as just mentioned, is overreliance on revenue from natural resource-linked sectors. If one or more such sector is prominent in a given territory, it can be expected that those sectors will receive greater protection than other economic sectors. Another element affecting the operation of the treadmill is governments’ fear of unsettling *perceptions* of risk as they relate to the financial worth of the built environment. That is, if public officials admit that the current built environment is untenable due to the changing profile of natural hazards, they risk both capital flight and devaluation of local property assets. So, officials pretend they can protect existing assets in order to avoid this potentially economy-wrecking admission. Finally, a third mechanism of the treadmill is linked to existing politics of disaster recovery, particularly prevalent in the U.S., that encourage local governments to socialize natural hazard losses as inevitable events deserving of national sympathy and federal taxpayer relief (Dauber, 2012).

Louisiana, where the Mississippi Delta meets the Gulf of Mexico, exhibits all the hallmarks of being caught in such a “treadmill.” Since the 1930s, the state has lost a startling amount of its coastland—an area roughly the size of Delaware—due to eroding soils, subsiding swamps, and rising sea levels (Wiegman et al., 2018). The situation puts Louisiana in a bind because much of its wealth is derived from activities connected to the coast, such as commercial fishing, petrochemical manufacturing and, in particular, offshore oil and gas extraction (Barnes et al., 2015). The state’s lucrative tourism industry, built on the region’s unique mix of Native, Creole, and Cajun cultural heritages, is inextricably linked to the bayou ecosystem, as are a significant portion of the state’s residents, whose personal wealth is bound up in the value of properties and homes

located on rapidly disappearing coastlands. As a result, the Louisiana government has launched an ambitious \$50 billion coastal protection plan aimed at preventing future land loss, which it views as an existential threat (CPRA, 2017).³

The single largest source of funding for the state's protection measures are mineral royalties from the oil and gas sector. This only seems appropriate, given that the sector is one of the principal contributors to Louisiana's environmental precarity; yet, it is also one of the prime beneficiaries of protection. The industry has successfully cast itself as both victim of land loss and as an irreplaceable source of revenue for dealing with that loss. "Every lease sale in the Gulf of Mexico that doesn't happen," an industry lobbyist recently warned, in response to a federal moratorium on new offshore extraction permits, "prevents tens of millions of dollars from going to Louisiana's coastal work" (Mosbrucker, 2021). The conundrum this poses for coastal planners is evident in the state's most recent Comprehensive Master Plan for a Sustainable Coast, where officials dedicate significant resources to secure the industry's immediate viability, despite its deleterious effect on longer-term trends of loss (CPRA, 2017: 97–99; Day et al., 2019b). Faced with few good options, state planners resemble the Red Queen in *Alice's Adventures in Wonderland*, running faster and faster just to stay in place, expending increasing public resources to defend patchwork pieces of an unraveling coastline.

Drawing inspiration from early work in U.S. environmental sociology, this paper develops a conceptual frame for understanding this dynamic. I speculate about the economic logics and political conjunctures that lead to particular projects of protection in particular places. How do these projects build and maintain citizen support, even as their limitations become increasingly apparent? I begin by tracing the genealogy of the treadmill idea from Allan Schnaiberg's pathbreaking work on the political economy of environmental regulation. Turning to the Mississippi Delta as a case study, I use the concept of the treadmill to help explain trajectories and trade-offs of coastal protection in Louisiana in which public monies are marshalled to protect private interests that paradoxically create the problems which public monies are solicited to resolve.⁴ Although the paper focuses particularly on Louisiana, in the final section I consider other situations in the U.S., and elsewhere, suggesting the applicability of the treadmill for thinking critically about the broader political economy of adaptation in the Anthropocene.

Repurposing the treadmill of production

My concept of the treadmill borrows from an analytic approach within U.S. sociology known as the "treadmill of production" (ToP₁) that strives to explain why environmental policies adopted by societies organized under capitalist exchange frequently fail to reduce the environmental degradation produced by that exchange (Schnaiberg, 1980; Schnaiberg et al., 2002). First theorized by Allan Schnaiberg, ToP₁ considers that the rise of consumer capitalism in the U.S. in the 1950s led to a major deterioration of the country's ecosystems. This deterioration, according to Schnaiberg, takes the form of a "treadmill," where consumption-fueled growth calls for increasing "withdrawals" from the environment (in the form of minerals, fossil fuels, water and other natural resources), which result in an expanding set of environmental "additions" (in the form of pollutants, synthetic molecules and other industrial byproducts) (Buttel, 2004; Schnaiberg, 1980). Public authorities, while theoretically in a position to rein in this dynamic, fail to do so in any meaningful way because the public operations and services they provide are secured by taxing the wages, property, and purchases linked to consumption. The liberal democratic state, in other words, is dependent on maintaining the treadmill.

Schnaiberg situates the rise of ToP₁ within the period following World War II, the same moment when human impacts on the biosphere enter what earth system scientists call the Great Acceleration

(Steffen et al., 2015b). Construed in treadmill terms, the Great Acceleration documents, at a planetary scale, the most pronounced versions of Schnaiberg's "withdrawals" (extraction of ground and surface water, marine fish capture, and tropical forest loss) and "additions" (excess production of methane, nitrogen, and atmospheric carbon dioxide). Unlike earth system science, however, and of relevance to those interested in the political ramifications of the Anthropocene (Bai et al., 2016; Dalby, 2016; Görg et al., 2020; Malm and Hornborg, 2014), Schnaiberg linked his notion of the treadmill to a materialist theory of the relation between environmental policies of the state and the political economies of capitalism. Since state expenditures on social programs depend on tax revenues generated by the activities of the private sector, public officials interested in expanding social services, in Schnaiberg's analysis, often find themselves advocating for endless economic growth (Schnaiberg, 1980, cf Chapter 5). "Social and ecological problems," in this framework, "are frequently resolved by speeding up the treadmill (i.e. generat[ing] more taxes to spend on ecological problems)" (Schnaiberg et al., 2002: 4), which in turn, generates new ecological problems.

Overtime, the balance of power between capital and public authority has become less and less favorable to the state. Subsequent ToP₁ analyses argued that beginning in the 1980s, in the U.S., firms gained increasing autonomy from labor constraints (through offshoring and automation) while they also played a greater role in policymaking (through corporate lobbying and direct donations to political campaigns) (Gould et al., 2008). As a result, state services in the U.S. have even been replaced to some extent by corporations, who "keep governments tied to reproducing the treadmill by their "generosity" toward previously state fulfilled mandates (e.g. money to schools; local governments; arts and culture, sports, health expenditures etc.)" (Schnaiberg et al., 2002: 18). For Schnaiberg and colleagues, this process of unwinding the welfare state's social commitments has only gotten worse as conditions of neoliberalism have expanded globally (Pellow, 2007; cf also Kentikelenis and Babb, 2019).

Developed 40 years ago, ToP₁ provides a useful framework for explaining the persistent failures of the "Environmental State." In adapting the concept to make sense of Anthropocene concerns, however, it is also necessary to update some its notions. The first is how ToP₁ conceives of the "environment." The simple model of "withdrawals" and "additions" fails to capture the changed nature and scale of vulnerabilities afoot in the Anthropocene. With its positive feedback loops, non-linear disequilibrium, and climatic shifts, the Anthropocene is not simply about managing a growing accumulation of externalities, but about coping with the emergence of a world fundamentally more erratic and less hospitable than the one in which human societies have lived for the past millennia (Dalby, 2019; Keys et al., 2019). The problem for government, thus, is not only about restoring a degraded planet, but about mediating an increasingly unpredictable and destructive environment.⁵

A second modification is in response to Schnaiberg and his colleagues' conception of capitalist "production" as a relatively homogenous force that operates alike across all geographic space. The problem of "protection" (i.e. the need to spend money on protective solutions from environmental change), is not operative everywhere to the same degree. It will be felt the hardest in places facing higher levels of Anthropocene-enhanced vulnerability (coastal areas, arid-zones, permafrost settlements, etc.). Thus, protection efforts will struggle or succeed not only due to the material resources and institutional capacities of a given government, but also due to its location (Biermann et al., 2016). This geographic unevenness of vulnerability will determine, in part, how capitalism "resettles" in an Anthropocene-altered landscape, which will carry, in turn, cascading consequences for governments' abilities to both project their territories as havens for ongoing investment and maintain the social and economic wellbeing of their own citizens.

Finally, ToP₁ does not address the tightening links in developed economies between natural disaster risk, finance capital, and local property markets (Taylor and Weinkle 2020). This nexus

presents a lurking public problem whose dimensions are difficult to clearly discern because of uncertainties about the scale and potential speed at which people's accumulated wealth (in the shape of fixed assets such as homes and small businesses) may become "stranded," i.e. converted into negative forms of wealth no longer worth the value of the mortgage or insurance needed to secure them (Keenan and Bradt, 2020). Such a situation could trigger defaults on par or in excess of the 2007 subprime crisis (Federal Reserve Bank of San Francisco, 2019). One place where all these processes are on display is the increasingly fragile Mississippi Delta, to which I now turn before returning to my analysis of the "treadmill of protection."

Anthropogenic factors of vulnerability in the Mississippi Delta

Louisiana is home to the broad alluvial fan of the Mississippi River, the seventh largest deltaic system in the world. These systems are among the most vulnerable to environmental change on the planet (Renaud et al., 2013; Elliott et al., 2019). Like many major deltas, the Mississippi's is heavily impacted from over two centuries of intense human-made modifications. As a result of these alterations, Louisiana's coast is facing one of the fastest rates of land loss in the world. In the past 100 years, nearly 2000 square miles of coastal wetlands have vanished into the Gulf of Mexico (Day et al., 2019a).

Of the many anthropogenic factors driving this loss, the most consequential is connected to land subsidence (Frederick et al., 2019). Subsidence has numerous causes, but the prime source is what hydrologists call "sediment starvation". Across the Mississippi watershed, upstream dams, irrigation diversions, and flood levees, stretching from Great Falls, MT to Boothville, LA, prevent the pulse of seasonal sediments from reaching the deltaic plain. This infrastructural hardening of the river essentially "starves" coastal areas of the land-nourishing soil required to replenish delta lands. Lacking this fresh sediment, the coastal zone is sinking on average at the rate of 4 mm/year due to natural compaction of soils (Blum and Roberts, 2009; Kolker et al., 2011).

More local factors are also hastening the demise of the coast. Beginning in the 1920s and 1930s, major discoveries of oil and gas deposits under the bayou led to the development of an offshore extraction industry that laid thousands of miles of pipes, platforms, and pumping stations within coastal wetlands (Austin, 2003; Theriot, 2014). While boosting the state's fortunes, withdrawals from underground oil and gas reservoirs have drastically sped up coastal subsidence rates (in some areas by up to 24 mm/year) (Kolker et al., 2011; Yuill et al., 2009). At the same time, industry-dredged pipeline channels and shipping canals accelerated saltwater intrusion into fragile brackish ecosystems, poisoning the root systems of the very plants that hold the land together (Wiegman et al., 2018; White and Kaplan, 2017).

Finally, locally-extracted fossil fuels have added one last layer of coastal impact in the form of global sea level rise. Heat-trapping greenhouse gases released from the combustion of hydrocarbons (Louisianans, among others) are responsible for melting ice sheets and thermally expanding seas, which are advancing by roughly 2 mm/year into the wetlands of the Mississippi Delta (Day et al., 2019b; Jankowski et al., 2017). Combined with coastal subsidence, sea level rise is creating a "sinking" coastal margin of 5–6 mm on average per year. All told, Louisiana is facing a crisis of land loss of almost unparalleled proportions that coincides with (and is in part caused by) the rise of oil and gas extraction.⁶

Political economy of wetland restoration

Although concern about wetland destruction in the state was articulated off-and-on over the years, coastal land loss itself did not become a sustained political problem in Louisiana until the 1980s

(Houck, 2015). Initially, local environmental advocates pointed to dredged canals and underground pumping as the principal culprits of wetland loss (Randolph, 2018). To combat these negative perceptions, oil and gas groups supported research on a wider set of factors, especially the role of sediment “starvation” due to upstream infrastructure (Priest and Theriot, 2009). By doing so, they succeeded in characterizing the sinking of the Mississippi Delta as the result of an infinitesimal number of geographically distributed actions for which nearly the whole nation was responsible. “You could entirely eliminate oil and gas dredging,” as a leading industry lobbyist put it at the time, “and the wetlands erosion problem won’t go away.” (Getschow and Petzinger, 1984; quoted in Houck, 2015: 270). Over the years, the industry successfully recast themselves as victims of land loss, just like the rest of the coastal public.⁷

Indeed, the nature of coastal vulnerability does put the oil and gas sector (and the state revenues it generates) at risk. Extraction in Louisiana accounts for roughly one fifth of all U.S. petroleum production (Barnes et al., 2015). The majority of that activity is concentrated along the coast, which links offshore oil and gas rigs to onshore storage tanks, refining facilities, and chemical manufacturing plants.⁸ Given these embedded interests, efforts to combat land loss have not focused on regulating oil and gas activities, but on “restoring” the coast (Houck, 2015; Randolph, 2018). Early policy actions included enlisting help through federal appropriations (the “Breux Act” of 1990) and earmarking state oil and gas royalties for exclusive use in restoration projects (the Wetlands Conservation and Restoration Fund Act of 1989).

These initial funding sources, however, proved woefully incommensurate with the scale of loss (Couvillion et al., 2013; Theriot, 2014). This became bluntly apparent in 2005 when Hurricane Katrina ripped through Louisiana’s saltmarshes, stripping away thousands of acres of already weakened cordgrass that buffers coastal communities from storm surge (Dean, 2005). In response to Katrina, the state consolidated numerous wetland rehabilitation efforts into a state level agency, the Coastal Protection and Restoration Authority (CPRA), tasked with coordinating the fight against accelerating land loss. Additionally, the state’s Congressional representatives succeeded in convincing their colleagues in Washington to redirect more federal fossil fuel royalties back to the Gulf states (rather than to federal coffers) through the Gulf of Mexico Energy Security Act (GOMESA), a maneuver that has opened up tens of millions of dollars annually for coastal protection and restoration.⁹

Preventing land loss requires immense resources. The CPRA’s (2017) latest Coastal Master Plan, scheduled for an update in 2023, calls for US\$ 50 billion to fund the projects in its 50-year pipeline. After accounting for inflation, this sum is likely closer to US\$ 92 billion (Davis et al., 2015). In addition to GOMESA, the Breux Act, and state oil and gas revenues, the principal funding mechanism for the Master Plan come from payments connected to BP, the British oil company. In 2010, an offshore oil rig drilling for BP, called the Deepwater Horizon, exploded, sending millions of tons of crude oil gushing into the Gulf. The disaster added to the ongoing coastal wetland crisis,¹⁰ but also generated billions of dollars in settlement money for environmental restoration work. Table 1 charts the principal sources of current coastal protection and restoration funding.

The overall conclusion to draw from the chart is that, of US\$ 20.617 billion in identified funding (Davis and Boyer, 2017), under \$2 billion, or 10% of expenditures, come from local state resources. In addition, the bulk of the money (both state and federal sources) is tied to the success of the oil and gas sector. In other words, coastal protection and restoration, as currently proposed, is unimaginable without the ongoing exploitation of fossil fuel resources.

The CPRA has divvied up these federal and liability-backed investments into three broad categories of protection: structural protections (levees and flood gates), natural infrastructure (restored marshes, barrier islands, and sediment diversions) and what the Authority calls non-structural

Table 1. Principal sources of coastal protection and restoration authority funding 2007–2020.

Fund	Type	Duration	Amount
CWPPRA (1990 Breaux Act)	Federal legislation	Annual (depending on congressional appr.)	\$30–\$80m/year (w/15% matching state funds)
GOMESA + Section 8(g)	Federal mineral royalties	Annual (depending on federal lease revenue)	\$140m cap starting w/Phase II (2018)
Deepwater Horizon Funds	Corp. liability payments	Dispersed over 15 years	\$5.787b
CIAP (Coastal Impact Assistance Program)	Federal mineral royalties	2007–2010	\$495.7m
HUD National Disaster Resilience Competition	Federal community block development grant	2011–2013	\$93m
State Surplus	State funds	Depends on surplus and competing state needs	~\$1b (to date)
Coastal Protection and Restoration Trust Fund	State mineral royalties	Annual	~\$30m
LA Dept. of Transportation	State general budget funds	Annual	\$4m
Total	--	--	\$20.617b

Sources are compiled from the fiscal 2021 report of the CPRA (2020) and Davis and Boyer (2015, 2017).

Small sources of one-time, or infrequent funding, are not included; amounts in US\$.

m: millions; b: billion.

components (elevating homes, floodproofing larger buildings, and offering voluntary buyouts to some homeowners). Mindful of the need to appear to balance protections benefiting fishing communities as much as major corporations, all three components are vetted by the CPRA's Planning Tool, "a computer-based decision support software system" designed in collaboration with the RAND Corporation, that "uses optimization to identify. . .the projects that build the most land and reduce the most flood risk while meeting funding and other planning constraints" (CPRA, 2016: 18). Projects that secure current sources of state revenue, areas of high employment, and denser concentrations of property, for the least expenditures, get higher evaluations than those that do not.¹¹

Guided by this optimization tool, the current Master Plan allocates US\$ 19 billion for traditional structural investments, US\$ 25 billion for nature restoration work, and US\$ 6 billion for non-structural expenditures. Discussion of the agency's ambitious planning and policy approaches has received extensive coverage in both academic and popular writings (Day and Erdman, 2017; Gotham, 2016; Kolbert, 2019; Nost, 2019; Rich, 2020). Rather than reprising this literature, I will now shift to develop how the pressures facing Louisiana's coastal planners resemble what I call a "treadmill of protection," and argue why the treadmill is conceptually useful for thinking through emerging political and economic dimensions of "protection" in the Anthropocene.

Protection and its three elements of circularity

In this section, I identify three principal elements at work in producing and maintaining treadmills of protection. These elements are not present everywhere, but wherever they are, they will reinforce treadmill tendencies. Confronted by threatening consequences from Anthropocene-driven change, public authorities will face pressure to: (1) Protect, in the short-term, sectoral activities

that generate large amounts of revenue for the state, even if these activities also exacerbate the vulnerabilities against which the state is protecting; (2) Protect against growing perceptions of risk that might undermine local property values, even though such efforts may enhance future risk by encouraging people to “remain in place”, despite increasing exposure; and (3) Offload local protection costs to central governments by relying on national disaster declarations, a process assisted by industries that benefit economically from such declarations. I take each dimension in turn, using empirical examples from Louisiana’s coastal protection initiatives to elucidate the workings of the treadmill.

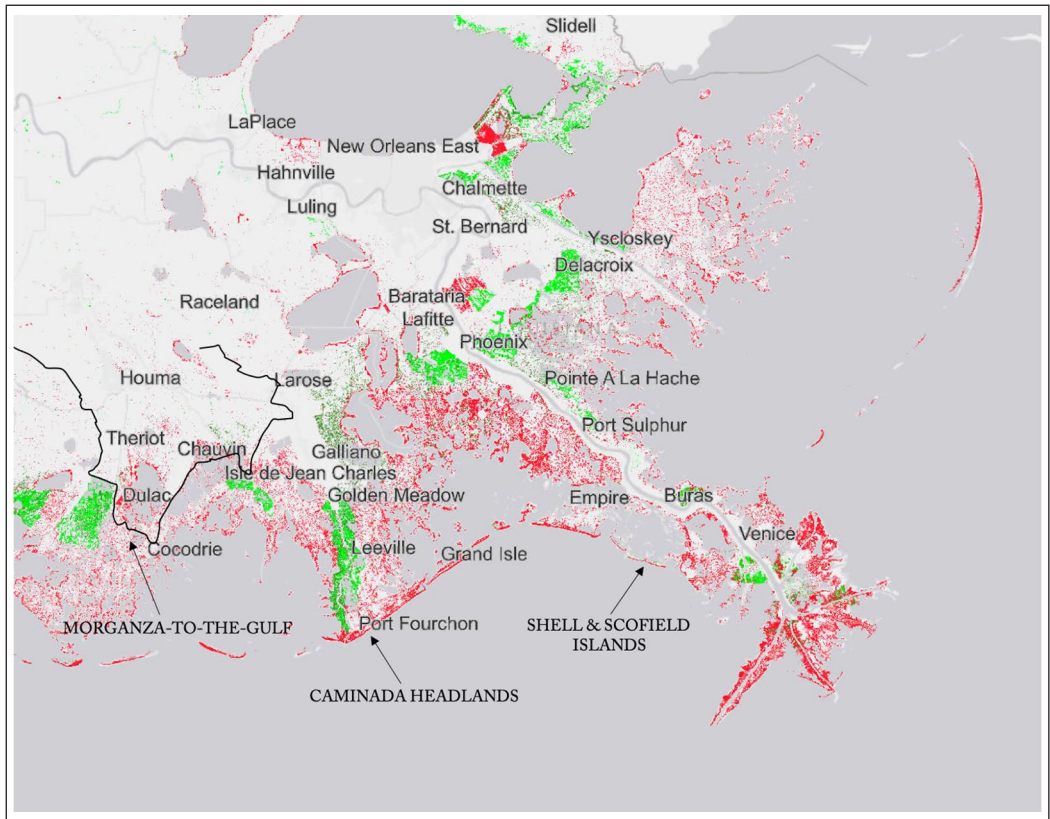
Protect existing sources of tax revenue

Like Schnaiberg’s “treadmill of production” (TOP₁), the “treadmill of protection” (TOP₂), is driven by state dependencies on securing operating revenue from private sector activities. The oil and gas sector, along with refining, petrochemical and plastics manufacturing, account for roughly 25% of Louisiana’s tax revenue and almost a quarter of state GDP (Duffin, 2020; Scott, 2018). Tax receipts from economic activity tied to these industries underwrite public education, health-care, transportation infrastructure and funds for public security. Per TOP₁, this makes public officials, whether Republican or Democrat, structurally unlikely to pass laws or regulations that seriously impede oil and gas operations. TOP₁ helps explain how Democratic Governor John Bel Edwards, in a recent visit to the coastal town of Thibodaux, can argue in one breath that, “We have to be proactive. That’s what coastal protection is all about,” while declaring in the next, “We are a natural gas state. There’s going to continue to be demand for hydrocarbons for a long time to come. . . .20, 30, 40 years” (Karlin, 2019).

Where the Anthropocene diverges from Schnaiberg’s concept of the treadmill, however, is the repositioning of the environment not only as an entity which capital degrades (TOP₁), but now as an entity which undermines, in a systemic and unpredictable fashion, capitalist production (TOP₂). This new relationship of the environment to capital is particularly evident in the form of physical climate risks (e.g. extreme weather, heat waves, drought, and sea level rise) (Houser et al., 2014). Facing a “vengeful Gaia” (Lovelock, 2006), the state is forced to make increasing expenditures to secure existing areas of capitalist activities, while potentially exacerbating vulnerabilities, or “unprotecting,” less capital-generative territories.

Recent restoration efforts in Louisiana resemble this operating logic. For instance, the optimization techniques used in the Master Plan create a strong rationale for spending on restoration projects that “maximize” state revenue sources by reducing what they call “estimated annual damages” (EAD) to those same sources. By turning avoidance of lost revenue into a benefit, the exercise makes it difficult *not* to prioritize protecting areas that also generate funding for coastal adaptation, which, as noted above, are primarily attached to the oil and gas sector. These kind of accounting tools, as scholars of critical finance have shown, often work to depoliticize processes of decision-making, cloaking administrative choice with an aura of rational calculation (Bebbington and Larrinaga, 2014; Hasberg, 2020; Samiolo, 2012).

According to their own tracking platform, the CPRA has finalized nearly 113 projects already, at a cumulative expense of US\$ 6.558 billion (CPRA, 2020: 35–36). Restoration projects make up a significant part of these expenditures, particularly in the form of barrier island replenishment and marsh creation. Among the CPRA’s first restoration expenses, beginning in 2012, have been US\$ 250 million on the Caminada Headlands, a swath of marsh and barrier islands that shields Port Fourchon, one of the state’s (and nation’s) major oil processing and storage facilities (see Map 1). Disconnected from any significant communities, the Caminada Headlands accounts for roughly a



Map 1. 2017 Coastal Master Plan “Land Use Change” Data Layer. Shows 30 years of land use change (to 2047) in southern Louisiana under the CPRA’s “medium environmental scenario” with an optimistic full implementation of the 2017 Master Plan; red = land loss; dark green = land maintained; light green = new land. (CMP data layers and visualizations are publicly available at <https://cims.coastal.louisiana.gov/masterplan>).

third of current restoration expenditures (CPRA, 2020). In true treadmill fashion, these restoration efforts were made in response to Hurricane Isaac (2012), which destroyed millions of dollars of a previous restoration work following Hurricanes Katrina and Rita in 2005 (Louisiana Division of Administration, 2015: 9–13). The CMP does not mention the costs of these previous efforts, nor does it budget for their reoccurrence.¹²

The bulk of protective spending (66%), however, has gone to structural projects. None more so than the massive Morganza-to-the-Gulf levee system (see Map 1). While some communities have been excluded from the system because of expenses (essentially ending their viability; cf Isle de Jean Charles), no major extractive infrastructure has yet to find itself on the wrong side of the levee or restoration plans.¹³ For many frontline and marginalized communities already caught in the “slow violence” of Louisiana’s former plantation system and toxic industries, none of this will sound like anything new (Allen, 2003; Davies, 2018; Yusoff, 2018). Yet the Anthropocene will likely deepen and expand current geographies of vulnerability by further constraining who and what gets protected (Anguelovski et al., 2016).¹⁴

Protect against risk downgrading

Another motor of “protection’s” troubling circularity can be found in the increasingly complex ties between local property assets and global capital markets, a relationship that largely postdates Schnaiberg’s conceptualization of ToP₁. As the 2007–2008 credit crisis showed, future-oriented promises of payments wrapped up in property-based debt and insurance contracts are now an integral part of the system of investment and lending upon which consumer capitalism depends (Fligstein and Habinek, 2014; Krippner, 2012). In this system, local prospects of economic growth are increasingly entangled—through bond markets and securitized debt—with distant centers of finance (Aalbers, 2016). As a result, judgments by financial actors regarding a community’s ability to protect the integrity of the built environment (i.e. what is the likelihood that a municipality will resist a particular hazard event), hold increasing sway over how risk and protection are discussed and framed by local authorities (Peck and Whiteside, 2016; Taylor, 2020).

Louisiana is at the forefront of this dynamic. In 2005, rating agency Moody’s downgraded New Orleans’ bond rating to junk status “in large part due to the unprecedented disruption to the city’s economy and revenue that Hurricane Katrina caused” (Moody’s, 2017: 10). This increased the municipal government’s cost of borrowing capital precisely at the moment when it was most in need of cheap recovery money, a “nightmare scenario” for the city (Norton, 2019). While New Orleans eventually got back on feet, the city faced another downgrading event in 2019 by Fitch’s, this time due to stress on the city’s sewage system caused by climate-influenced floods in 2017 (Climate Nexus, 2017; Fitch Ratings, 2019). Such seesawing rates make it more expensive to maintain existing city services, let alone improve or expand them (Painter, 2018).

Institutional investors are increasingly expecting local governments to demonstrate that they are aware of, and trying to manage, these emerging risks (Flavelle, 2018). According to research by the asset management giant BlackRock, “within a decade,” in the absence of decisive climate action, “more than 15 percent of the S&P National Municipal Bonds index [will] be issued by metropolitan areas suffering likely average annualized economic losses of 0.5 percent to 1 percent of GDP” (BlackRock, 2019: 10). In light of these kind of reports, efforts such as Louisiana’s Coastal Master Plan (whose largest protection expenses target New Orleans) can be understood as complex market signaling devices. They demonstrate (through advanced modeling capacity, active fundraising, and a steady pipeline of projects) the State’s appetite to shield a broad array of fixed assets from coastal vulnerabilities. The very existence of the CPRA and its ongoing expenditures serve to soothe nervous lenders, underwriters and other business interests, *performing* the value of the state’s protective intent (Nost, 2015; Wakefield, 2019a).

In the absence of such extravagant displays, the response of lenders and underwriters follows two likely paths: increase the cost of capital or withdraw services altogether. In both instances, the resilience of communities is undermined long before the event of a “natural disaster” as homeowners and businesses struggle to maintain access to insurance and credit, property values begin to suffer, and tax receipts upon which local governments depend for their operations and services begin to shrink (Elliott, 2018b; Gray, 2021; Shi, 2020). These perceptions of future risk, regardless of the performative efforts of the state, are slowly seeping into US real estate markets. Coastal property values, for instance, are already starting to experience forms of market discounting (Freddie Mac, 2016; Keenan and Bradt, 2020), hinting at the possibilities for future economic shifts that will see household wealth erode in tandem with disappearing wetlands in places like Louisiana (Federal Reserve Bank of San Francisco, 2019; Hino and Burke, 2020). By putting policy commitments and public money on the table, the Master Plan serves in some measure to forestall even greater negative risk assessments, while also potentially delaying more substantive efforts to move people out of harm’s way.

Socialize local protection costs as widely as possible

Finally, a third major problem posed by the dynamics of ToP₂, compared to ToP₁, is that expenditures on protection against climate risks often generate “avoided losses,” rather than new revenues. They do not, in other words, typically pay for themselves. As a result, in the face of mounting damages, private capital will attempt to offload protection expenses onto local authorities,¹⁵ who will further try and pass those costs on to central governments (Traywick, 2016). As urban sociologists have shown, these efforts enjoy significant economic support from local networks of real estate developers, property owners, and building contractors—what Molotch (1976) called “growth coalitions.” In the aftermath of disasters, such coalitions have become adept at treating federal aid as part of local “recovery growth machines” (Pais and Elliott, 2008), entrenching parochial interests around ongoing federal relief.¹⁶

Louisiana, over the years, has been remarkably successful at socializing local catastrophe losses through national disaster recovery payments.¹⁷ Since 2005 alone, state communities have received over \$100 billion in disaster aid from various federal programs and agencies.¹⁸ Yet, much of this support is distributed in deeply unequal and racially targeted ways such that “reconstruction” leaves some Louisianan communities poorer and more vulnerable than they were prior to a disaster (Fussell, 2015; Sovacool and Linnér, 2016: ch. 4). A decade after Hurricane Katrina, for instance, the black population of New Orleans still has not returned to its pre-storm levels, in part because these individuals have a much harder time accessing federal aid (Horowitz, 2020). Recent studies have found this form of dispossession pertains across the U.S. as recovery aid disproportionately flows toward white people of means, while minorities and the marginal (ostensibly those most in need of help) backslide further into precarity and debt after a disaster (Howell and Elliott, 2018).

The same vulnerabilities that lead to economic disparity for some, however, can be framed as an economic advantage for others. The CPRA, for instance, has characterized its planning around coastal protection as a lucrative form of economic stimulus. Officials expect the expertise they are developing around coastal planning will give Louisiana a leg up in the growing global sector of “water risk management” (CPRA, 2017). The success of Dutch engineering companies such as Deltares and Arcadis, who the CPRA paid to help develop their Master Plan, provide a business model for the state’s own ambitions in the transnational sector of commercial coastal resiliency (Leitner et al 2018; Goh, 2020). With official disaster spending up by a factor of 10 in recent years in the U.S. compared to the past four decades (and declarations of major disasters doubling over the same period), this growing coalition of recovery experts can be expected to continue echoing state calls for increased protection spending (Stein and Van Dam, 2019).

Finally, the government’s own Army Corps of Engineers is complicit in perpetuating ToP₂ dynamics in Louisiana as well. The recently completed Greater New Orleans Hurricane and Storm Damage Risk Reduction System, built by the Corps for \$14 billion following Hurricane Katrina, provides a stunning example of the need to rethink current approaches to protection. Begun in 2007, with the intention of securing New Orleans from the proverbial 1-in-100-year storm, the levees are already subsiding at a pace far exceeding modeled expectations, which, coupled with new sea level rise projections will likely render the entire system out-of-date within 4 years (Frank, 2019; US Army Corps of Engineers, 2019).¹⁹ The immensity of these kinds of expenditures, however, create path dependencies that make it economically and politically difficult for policymakers to ignore calls for “one more round” of upgrades from constituents who are project beneficiaries (Anguelovski et al., 2016; Eriksen et al., 2015).

Headwinds on the treadmill?

Despite different treadmill traps, ToP₂ also generates resistance. In Louisiana, for instance, a number of parishes have brought lawsuits seeking damages from oil companies for years of neglecting laws that require companies to maintain (or backfill) dredged canals (ILR, 2019; SLFPA vs Tennessee Gas Pipeline Co., 2017). Even though courts have rejected these suits, they demonstrate that some local officials are willing to adopt more adversarial relations with industry. But demands for a fuller accounting from the oil and gas sector for their role in coastal degradation are, on the whole, tepid.²⁰ This is even more true to the extent that certain constituents in Louisiana (including broad swaths of negatively exposed communities) appear to harbor a general mistrust of government regulations, even those ostensibly designed for their benefit (Hochschild, 2016). “The oil industry not only molded the politics and economics of Louisiana,” writes legal scholar Oliver Houck, “it molded the mind” (Houck, 2015: 192).

At the same time, increasing scientific evidence may also make it harder to ignore the economic consequences of staying on the treadmill. In the U.S. context, according to numerous studies, Southern states will likely face the largest economic impacts from climate change (Hsiang et al., 2017; Rasmussen et al., 2016; Schinko et al., 2020). Over time, it is not difficult to imagine that politicians and citizens from other parts of the country will feel less and less inclined to foot the bill for communities that do not demonstrate tangible progress toward reducing their vulnerabilities (Branch and Plummer, 2020; Stein and Van Dam, 2019). Also, as other states begin coping with their own increasingly deranged climates, tougher negotiations can be expected around who pays for what following a disaster (Schroeder and Stauffer, 2018). In other words, to the extent that protection costs begin to rise in multiple places, there may be more push back against treadmill effects as disaster recovery resources become constrained.

Beyond resistance to ToP₂, there are also imaginative alternatives. Within the bounds of market-oriented solutions, some climate-impacted states in the U.S. are adopting carbon pricing schemes, and using the proceeds of these schemes to fund restoration and protection work. Different than legal liability, these “polluter pay” models spread the costs of greenhouse gas emissions across the entire chain of fossil fuel-based production and consumption. New Jersey recently adopted a carbon pricing mechanism and is allocating some of the proceeds to rebuilding wetlands along the Chesapeake Bay (McCabe, 2020). Louisiana, with the third highest per capita emissions in the country, could generate significant revenue from extractive industries that have benefited from decades of favorable regulations. Estimates suggest that just targeting electric utilities in the state (and excluding other large emitters such as refineries and petrochemical manufacturers), could generate between \$110 and \$293 million/year, which could be funneled into restoration work, while gradually ratcheting down climate-altering emissions at the same time (Davis and Boyer, 2017).

Another prime alternative to ToP₂ can be summed up by what planners call “managed retreat” (Koslov, 2016). Retreat, in the context of coastal risk, “refers to the relocation of people to higher ground and associated efforts to plan and manage that movement” (Koslov, 2016: 362). It means adjusting conceptions of what constitutes “protection” and developing new expectations of coastal living. It follows similar calls for “amphibious” policy approaches (Jensen, 2017), where public spending focuses on what prominent New Orleans architect and planner David Waggoner calls “living with water,” rather than against it (Waggoner and Ball, 2010). Amphibious thinking recognizes vulnerability as a persistent quality of coastal zones, as opposed to something that can be designed away (Wakefield, 2019b).

The CPRA gestures toward this line of thinking in its Master Plan through what they call “non-structural” investments. These are investments that go to elevating homes, “floodproofing” larger structures, and buying out properties that cannot be protected. There is increasing evidence that

offering people the means to proactively get out of harm's way can have significant upsides for both public finances and individuals' abilities to get on with their lives (Koslov, 2019; Mach et al., 2019; Siders et al., 2019). Yet, retreat is not a silver bullet; it introduces other issues of loss that are difficult to calculate and likely impossible to compensate (loss of community; loss of affective attachment to place) (Elliott, 2018a). In the most recent Master Plan, however, only about 10% of the overall budget is set aside for non-structural interventions, indicating that there is still little political will for this kind of strategy in Louisiana.²¹

Reframing protection

Louisiana's vulnerabilities are the result of a complex set of factors and patterns of anthropogenic interventions spanning scales of time and space that defy easy policy solutions at the local level. As asserted in this paper, a logic of protecting existing economic gains has emerged as a default public policy position, even if incumbent activities simultaneously participate in processes of "unprotection." Public officials, in lieu of holding specific actors accountable, turn to sophisticated simulation exercises and "optimization" analyses to determine where and how money should be spent. This process works to depoliticize decision-making while also favoring protective actions that prop up current sources of public revenue, including extractive sources that exacerbate present and future vulnerabilities. Once protective investments are made (particularly large-scale investments), they can create infrastructural lock-in, making it harder to change course in the future (sunk costs invite more sunk costs). I call this overall situation the "treadmill of protection."

My conceptualization of ToP₂ is framed heavily around the Louisiana case, yet similar dynamics of political economy are afoot elsewhere in the U.S. and other parts of the world. Fresh research already shows ToP₂ at work in states and cities heavily dependent on tourism and property tax revenue linked to esthetically desirable, yet environmentally overburdened, urban areas. Major urban areas such as Boston, metro-Miami, New York, Venice, and Jakarta are all doubling down on expensive coastal infrastructure protections in recognition of risk, while also paradoxically encouraging additional coastal development to help maintain the tax base that pays for protection (Cohen, 2020; Samiolo, 2012; Taylor, 2020; Wakefield, 2019a; Colven 2017). Evoking the treadmill in all but name, one planning scholar writes in reference to Boston, "The trend of dense new developments along the coast is worrisome because it commits taxpayers to protecting these investments down the road—stressing the very budgets that town leaders and city planners hope to balance by building the developments in the first place" (Shi, 2020).

ToP₂ dynamics are also present in other sectors, such as agriculture. In territories experiencing increasing water scarcity, for instance, where farming constituencies retain significant political clout, rural coalitions are able to exert pressure on public authorities to protect agricultural access to water supplies, even if it means expensive and potentially maladaptive irrigation infrastructure (Gaudin and Fernandez, 2018). The California Delta Conveyance Project, which aims to transport water at great cost from the Sacramento and San Joaquin River Deltas into Central Valley farmlands of California (Lakoff, 2016; Scoville, 2015), bears all the hallmarks of the treadmill. It would lock in status quo irrigation and cultivation practices for another decade or so, saving, at least temporarily, the Central Californian model of industrial food production. Protection, in each of these cases, essentially buys extra time for extraction, allowing incumbent economic actors to chase a final round of returns on existing investments, while delaying a deeper public reckoning with the social and environmental consequences of their activities.

Some aspects of ToP₂, as conceived in this paper, are especially relevant to the U.S. context, such as the politics of federal disaster aid in Louisiana, or the protective reactions by local governments against threats to creditworthiness.²² Yet these examples point to similar mechanisms

elsewhere. Tools being developed to evaluate climate risks in U.S. municipal debt are already being promoted for scrutinizing risks in the sovereign bond market (BlackRock, 2019). Natural hazard-exposed developing countries may be pushed to divert multilateral loans toward “loss avoidance” protection efforts and away from economic development, making it harder to pay back borrowed money. South East Asian countries such as Myanmar and, the Philippines are considered particularly vulnerable in this regard (Volz et al., 2020). Other dimensions of ToP₂ at work in developing countries deserve exploration, particularly in regions caught in what political economists call the “natural resource curse” (Ross, 2018; Sachs and Warner, 2001), where extractive industries dominate post-colonial politics. Elaborating these additional contexts will help further define the theoretical reach of the concept.

This paper is not arguing that governments should not spend money on adaptation. This money is already being spent, even if sometimes quietly (Koslov, 2019). What it hopes to encourage is additional research into the political economy of protection. Scholars need a better understanding of who benefits from public expenditures toward reducing vulnerability. Are local officials, national governments, and transnational actors actually working to redistribute risk fairly, or merely trying to defer losses and shelter private profits in the short-term? What kind of protection coalitions are already emergent in different territories? And what kind of accounting is necessary to understand the transfers of wealth involved in protection measures? Scholars also need to be primed for alternatives. Breaking out of treadmill tendencies in Louisiana likely means figuring out how to inhabit new coastlines, instead of preserving old ones. “Agricultural retreat,” meanwhile, might look something like publicly assisting local farmers in shifting to new crops and adaptive farming practices, rather than maintaining water intensive modes of growing food.

The original treadmill of production analysts believe that a positive form of the environmental state can only be achieved through some form of de-industrialization. Getting off the treadmill of protection will require a similar restructuring of the role and use of public finance in the age of the Anthropocene as capital interests strive to squeeze one last cycle of profit out of past investments, while also gambling that they will not be the last ones left holding worthless properties and other sunk assets. Scholars need to move past the insight that protection for one group frequently means exacerbating vulnerabilities for others and begin articulating positive forms of adaptation premised on redistributing social and environmental vulnerability in a more equitable and even reparative fashion. Public authorities, meanwhile, should be called on to show how they are facilitating logics of protection that both mitigate the underlying drivers of the Anthropocene and reduce the exposure of already fragile populations, rather than gradually and repetitively enhancing both.

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Notes

1. Abrupt and catastrophic impacts include extreme weather, heat waves, drought, and wildfires; more incremental impacts include nuisance flooding, salt water intrusion, greater variation in precipitation, and increased airborne smoke. Both forms of change, abrupts and gradual, invoke different coping strategies and institutional capacities (Kates et al., 2012).
2. While some of this spending will be private in nature (Goldstein et al., 2019), the bulk will involve major infrastructure spending, which historically depends on large outlays of public monies.
3. As the public-facing Comprehensive Master Plan for a Sustainable Coast puts it: “In view of rising seas and the migration of people away from Louisiana’s southernmost parishes, some have asked, ‘Why not just give up on Louisiana’s coast?’ The answer is simple: Our combination of resources, cultural heritage, and geography are found nowhere else on earth. The delta of one of the world’s great rivers, vast resources, and wetland habitats—these things are all here in coastal Louisiana and worth celebrating and protecting” (CPRA, 2017: 11).
4. Primary data for the case study was gathered during three weeks of field work in Louisiana in November of 2019, where I visited different coastal communities and conducted 10 semi-structured interviews with state officials from the Coastal Protection and Restoration Authority (CPRA), the Governor’s office, the Office of Community Development, the Department of Insurance, coastal engineers, landscape architects, oystermen, and members of the Pointe-au-Chien Indian Tribe. Other documents reviewed include scientific articles on Louisiana’s wetland loss, state budget and economic analyses, rating agency reports, and a wide range of planning documents, criticism, newspaper accounts, and prior restoration plans predating the CPRA’s current Coastal Master Plan.
5. The notion of degradation, for instance, depends on a prior baseline against which degradation can be measured. While this use of baselines works well for describing changes to ecosystems, it is less adapted when describing changes to the atmosphere. “Additions” of greenhouse gases may push the atmosphere into a new “state,” but it is a stretch to call this new situation a “degradation,” since there are previous examples in the geologic record of earth achieving similar levels of atmospheric greenhouse gases.
6. While this situation is particularly stark for the fact that it is happening in the context of a developed economy such as the U.S., it echoes problems facing other oversubscribed deltas such as the Mekong, the Niger, and the Ganges rivers. Considering just the impacts of anthropogenic climate change in these areas (to the exclusion of other forms of anthropogenic forcing), economists estimate that “the costs of local rising sea levels for [global] coastal cities will be much larger than those due to socioeconomic changes, and could amount to US\$ 1 trillion/year in the absence of appropriate adaptation measures” (Hallegatte et al., 2013).
7. As ToP₁ might predict, when the state’s broader campaign to “save America’s wetlands” kicked off in the early 2000s, it was financed by none other than the oil and gas industry (Randolph, 2018). If there was one culprit that the industry picked out, it was the Army Corps of Engineers (i.e. the federal government), for building and managing all the upstream diversions and levees (Houck, 2015: 270–272).
8. Louisiana’s petrochemical industry, which relies on its tight proximity to cheap hydrocarbon feedstocks, turns offshore petroleum and gas into ingredients for shampoos, disinfectants, pharmaceuticals, cosmetics, milk cartons, adhesives, toys, wetsuits, furniture, electronics, and single use plastics, among many other consumer products.
9. The proportion reserved for the four Gulf states is 37.5% of annual offshore revenues, capped at \$500 million/year. For Louisiana, the full portion they can receive is \$140 million, which they did for the first time in the 2020 GOMESA allocations.
10. Globules of crude oil from the BP disaster aggregated in coastal wetlands, further degrading salt grasses and soils. The persistence of oil and its effects in these ecosystems is poorly understood. A recent landmark survey, published in the journal *Nature*, found that astonishing amounts of hydrocarbons were

still present in over ninety species of fish a decade after the explosion; in other words, across the entire trophic chain of the region (Pulster et al., 2020).

11. My understanding of CPRA project prioritization was especially informed by my interviews with the Chief Resilience Officer for the State of Louisiana, conducted by Zoom on 10/24/2019, and with a CPRA assistant administrator and software engineer, conducted in Baton Rouge, 11/25/2019.
12. In a further twist of the ToP₂ screw, the majority of restoration expenses go toward purchasing diesel fuel to pump dredged sands to barrier island or marsh sites—sites undermined by the very fuel used to restore them (Wiegman et al., 2018).
13. Identifying precisely who is benefiting from CPRA investments deserves its own empirical study. At the regional level, protection expenditures provide diffuse benefits, so it is not always easy to separate private gain from public good. That said, the oil and gas industry is, by any measure, a “frontline beneficiary” of restoration investments. Roughly 80% of land along the coast in Louisiana is private property, with the majority of that being owned by companies and holding groups affiliated with the oil and gas sector. Any effort to build back land positively affects these landowners (Theriot, 2014).
14. For instance, the projected budget for the CPRA from 2020 onward tops \$1 billion in annual expenditures, which is equivalent to roughly 4% of the entire state budget. As an increasing amount of public revenues go toward unevenly distributed “protective” expenditures, it is easy to imagine that some communities will face not just increasing exposure to the physical impacts of climate change, but potentially constrained spending on other social services as the overall pie of public money gets stretched thinner and thinner (Shi and Varuzzo, 2020).
15. An example: Farmers’ Insurance Co. suffered multiple repeat flood claims in a 5-year period on residential properties it underwrote in the Chicago area between 2010 and 2014. In an effort to recuperate some of its losses, the company sued the city for “failing to prepare for the effects of global warming,” pointing to an adaptation plan which Chicago had developed that recognized the need for investments in greater storm water management capacity (Paquette, 2014). The company withdrew the suit before it went to trial, but the attempt points to a broader logic of climate risk liability that will certainly expand as Anthropocene impacts worsen.
16. This dimension of the treadmill is observable even in relatively wealthy, liberal jurisdictions, such as New York City. After Superstorm Sandy struck NYC in 2012, Congress approved a massive disaster recovery bill to assist the city in rebuilding. Many areas that flooded were not included in the Federal Emergency Management Agency’s (FEMA) flood maps that determine whether or not residents must own federal flood insurance. FEMA updated its maps with new data on storm surge risk, but the expanded flood zones received immense push back from residents, tens of thousands of whom would now be obliged to purchase flood insurance. Officials from the city spent extensively on an engineering report that disputed FEMA’s findings (despite NYC having already conducted sophisticated sea level rise risk estimates that shared FEMA’s updated risk perceptions). Ultimately, the city succeeded in excluding thousands of homes from FEMA’s new flood maps thus saving their constituents higher insurance premiums, while keeping federal taxpayers on the hook for future disaster bills (Elliott, 2018b).
17. The state already benefits from being one of the highest recipients for federal money for basic operations and social programs. According to annual Pew reports comparing the fiscal solvency of US states, Louisiana is the third most federally dependent state per capita. For every \$1 the state sends to the federal government in taxes, it receives \$1.52 back (Rosewicz and Huh, 2019).
18. Accounting for federal disaster spending is very difficult, as relief arrives through numerous agencies and appropriation processes. To get at the \$100 billion estimate for LA relief since 2005 (\$98.849 billion, to be precise), I relied on the Louisiana Division of Administration’s accounting of U.S. Department of Housing and Urban Development grants received since 2005 (Louisiana Division of Administration, 2020), the Federal Emergency Management Administration (FEMA)’s summary of its disaster mitigation and preparedness grants to the state from 2005 to 2016 (FEMA, 2020), and a new web portal run by an interagency federal task force that tracks all recovery money allocated, state by state, beginning in 2017 (U.S. Recovery Support Function Leadership Group, 2020). Supplemental Congressional appropriates for Katrina relief were not included in these databases, so these were added to the total LA relief estimates from Congressional Research Services reports (Lindsay and Nagel, 2019). While this \$100 billion figure

- may contain slight double counting for 2005, it also likely underestimates total federal disaster expenditures in LA because it does not systematically account for levee and construction work done by the US Army Corps of Engineers after 2005, which, in addition to FEMA, accounts for a disproportionate amount of the state's federal disaster assistance.
19. In a comment in the Federal Register just after having finished construction on the massive hurricane system (whose levees stand at 35 feet), the Army Corps stated that, "absent future levee lifts to offset consolidation, settlement, subsidence, and sea level rise, risk to life and property in the Greater New Orleans area will progressively increase." Treadmill of protection logic if ever it existed.
 20. For instance, under the recent economic downturn caused by COVID-19, Louisiana Governor Bel Edwards joined other regional governors asking for more GOMESA royalties; importantly, however, the governors are not asking for oil and gas companies to pay more royalty payments, just for the federal government to redistribute more of the payments to the Gulf states (Outer Continental Shelf Governor's Coalition, 2020).
 21. A separate branch of the Louisiana state government, the Office of Community Development (the state office responsible for administering disaster relief from the federal government), has actually developed a detailed manual for community adaptation that puts "managed retreat" front-and-center in Louisiana's planning for climate impacts, including encouraging the state to think about preparing "receiver communities" for those that migrate from the coast (LA SAFE, 2019). According to author interviews with numerous state officials, however, the plan has neither political backing from the legislature nor the Governor's office, so it remains to be seen to what extent its ideas are able to reorient the efforts of the CPRA.
 22. It is true that U.S. states, municipalities and other local public entities have an unusual amount of authority in terms of self-financing urban and regional infrastructure by issuing debt. Few European cities, for instance, have anything resembling the same bonding powers (Cox, 2017). This accounts for why the U.S. makes up such a disproportionate part of the global municipal bond market (67%) (Cox, 2017).

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