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Who manages a spill? multilevel collaborative governance of offshore oil spills in Brazil and the United States*

Quem gerencia um derramamento? governança colaborativa multinível de derramamentos de petróleo offshore no Brasil e nos Estados Unidos

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Abstract

In a federal system, who takes lead when an offshore oil spill occurs? There is a need for multilevel collaborative governance at the local, state, regional, and federal level, and across the public, private, and civic spheres. But such governance is hard to coordinate and harder to maintain. In this paper, we conducted process-tracing for comparative case-study analysis to identify the causal mechanisms that led to inadequate government response to the 2010 Deepwater Horizon and 2019 Northeast oil spills in the United States and northern Brazil, respectively. We recognize that our case studies serve primarily as illustrations within the broader international context. However, it should be noted that these studies encompass two nations of considerable significance in terms of their socio-economic and environmental contributions. We find that while systems may be designed to ensure cooperation, there is often discordance and disagreement in the face of actual environmental problems.

Keywords: oil spill; multilevel governance; Brazil; Gulf of Mexico

Resumo

Num sistema federal, quem assume a liderança quando ocorre um derramamento de petróleo no mar? É necessária uma governança colaborativa a vários níveis, a nível local, estatal, regional e federal, e nas esferas pública, privada e cívica. Mas essa governança é difícil de coordenar e de manter. Neste artigo, realizamos o rastreamento de processos para análise comparativa de estudos de caso para identificar os mecanismos causais que levaram a uma resposta inadequada do governo aos derramamentos de petróleo da

Deepwater Horizon em 2010 e do Northeastern em 2019 nos Estados Unidos e no norte do Brasil, respectivamente. Reconhecemos que nossos estudos de caso servem principalmente como ilustrações dentro do contexto internacional mais amplo. No entanto, deve-se notar que esses estudos abrangem duas nações de considerável importância em termos de suas contribuições socioeconômicas e ambientais. Verificamos que, embora os sistemas possam ser concebidos para assegurar a cooperação, existe frequentemente discordância e desacordo face aos problemas ambientais reais.

Palavras-chave: derramamentos de petróleo; governação a vários níveis; Brasil; Golfo do México

1 Introduction

In federalist systems, the governance of disasters, including oil spills, necessitates multilevel collaborative efforts among various levels of government and across the public, private, and civic spheres. However, coordinating such governance can be challenging, leading to discordance and disagreements when confronted with actual environmental crises. This paper employs process-tracing for a comparative case-study analysis to explore the causal mechanisms that resulted in inadequate government responses to two significant oil spills: the 2010 Deepwater Horizon oil spill in the United States and the 2019 Northeastern oil spill in northeast Brazil. By examining these cases, the article aims to shed light on the complexities of disaster governance in federalist systems and the need for effective coordination and collaboration.

Federalist systems, characterized by the separation and sharing of authority between national, state, and sometimes local levels of government, inherently encounter tensions in the governance of disasters.¹ Natural disasters, such as hurricanes, primarily fall under the purview of state and local governments, with the federal government supporting capacity building and guidance for preparedness and response.² In contrast,

technological disasters, like oil spills, are predominantly governed by federal authorities, with the federal government taking the lead in response and coordination.³

Inherently, disaster governance is a “multi-layered, and multi-actor affair,” where the main challenge is to achieve coordination and unity of action to optimize policy and decision-making results.⁴ Effective disaster response, especially of oil spills, requires multilevel governance, which Marks describes as “... a system of continuous negotiations among nested governments at several territorial tiers,” in which “supranational, natural, regional, and local governments are enmeshed in territorially overarching policy networks.”⁵ Traditionally, the concept of multilevel governance has focused on vertical coordination between higher and lower levels of government.⁶ Lottie and Hesselman suggest that this might more accurately be termed ‘multi-level government’ because the levels are conceptualized like “a set of ‘Russian doll-like’ jurisdictions that each have a set of non-overlapping functions, competences, and members.”⁷ Increasingly, the concept has been expanded to include horizontal interactions at different levels between governments and non-governmental actors, including private sector actors, such as corporations and non-profit organizations, members of civil society, and social movement actors. According to Stein and Turkewitsch, this shift denotes a change in political analysis from statist models of decision-making towards more shared or cooperative models that are more aptly understood as governance.⁸

2007.; GODCHALK, D. *Natural hazard mitigation: recasting disaster policy and planning*. Washington: Island Press, 1999.

³ BIRKLAND, T. A.; DEYOUNG, S. E. Emergency response, doctrinal confusion, and federalism in the Deepwater Horizon oil spill. *Publius: The Journal of Federalism*, [S. l.], v. 41, n. 3, p. 471-493, 2011.

⁴ LOTTIE, L.; HESSELMAN, M. Governing disasters: embracing human rights in a multi-level, multi-duty bearer, disaster governance landscape. *Politics and Governance*, [S. l.], v. 5, n. 2, p. 93-104, 2017.

⁵ MARKS, G. Structural policy and multi-level governance in the E C. In: CAFRUNY, A.; ROSENTHAL, G. (ed.). *The state of the European community: the Maastricht debate and beyond*. Boulder: Lynne Rienner, 1993. p. 391-411.

⁶ STEIN, M.; TURKEWITSCH, L. *The concept of multi-level governance in studies of federalism*. In: INTERNATIONAL POLITICAL SCIENCE ASSOCIATION INTERNATIONAL CONFERENCE. Montréal, 2008.

⁷ LOTTIE, L.; HESSELMAN, M. Governing disasters: embracing human rights in a multi-level, multi-duty bearer, disaster governance landscape. *Politics and Governance*, [S. l.], v. 5, n. 2, p. 93-104, 2017.

⁸ STEIN, M.; TURKEWITSCH, L. *The concept of multi-level governance in studies of federalism*. In: INTERNATIONAL POLITICAL

¹ RADIN, B. A.; BOASE, J. P. Federalism, political structure, and public policy in the United States and Canada. *Journal of Comparative Policy Analysis: Research and Practice*, [S. l.], v. 2, n. 1, p. 65-89, 2000.

² BIRKLAND, T. A. Disasters, catastrophes, and policy failure in the homeland security era. *Review of Policy Research*, [S. l.], v. 26, n. 4, p. 423-438, 2009.; COL, J. M. Managing disasters: the role of local government. *Public Administration Review*, [S. l.], v. 67, p. 114-124,

Oil spill governance in the United States involves a combination of federal and state authorities, with jurisdiction shared between the federal government and state governments in coastal waters.⁹ The Oil Pollution Act of 1990¹⁰ (OPA) designates the President, with delegation to the U.S. Coast Guard or the Environmental Protection Agency (EPA), as responsible for oil spill response, and an On-Scene Coordinator (OSC) is appointed to direct and coordinate response activities.¹¹ Similarly, Brazil employs the National Contingency Plan for Oil Pollution Incidents in Waters Under National Jurisdiction (NCP) to manage oil spills, activated by an interagency federal group for monitoring and evaluation.¹² Both countries follow a standard incident command system at national, regional, and local levels to ensure effective coordination.

The «polluter-pays» principle, present in the laws of both the U.S. and Brazil, assigns liability to the responsible party for the oil spill incident, requiring them to compensate for damages.¹³ However, despite these legal frameworks, responses to oil spills in both countries have faced criticisms due to institutional gaps, poor communication, inadequate planning, and fragmented federal policies.¹⁴ These challenges highlight the complexities of disaster governance in federalist systems and the importance of enhanced collaboration and coordination to address environmental crises effectively.

In the following sections, we will delve into a comparative case analysis of the 2010 Deepwater Horizon and 2019 Northeastern oil spills, identifying the causal mechanisms that contributed to the inadequate government responses and shedding light on the broader implications for disaster governance in federalist systems. By understanding the shortcomings in these cases, we aim to propose recommendations for improving the collaborative governance required to effectively respond to oil spills and other environmental disasters.

2 Disaster Governance in Federalist Systems

Federalist systems separate and share authority “horizontally through the delineation of separate institutions charged with executive, legislative, and judicial functions, as well as vertically through the assumption of shared or separate powers between the national, state, and sometimes local levels of government”.¹⁵ Disasters are an area of shared governance in federalist systems, and tensions between federal and subnational government authority is inherent to the policy area.¹⁶ Policies and programs designed to address disasters in federalist systems tend to be defined in terms of extreme events and, overtime, assign an expanded role to the federal government for disaster assistance.¹⁷

Shared governance of disasters looks very different for those caused by technological failure (e.g., oil spill) and those attributed to natural hazards (e.g., hurricanes). In the U.S., the federal government’s role in natural disasters has significantly grown over the past 70 years,¹⁸

SCIENCE ASSOCIATION INTERNATIONAL CONFERENCE. Montréal, 2008.

⁹ RAMSEUR, J. L. Oil spills: background and governance. *CRS Reports*, 2023.

¹⁰ UNITED STATES. *Oil pollution ACT*. 33 U.S.C. 1990.

¹¹ RAMSEUR, J. L. Oil spills: background and governance. *CRS Reports*, 2023.

¹² BARBEIRO, P. P.; INOJOSA, F. C. Assessing the actions of the Brazilian Federal Government to respond to the 2019 mysterious oil spill: a perspective of the national environmental agency. *Anais da Academia Brasileira de Ciências*, [S. l.], v. 94, p. e20210320, 2022.

¹³ RAMSEUR, J. L. Oil spills: background and governance. *CRS Reports*, 2023.; AUSTRALIA. Law Library of Congress. *Oil spill liability and regulatory regime*. 2014. Available in: <https://tile.loc.gov/storage-services/service/ll/lglrd/2013417621/2013417621.pdf>. Access at: Nov. 2023.

¹⁴ GONCALVES, L. R.; WEBSTER, D. G.; YOUNG, O.; POLETTE, M.; TURRA, A. The Brazilian blue Amazon under threat: why has the oil spill continued for so long?. *Ambiente & Sociedade*, [S. l.], v. 23, 2020.; BARBEIRO, P. P.; INOJOSA, F. C. Assessing the actions of the Brazilian Federal Government to respond to the 2019 mysterious oil spill: a perspective of the national environmental agency. *Anais da Academia Brasileira de Ciências*, [S. l.], v. 94, p. e20210320, 2022.; RAMSEUR, J. L. Oil spills: background and governance. *CRS Reports*, 2023.

¹⁵ RADIN, B. A.; BOASE, J. P. Federalism, political structure, and public policy in the United States and Canada. *Journal of Comparative Policy Analysis: Research and Practice*, [S. l.], v. 2, n. 1, p. 65-89, 2000. p. 67.

¹⁶ ROSS, A. D. Public sector agencies and their formal legal and administrative responsibilities. In: CUTTER, Susan L. *Oxford research encyclopedia of natural hazard science*. Oxford: Oxford University Press, 2019.

¹⁷ MAY, P. J.; WILLIAMS, W. Disaster policy implementation: Managing programs under shared governance. In: SURHONE, Lambert M.; TIMPLEDON, Miriam T.; MARSEKEN, Susan F. (ed.). *Springer science and business media*. Beau Bassin: Betascript Publishing, 2012.

¹⁸ MAY, P. J.; WILLIAMS, W. Disaster policy implementation: Managing programs under shared governance. In: SURHONE, Lambert M.; TIMPLEDON, Miriam T.; MARSEKEN, Susan F. (ed.). *Springer science and business media*. Beau Bassin: Betascript Publishing, 2012.; ROSS, A. D. Public sector agencies and their formal legal and administrative responsibilities. In: CUTTER, Susan L. *Oxford research*

and subnational governments, namely city and county governments, continue to have the primary responsibility for disaster response within their jurisdictions.¹⁹

Central to the federal government's role in natural disasters is building the capacity of state and local governments to prepare for and respond to natural hazard threats through the activities of and guidance provided by federal agencies, including, in the U.S., the Federal Emergency Management Agency.²⁰ In contrast to this approach, governance of technological disasters is dominated by federal governments. As Birkland and DeYoung explain, "the federal government acts first, without state government requests for assistance, and acts to supervise the cleanup of an oil spill by the spiller, or, in legal terms, the 'responsible party.'"²¹

Although the added element of civil liability puts the federal government as the lead authority in oil spill response, there remains a shared responsibility and need for coordination between levels of government in oil spills. The systems of response in the federalist countries of the U.S. and Brazil demonstrate the central role of the federal government in oil spill incidents and the supporting role of state and local authorities.

Differently, in Brazil, the responsibility for acting and coordinating in case of disasters (natural or technological failures) remains on the federal level, since the democratic constitution.²² Therefore, the federal level has to coordinate across levels and actors to play its role accordingly. This pathway was the basis for the entry on the democratic period in Brazil. However, when the-

re is a lack of coordination and political confrontation across levels, the chances of failure to address complex problems in the system are great.²³

The federative model in Brazil was established differently from the North American experience. Rather than a pact among autonomous units, it involved a decentralization of power from the centralized unit to the states over several decades. Despite adopting similar institutional structures, such as a written Federal Constitution, a Federal Senate, and a Superior Court, the results were mixed. While the states gained strength, the Union weakened, leading to a unique centrifugal model unlike the United States. This system also empowered the state executive branch, resulting in an oligarchic political game, unlike in the US, where local power was fundamental to republicanism. Additionally, Brazilian governors emerged as influential national leaders. Hence, in Brazil, if the federal level has any political confrontation with states or is afraid of losing its power, the federative coordination is weakened.²⁴

2.1 Shared Governance of Oil Spill Response

Oil spill governance in the United States (U.S.) involves a combination of federal and state authorities. Per the Submerged Lands Act of 1953, 43 U.S.C. § 1301 et seq., the U.S. federal government shares jurisdiction over coastal waters with state governments up to three nautical miles off the coastline, except for Texas and the Gulf coast of Florida where the state governments have jurisdiction up to three marine leagues from the coastline. The federal government maintains authority to regulate commerce, navigation, national defense, power production, and international affairs within state water, and federal jurisdiction extends to the edge of the exclusive economic zone, 200 nautical miles from shore.

U.S. federal government responsibility and authority for oil spills is governed by the Oil Pollution Act (OPA) of 1990, 33 U.S.C. Ch. 40 § 2701 et seq. Following public outcry about the inadequacies of the

encyclopedia of natural hazard science. Oxford: Oxford University Press, 2019.; RUBIN, C. B. (ed.). *Emergency management: the american experience, 1900-2005*. Fairfax: Public Entity Risk Institute, 2007.

¹⁹ BIRKLAND, T. A. Disasters, catastrophes, and policy failure in the homeland security era. *Review of Policy Research*, [S. l.], v. 26, n. 4, p. 423-438, 2009.; COL, J. M. Managing disasters: the role of local government. *Public Administration Review*, [S. l.], v. 67, p. 114-124, 2007.

²⁰ GODCHALK, D. *Natural hazard mitigation: recasting disaster policy and planning*. Washington: Island Press, 1999.; MAY, P. J.; WILLIAMS, W. Disaster policy implementation: Managing programs under shared governance. In: SURHONE, Lambert M.; TIMPLEDON, Miriam T.; MARSEKEN, Susan F. (ed.). *Springer science and business media*. Beau Bassin: Betascript Publishing, 2012.

²¹ BIRKLAND, T. A.; DEYOUNG, S. E. Emergency response, doctrinal confusion, and federalism in the Deepwater Horizon oil spill. *Publius: The Journal of Federalism*, [S. l.], v. 41, n. 3, p. 471-493, 2011. p. 472.

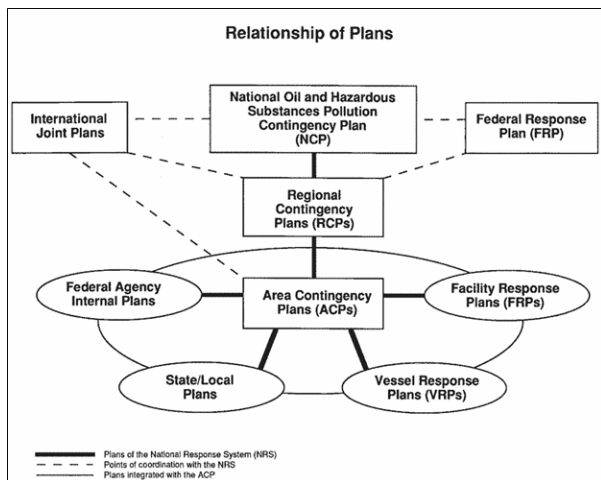
²² BRAZIL. [Constituição (1988)]. *Constituição da República Federativa do Brasil de 1988*. Available in: https://www.planalto.gov.br/cciv-il_03/constituicao/constituicao.htm. Access at: July 2023.

²³ ABRUCIO, F. L.; GRIN, E. J.; FRANZESE, C.; SEGATTO, C. I.; COUTO, C. G. Combate à COVID-19 sob o federalismo bolsonarista: um caso de descoordenação intergovernamental. *Revista de Administração Pública*, [S. l.], v. 54, p. 663-677, 2020.

²⁴ ABRUCIO, F. L.; FRANZESE, C. Federalismo e políticas públicas: o impacto das relações intergovernamentais no Brasil. *Tópicos de economia paulista para gestores públicos*, [S. l.], v. 1, p. 13-31, 2007.

federal government's role in the Exxon Valdez oil spill in 1989, Congress passed the OPA to consolidate existing federal laws on oil spills into a unified multilayered planning and response system for spills in marine environments (Figure 1). OPA designates authority to the President for oil spill response, with delegation to the U.S. Coast Guard for spills in the coastal zone or the Environmental Protection Agency (EPA) for spills in the inland zone. Depending on where the spill occurs, the On-Scene Coordinator (OSC) is an agent of the Coast Guard or EPA and has authority to direct and coordinate all response and recovery activities of federal, state, local, and private entities including the responsible party.²⁵ The OSC has ultimate authority to ensure effective removal of the oil spill and prevention of further discharge from the source.

Figure 1 - Multilayered Oil Spill Contingency Planning for Oil Spills in the United States



Source: Environmental Protection Agency (2016)²⁶

The legal structures for oil spill management in Brazil are similar to the U.S. Oil spills in Brazil are governed by the National Contingency Plan for Oil Pollution Incidents in Waters Under National Jurisdiction (NCP), and it has a novel version since the 2019 northeast oil spill.²⁷

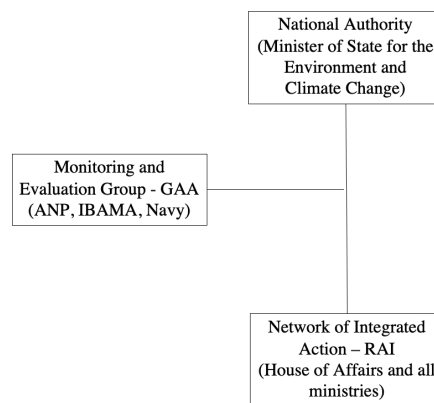
²⁵ RAMSEUR, J. L. Oil spills: background and governance. *CRS Reports*, 2023.

²⁶ ENVIRONMENTAL PROTECTION AGENCY. National oil and hazardous substances pollution contingency plan revisions to align with the national response framework. *Federal Register*, v. 81, n. 15, p. 3982-4005, Jan. 25, 2016. Available in: <https://www.govinfo.gov/content/pkg/FR-2016-01-25/pdf/2016-00663.pdf>. Access at: Nov. 2023.

²⁷ BRAZIL. *Decreto nº 10.950, de 27 de janeiro de 2022*. Dispõe sobre o plano nacional de contingência para incidentes de poluição por óleo em águas sob jurisdição nacional, 2022. Available in: https://www.planalto.gov.br/ccivil_03/_ato2019-2022/2022/decreto/D10950.htm Access at: July 2023.

The organizational structure of the NCP establishes the figure of the National Authority, which coordinates all the activities of the NCP, being exercised by the Minister of State for the Environment and Climate Change, of the Monitoring and Evaluation Group (GAA), responsible for monitoring all and any accident, regardless of size, composed of the National Petroleum, Natural Gas and Biofuels Agency (ANP), the Brazilian Institute for the Environment and Renewable Natural Resources (Ibama), and the Brazilian Navy (MB), and the Integrated Action Network, composed of the House of Affairs of the Presidency of the Republic and ministries. In its structure, instances aimed at the articulation of public bodies are also established. The main executive figure is the Operational Coordinator responsible for commanding immediate actions to the accident, which should preferably be coordinated by the Navy, for incidents in maritime waters, by Ibama, for incidents in inland waters, and by the National Petroleum Agency (ANP) in cases involving underwater drilling and oil production structures.²⁸

Figure 2 - Brazilian NCP new governance structure. Elaborated by authors.



2.2 Polluter-Pays Principle

Laws in the U.S. and Brazil adopt the polluter-pays principle, which assigns liability to the party responsible for the oil spill incident and requires the polluter to com-

htm Access at: July 2023.

²⁸ BRAZIL. *Decreto nº 10.950, de 27 de janeiro de 2022*. Dispõe sobre o plano nacional de contingência para incidentes de poluição por óleo em águas sob jurisdição nacional, 2022. Available in: https://www.planalto.gov.br/ccivil_03/_ato2019-2022/2022/decreto/D10950.htm Access at: July 2023.

pensate for damages. In the U.S., the OPA establishes that a responsible party is liable for all cleanup costs incurred by governmental and private entities up to a specified limit, depending on the source of the spill. Per the OPA, liable damages include injury to natural resources; loss of personal property; loss of subsistence uses of natural resources; lost revenues, profits, and earning capacity resulting from destruction of property or natural resource injury; and costs of providing extra public services during or after a spill response. The OPA also established the Oil Spill Liability Trust Fund, which makes funds immediately available to address an incident.²⁹ The fund has a principal and an emergency component, the former used to pay claims for uncompensated removal costs and certain damages with the latter to be used by federal, tribal, and state authorities in response.³⁰

In Brazil, the right to “an ecologically balanced environment” is enshrined in the federal constitution.³¹ Notably, this was revised following a major oil spill in Guanabara Bay in 1988.³² This right is enforced through Law No. 6938 of 1981 that assigns civil liability to parties responsible for the oil spill to compensate or repair damage to the environment.³³ There are no limits to civil liability and no need to prove fault or willful misconduct; however, there are no provisions for punitive damages as indemnity is limited to direct damages suffered, including loss of earnings.³⁴

2.3 Criticisms of Oil Spill Response Efforts

The responses of the U.S. and Brazilian federal governments to oil spills have been heavily criticized. Exist-

ing laws in both countries that govern oil spill response have emerged in the wake of catastrophic events, thereby leaving institutional gaps in the management approach.³⁵ For example, Brazilian protocol does not address how oil spills with an undetermined source should be handled, because previous strategies have been based on polluter accounting for financial, civil, and even criminal responsibility.³⁶ Beyond reactive policymaking, inadequate federal government responses to oil spills in the U.S. and Brazil have been attributed to fragmented federal policies,³⁷ lax federal regulation enforcement, poor communication and coordination among responding agencies across levels of government,³⁸ late integration of state and local authorities in the response process,³⁹ and poor planning to enable response capabilities (e.g., equipment).⁴⁰ Some of these may be attribu-

²⁹ RAMSEUR, J. L. Oil spills: background and governance. *CRS Reports*, 2023.

³⁰ HEMMINGER, Helkei S. United States and Canada transboundary oil spill liability and compensation regimes: an overview. *IOSC Proceedings*, [S. l.], v. 2021, n. 1, p. 1141278, 2021.

³¹ BRAZIL. [Constituição (1988)]. *Constituição da República Federativa do Brasil de 1988*. Available in: https://www.planalto.gov.br/ccivil_03/constituicao/constituicao.htm. Access at: July 2023.

³² GOLDSMITH, B. J.; WAIKEM, T. K.; FRANEY, T. Environmental damage liability regimes concerning oil spills—A global review and comparison. *IOSC Proceedings*, [S. l.], v. 2014, n. 1, p. 2172-2192, May 2014.

³³ AUSTRALIA. Law Library of Congress. *Oil spill liability and regulatory regime*. 2014. Available in: <https://tile.loc.gov/storage-services/service/ll/lglrd/2013417621/2013417621.pdf>. Access at: Nov. 2023.

³⁴ LINH, D. T. M. Civil liability for marine oil pollution damage in the BRICS Countries. *BRICS Law Journal*, [S. l.], v. 7, n. 3, p. 29-51, 2020.

³⁵ BARBEIRO, P. P.; INOJOSA, F. C. Assessing the actions of the Brazilian Federal Government to respond to the 2019 mysterious oil spill: a perspective of the national environmental agency. *Anais da Academia Brasileira de Ciências*, [S. l.], v. 94, p. e20210320, 2022.; RAMSEUR, J. L. Oil spills: background and governance. *CRS Reports*, 2023.

³⁶ BARBEIRO, P. P.; INOJOSA, F. C. Assessing the actions of the Brazilian Federal Government to respond to the 2019 mysterious oil spill: a perspective of the national environmental agency. *Anais da Academia Brasileira de Ciências*, [S. l.], v. 94, p. e20210320, 2022.; POSSOBON, R. Z.; ESTEVES, R. C.; PEREIRA, A. C. S.; XAVIER, G. Brazilian regulation on oil spill: the need of review. *IOSC Proceedings*, [S. l.], v. 2021, n. 1, p. 689571, May 2021.

³⁷ RAMSEUR, J. L. Oil spills: background and governance. *CRS Reports*, 2023.

³⁸ BIRKLAND, T. A.; DEYOUNG, S. E. Emergency response, doctrinal confusion, and federalism in the Deepwater Horizon oil spill. *Publius: The Journal of Federalism*, [S. l.], v. 41, n. 3, p. 471-493, 2011.

³⁹ GONCALVES, L. R.; WEBSTER, D. G.; YOUNG, O.; POLETTE, M.; TURRA, A. The brazilian blue Amazon under threat: why has the oil spill continued for so long?. *Ambiente & Sociedade*, [S. l.], v. 23, 2020.; BARBEIRO, P. P.; INOJOSA, F. C. Assessing the actions of the Brazilian Federal Government to respond to the 2019 mysterious oil spill: a perspective of the national environmental agency. *Anais da Academia Brasileira de Ciências*, [S. l.], v. 94, p. e20210320, 2022.

⁴⁰ GONCALVES, L. R.; WEBSTER, D. G.; YOUNG, O.; POLETTE, M.; TURRA, A. The brazilian blue Amazon under threat: why has the oil spill continued for so long?. *Ambiente & Sociedade*, [S. l.], v. 23, 2020.; POSSOBON, R. Z.; ESTEVES, R. C.; PEREIRA, A. C. S.; XAVIER, G. Brazilian regulation on oil spill: the need of review. *IOSC Proceedings*, [S. l.], v. 2021, n. 1, p. 689571, May 2021.

ted to the shared governance model ascribed to oil spill response⁴¹ while others are more event-specific.⁴²

3 Methodology Comparative Case Study and Process Tracing

To identify the causal mechanisms that led to inadequate government response to the 2010 Deepwater Horizon and 2019 Northeast oil spills that occurred in the United States and northern Brazil, respectively, we engaged in process-tracing for comparative case-study analysis. According to Beach and Pedersen, process-tracing is a “method for tracing causal mechanisms using detailed, within-case empirical analysis of how a causal mechanism operated in real-world cases”.⁴³ In process-tracing, the analytic focus shifts from causes and effects to hypothesized causal processes that link causes and effects in the form of a productive relationship. Although causal mechanisms are widely used in social science research, there is considerable disagreement about their specificity.⁴⁴ Beach and Pedersen argued that they are much more than descriptive narration, which by definition fails to causally link events. Instead, inferences are made by analyzing mechanistic evidence, which is defined as the observational evidence left by the operation of a causal mechanism in a case. In other words, causal processes are determined by analyzing the “correspondence between the hypothetical empirical fingerprints” that may have been “left by the activities associated with the mechanisms or their parts”.

As a method, process-tracing contains three key components.⁴⁵ First is identification of possible causal

mechanisms. Based on our review of the literature, we hypothesize that government fragmentation, deresponsibilization, and omission of government institutions within both federal systems, coupled with a primary focus on response (e.g., stopping oil flow and oil clean-up), led to inadequate long-term recovery strategies and government reorganization in face of intense criticism. Second is the analysis of empirical manifestations of the hypothesized mechanisms. To conduct our analysis, we engaged in analytic abduction. Data entailed a mix of primary and secondary sources, including government reports, news articles, and scholarly research. The third and final component of process-tracing is the complementary use of comparative case-study methods, which is necessary to generalize beyond within-case findings to include causally similar cases. When combined with within-case analyses, cross-case comparisons “can play a vital role in enabling us to make strong inferences about causal relationships” by providing confirming or disconfirming mechanistic evidence.⁴⁶

4 Case Study: United States

Drilling offshore for oil and gas has a long history both in the United States in general and in the Gulf of Mexico in particular. The first offshore wells were drilled in the Summerville Oil Field, near Santa Barbara, California, in 1896.⁴⁷ These wells were affixed to man-made docks and were only feet from the coast, but it was the beginning of a multibillion dollar industry.

Back at the turn of the 20th century, there were no laws about ownership of oil rights offshore. Domestically, it was not yet a major concern, and international law was still sporadic at best. Customary international law held that states had ultimate rights and responsibilities over the ocean and seabed up to a distance of three miles from the low tide mark on their coast, but after that was free seas open to all.⁴⁸ This was not a problem for states,

⁴¹ BIRKLAND, T. A.; DEYOUNG, S. E. Emergency response, doctrinal confusion, and federalism in the Deepwater Horizon oil spill. *Publius: The Journal of Federalism*, [S. l.], v. 41, n. 3, p. 471-493, 2011.

⁴² BARBEIRO, P. P.; INOJOSA, F. C. Assessing the actions of the Brazilian Federal Government to respond to the 2019 mysterious oil spill: a perspective of the national environmental agency. *Anais da Academia Brasileira de Ciências*, [S. l.], v. 94, p. e20210320, 2022.

⁴³ BEACH, Derek; PEDERSEN, Rasmus Brun. *Process-tracing methods: foundations and guidelines 2*. ed. Ann Arbor: University of Michigan Press, 2019. p. 1.

⁴⁴ e.g., BEACH, Derek; PEDERSEN, Rasmus Brun. *Causal case studies: foundations and guidelines for comparing, matching, and tracing*. Ann Arbor: University of Michigan Press, 2016.; CRAVER, Carl F.; DARDEN, Lindley. *In search of mechanisms*. Chicago: University of Chicago Press, 2013.

⁴⁵ See BEACH, Derek; PEDERSEN, Rasmus Brun. *Process-tracing methods: foundations and guidelines 2*. ed. Ann Arbor: University of

Michigan Press, 2019.

⁴⁶ MOLLER, Jorgen; SKAANING, Svend-Erik. Comparative methods. In: BEACH, Derek; PEDERSEN, Rasmus Brun (ed.). *Causal case study methods: foundations and guidelines for comparing, matching, and tracing*. Ann Arbor: University of Michigan Press, 2016. p. 227-268. 228.

⁴⁷ SCHEMPF, F. J. *Pioneering offshore: the early years*. Tulsa: Pennwell Publishing Company, 2007.

⁴⁸ FRIEDHEIM, R. L. *Negotiating the new ocean regime*. Hampton: Univ. of South Carolina Press, 1993.

of course, given that drilling more than three nautical miles offshore was not technically possible. But as the 20th century crept on, and technology advanced, it was clear that eventually such drilling would be possible.

At the time, the United States was invested in preventing additional claims to the high seas past three nautical miles, due to their status as a naval power and their interest in deep sea scientific research. However, this desire warred with the need to claim the continental shelf for its potential mineral resources. In 1945, President Truman tried to bridge the gap by issuing an executive order claiming the continental shelf of the United States without addressing the issue of the high seas above it. Such a distinction was not accepted by other states and led to claims of up to 200 nautical miles offshore by states with generally steep and less far ranging continental shelves, such as Ecuador, Peru, and Chile.

Truman's executive order was well-timed, however. In 1947, the first oil well was drilled out of sight of land, by Kermac-McGee 12 miles off the Louisiana coast.⁴⁹ It was drilled, however, in a time of conflict between individual U.S. states and the federal government. Also in 1947, federal courts sided with the federal government and told the state of California that it no longer had rights to its own offshore because U.S. national security needs trumped California's desire for control. In 1950, Texas and Louisiana were told much the same.⁵⁰

An inability to resolve this dispute in U.S. courts led to a debate in Congress that ultimately resulted in the Submerged Lands Act (discussed above)⁵¹, which gave states rights to up to three nautical miles off their coasts, and potentially up to three marine leagues if they could demonstrate historical use and ownership. Federal rights over the rest of the United States's offshore claims were given in the Outer Continental Shelf Lands Act (OCSLA) of the same year. OCSLA solidified federal government control over offshore drilling greater than three nautical miles (or marine leagues, depending on the state), and gave the Department of the Interior rights to handle leasing sales in the U.S. continental

shelf.⁵² In 1982, a specialty agency of the Department of Interior was created specifically to handle offshore oil and gas, the Minerals Management Service (MMS).

MMS was tasked with two competing objectives. The first was to protect the environment from the potential ill effects of offshore drilling. During the 1970s, a number of environmental protection laws were passed in the U.S., most notably the National Environmental Policy Act of 1970. MMS was supposed to make sure that these laws, passed during the 1970s as the U.S. environmental protection movement grew in strength, were adequately enforced in offshore leases. However, it was also tasked with ensuring, to the best of its ability, U.S. energy independence, as a response to the 1973 oil embargo that led to shortages across the country. Thus, MMS was responsible for both promoting the U.S. offshore oil industry, as well as regulating and potentially pointing out violations committed by that same industry. This was a difficult job at best, and an impossible one at worst.

MMS was unable to respond even to the Exxon Valdez spill in 1989. Instead, it was saddled with even greater authority without the resources to deal with such responsibility.⁵³ In 1991, struggling to deal with the creation of new rules and regulations, the offshore industry asked that they be allowed to take the initiative. The result was a 1993 document that did not even cover drilling rigs.⁵⁴ It was nevertheless considered until 1997.

4.1 United States 2010 Oil Spill and its Aftermath

Everything would change, however, on 20 April 2010 when the Gulf of Mexico was rocked by an explo-

⁴⁹ SCHEMPF, F. J. *Pioneering offshore: the early years*. Tulsa: Pennwell Publishing Company, 2007.; NYMAN, E. Offshore oil development and maritime conflict in the 20th century: a statistical analysis of international trends. *Energy research & social science*, [S. l.], v. 6, p.1-7, 2015.

⁵⁰ CORBITT Jr., James W. The Federal-State Offshore Oil Dispute. *Wm. & Mary L. Rev.*, [S. l.], v. 11, n. 3, p. 755, 1970.

⁵¹ UNITED STATES. *Submerged lands ACT*. 43 U.S.C. 1953.

⁵² UNITED STATES. Department of the Interior. Bureau of Ocean Energy and Management. *Federal offshore lands*. Available in: <https://www.boem.gov/oil-gas-energy/leasing/federal-offshore-lands>. Access at: July 25, 2023.

⁵³ NATIONAL COMMISSION ON THE BP DEEPWATER HORIZON OIL SPILL AND OFFSHORE DRILLING. *Deep water: the Gulf oil disaster and the future of Offshore Drilling* report to the president. 2011. Available in: <https://www.govinfo.gov/content/pkg/GPO-OILCOMMISSION/pdf/GPO-OILCOMMISSION.pdf>. Access at: July 25, 2023.

⁵⁴ NATIONAL COMMISSION ON THE BP DEEPWATER HORIZON OIL SPILL AND OFFSHORE DRILLING. *Deep water: the Gulf oil disaster and the future of Offshore Drilling* report to the president. 2011. Available in: <https://www.govinfo.gov/content/pkg/GPO-OILCOMMISSION/pdf/GPO-OILCOMMISSION.pdf>. Access at: July 25, 2023.

sion at the Macondo drilling site. The oil rig Deepwater Horizon, owned by Transocean and leased by British Petroleum (BP), sank as a result of the explosion, killing eleven men and leaving an uncapped well to gush oil freely into the Gulf of Mexico. It would take 87 days to cap the well and stop the flow of oil into the Gulf. By that time, however, over 5 million barrels of oil had already spilled into the water,⁵⁵ with negative impacts on the environment in general and on marine life in particular.

By U.S. law, the first responder is the Coast Guard, who was on site almost immediately after the rig explosion. At first they were conducting search and rescue activities for the eleven men who still remained missing, though they did take note of the oily sheen on the water as they flew over the drill site.⁵⁶ Financial responsibility for the spill, as well as the provision of necessary response equipment, belonged to the offender responsible, in this case BP, who accepted responsibility and provided the required help.⁵⁷ The response was coordinated between the federal government and state and local officials through the National Contingency Plan, which confused some state and local officials due to the many differences between the NCP and the federal response to natural disasters, which they were more familiar with.⁵⁸

The National Commission on the BP Deepwater Horizon Oil Spill and Offshore Drilling, in their 2011 Report to the President about the causes of the well blowout and rig explosion, would point to a number of causes, including poor management, use of shortcuts, lack of oversight, and human error.⁵⁹ There was a

lack of communication between the various operators on the Deepwater Horizon rig (Transocean, BP, and Halliburton), as well as between the operators and the MMS, as several of the actions taken on the rig prior to blowout were either not disclosed to MMS or were done improperly.

The report places the primary blame on the lack of communication and failure to use proper procedures by industry workers.⁶⁰ However, they note that the second major failure was that of government regulatory oversight. Indeed, before the well was even capped it was apparent that the MMS was not up to the task of either dealing with the ongoing spill or preventing future accidents from occurring. MMS lacked the political or financial resources to do the hard work needed to oversee an industry that would, by its nature, always have risks. As such, one of the Department of the Interior's first actions was to shut down the MMS and replace it.⁶¹

Two replacement agencies were created, the Bureau of Ocean Energy Management (BOEM), responsible for offshore lease sales, and the Bureau of Safety and Environmental Enforcement (BSEE), responsible for making sure that applicable laws were being followed. By splitting these primary duties of the MMS, the two successor agencies would lack the same pressures that were put on the single entity to maximize revenue by allowing industry laxity. This would not be a panacea, however; BSEE inherited the same patchwork laws and industry pushback that had plagued MMS before it, and to be more successful than its predecessor would need to address these problems.⁶²

Besides that, the other issue that the new regulatory agencies would have to face would be dealing with the continual scientific innovation taking place in the indus-

⁵⁵ JOYE, S. B. Deepwater Horizon, 5 years on. *Science*, [S. l.], v. 349, n. 6248, p. 592-593, 2015.

⁵⁶ NATIONAL COMMISSION ON THE BP DEEPWATER HORIZON OIL SPILL AND OFFSHORE DRILLING. *Deep water: the Gulf oil disaster and the future of Offshore Drilling* report to the president. 2011. Available in: <https://www.govinfo.gov/content/pkg/GPO-OILCOMMISSION/pdf/GPO-OILCOMMISSION.pdf>. Access at: July 25, 2023.

⁵⁷ BIRKLAND, T. A.; DEYOUNG, S. E. Emergency response, doctrinal confusion, and federalism in the Deepwater Horizon oil spill. *Publius: The Journal of Federalism*, [S. l.], v. 41, n. 3, p. 471-493, 2011.

⁵⁸ BIRKLAND, T. A.; DEYOUNG, S. E. Emergency response, doctrinal confusion, and federalism in the Deepwater Horizon oil spill. *Publius: The Journal of Federalism*, [S. l.], v. 41, n. 3, p. 471-493, 2011.

⁵⁹ NATIONAL COMMISSION ON THE BP DEEPWATER HORIZON OIL SPILL AND OFFSHORE DRILLING. *Deep water: the Gulf oil disaster and the future of Offshore Drilling* report

to the president. 2011. Available in: <https://www.govinfo.gov/content/pkg/GPO-OILCOMMISSION/pdf/GPO-OILCOMMISSION.pdf>. Access at: July 25, 2023.

⁶⁰ NATIONAL COMMISSION ON THE BP DEEPWATER HORIZON OIL SPILL AND OFFSHORE DRILLING. *Deep water: the Gulf oil disaster and the future of Offshore Drilling* report to the president. 2011. Available in: <https://www.govinfo.gov/content/pkg/GPO-OILCOMMISSION/pdf/GPO-OILCOMMISSION.pdf>. Access at: July 25, 2023.

⁶¹ BARAM, M. The US regulatory regime for preventing major accidents in offshore operations. *In: Risk governance of offshore oil and gas operations*. Cambridge: Cambridge University Press, 2014. p. 154-187.

⁶² BARAM, M. The US regulatory regime for preventing major accidents in offshore operations. *In: Risk governance of offshore oil and gas operations*. Cambridge: Cambridge University Press, 2014. p. 154-187.

try.⁶³ There had been oil spills and well blowouts prior to Deepwater Horizon, information from which could have scientifically informed spill response had it been applied.⁶⁴ U.S. government leaders point to the use of science in their response to the spill,⁶⁵ but this is an area of advancing technology and there had been several choices made on the Deepwater Horizon rig in April 2010 that had not been scientifically tested. Moreover, Baram points to a lack of learning about cutting edge science that was demonstrated by both MMS and the Coast Guard about prevention and response.⁶⁶

5 Case Study: Brazil

In August 2019, Brazil experienced a significant oil spill that affected its northeastern coastline.⁶⁷ Given its extent (more than 3000 km) and the recorded impacts, the spill was considered the most severe environmental disaster ever recorded in tropical coastal regions.⁶⁸ More than 40 marine protected areas and a unique set of poorly explored coastal ecosystems that include intertidal rocky shores, rhodolith beds, sandy beaches, mangroves, estuarine systems, seagrass beds, and coral reefs have been affected. Exacerbating the ecological, social, and economic impacts, Brazil's government action has been inadequate. The insensitivity of the fe-

deral Brazilian government to the environment and to the economic and social consequences that affected tourism activities (hotels, inns, coastal transport, among many), economic activities such as large and small-scale fishing, insensitivity that revealed itself in a deliberate absence of actions to combat the succession of occurrences of oil slicks.

The spill was first noticed on August 30, 2019 when patches of crude oil began washing up on the beaches of the state of Paraíba. Over the following months, the oil slick spread along the coast, affecting multiple states, including Pernambuco, Alagoas, Sergipe, and Bahia.⁶⁹ The Brazilian Navy, following an investigation by the federal police, concluded that a Greek-flagged ship carrying the oil was to blame for the spill. Despite that conclusion, it can be said that the outcome is controversial and requires further reflection. It is important to consider other scientific hypotheses regarding the origin of the oil, as well as further investigation and due punishment of those responsible.⁷⁰

The impact of the oil spill was severe, both environmentally and economically. It affected numerous marine species, including fish, turtles, and seabirds, as well as mangrove forests and coral reefs. Many beaches were closed due to the contamination, negatively impacting tourism and local communities that rely on coastal activities.⁷¹ The Brazilian government faced criticism for its response to the spill, with concerns raised about the speed of the reaction and coordination of cleanup efforts. The incident also sparked discussions about the country's preparedness for handling such environmental disasters.⁷²

It is worth noting that in the absence of effective government action, civil society took upon itself the

⁶³ NATIONAL COMMISSION ON THE BP DEEPWATER HORIZON OIL SPILL AND OFFSHORE DRILLING. *Deep water: the Gulf oil disaster and the future of Offshore Drilling* report to the president. 2011. Available in: <https://www.govinfo.gov/content/pkg/GPO-OILCOMMISSION/pdf/GPO-OILCOMMISSION.pdf>. Access at: July 25, 2023.

⁶⁴ FINGAS, Mervin. *Oil Spill Science and Technology*. 2th ed. Amsterdam: Elsevier, 2017.

⁶⁵ LUBCHENCO, J.; MCNUTT, M. K.; DREYFUS, G.; MURAWSKI, S. A.; KENNEDY, D. M.; ANASTAS, P. T.; CHU, S.; HUNTER, T. Science in support of the Deepwater Horizon response. *Proceedings of the National Academy of Sciences*, [S. l.], v. 109, n. 50, p. 20212-20221, 2012.

⁶⁶ BARAM, M. The US regulatory regime for preventing major accidents in offshore operations. In: LINDØE, Preben Hempel; BARAM, Michael; RENN, Ortwin (ed.). *Risk governance of offshore oil and gas operations*. Cambridge: Cambridge University Press, 2014. p. 154-187.

⁶⁷ GONCALVES, L. R.; WEBSTER, D. G.; YOUNG, O.; POLETTE, M.; TURRA, A. The brazilian blue Amazon under threat: why has the oil spill continued for so long?. *Ambiente & Sociedade*, [S. l.], v. 23, 2020.

⁶⁸ SOARES, M. O.; TEIXEIRA, C. E. P.; BEZERRA, L. E. A.; ROSSI, S.; TAVARES, T. C. L.; CAVALCANTE, R. M. Brazil oil spill response: time for coordination. *Science*, [S. l.], v. 367, n. 6474, p. 155, 2020.

⁶⁹ GONCALVES, L. R.; WEBSTER, D. G.; YOUNG, O.; POLETTE, M.; TURRA, A. The brazilian blue Amazon under threat: why has the oil spill continued for so long?. *Ambiente & Sociedade*, [S. l.], v. 23, 2020.

⁷⁰ SANTOS, M. O. S. D.; NEPOMUCENO, M. M.; GONCALVES, J. E.; MEDEIROS, A. C. L. V.; MACHADO, R. M.; SANTOS, C. P. D. S.; ALVES, M. J. C. F.; GURGEL, A. D. M.; GURGEL, I. G. D. Oil spill in Brazil: analysis of vulnerabilities and socio-environmental conflicts. *BioChem*, [S. l.], v. 2, n. 4, p. 260-268, 2022.

⁷¹ MAGRIS, R. A.; GIARRIZZO, T. Mysterious oil spill in the Atlantic Ocean threatens marine biodiversity and local people in Brazil. *Marine pollution bulletin*, v. 153, p. 110961, 2020.

⁷² GONCALVES, L. R.; WEBSTER, D. G.; YOUNG, O.; POLETTE, M.; TURRA, A. The brazilian blue Amazon under threat: why has the oil spill continued for so long?. *Ambiente & Sociedade*, [S. l.], v. 23, 2020.

task of reducing the negative consequences of oil spills, through civil defense in the municipalities where it was organized, local fishing communities, and environmental non-governmental organizations. Such a movement reveals the resilience capacity of the Brazilian population, even in occasions where the government is absent.

5.1 Post-spill

Following the 2019 oil spill, there were discussions and calls for stricter regulations and improved preparedness to prevent and respond to future oil spills. These discussions highlighted the need for enhanced monitoring systems, emergency response protocols, and better coordination between government agencies, the private sector, and local communities. Like the United States, Brazil has a National Contingency Plan (NCP) in place to address and respond to oil spills and other environmental emergencies. The NCP is designed to provide a framework for coordination, response, and mitigation efforts during such incidents.

The Brazilian NCP is overseen by the Brazilian Institute of the Environment and Renewable Natural Resources (IBAMA) in collaboration with other government agencies and stakeholders. The plan outlines the roles and responsibilities of various entities involved in responding to oil spills, including federal, state, and local authorities, as well as private companies and non-governmental organizations. It includes guidelines and procedures for monitoring, containment, cleanup, and restoration activities in the event of an oil spill. It aims to ensure a coordinated response to minimize the environmental and socioeconomic impacts of spills. The plan also addresses aspects such as communication, public involvement, and the use of appropriate technology and equipment for response operations.

However, it is important to note that the effectiveness and implementation of the NCP can vary based on specific incidents and local circumstances. The 2019 oil spill highlighted some challenges and areas for improvement in terms of response coordination and effectiveness.

While the details surrounding the oil spill remain unknown, the Brazilian Federal Government has displayed significant inaction in terms of coordinating efforts with non-governmental organizations, the mi-

litary, civil society, states, and Brazilian municipalities.⁷³ Responding to oil spills involves multiple parties and necessitates effective coordination and transparent guidelines,⁷⁴ both within territorial waters (12 nautical miles) and the exclusive economic zone (200 nautical miles). This lack of government action, coupled with the expansive scale of the oil spill and its unexplained cause, may have exacerbated the ecological, social, and economic ramifications.⁷⁵

Furthermore, the federal government's inaction has been compounded by substantial budget cuts for public policies,⁷⁶ resulting in reduced funding and human resources, as well as the recent dissolution of two committees related to the National Contingency Plan of Oil Spills (PNC) that encompassed various stakeholders: the executive committee and the support committee. The government's failure to take action may have legal consequences, as their liability is linked to accepting the risks associated with their inaction.

Surveillance and response measures are vital for mitigating the risks of oil disasters, with the PNC playing a crucial role. In spill scenarios, two types of models are pivotal for response efforts: tactical and strategic.⁷⁷ Tactical models are implemented post-spill and involve specific instructions for cleanup equipment, deployment locations, duration, and appropriate operational tactics (e.g., mechanical removal, dispersant application, in situ burning, and boom placement). On the other hand, strategic elements of spill responses are typically implemented prior to spills, necessitating consideration of potential spill locations, their frequency, size, and duration. It's important to note that strategic and tactical

⁷³ SOARES, M. O.; TEIXEIRA, C. E. P.; BEZERRA, L. E. A.; ROSSI, S.; TAVARES, T. C. L.; CAVALCANTE, R. M. Brazil oil spill response: time for coordination. *Science*, [S. l.], v. 367, n. 6474, p. 155, 2020.

⁷⁴ KNOL, M.; ARBO, P. Oil spill response in the Arctic: norwegian experiences and future perspectives. *Mar. Pol.*, [S. l.], v. 50, p. 171-177, 2014.

⁷⁵ SOARES, M. O.; TEIXEIRA, C. E. P.; BEZERRA, L. E. A.; ROSSI, S.; TAVARES, T. C. L.; CAVALCANTE, R. M. Brazil oil spill response: time for coordination. *Science*, [S. l.], v. 367, n. 6474, p. 155, 2020.

⁷⁶ ABESSA, D.; FAMA, A.; BURUAEM, L. The systematic dismantling of Brazilian environmental laws risks losses on all fronts. *Nat. Ecol. Evol.*, [S. l.], v. 3, p. 510-511, 1979.

⁷⁷ GRUBESIC, H.; WEI, R.; NELSON, J. Optimizing oil spill cleanup efforts: a tactical approach and evaluation framework. *Marine Pollution Bulletin*, [S. l.], v. 125, p. 318-329, 2017.

response models are closely intertwined in theory and practice.⁷⁸

However, there was a lack of immediate and coordinated adoption of the Contingency Plan for Oil Pollution Incidents (PNC) in Waters under National Jurisdiction, formulated in 2013.⁷⁹ As previously mentioned, the federal government terminated two committees that were integral to this plan at the beginning of 2019: the executive committee, responsible for overseeing the plan's initiation as the national authority, and the support committee, tasked with fostering responsiveness and proposing international cooperation agreements.⁸⁰ This delay in governmental response was crucial for environmental protection and minimizing economic and social losses.⁸¹ Among the ongoing legal actions, the Federal Public Prosecutor's office of the Northeast States filed a lawsuit against the federal government to enforce the activation of the plan and mitigate the damage caused by the oil spill.

The delayed implementation of the PNC, coupled with the dissolution of both the executive and support committees, constitutes a significant aspect of the issue, as timing is crucial for effective cleanup, reduced environmental impact, cleanup costs, damage compensation, and environmental restoration.⁸² Nevertheless, other factors should be highlighted. In the past, various oil-related incidents worldwide faced delays in response due to the absence of PNCs, and even in modern

times, when many nations have established PNCs, oil spill responses often prove inadequate. Effective contingency plans necessitate adequate investments in equipment and ongoing training for response teams, as well as regular revisions to ensure preparedness.⁸³ Other considerations include political commitment to oil spill prevention, investment in preparedness, and ratification of international agreements. The allocation of government budgets for oil spill response can be questionable and subject to reduction based on internal affairs, varying with different governments or the country's economic situation. One strategy involves implementing the «polluter pays» principle and establishing an oil spill response organization through oil refineries and tanker shipping companies operating in the country, thereby augmenting resources and response capabilities for significant oil spills. In Brazil, the vastness of the country's territory presents a notable challenge, making effective implementation of even a well-designed PNC difficult. An effective strategy involves extending preparedness and oil awareness to regional and local levels through training programs or the development of regional contingency plans in major coastal states to ensure an efficient response to oil spills.⁸⁴

Lastly, 120 days after the initial appearance of the oil, reports continue to emerge of varying volumes of oil washing up on coasts and marine protected areas (MPAs), indicating that the full extent of this environmental disaster remains unknown. Volunteers have actively mobilized through social networks to carry out cleanup efforts on several tropical beaches without proper support from the federal government. Furthermore, recent budget cuts to science⁸⁵ and environmental protection⁸⁶ undermine the capacity of Brazilian institutions

⁷⁸ GRUBESIC, H.; WEI, R.; NELSON, J. A strategic planning approach for protecting environmentally sensitive coastlines from oil spills: allocating response resources on a limited budget. *Marine Policy*, [S. l.], v. 108, p. 103549, 2019.

⁷⁹ SOARES, M. O.; TEIXEIRA, C. E. P.; BEZERRA, L. E. A.; ROSSI, S.; TAVARES, T. C. L.; CAVALCANTE, R. M. Brazil oil spill response: time for coordination. *Science*, [S. l.], v. 367, n. 6474, p. 155, 2020.

⁸⁰ BRAZIL. *Decreto federal n. 9.759 de 11 de abril de 2019*. Extingue e estabelece diretrizes, regras e limitações para colegiados da administração pública federal, 2019. Available in: http://www.planalto.gov.br/ccivil_03/_ato2019-2022/2019/decreto/D9759.htm. Access at: Nov. 2023.

⁸¹ SOARES, M. O.; TEIXEIRA, C. E. P.; BEZERRA, L. E. A.; ROSSI, S.; TAVARES, T. C. L.; CAVALCANTE, R. M. Brazil oil spill response: time for coordination. *Science*, [S. l.], v. 367, n. 6474, p. 155, 2020.; GONCALVES, L. R.; WEBSTER, D. G.; YOUNG, O.; POLETTE, M.; TURRA, A. The Brazilian blue Amazon under threat: why has the oil spill continued for so long?. *Ambiente & Sociedade*, [S. l.], v. 23, 2020.

⁸² TEGEBACK, A.; HASSELSTROM, L. Costs associated with a major oil spill in the Baltic Sea. *BalticMaster II*, Jan. 2012. Available in: <https://docplayer.net/6337753-Costs-associated-with-a-major-oil-spill-in-the-baltic-sea.html>. Access at: Nov. 2023.

⁸³ COSTA, L. R. T. A.; FERREIRA FILHO, V. J. M.; ANDRADE, F. N. P. de; ANTOUN, A. R. Strategic Optimization and Contingency Planning Model for Oil-Spill Response. In: PE LATIN AMERICAN AND CARIBBEAN PETROLEUM ENGINEERING CONFERENCE, 2005, Rio de Janeiro. *Proceedings* [...], Rio de Janeiro: SPE Latin American and Caribbean Petroleum Engineering Conference, 2005.

⁸⁴ SOARES, M. O.; TEIXEIRA, C. E. P.; BEZERRA, L. E. A.; PAIVA, S. V.; TAVARES, T. C. L.; GARCIA, T. M.; ARAUJO, J. T. de, CAMPOS, C. C., FERREIRA, S. M. C.; MATTHEWSCASCON, H.; FROTA, A. Oil spill in South Atlantic (Brazil): environmental and governmental disaster. *Marine Policy*, [S. l.], v. 115, p.103879, 2020.

⁸⁵ ANGELO, C. Brazil freezes science spending. *Nature*, v. 568, p. 155-156, 2019.

⁸⁶ ABESSA, D.; FAMA, A.; BURUAEM, L. The systematic dismantling of Brazilian environmental laws risks losses on all fronts.

to comprehend the disaster's effects on the economy, biodiversity, public health, and environmental quality in the South Atlantic. Consequently, there is a dearth of information, and the government appears to underestimate the environmental, social, and economic consequences of the disaster. This incident underscores the importance of establishing science-based solutions that involve multiple stakeholders to prevent extensive and long-term impacts at both regional and global scales.⁸⁷

Brazil is comfortably ranked in terms of natural disaster risks (123rd globally). However, with issues like dam collapses and oil spills, especially given the large number and the structural and geographical challenges, there's a significant risk. Effective preventive measures are needed to protect both people and property.⁸⁸

6 Analysis

As per the provisions of the United Nations Convention on the Law of the Sea (UNCLOS), it is the responsibility of the coastal state to establish internal regulatory systems or implement bilateral or regional agreements to protect and preserve marine resources, as well as enforce environmental public policies within its jurisdictional waters.⁸⁹ However, UNCLOS does not have any set rules or regulations that tell states how they should manage their marine resources or environment. It is up to states themselves to determine how best to utilize the resources of their continental shelves and how best to protect the marine environment while doing so.

This is particularly important in dealing with oil spills, because to a certain extent oil spills cannot be completely eliminated through good practices or appropriate domestic and/or international laws. Whether we are considering well blowouts or rig explosions, as was the case with the Deepwater Horizon, or spills from ships,

as was named the cause of the 2019 Brazilian oil spill, we have to accept that there is a certain level of risk that goes along with these activities. There is always the potential for human error or impact from environmental disasters such as rogue waves or hurricanes.

What sets both the Brazilian and United States offshore apart is the movement in both states towards greater activities in deepwater, where the risks are greater.⁹⁰ Joye singles these two countries out, along with Western Africa, as areas where the threats of a well-based spill are highest.⁹¹ Likewise, we can see from the events of the 2010 and 2019 respective incidents that there is still much work to be done by both countries with regards to responding to an incident should one occur in the future.

In the United States, state and local officials were confused at the federal response, both because they had been (wrongfully) expecting something similar to the federal response to natural disasters, and because many local officials felt that the federal response did not go far enough. This was in part due to the large role that BP undertook in dealing with the disaster but also in part because local officials did not necessarily understand mitigation techniques that were less publicly visible than the use of booms or controlled burns.⁹²

Moreover, the sheer size of the spill called into question the effectiveness of MMS as a regulatory agency. MMS lacked the budget to conduct necessary inspections, and tended to sign off on industry reports without fact-checking them. It is difficult to say whether BOEM and BSEE will do a better job at regulating the offshore industry, because it will only be tested if/when there is another serious incident. But there is still a strain in U.S. politics that calls for the increase in U.S.-based oil drilling and production due to a desire for energy independence, which haunted the MMS before them.

With regards to the situation that occurred in Northeast Brazil, the full extent and losses have yet to be

Nat. Ecol. Evol., [S. l.], v. 3, p. 510-511, 1979.

⁸⁷ SOARES, M. O.; TEIXEIRA, C. E. P.; BEZERRA, L. E. A.; ROSSI, S.; TAVARES, T. C. L.; CAVALCANTE, R. M. Brazil oil spill response: time for coordination. *Science*, [S. l.], v. 367, n. 6474, p. 155, 2020.

⁸⁸ SAMPAIO, José Adércio Leite; OLIVEIRA, Edson Rodrigues de. A justiça espacial e ambiental e a teoria do risco: a responsabilidade do governo na prevenção contra desastres (no Brasil). *Revista de Direito Internacional, Brasília*, v. 16, n. 2, p. 168-201, 2019.

⁸⁹ UNITED NATIONS. *United Nations convention on the law of the sea*. Kingston: United Nations, 1982.

⁹⁰ IVSHINA, I. B.; KUYUKINA, M. S.; KRIVORUCHKO, A. V.; ELKIN, A. A.; MAKAROV, S. O.; CUNNINGHAM, C. J.; PESHKUT, T. A.; ATLAS, R. M.; PHILP, J. C. Oil spill problems and sustainable response strategies through new technologies. *Environmental Science: Processes & Impacts*, [S. l.], v. 17, n. 7, p.1201-1219, 2015.

⁹¹ JOYE, S. B. Deepwater Horizon, 5 years on. *Science*, [S. l.], v. 349, n. 6248, p.592-593, 2015.

⁹² BIRKLAND, T. A.; DEYOUNG, S. E. Emergency response, doctrinal confusion, and federalism in the Deepwater Horizon oil spill. *Publius: The Journal of Federalism*, v. 41, n. 3, p. 471-493, 2011.

determined, making it more difficult to fully understand the effectiveness of any response. But it has underscored insufficient inspection and regulation of marine spaces under Brazilian jurisdiction, just as Deepwater Horizon did in the United States. The 2019 spill indicated the need for several regulatory improvements, such as marine spatial planning, improved on-site inspection capabilities, and real-time monitoring of maritime traffic. Tracking ships in areas with limited cell phone and VHF (Very High Frequency) radio coverage, such as open waters far from land, is achievable through the use of Automatic Identification Systems, whereby ships or boats have devices that transmit information automatically via VHF radio or low-orbit satellites when far from land. However, the Brazilian maritime authority does not provide technological instruments for real-time monitoring of Brazilian marine waters, and the federal government has been reformulating the Blue Amazon Management System (SisGAAz) since 2015 due to budgetary constraints.

The 2019 oil spill in Brazil was considered the most severe environmental disaster ever recorded in tropical coastal regions, affecting more than 3000 km of coastline. The spill had significant ecological, social, and economic impacts, with more than 40 marine protected areas and various poorly explored coastal ecosystems being affected.⁹³

Brazil's government response to the oil spill was criticized for being inadequate. There were concerns about the speed of reaction and coordination of cleanup efforts, and the lack of immediate and coordinated adoption of the National Contingency Plan for Oil Pollution Incidents (PNC) further complicated the response. The delay in implementing the PNC and the dissolution of committees responsible for overseeing the plan raised questions about the government's commitment to environmental protection and minimizing the damage caused by the oil spill. Furthermore, the government's inaction and lack of coordination with non-governmental organizations, the military, civil society, states, and municipalities hampered response

⁹³ MAGRIS, R. A.; GIARRIZZO, T. Mysterious oil spill in the Atlantic Ocean threatens marine biodiversity and local people in Brazil. *Marine pollution bulletin*, v. 153, p. 110961, 2020.; SOARES, M. O.; TEIXEIRA, C. E. P.; BEZERRA, L. E. A.; PAIVA, S. V.; TAVARES, T. C. L.; GARCIA, T. M.; ARAUJO, J. T. de, CAMPOS, C. C., FERREIRA, S. M. C.; MATTHEWS-CASCON, H.; FROTA, A. Oil spill in South Atlantic (Brazil): environmental and governmental disaster. *Marine Policy*, [S. l.], v. 115, p.103879, 2020.

efforts and may have exacerbated the environmental, social, and economic consequences of the disaster.

The case study highlighted challenges in Brazil's preparedness and response to oil spills, including the need for enhanced monitoring systems, emergency response protocols, and better coordination between government agencies, the private sector, and local communities.⁹⁴ The incident also underscored the importance of establishing science-based solutions involving multiple stakeholders to prevent extensive and long-term impacts at both regional and global scales. Effective contingency plans, investments in equipment and training, and political commitment to oil spill prevention are crucial aspects to be addressed. Moreover, the lack of information about the full extent of the environmental disaster and recent budget cuts to science and environmental protection agencies hindered the understanding of the disaster's effects on the economy, biodiversity, public health, and environmental quality in the South Atlantic.⁹⁵

Brazil, while not highly vulnerable to natural disasters, faces challenges with incidents like dam collapses. The emphasis should be on proactive prevention rather than reactive solutions. Effective governance can drastically reduce the impact and costs of such events. For incidents like the 2019 Brazilian oil spill, this underscores the need for continuous risk assessment, robust oversight mechanisms, and prioritizing public and environmental safety⁹⁶.

In summary, the case study of the 2019 oil spill in Brazil highlights the need for improved governance and coordination in response to environmental disasters in the federalist system, the importance of effective contingency plans and preparedness, and the significance of science-based solutions involving multiple stakeholders to protect marine ecosystems and coastal communities.

⁹⁴ BARBEIRO, P. P.; INOJOSA, F. C. Assessing the actions of the Brazilian Federal Government to respond to the 2019 mysterious oil spill: a perspective of the national environmental agency. *Anais da Academia Brasileira de Ciências*, [S. l.], v. 94, p. e20210320, 2022.

⁹⁵ FERNANDES, G. M.; MARTINS, D. A.; SANTOS, R. P. dos; SANTIAGO, I. S. de; NASCIMENTO, L. S.; OLIVEIRA, A. H.; CAVALCANTE, R. M. Levels, source appointment, and ecological risk of petroleum hydrocarbons in tropical coastal ecosystems (northeast Brazil): baseline for future monitoring programmes of an oil spill area. *Environmental pollution*, v. 296, p. 118709, 2022.

⁹⁶ SAMPAIO, José Adércio Leite; OLIVEIRA, Edson Rodrigues de. A justiça espacial e ambiental e a teoria do risco: a responsabilidade do governo na prevenção contra desastres (no Brasil). *Revista de Direito Internacional, Brasília*, v. 16, n. 2, p. 168-201, 2019.

The study also emphasizes the potential consequences of inadequate government action and budget cuts on environmental protection efforts.

Reactive actions without preventive work are costly and dangerous. Investments in prevention are relatively smaller than those for reactive actions after a disaster. The specific control bodies have the challenging but rewarding task of ensuring the effective compliance of constitutional and programmatic mandates. Nonetheless, governments should promote and enhance public (and environmental) safety, aiming to mitigate human vulnerabilities against disaster risks⁹⁷.

7 Conclusion

The analysis of disaster governance in federalist systems, with a focus on oil spill response in the United States and Brazil, highlights the complexities and challenges associated with coordinating multilevel collaborative efforts in such situations. The case study of the 2010 Deepwater Horizon oil spill in the United States and the 2019 Northeast oil spill in Brazil's northeastern coastline reveals the significance of effective coordination, response, and preparedness in mitigating the environmental, social, and economic impacts of oil spills.

There are many reasons why federal system responses look different in technological and natural disasters. One, oil spills occur in marine environments where the federal government retains more authority than state governments and local governments have no authority.⁹⁸ Two, disasters caused by technological failure have an entity to blame - the polluter - while those caused by natural hazards are typically seen as beyond individual control.⁹⁹ Three, there is a line of thinking about disasters that supports varying agents that have distinctive characteristics and, therefore, different consequences for what occurs;¹⁰⁰ accordingly, technological and natu-

ral hazard agents should be managed differently. Fourth, the addition of civil liability in oil spills pushes the federal government to take primary authority (rather than share it) in order to deter and punish potential and actual polluters.¹⁰¹

While these social and institutional factors, among others, may explain why disasters caused by technological failure are approached differently than those triggered by natural hazards, we question if governance should look different across the disaster types. Research has consistently found that disaster impacts are tied to inequities in socioeconomic status and the socially vulnerable are the most exposed to disasters.¹⁰² At the same time, studies have recorded the remarkable abilities of people and communities to come together to respond to emergencies.¹⁰³ Perhaps the answer for improved management of oil spills, particularly for those where attribution is fuzzy, lies in focusing on the social aspects of disasters by addressing, for example, predictability of the threat, relative loss impact of affected populations, and inclusiveness of involvement and the social centrality of the affected population.¹⁰⁴ This will require new avenues of shared governance where federal, state, and local governments shift focus from extreme events and retrospective actions¹⁰⁵ to bottom-up growth of disaster resilience through community capacity building.¹⁰⁶

responses to natural and technological disasters. 1990. Available in: <https://udspace.udel.edu/server/api/core/bitstreams/746c3568-dfd4-4e41-9675-641bd10e49cc/content>. Access at: Nov. 2023.

¹⁰¹ BIRKLAND, T. A.; DEYOUNG, S. E. Emergency response, doctrinal confusion, and federalism in the Deepwater Horizon oil spill. *Publius: The Journal of Federalism*, v. 41, n. 3, p. 471-493, 2011.

¹⁰² See TIERNEY, K. *The social roots of risk: producing disasters, promoting resilience*. Redwood City: Stanford University Press, 2020.; WISNER, Ben; BLAIKIE, Piers; CANNON, Terry; DAVIS, Ian. *At risk: natural hazards, people's vulnerability, and disasters*. 2th ed. Abingdon: Routledge, 2004.

¹⁰³ KENDRA, J. M.; WACHTENDORF, T. Elements of resilience after the world trade center disaster: reconstituting New York City's Emergency Operations Centre. *Disasters*, [S. l.], v. 27, n. 1, p. 37-53, 2003.; ROSS, A. D. *Local disaster resilience: administrative and political perspectives*. Abingdon: Routledge, 2013.

¹⁰⁴ QUARANTELLI, E. L. *Technological and natural disasters and ecological problems: Similarities and differences in planning for and managing them*. 1993. Available in: <https://udspace.udel.edu/server/api/core/bitstreams/b97a948d-3da9-4a1a-9293-bca2721fe200/content>. Access at: Nov. 2023.

¹⁰⁵ MAY, P. J.; WILLIAMS, W. Disaster policy implementation: managing programs under shared governance. In: SURHONE, Lambert M.; TIMPLEDON, Miriam T.; MARSEKEN, Susan F. (ed.). *Springer science and business media*. Beau Bassin: Betascript Publishing, 2012.

¹⁰⁶ WARD, P. S.; SHIVELY, G. E. Disaster risk, social vulnerability, and economic development. *Disasters*, [S. l.], v. 41, n. 2, p. 324-351,

⁹⁷ SAMPAIO, José Adércio Leite; OLIVEIRA, Edson Rodrigues de. A justiça espacial e ambiental e a teoria do risco: a responsabilidade do governo na prevenção contra desastres (no Brasil). *Revista de Direito Internacional, Brasília*, v. 16, n. 2, p. 168-201, 2019.

⁹⁸ UNITED STATES. *Submerged lands ACT*. 43 U.S.C. 1953.

⁹⁹ MEYER, M. Internal environmental displacement: a growing challenge to the United States welfare state. *Oñati Socio-Legal Series*, [S. l.], v. 3, n. 2, 2013.

¹⁰⁰ QUARANTELLI, E. L. *Similarities and differences in institutional*

Additionally, in both cases, the extent of the spills and their ecological ramifications were substantial. The Deepwater Horizon spill, occurring in U.S. coastal waters, exposed challenges in coordinating federal and local responses, leading to criticisms of fragmented federal policies and inadequate regulation enforcement. Similarly, the Brazilian government's response to the 2019 oil spill was deemed inadequate, with concerns raised about the speed of reaction and coordination of cleanup efforts. The vastness of Brazil's territory and delays in implementing the National Contingency Plan for Oil Pollution Incidents further complicated response efforts, underscoring the need for enhanced preparedness and regional coordination.

Both the United States and Brazil need to address specific issues in their oil spill response strategies. In the U.S., the effectiveness of the regulatory agency responsible for offshore drilling, BOEM, and BSEE, remains under scrutiny, and improvements are needed to ensure timely and thorough inspections. Brazil must strengthen its regulatory oversight and invest in real-time monitoring and inspection capabilities to enhance response efficiency. Both countries should consider strategies for increased collaboration among government agencies, private companies, and local communities to develop science-based solutions for preventing extensive and long-term impacts.

Furthermore, it is crucial to recognize that oil spills cannot be entirely eliminated due to the inherent risks associated with oil-related activities. As such, the focus should shift towards a social-centric approach to disaster management, considering the predictability of threats, the relative impact on vulnerable populations, and inclusive involvement of affected communities. Building disaster resilience through community capacity building and bottom-up growth should be prioritized, emphasizing the collaboration between federal, state, and local governments to address environmental hazards effectively.

In conclusion, the governance of oil spills in federalist systems demands a proactive, multilevel collaborative approach that involves effective coordination, enhanced preparedness, and a focus on social aspects to ensure a comprehensive response to environmental disasters. By learning from the challenges and successes of past incidents, both the United States and Brazil can

develop more robust and efficient strategies to protect their coastlines and marine ecosystems, safeguarding the environment and the well-being of their communities.

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