FEDERAL UNIVERSITY OF PERNAMBUCO
CENTER FOR PHILOSOPHY AND HUMANITIES
DEPARTMENT OF POLITICAL SCIENCE
GRADUATE PROGRAM IN POLITICAL SCIENCE

The International Convention on Oil Pollution Preparedness, Response and Co-operation and its effectiveness in Brazil: a case study of the 2019 oil spill

Dissertation

Candidate: Clara Barros Mendes Cantalice
Advisor: Andrea Quirino Steiner

Recife
2025

FEDERAL UNIVERSITY OF PERNAMBUCO
CENTER FOR PHILOSOPHY AND HUMANITIES
DEPARTMENT OF POLITICAL SCIENCE
GRADUATE PROGRAM IN POLITICAL SCIENCE

The International Convention on Oil Pollution Preparedness, Response and Co-operation and its effectiveness in Brazil: a case study of the 2019 oil spill

Dissertation presented by Clara Barros Mendes Cantalice to the Graduate Program in Political Science of the Department of Political Science, linked to the Center for Philosophy and Human Sciences of the Federal University of Pernambuco, as part of the requirements for obtaining a master's degree in Political Science.

Advisor: Andrea Quirino Steiner

Recife
2025

.Catalogação de Publicação na Fonte. UFPE - Biblioteca Central

Cantalice, Clara Barros Mendes.
The International Convention on Oil Pollution Preparedness, response and co-operation and its effectiveness in Brazil: a case study of the 2019 oil spill / Clara Barros Mendes Cantalice. - Recife, 2025.
80f.: il.

Dissertação (Mestrado)- Universidade Federal de Pernambuco, Centro de Filosofia e Ciências Humanas (CFCH), Programa de Pós Graduação em Ciência Política (PPGCP), 2025.
Orientação: Andrea Quirino Steiner.

1. International environmental agreements; 2. Regime effectiveness; 3. Marine pollution. I. Steiner, Andrea Quirino. II. Título.

UFPE-Biblioteca Central

Clara Barros Mendes Cantalice

The International Convention on Oil Pollution Preparedness, Response and Co-operation and its effectiveness in Brazil: a case study of the 2019 oil spill

Dissertation presented to the Graduate Program in Political Science of the Federal University of Pernambuco, as a partial requirement for obtaining the master's degree in political science.

Recife, June 20, 2025

Examination Board

_____

Prof. Andrea Quirino Steiner (Advisor)
Federal University of Pernambuco

_____

Prof. Christian Brannstrom
Texas A&M University

_____

Prof. Magno Klein Silva
Federal University of Rio de Janeiro

À minha família. A que já construí e a que ainda irei conhecer.

Agradecimentos (*Acknowledgments*)

Neste longo trabalho, gostaria de agradecer aos que trouxeram luz à minha jornada. O desenvolvimento desse estudo não seria possível sem o apoio da minha família, amigos e professores. A cada um que depositou em mim confiança para concluir a minha maior empreitada. Hoje sei que não ando só.

Aos meus pais e meu irmão, por todo apoio desde criança. Por me ajudarem a sempre enxergar o lado bom por trás de cada sacrifício. Por sempre segurarem minha mão e me incentivarem a seguir, degrau por degrau. Sem vocês eu não conseguiria concluir mais essa etapa. Os amo íntima e profundamente.

À Renan, meu noivo e meu grande amor, por todos os abraços, as palavras de confiança, as revisões de trabalho e as consultas de literatura. Por dividir comigo esta e tantas outras conquistas que virão nas nossas vidas. Pelo companheirismo e apoio ilimitados. Por ser meu porto seguro todos os dias. Por me encontrar na terceira margem. Viver do seu lado é melhor que sonhar.

Ao amor e carinho de minha tia Silvia Maria, minha prima Maria Carolina, Betina e minha cunhada Rísia, saibam que cada abraço de vocês também me trouxe até aqui hoje. À minha segunda família, à Dona Lúcia, Rostand Filho, Ricardo e todos os que me abriram as portas com tanta gentileza. Sou imensamente grata à companhia e à amabilidade de cada um.

À Maria Dolores, Valentina, Olívia, Hina, Gabriel, Lady Diana, Leleco, Brigite, Vladimir, Capitu e Virgínia pelos muitos carinhos e conforto nas longas horas de estudo. Aos amigos que estiveram perto durante essa caminhada, nunca esquecerei a bondade e lealdade de cada um de vocês.

Programa de Pós Graduação em Ciência Política da UFPE e ao PELD TAMS, ao apoio e orientação dada pela professora Andrea Steiner, contribuindo desde minha graduação com a execução desta e de outras pesquisas, e me assistindo no intercâmbio acadêmico durante a conclusão desta pós-graduação. Agradeço ao professor Christian Brannstrom e a todos que me receberam de braços abertos na Texas A&M durante minha breve estadia, por toda receptividade, orientação e solicitude durante nosso trabalho conjunto.

List of abbreviations

AIOC - Amoco International Oil Company

CBD - Convention on Biological Diversity

CLC - The International Convention on Civil Liability for Oil Pollution Damage, 1969

IBAMA - *Instituto Brasileiro de Meio Ambiente e Recursos Naturais Renováveis* (Brazilian Institute for the Environment and Renewable Natural Resources)

ICMBIO - *Instituto Chico Mendes de Conservação da Biodiversidade* (Chico Mendes Institute for Biodiversity Conservation)

IMO - International Maritime Organization

ITOPF - International Tanker Owners Pollution Federation Limited

OPRC - International Convention on Oil Pollution Preparedness, Response and Cooperation

PNC - Plano Nacional de Contigência (*Brazilian National Contingency Plan for Oil Pollution Incidents in Waters under National Jurisdiction*)

UNCLOS - United Nations Convention on the Law of the Sea

List of Figures

List of tables

List of graphs

Abstract

Considering the oil spills off the coast of Brazil in 2019 and their social and environmental impact, along with the delayed response of the federal government, it is increasingly relevant to study international mechanisms to prevent similar situations. This study sought to answer the following question: has the International Convention on Oil Pollution Preparedness, Response and Co-operation (OPCR 1990) been effective in Brazil? In order to observe the country's implementation journey and evaluate its effectiveness by using the techniques suggested by the literature, the study uses counterfactual analysis based on three groups of independent variables. The dissertation contributes to the literature on regime effectiveness and helps understand the political dynamics around the prevention and response to oil spills through a mixed performance regime. This performance is discussed, especially, in terms of OPCR's weak system for implementation review, the convention's 6th article 6 and the Brazilian Decree nº 9.759/2019.

Keywords: international environmental agreements, regime effectiveness, marine pollution, marine policy, regime theory, environmental regime

Resumo

Considerando os derramamentos de petróleo na costa do Brasil em 2019 e seu impacto social e ambiental, juntamente com a resposta tardia do governo federal, é cada vez mais relevante estudar os mecanismos internacionais para evitar situações semelhantes. Este estudo busca responder à seguinte pergunta: a Convenção Internacional sobre Preparação, Resposta e Cooperação para a Poluição por Óleo (OPCR 1990) tem sido eficaz no Brasil? Assim, observou-se a jornada de implementação no país para avaliar sua eficácia, utilizando as técnicas sugeridas pela literatura. Para tal, o estudo utiliza a análise contrafactual com base em três grupos de variáveis independentes. A dissertação contribui para a literatura sobre a eficácia dos regimes e, ao mesmo tempo, ajuda a entender a dinâmica política em torno da prevenção e da resposta a derramamentos de petróleo por meio de um regime de performance mista. Tal performance é discutida, especialmente, no contexto do fraco sistema de revisão da implementação da OPCR, o 6o artigo da convenção, e o Decreto Federal nº 9.759/2019.

Palavras-chave: acordos ambientais internacionais, eficácia do regime, poluição marinha, política marinha, teoria do regime, governança ambiental

Table of contents

I. Introduction

Has the International Convention on Oil Pollution Preparedness, Response, and Co-operation (1990) been effective in Brazil? Evaluating this agreement in this country's context is increasingly relevant, considering the two recent oil spills off the Brazilian coast.

This is especially true for the first of these spills, which brought major social and environmental damage. It is estimated that this spill occurred between June and August 2019 (Nobre *et al.,* 2022). Unfortunately, it is remembered by the federal government's late response, the spread of misinformation, and blame-shifting among officials, with the main suspect being a Greek tanker named *Bouboulina* (Escobar, 2019). Impacts spread across a stretch of almost 2,500 km of shoreline, and it is estimated that approximately 4,000 tons of oil residue reached the land (Escobar, 2019; Marinha do Brasil, 2019; Brum, Campos-Silva and Oliveira, 2020). Alongside the environmental disasters that occurred throughout the last decade, such as those of the Mariana (2015) and Brumadinho (2018) tailing dams, the 2019 oil spill is seen as one of the largest environmental disasters in the country and the biggest crude oil spill in Brazilian history (Pena *et al.* 2020).

Considered a matter of public health (Carmo & Teixeira, 2020), the event disturbed natural ecosystems and the communities that benefited from the use of their resources, such as low-income populations that depend directly on fishing, tourism, and coastal resources in general. Thus, due to the delayed governmental response, civilian volunteers took the lead (Brum, Campos-Silva, & Oliveira, 2020) to clean the beaches, mangroves, seagrass beds, and reef environments that were being progressively contaminated.

The agreement that will be analyzed here, also known as the Oil Pollution Act of 1990 (Mahapatra, 1995), envisages international cooperation around oil spills that reach more than one coastal state. Within this convention, member-states must devise a well-circumscribed plan to prevent or deal with oil spills, that when properly and effectively implemented, ultimately benefits the environment and, consequently, humankind (Mahapatra, 1995).

Beyond oil pollution, the oceans are being increasingly threatened by

anthropogenic impacts, such as acidification, climate change, predatory fishing, and unplanned tourism. Therefore, it is crucial to develop transformative actions that can change the degradation the oceans face today, including in political terms (Cia Alves, Albuquerque & Steiner, 2020). Given its immeasurable importance to the planet's balance, such as its unpaired capacity to absorb carbon, the oceanic environment requires attention at all levels.

Although the literature focuses on different stages and aspects of what can be called the international regime lifecycle (Cohen, 2018), this study focuses on effectiveness, i.e., whether the Oil Pollution Act has attained its goals and solved the problem it seeks to deal with, specifically in Brazil. Nevertheless, implementation is also part of effectiveness (Rosendal, 2000; Mitchell, 2006), and this phase is also observed through the operationalization of the cited regime and the government actions taken to enforce it from October 21st, 1998, to December 2022. The time frame studied encompasses the period between the regime's adoption (determined by the convention's signature)[1] and the end of the term of the federal government in place during the oil spill.

To answer the central research question, this study will analyze official domestic and international documents to evaluate the effectiveness of the cited convention from a qualitative standpoint, by using the techniques suggested by Underdal (2002a; 2002b). To that end, chapter II covers the main concepts to be referred to in this dissertation and the model and variables used; chapter III presents a conceptual framework for studying the effectiveness of environmental regimes and the OPRC Convention; chapter IV focuses on oil spills as an international political issue; chapter V looks into the work's methodology and objectives; chapter VI, lastly, will proceeds to answer the main question - has the International Convention on Oil Pollution Preparedness, Response and Co-operation effective been effective in Brazil?

[1] Referencing Underdal (1992), the subscription of the convention determines the very beginning of the timeframe of the regime to be constructed, which in this case lasts until the end of the presidential term reliant on implementing the provisions in occurrence of the oil spill.

II. Concepts, variables, and model

The first section of this chapter summarizes the main definitions used. The following section presents the elements of effectiveness and related variables, according to the literature. The last section presents the model used to analyze the effectiveness of the Convention on Oil Pollution Preparedness, Response, and Co-operation in Brazil.

II.a. Key concepts and definitions

Although it is important to acknowledge the profound debates that surround each of the terms that will be presented here, for the purposes of this dissertation, this section only briefly introduces the key concepts that guide the following chapters. The first term is “international regime”.

A regime, in its simplest form, is a cooperative arrangement established to coordinate behavior and achieve better outcomes than would occur without such coordination (Miles *et al*., 2002). This definition highlights the problem-solving nature of regimes, particularly in situations where uncoordinated actions lead to suboptimal results. Regimes can be formal, embodied in treaties, conventions, and agreements, or informal, encompassing shared understandings, as Krasner (1982) emphasizes as a key characteristic distinguishing a regime from a non-regime condition.

According to Miles *et al*. (2002), the effectiveness of a regime is determined by comparing its achievements against a previously defined standard of success or accomplishment. Thus, from these authors’ perspective, effectiveness can be evaluated around three key questions. Firstly, the object or nature of the subject of the regime, such as attempts at behavioral change, environmental improvements, or other regime outputs like rules and regulations. Secondly, the standard against which the regime is being evaluated. Here, Miles *et al*. (2002) propose two main standards: relative improvement and distance from collective optimum. Relative improvement will be the standard used in this work. Lastly, how to compare the object to the standard, and what measurements are needed to assign an effectiveness score to the regime. This involves considering the stringency of the regime's provisions, the level of compliance of its members, and any unintended consequences or side effects.

In the operationalization of these concepts, Miles *et al*. (2002) acknowledge the methodological challenges in scoring cases for effectiveness, and emphasize that it is not merely a descriptive measurement but an exercise in causal inference. Thus, the regime's impact must be distinguished from that of other factors. Also, the challenges in constructing precise ordinal scales must be acknowledged, as well as the subjectivity in such assessments. On the other hand, robustness and transparency in the evaluation process must be a priority.

The results of this research emphasize a nuanced understanding of regime effectiveness that goes beyond simply labeling a regime as successful or unsuccessful. Thus, the following key aspects will be considered: (1) the definition of effectiveness through a problem-solving lens; (2) the assessment of effectiveness across multiple dimensions and looking at relative improvement vs. the collective optimum; (3) accounting for the factors that shape effectiveness and the variables that will be discussed later in this dissertation; and (4) the methodological challenges regarding causal inference and data limitations.

Concisely, as punctuated by Underdal (2002a, p. 4), a regime can be considered effective if it successfully performs the function(s) or solves the problem(s) that motivated its creation. Therefore, a regime may be considered effective even if its design has not been entirely consensual, as effectiveness is more linked to problem-solving power than to cooperation between actors (Underdal, 2002b). From a methodological perspective, in the case of environmental regimes, the decisive test will be to what degree the state of the environment improves, and human behavior is the immediate target. The regime effectiveness literature will serve as this work’s theoretical framework, as discussed further in the next section.

Another central term is the notion of an international environmental treaty (or agreement). Here it is used in a broad sense, including all kinds of valid international environmental agreements (IEA), such as conventions, declarations, protocols, and acts *e così via*, in which a relationship between countries is established (Feldmann, 1997). These environmental agreements are usually international documents, often legally binding, with a primary stated purpose of preventing or managing human impacts on natural resources (Mitchell, 2003). In the Brazilian case, the president has the power to celebrate treaties, acts, and international agreements, yet this is subject to the approval

of the national congress (Article 84, VIII, Constitution of the Federative Republic of Brazil).

The international environmental regime literature has focused on aspects such as negotiation, implementation, compliance, consequences, and effectiveness (Zürn, 1998). According to Rosendal (2000), implementation includes the actual activities pursued by governments in order to fulfill their international commitments. Compliance, in turn, refers exclusively to whether policies are in alignment with international standards or not, and does not look at what caused the output (Rosendal, 2000). Therefore, even with high compliance, member countries may not possess enough conditions to attain an agreement's goals and intentions (Miles *et al.*, 2002). Moreover, as the same author posits, neither compliance nor implementation guarantees problem-solving, as international regulations prescribed may have been insufficient, and Underdal (1992) states that effectiveness is more linked to problem-solving power.

All of the phases cited require a range of actors, such as member states, secretariats, NGOs, epistemic communities, domestic political constituencies, and individual leaders (O'Neill, 2009). As described by Mitchell (1994), treaties are epiphenomenal and reflect different power dynamics and interests, yet do not necessarily shape behaviors.

The fourth central concept is that of an oil spill. An oil spill refers to operational and accidental leaks of oil from shipping activities. Such accidents are extremely harmful to the environment and can be caused by collisions, groundings, null failures or fire, and explosions (ITOPF, 2008).

Lastly comes the concept of oil regime. Although we acknowledge the complexity of the term and the multiplicity of existing discussions, for reasons of limit of time and space, for the purposes of this dissertation we will use Soto-Oñate & Caballero's (2017) definition: "liability and compensation for oil pollution damage" (pg. 300).

II.b The components of effectiveness

Beyond the political aspects of enforcing an international regime, effectiveness might be entirely dependent on the capacity and available resources of member states (Edwards and Pascoe, 1991). According to Serikbayeva *et al.* (2020), domestic state

capacity involves analytical, operational, and political competencies, as well as private, organizational, and system resources that affect the success of policies designed by the government. Colonial heritage, religious power, and ethnic fragmentation are some of the conditions that can contribute to low state capacity (Majeed *et al.*, 2017).

According to Underdal (2002a), the effectiveness of a regime can be characterized by the following set of variables: type of problem (benign or malignant), problem-solving capacity, and political context. Thus, a regime can be classified as high-performance, low-performance, or mixed-performance.

Considering effectiveness as the dependent variable, several independent variables can be analyzed. Table I presents the effectiveness variables that have been mapped by the literature, and the components of each (Victor *et al*., 1998; Steiner, 2011; Moraes, 2017), which will be discussed ahead.

Table I. Independent variables used to evaluate regime effectiveness

Independent Variables	Components
Type and problem structure	Problem character; knowledge status
Political Context	Connections with other problems; ulterior motives
Problem-solving capacity	Institutional capacity; power distribution; political skill and effort

Source: Moraes (2017, p. 24) & Mitchell *et al.* (2020).

II. b. 1. Type and problem structure

Assessing the effectiveness of environmental regimes depends both on their format and on the environmental problem's structure (Mitchell, 1993; 1994; 2006; Steiner & Medeiros, 2010). According to Mitchell (2006), problem structure can be a major alternative explanation to institutional influence. This depends on interactions between institutional design elements and problem structure variables that serve as conditioning factors. Thus, problem structure may influence both the type of institutions states create and how likely states are to respond to such institutions. This variable also includes the knowledge status around the problem attributed to this variable:

Regarding the knowledge status, the author states that:

> As students of politics, we thus examine the interplay between knowledge and politics from the perspective of policy-making rather than knowledge-making. Moreover, we conceive of intellectual complexity in terms of the amount of descriptive and theoretical uncertainty pertaining to the knowledge base rather than in terms of some objective measure of the inherent intricacy of a problem (Underdal, 2002a, p.16).

As summarized by Underdal (2002a), a problem may be difficult to solve in at least two aspects - intellectual and political. This model will revolve around the political aspect, the degree of malignancy:

> The political malignancy of a problem will here be conceived of primarily as a function of the configuration of actor interests and preferences that it generates. According to this conceptualization, a perfectly benign problem would be one characterized by identical preferences. The further we get from that state of harmony, the more malign the problem becomes. (...) …we are concerned primarily with the political aspects of policy problems. The intellectual dimension will be considered only as it interacts with political characteristics. This is by no means a trivial aspect; intellectual complexity and political malignancy do in fact often interact—most often with the consequence of making a problem more intractable, but sometimes with the benign consequence of facilitating agreement (Underdal, 2002a, p.15-16).

The major characteristics of malign and benign problems are summarized in Table II. Underdal (2002a) also states that the more incongruent the problem presents, the more

malign it is (Table III).

Table II. Characteristics of malign and benign problems.

Characteristics of malign and benign problems

Malign	Benign
Incongruity (in particular relationships of competition)	Coordination (synergy or contingency relationships)
Asymmetry	Symmetry or indeterminate distribution[a]
Cumulative cleavages	Cross-cutting cleavages[a]

a. As indicated above, these dimensions are relevant primarily for problems of incongruity.

Source: Underdal (2002a).

Table III - Characteristics of incongruity and coordination problems.

Dimension	Incongruity	Coordination
Essence of problem	Incentive distortion ($q_i \neq k_i$)	Imperfect information, communication failure
Essence of cure	Incentive correction	Information or communication improvement
Consequences of unilateral cooperative moves	Risky, particularly in relationships of competition	No risk (except for transaction costs of own efforts)
Tactical implications for negotiations	Manipulation or coercion likely	Integrative negotiations, persuasion
Postagreement implications	Incentives to unilaterally defect tend to persist; transparency, monitoring, and enforcement mechanisms important	Self-enforcing; no incentives for unilateral defection from an agreed solution

Source: Underdal (2002a).

II. b. 2. Political context

Evaluating political context involves analyzing nuances that make context favorable or not for regime implementation and effectiveness. Underdal (2002a) suggests two components to this variable: (1) connections with other issues; and (2) ulterior motives, or selective incentives for cooperation. According to Cortell & Davis (2000), environmental issues are hardly isolated from previous motives, which makes them difficult to analyze and separate from other issues, especially when seeking to infer causality. Thus, intricately intertwined with other variables, political context includes a broad list of factors that may enhance or hinder a regimes' success (Miles *et al*., 2002, p.64):

> A favorable political context can to some extent reduce the demands on problem-solving capacity but is probably in and of itself neither a necessary nor a sufficient condition for regime effectiveness (Miles *et al*., 2002, p.64).

II. b. 3. Problem-solving capacity

It is worth mentioning that high problem-solving capacity might be a necessary condition - similar to the previous one, but certainly not sufficient - to develop effective solutions to solve malignant problems. Underdal's (2002a; 2002b) proposals are valid to look at an issue isolated but that also may be attached to a multifactorial political setting that concerns how the regime was created and what is able to improve or hinder its success. A favorable political context can also reduce the problem-solving demand, but alone it is not enough to assure effectiveness (Underdal, 2002b, 2002c). Furthermore, a regime may have unambitious, inadequate, or insufficient goals to solve the matter.

To determine problem-solving capacity, Underdal (2002a; 2002b) outlines three fundamental components: institutional setting, power distribution, and political skill and effort. The author refers to institutional settings under a general label that includes two distinctive notions: institutions as arenas and organizations as actors. Here we adopt the notion of institutions as the rules of the game (Underdal, 2002a). Regarding the

distribution of power, the author suggests less centralized power is better for problem solving, considering that power is the control over important events.

Internationally, as part of the institutional setting, so-called systems for implementation review can also affect effectiveness. According to Victor et al. (1998), these include:

> "Activities of reporting, reviewing, assessing, and promoting implementation (...) typically conducted in synergy, even when actually performed by many different actors and institutions" (p. 47).

Still following these authors, such systems increase information sharing, promote transparency, improve cooperation and lower transaction costs. Overall, SIRs can help with:

> "Coordinating and assisting the reporting of data on implementation; Reviewing and assessing implementation; Handling implementation problems such as noncompliance; Providing assessments of needed adjustments to international commitments" (p. 48).

The authors also suggest SIRs can help bring about behavioral change through decreasing the fear of free riding, redistributing power, identifying commitment violations and promoting learning among negotiators, governments and society in general.

Lastly, Underdal (2002a) states that evaluating political skill and effort would require a more in-depth comparative analysis of individual behavior. Nevertheless, some general remarks can be made regarding, for example, the longevity of a regime; this could indicate that actors have acquired more knowledge and abilities. In turn, this could be used to improve the regime's problem-solving capacity and, ultimately, its effectiveness. Table IV outlines the model's variables.

Table IV. Hypothesized configuration of scores for effective regimes

Independent Variable	Hypothesized Score
Type of problem	• Predominantly *benign* or at least *mixed* • State of knowledge: *good*
Problem-solving capacity	*High*, as indicated by • Decision rules providing for adoption of rules by (qualified) majority • An IGO with significant actor capacity serving the regime • A well-integrated epistemic community • Distribution of power in favor of pushers or pushers + intermediaries • Instrumental leadership by one or a few parties or by individual delegates or coalitions of delegates
Political context	*Favorable*, as indicated by • Linkages to other, benign problems • Ulterior motives or selective incentives for cooperation

Source: Miles *et al*. (2002, p.63).

II.c. A model to measure regime effectiveness

As previously conceptualized, to analyze the effectiveness of a cooperation arrangement, one must compare the agreement in question against a success or fulfillment standard (Underdal, 1992). The measurement's consistency and interpretation can be obtained through internal analysis of the regime, and the literature suggests it is better to compare a regime with itself over time than with other regimes, especially when considering regimes that encompass different themes and troubles (Underdal, 2002a; 2002b).

Thus, evaluating effectiveness involves a comparison against a standard of success or accomplishment. Defining the referred standard requires two steps: (1) pinning down the point of reference for the comparison and (2) determining the standard metric of measurement (Underdal, 2002a; 2002b).

As Underdal and Young (2004) posit, a standard of evaluation is needed to assign a score of effectiveness to a particular regime. This helps define a point in time or

trajectory to compare against the regime and provides a common metric of comparison to be applied across a wide range of cases. Equally necessary in the attempt to measure effectiveness is to refer to the state of affairs at a particular point in time (Underdal, 2002b; 2002c). This occurs for numerous reasons, such as the time needed to produce effects, since scores may vary according to the point the assessment is made.

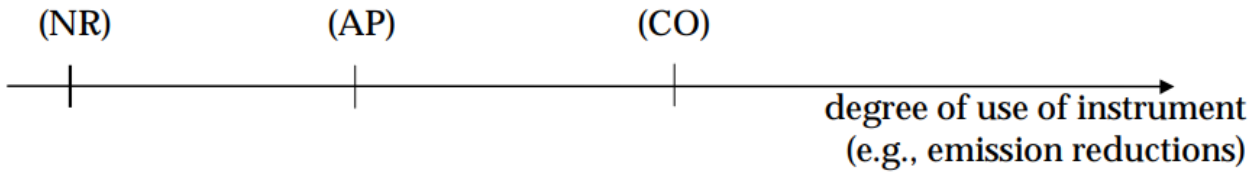
Figure I shows a scale to measure regime effectiveness in comparison with two scenarios: the absence of the regime and a collective optimum scenario. The measurement procedure can be conducted to investigate effectiveness at the country level as well as in general, aggregating all countries. This can generate nested effectiveness scores (Sprinz, 2000).

Beyond oil spill scenarios, the procedure can be applied to a variety of international environmental issues, *i.e.* transboundary and global environmental problems (Sprinz & Helm, 1999; Helm & Sprinz, 2000; Sprinz, 2000). Sprinz (2000) states that:

> "In the context of research on regime effectiveness, it is geared to establish the performance score in case of the absence of an international regime. By way of comparison with the performance score in the presence of an environmental regime, the difference in scores is attributed to the effect of the international regime." (p. 5)

In other words, applying the cited procedure revolves around a clear comparison of the actual performance over a no-regime counterfactual and a collective optimum medium. Nevertheless, determining the effectiveness of a regime is not a mere measurement, but an exercise of causal inference. After all, the result is being linked to the regime studied (Underdal, 2002a; 2002b). Thus, the analysis will be based on a comparison of the counterfactuals with data from official documents.

Figure I. Measuring Regime Effectiveness (general concept)



Effectiveness Score ES = (AP – NR) / (CO – NR)

Notes: (NR) = no-regime counterfactual
(CO) = collective optimum
(AP) = actual performance

Source: Helm & Sprinz (2000) *apud* Sprinz (2000)

II.d. Studying the effectiveness of the OPRC Convention

The expansion of the international environmental agenda resulted from a paradigm shift, especially from the second half of the twentieth century onwards. Specifically, for marine issues, as highlighted by Henderson (2019), the relationship of humanity with the sea has always been intertwined:

> The social, economic, and cultural progress of humanity has always been closely connected to the sea. From the spread of human groups in early prehistory to the importance of container shipping and maritime commerce to modern economies today, sea travel has remained central to the development and maintenance of human societies. It seems odd then that it enjoys, at best, a supporting role in dominant historical narratives (p. 2).

The recent history of the marine protection agenda is marked by responses to environmental disasters and growing public awareness of marine pollution. Early initiatives often focused on oil spills and their impact on the marine environment, as further compiled in chapter four. This agenda also results from a growing recognition of the interconnectedness of human activities and the health of our oceans, which has

demonstrated the importance of international cooperation, scientific research, and proactive measures to protect marine environments (Henderson, 2019).

International cooperation can specifically help countries respond to large oil spills, as emphasized by this dissertation (Nichols & Moller, 1991). Thus, this chapter will look at the OPRC and how we can analyze its effectiveness.

Environmental regimes aim to protect values and achieve greater goals to provide solutions to some form of biophysical impact, concurrently aspiring for a change in the human behavior that causes it (Mitchell, 2003). Many years are necessary to fulfill such commitments, as they are inserted in multifaceted contexts. A universal pact between nations with radically different preferences is something tremendously hard to fulfill (Underdal, 1980 *apud* Victor, 2016). Obtaining success in such circumstances would only be possible with a dilution of its content, as a way to reflect the interests of much less ambitious political actors. This strategy has been employed many times by the United Nations Framework Convention on Climate Change (UNFCCC), for example.

Marine vessel disasters have a history of driving waves of international legislation, by imposing more restrictions, stricter terms, and greater responsibilities on the shipping industry. The Prince William Sound (USA) oil spill in 1989 - popularly known as the Exxon-Valdez oil spill (Wolfe et al., 1994), caused an estimated 10.8 million gallons of crude oil to be released into the Gulf of Alaska. As a result, in November of 1990, maritime nations of the world gathered in London at the International Maritime Organization (IMO) headquarters. The goal was to sign what would later become the International Convention on Oil Pollution Preparedness, Response, and Cooperation (Mahapatra, 1995; Frynas, 2012) and strictly address oil pollution. Thus, it does not encompass other forms of contamination, such as nuclear accidents. The convention defines precautionary standards around oil leaks, establishing the integration of multilateral, institutional, and financial efforts around likely risks.

The agreement recognizes that it is essential to establish national plans as a priority (Nichols & Moller, 1991). It takes into consideration the polluter pays principle (embraced by the environmental international agenda since the 1970s) to protect the marine environment. It also considers, in its 46 provisions, the importance of global cooperation to achieve its goals, which includes possible future accidents arising from commercial ships.

Precaution protocols, training, communication, and contingency agencies were established to coordinate accidents. Beyond the signatory states, the convention recognizes and seeks help from international organizations for implementation. Yet, it is expected that its protagonism will result from state action. In other words, it acknowledges its signatory nations' provisions as the main national authorities (United Nations, 1990), while encouraging and recognizing third parties in collaborating towards the development of techniques and employing equipment to combat oil pollution, but not stating them as a primary source of legitimacy.

Edwards and Pascoe (1991), when discussing the IMO Conference on International Cooperation on Oil Preparedness and Response, held in 1990, point out that the convention envisioned facilitating international cooperation at a global level in regions in which such foreseen resources and expertise would be scarce, as well as reinforcing regional arrangements and national preparation and response strategies to oil spills. Particularly in developing countries (Edwards and Pascoe, 1991; Edwards, 1995), the IMO helps promote the potential of member state's capacities and acts as a catalyst for actions between member states and the industry. Meanwhile, recognizing the costs attributed to the adoption of the Convention and the challenges attributed to that, the active involvement of the IMO, its secretariat, and States, with an implementation strategy envisioned primarily on promoting tools to those vulnerable countries (Edwards, 1995), such as manuals, guides, training courses, and aid.

Among the efforts made by the IMO, Edwards (1995) points out to some achievements that had occurred to that moment: 1) the establishment, in 1991, of an OPRC Working Group, to monitor the convention's implementation (by the organization's Marine Environment Protection Committee); 2) the IMO Oil-Pollution Coordination Centre (OPCC) was set up by the Marine Environment Division to carry out specific functions the Conventions assigned the organization; 3) the OPRC Information System, which consists in a group of databases that contains resources, reports, organizations involved and other elements that compose the Convention's environment; 4) the promotion of research and development (R&D) by national governments, according to Article 8 of the Convention; 5) IMO assistance for national contingency planning and development - a high priority obligation under the regime; 6) the promotion of regional cooperation mechanisms (although IMO started this before the agreement, it gained

momentum with the Oil Convention); 7) a comprehensive training strategy and program evolving IMO, governments and industries; 8) the promotion of cooperation with oil and shipping industries; 9) lastly, technical assistance and resource mobilization, since governments under the Convention are obliged to support countries in need of technical assistance, whether bi or multilaterally, through the IMO.

Edwards and Pascoe (1991) also highlight the improvement brought by the convention (which could be classified as declaratory) to the role of IMO in promoting cooperation by assigning the latter several activities. In addition to the obligations listed in Figure II, the Convention designates the following functions and activities:

(1) On information services: to receive, collate, and disseminate on request the information provided by parties and relevant information provided by other sources; to assist in identifying sources of provisional financing of costs;

(2) On education and training: to promote training in the field of oil pollution preparedness and response; to promote international symposia;

(3) On technical services: to facilitate cooperation in research and development; to provide advice to states establishing national or regional response capabilities; to analyze the information provided by parties and relevant information provided by other sources and provide advice or information to States;

(4) On technical assistance: to facilitate the provision of technical assistance to states establishing national or regional response capabilities; to facilitate the provision of technical assistance and advice, upon the request of states faced with major oil pollution incidents.

Table V. List of the articles of the OPRC Convention.

Article	Description
Article 1	General Provisions
Article 2	Definitions
Article 3	Oil pollution emergency plans
Article 4	Oil pollution reporting procedures

Article 5	Action on receiving an oil pollution report
Article 6	National and regional systems for preparedness and response
Article 7	International cooperation in pollution response
Article 8	Research and development
Article 9	Technical co-operation
Article 10	Promotion of bilateral and multilateral cooperation in preparedness and response
Article 11	Relation to other conventions and international agreements
Article 12	Institutional arrangements
Article 13	Evaluation of the Convention

Source: United Nations (1990)

Figure II. Summary of OPRC Convention obligations

Preparedness	Response	Cooperation
Oil pollution emergency plans required for: Oil tankers ≥ 150,000 gross tons and other ships ≥ 400,000 gross tons	Requirements to report oil pollution incidents for: All ships	Advisory services Technical support Training
Any fixed or floating offshore installation or structure engaged in gas or oil exploration, exploitation, or production activities, or loading or unloading of oil Any seaport and oil handling facility that presents a risk of an oil pollution incident	Any fixed or floating offshore installation or structure engaged in gas or oil exploration, exploitation, or production activities, or loading or unloading of oil Any seaport and oil handling facility, which presents a risk of an oil pollution incident	Equipment Facilitation of trans-frontier movement of equipment and personnel Research and development
Establishment of national contingency plans	Establishment of national systems for responding promptly and effectively	

Source: Edwards and Pascoe (1991).

Using the example of another similar environmental agreement, Ishak & Hisham (2020) studied crude oil spills in the straits of Malacca, discussing the ways that the Act of Marine Environment Protection (MEP) provided an integrated management response and awareness to the accident in Peninsular Malaysia in 2000. The authors list the structure of contents of a contingency plan (Table VI) with the purpose of showing what is required for a typical plan execution. In such a context, they state that the related

federal organization should be the one to distribute the legal responsibility and duty together with supplying oversight of response strategies, preventing unforeseen events, and employee coaching.

Table VI. The contents of a typical contingency plan

First response	Initial measures Preliminary call First processes Addresses and telephone record
Establishment	Activation processes
Concentrations of response	Actions for numerous echelons of escalation techniques
Association	Responsibilities entities and responsibilities
Coverage	Systems actions
Safeguard urgencies	Crucial regions Vulnerable regions
Operations	Personalities and responsibilities Reconnaissance, supervising, and investigation Apparatus utilization Telecommunications record keeping Community affairs Coastline investigation
Action proposes	Operation regions Shoreline evaluation and countermeasures Disposal options
Circumstances	Judgment trees consequences
Exercises	Exercise practices
Records	Connections Apparatus: catalogs, suppliers, distributes Compassion information Additional supplies

Source: Ishak and Hisham (2020).

Ishak and Hisham (2020) argue that an appropriate preparation to ease the emergency response of affected states can increase their readiness, self-confidence, and potential of spill recovery and containment of pollution, i.e., a proper response that can lead to the effectiveness of the regime.

As mentioned earlier, the term regime effectiveness used in this study refers to the comparison of the regime against some standard of success or accomplishment (Breitmeir *et al*., 2011; Underdal, 1992; 2002a). The components analyzed and the way the comparison will be executed will be discussed in detail further ahead.

III. Oil spills as an international political issue

III.a. International cooperation around oil spills - a brief compilation of modern oil spill incidents

In a shift brought about in the 1960s, with the then recent modern environmental movement, many coastal countries started adopting intergovernmental agreements that aimed to promote cooperation in combating and offering an emergency response to oil spills (Nichols & Moller, 1991). A common ground among these agreements is the obligation to notify the contracting states over spills that may impact them, and the similar problems that oil spills might bring regardless of governments and regional or local industrial arrangements.

Several international agencies have taken significant action towards handling oil spills since the 1970s up until the 1990s, such as the Food and Agriculture Organization of the United Nations (FAO), the IMO, the Intergovernmental Oceanographic Commission (IOC), the United Nations Environment Program (UNEP), and the World Health Organization (WHO) (Jernelöv, 2010b).

As pointed out earlier, this study will focus on accidental oil spills[2], which are fundamentally different from operational leaks in the sense that the latter can be quickly contained and represent a much smaller risk of escalating into an environmental disaster (Luoma, 2009). Tanker accidents encompass less than 10% of the total oil input into the marine environment (Vanem *et. al.*, 2008). However, statistically, it is not prudent to consider only the proportion discharged, since one large accident can promote a huge local impact on the marine environment with devastating consequences, according to the circumstances of the event (Luoma, 2009). Also, Hassler (2011) highlights that institutional responses to accidental and operational oil spills are very different, including in terms of success.

Operational spills will not be taken into consideration in the brief compilation of oil spill events brought in this section due to their multifactorial nature and geopolitical

[2] According to Vanem *et al.* (2008), accidental oil spills refer to the discharge of oil in circumstances of oil tanker accidents, both legal and illegal, and are more prone to cause environmental impacts.

complexities. Cases such as the ecocide of the Niger Delta, which occurred over a period of 20 years of continuous incidents, demonstrate a notable lack of environmental governance in the handling of over 4000 incidents reported between the years 1976 and 1996. In those incidents, approximately 2,369,470 barrels of crude oil were dumped into the water (with an alarming estimate of only 23% removed), and impacted marine and terrestrial resources (Nwilo and Badejo, 2005). Despite Nigeria's participation in several international environmental agreements, the low compliance and effectiveness of its domestic legislation have hindered the local population's access to safe drinking water and the destruction of the river's ecosystem (Nwilo and Badejo, 2005). Such cases cannot be compared to single accidental events of oil tanker spills, due to their specific settings and contexts.

Likewise, the inclusion of spills resulting from wars will not be included, since their motives come from backgrounds that are quite different from that of tanker accidents. One example is that of the great Gulf War Oil Spill of 1991, which left an estimated 380 million gallons of crude oil dispersed over the Persian Gulf. This incident was deliberate, and was used as a strategy by one the sides of the war to set fire to the enemy - which did not happen in the end. It is the biggest oil spill to date in its category (Jernelöv, 2010a).

Based on the criteria presented, this section lists the ten largest oil spill events since 1967, the year of the much-reported Torrey Canyon spill off the coast of Scilly of Cornwall (UK). Although this was not the greatest spill of its time (numerically), it brought major damage to the local marine biome and promoted the design of MARPOL 73 (Luoma, 2009). This environmental agreement, in turn, provided a framework that inspired other regimes.

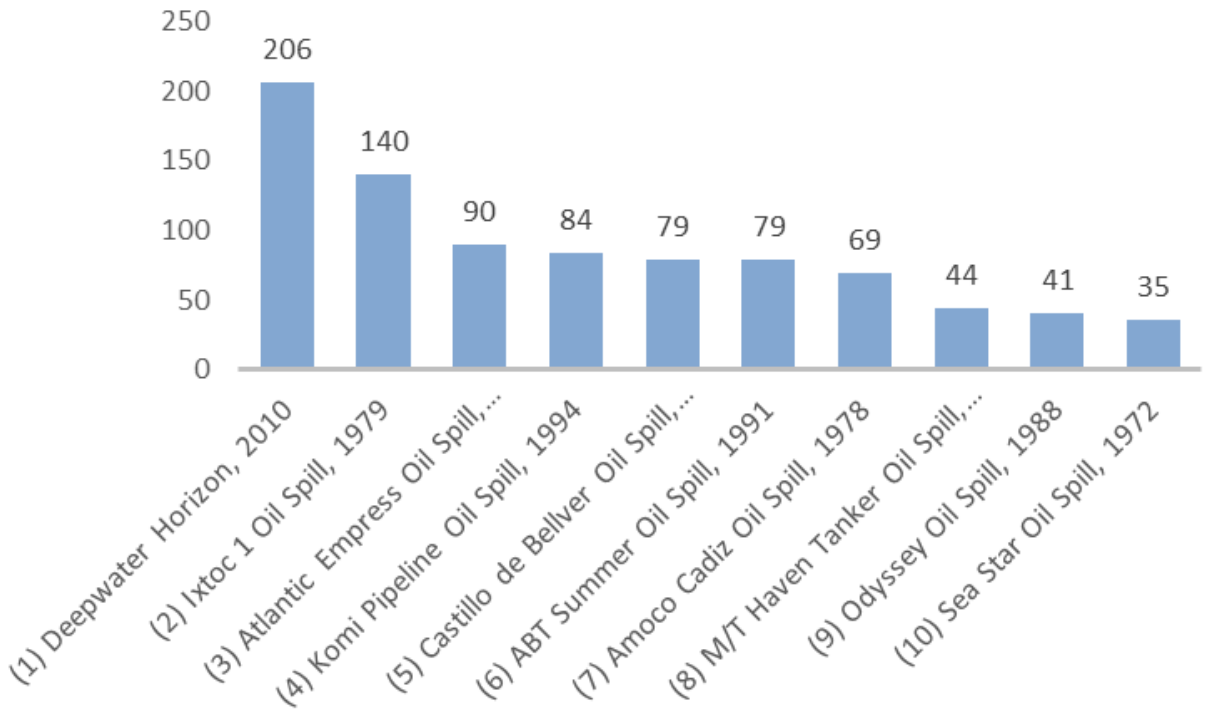
Graph I presents the environmental impact of the largest accidental oil spills since 1967 (Jernelöv, 2010b). The list begins with the Deepwater Horizon incident (2010), when 206 million gallons of crude oil were dispersed in an industrial disaster in the Gulf of Mexico due to an explosion of the oil drilling rig Deepwater Horizon; this caused an unprecedented leak that took five months to be contained (Schoenbaun, 2012).

Near the same area to the Deepwater Horizon incident, 1979 the Ixtoc I oil spill resulted from a fire that caused the drilling rig to rise and collapse. The spill lasted nine months until it was contained, leaving 140 million gallons of crude oil exposed in the

Gulf of Mexico (Jernelöv & Lindén, 1981).

The same year, due to a collision in the Caribbean Sea, the ship Atlantic Empress spilled 90 million gallons of crude oil into the ocean (Horn & Neal, 1981). In fourth place is the Komi pipeline oil spill, which leaked 84 million gallons of crude oil into the Kolva and Pechora rivers, in the Komi Republic of Russia (Owens & Sergy, 1997).

Graph I. Largest Oil Spills worldwide since 1967 (in millions of gallons)



Source: Jernelöv (2010a) and Statista (2023).

In fifth and sixth places come two tanker spills: The Castillo de Bellver (1983), near South Africa, and the ABT Summer (1991), off the coast of Angola. Both spilled approximately 79 million gallons of crude oil (Moldan *et al.*, 1985; UNEP, 1991).

The AMOCO Cadiz oil spill comes in seventh place. It spilled 69 million gallons of the coasts of England and France (Brittany) in 1978, and caused a lot of damage to the local marine life. Along with other events, such as the Torrey Canyon spill, it led to many changes in the regional legislation on handling and moving crude oil (Jernelöv, 2010a).

Namely, being the first case litigated under the International Convention on Civil Liability for Oil Pollution Damage (CLC) (Rosenthal & Raper, 1985).

In eighth place, the Motor Tanker Haven accident (1991) spilled 44 million gallons off the Italian coast. This accident was caused by a small vessel; these tend to leak more than larger ones, which rarely leak all their content when fractured (Luoma, 2009). In ninth place, the Odyssey Oil spill (1988) left 40.7 million gallons of crude oil along the coast of Nova Scotia when the tanker got hit by a storm and broke in two. It is the largest spill in Canada (Daisy *et al.*, 2022).

Lastly, the Sea Star Oil spill in 1972 was caused by a South Korean tanker on a voyage from Ras Tanura, Saudi Arabia, to Rio de Janeiro, Brazil. The ship collided with the Brazilian Tanker Horta Barbosa and leaked 35 million gallons of crude oil into the Gulf of Oman (ITOPF, 2023).

Considering the environmental governance surrounding these spills, the literature shows a variety of responses and legislations tied to the events and an increasing number of environmental treaties over time (Daisy *et al.*, 2022; Diário da República, 2001; Horn & Neal, 1981; ITOPF, 2023; Jernelöv, 2010a; 2010b; Luoma, 2009; Moldan *et al.*, 1985; Owens & Sergy, 1997; Rosenthal & Raper, 1985; Schoenbaun, 2012; UNEP, 1991).

More recently, newer and more efficient mitigating technologies are able to contain accidents and promote quicker responses, when applied properly (Jernelöv, 2010b). However, they still may not cover the risks of more remote, difficult, and/or deeper sites (Jernelöv, 2010b; Chen *et al.*, 2019).

Table VII summarizes the propositions in response to the largest oil spills worldwide since 1967, in terms of international regimes (or the absence of such a response).

Table VII. Largest oil spills worldwide since 1967 (in decreasing order) and related legislation.

Event	Date and site	Regime/legislation in force at the time
(1) Deepwater	April 20th, 2010; Gulf of Mexico	Oil Pollution Act, 1990

Horizon		
(2) Ixtoc I	June 3rd, 1979; Gulf of Mexico	A liable regime is not significantly discussed in the literature (Jernelöv & Lindén, 1981)
(3) Atlantic Empress	July 19th, 1979; Tobago, Caribbean Sea	N/A
(4) Komi Pipeline	October 1994; the Komi Republic of Russia	N/A
(5) Castillo de Bellver	August 6th, 1983; Cape Town, South Africa	N/A
(6) ABT Summer	May 28th, 1991; Coast of Angola	International Convention on Oil Pollution Preparedness, Response and Co-operation, 1990
(7) Amoco Cadiz	March 16th, 1978; England, France	International Convention on Civil Liability for Oil Pollution Damage (CLC)
(8) Motor Tanker Haven	April 11th, 1991; Genoa, Italy	Oil Pollution Preparedness, Response and Co-operation, 1990
(9) Odyssey	November 10th, 1988; Nova Scotia, Canada	MARPOL 73/78
(10) Sea Star	November 19th, 1972; Gulf of Oman	N/A

Sources: Daisy *et al.* (2022); Diário da República (2001); Horn & Neal (1981); ITOPF (2023); Jernelöv & Lindén (1981); Jernelöv (2010a; 2010b); Luoma (2009); Moldan *et al.* (1985); Owens & Sergy (1997); Rosenthal & Raper (1985); Schoenbaun (2012); UNEP (1991).

Each one of the top ten largest oil spills since 1967 received a different level of academic attention, ranging from general descriptions (Horn & Neal, 1981; Luoma, 2009) to biophysical explanations (Jernelöv & Lindén, 1981; Daisy *et al.*, 2022). Thus, the extent of research on the ten accidents varied immensely: only five out of the ten spills were found to have been more widely published through scientific outlets, with even fewer publications on the social aspects compromised as a result of the events of the oil

leaks.

Starting with the most reported and, perhaps, the most unique case regarding research funding to investigate its outcomes and the prevention of future spills, there are over a thousand published articles covering the Deepwater Horizon incident (GoMRI[3]). The accident, under the liability of the oil giant British Petroleum (BP), is by large the biggest oil spill in US history (Eklund *et al.* 2019). It was followed by an extensive cleanup response, which required thousands of workers. In fact, it was considered the most comprehensive application of the Oil Pollution Act of 1990 (OPA 90), the U. S. national legislation created in response to the Exxon Valdez oil spill of 1989. The Deepwater Horizon spill brought a unique set of outcomes in a political context in which the OPA was interpreted by the Obama administration (January 2009 - January 2017). Due to this, most of the fines paid by BP were applied to the creation of the Gulf of Mexico Research Initiative (GoMRI - 2010-2020) (Mason, 2003; Eklund *at al.,* 2019; Zimmermann *et al.,* 2016; Harlow, Brantley & Harlow, 2011; Force, Davies & Force, 2011).

Apart from the cleanup efforts, the liable company committed to repairing its public image after the spill, and grew an online presence reporting on the progress made to contain the accident, through its website and press releases.

The second largest incident, the Ixtoc I, was well reported by Jernelöv & Lindén's (1981), in an extensive description of the accident. Even though the study did not cover the institutional aspects of the incident, the authors provide a clear image of the events that accompanied the oil leak and the lack of transparency and disclosure of the liable oil company, PEMEX[4] (*Petroleos Mexicanos*). At that time, PEMEX was the only operating oil company in Mexico and fully state-owned (O'Brien, 1981).

About the ABT Summer case (1991), Angola only became a member state of the International Convention on Oil Pollution Preparedness, Response and Cooperation in 2001 (Diário da República*,* 2001). There are not many publications on the response to the accident in 1991, and the OPRC was only opened for signatures six months after the spill (UNEP, 1991).

Although it occurred in Brittany, the multiple lawsuits that arose from the Amoco

[3] Available at https://gulfresearchinitiative.org/

[4] *Petroleos Mexicanos* or PEMEX is the Mexican state-owned oil company nationalized in 1938, which held up until 2013 the monopoly over the exploration of all oil over Mexican sovereignty (Phillip, 1999).

Cadiz incident (1978) were consolidated in the United States District Court for the Northern District of Illinois (Rosenthal & Raper, 1985), based on the admiralty law[5] (Bonnieux and Rainelli, 1993; Gundlach *et al.* 1983). An interesting fact about this incident is that it was the first case litigated under the International Convention on Civil Liability for Oil Pollution Damage (CLC). The Amoco International Oil Company (AIOC) and Transport companies were deemed responsible for the ownership of the Amoco Cadiz vessel and considered negligent.

The Motor Tanker Haven oil spill (1990) was the largest in the Mediterranean (Madrid *et al.* 2015). Italy's mitigation response is not reported in scientific publications, and Italy only signed the OPRC in 1999. Similarly, there is not a lot published on the Odyssey oil spill (1988) and its institutional repercussions. Canada only ratified MARPOL 73/78 in 1992 (Ecolex, 2023).

This brief compilation of the largest events of oil spills shows that each incident had a particular set of circumstances that led to the leakage and to the responses held. Nevertheless, many of these did not get vast media coverage or abundant scientific publications, as noted in the Komi Pipeline case in Russia.

The Brazilian case, despite its smaller scale when compared to the listed accidents, followed a trajectory that also involved a particular set of human and political failures. Similarly, regimes may follow an uneven pattern of implementation and compliance and, therefore, be frequently ineffective (Etkin, 1999; Soares *et al.*, 2021; Lessa *et al.*, 2021). The next section analyzes the issue of compliance to the OPRC convention in Brazil.

III.b. The OPRC Convention and the matter of compliance in Brazil

As pointed out by Chayes *et al.* 1998 (*apud* Mitchell, 1994), compliance describes the conformity of an actor to an explicit rule of a treaty; in other words, a country's alignment to a regime's guidelines. However, as discussed in Chapter I, even if a state

[5] The Admiralty, within the United States Constitution, stands for the exclusivity on "saving to suitors in all cases the right of a common law remedy, where the common law is competent to give it" (Merrick Dodd, 1921, p. 649). Also referred to as the Maritime Law, its jurisdiction covers marine commerce, pollution and navigation, seafarer rights, and the transportation of both wares and passengers, as well as in-land based activities of maritime character.

complies with an international agreement, it might not have the resources to reach the agreement's goals and intentions. Also, compliance does not guarantee problem-solving if international regulations are insufficient.

Regime compliance reveals the translation of propositions into actual laws, regulations, policies, etc., in this case, the Brazilian domestic policies that align to the OPRC Convention. That said, previous studies have directly and indirectly analyzed compliance of the OPRC Convention in Brazil. Cantalice (2021) analyzed publications (1990-2020) by the Brazilian National Environment Council (CONAMA), and matched its resolutions to the convention's articles, as shown in Table IX[6].

CONAMA is the consultative and deliberative body of Brazil's National Environmental System - SISNAMA. It was established by Law 6.938/81, which provides for the National Environmental Policy, and was regulated by Decree 99.274/90 (CONAMA, 2023). Its relevance rests on the ability to assimilate national regulations structured by the Environmental Ministry and SISNAMA in its collegiate of five sectors: federal, state and municipal bodies, the business sector and environmental organizations; namely, it congregates a wide network set of actors while promoting its regulations.

Table VII shows that Brazil is largely compliant with the OPRC convention, although not directly addressing the Convention's evaluation provisions (Article 13) (Cantalice, 2021; Silva, 2023). The country is particularly aligned with article 12, which delivers the institutional arrangements of the regime (Cantalice, 2021).

Table VIII - Compliance to the International Convention on Oil Pollution Preparedness, Response and Cooperation.

Convention article	Alignment with the Convention
Art. 3 - Emergency plans for oil pollution	CONAMA resolutions: nº 006, nº 003, nº 010, nº 265, nº 293, nº 326, nº 330, nº 398, nº 420, nº 430, nº 450, nº 460, nº 467, nº 472; law nº 9966/2000; federal decrees nº 4871/2003 (modified by decree nº

[6] It is important to note that in May 2019 the Bolsonaro government changed CONAMA's structure significantly by reducing the number of councilors from 96 to 23, through Decree nº 9806/2019. Among these changes, the participation of representatives from nongovernmental organizations was reduced from 23 to 4 (Silva et al., 2022). In 2023 the Decree was considered unconstitutional by the Brazilian Supreme Court. In the same year, participation in the council was augmented and it began functioning with 113 councilors.

	8127/2013, and substituted by decree nº 10.950/2022)
Art. 4 - Reporting procedures for oil pollution	CONAMA Resolutions: nº 003, nº 010, nº 265, nº 306, nº 326, nº 327, nº 330, nº 398, nº 420, nº 017; federal decrees nº 8127/2013 and nº 10.950/2022
Art. 5 - Action on receiving an oil pollution report	CONAMA Resolutions: nº 265, nº 293, nº 398; federal decrees nº 4871/2003 (modified by decree nº 8127/2013, and substituted by decree nº 10.950/2022)
Art. 6 - National and regional systems for preparedness and response	CONAMA Resolutions: nº 003, nº 265, nº 306, nº 326, nº 327, nº 330, nº 398, nº 420, nº 430, nº 450, nº 460, nº 017; law nº 9966/2000; federal decrees nº 4871/2003 (modified by decree nº 8127/2013, and substituted by decree nº 10.950/2022)
Art. 7 - International co-operation in pollution response	Federal decrees nº 8127/2013 and nº 10.950/2022
Art. 8 - Research and development	CONAMA Resolutions: nº 327, nº 422
Art. 9 - Technical cooperation	CONAMA Resolutions: nº 003, nº 265, nº 326, nº 327 No. 330, No. 398, nº 422, nº 017; federal decree nº 10.950/2022; Framework Agreement on the Environment of Mercosur
Art. 10 - Promotion of bilateral and multilateral preparedness and response	Federal decree nº 2596/1998; Framework Agreement on the Environment of Mercosur
Art. 11 - Relationship to other Conventions and international agreements	CONAMA Resolution: nº 452; law nº 9966/2000; federal decrees nº 4871/2003 (modified by decree nº 8127/2013, and substituted by decree nº 10.950/2022); decree nº 6478/2008
Art. 12 - Institutional arrangements	CONAMA Resolutions: nº 003, nº 010, nº 265, nº 269, nº 306, nº 326, nº 327, nº 330, nº 420, nº 422 nº 430, nº 450, nº 452, nº 460, nº 017; law nº 9966/2000
Art. 13 - Convention evaluation	No resolution matched.

Source: based on Cantalice (2021) and Silva (2023)

Brown Weiss & Jacobson (1998) argue that compliance can be analyzed in three essential ways: procedural, substantive and treaty-minded. The first of these, procedural compliance, is considered punctual and easy to understand, referring only to the bureaucratic process of the regime in question. In this case, state actors fulfill their commitments on issues directly to the treaty, such as through national reports. Substantive compliance refers to actions taken to fulfill treaty commitments in a more in-

depth manner. Finally, compliance "with the spirit of the treaty" (treaty-mined) means that actions comply with the broad normative framework of the agreement, such as placing biodiversity protection in the context of conservation or sustainable development goals in the case of the Convention on Biological Diversity - CBD. Cantalice (2021) states that Brazil's compliance regarding the OPRC Convention can be classified as procedural compliance, according to the Brown & Weiss' (1998) classification. Whether this translates into effectiveness will be analyzed ahead.

III. c. The Brazilian oil spill of 2019 in perspective: a political matter

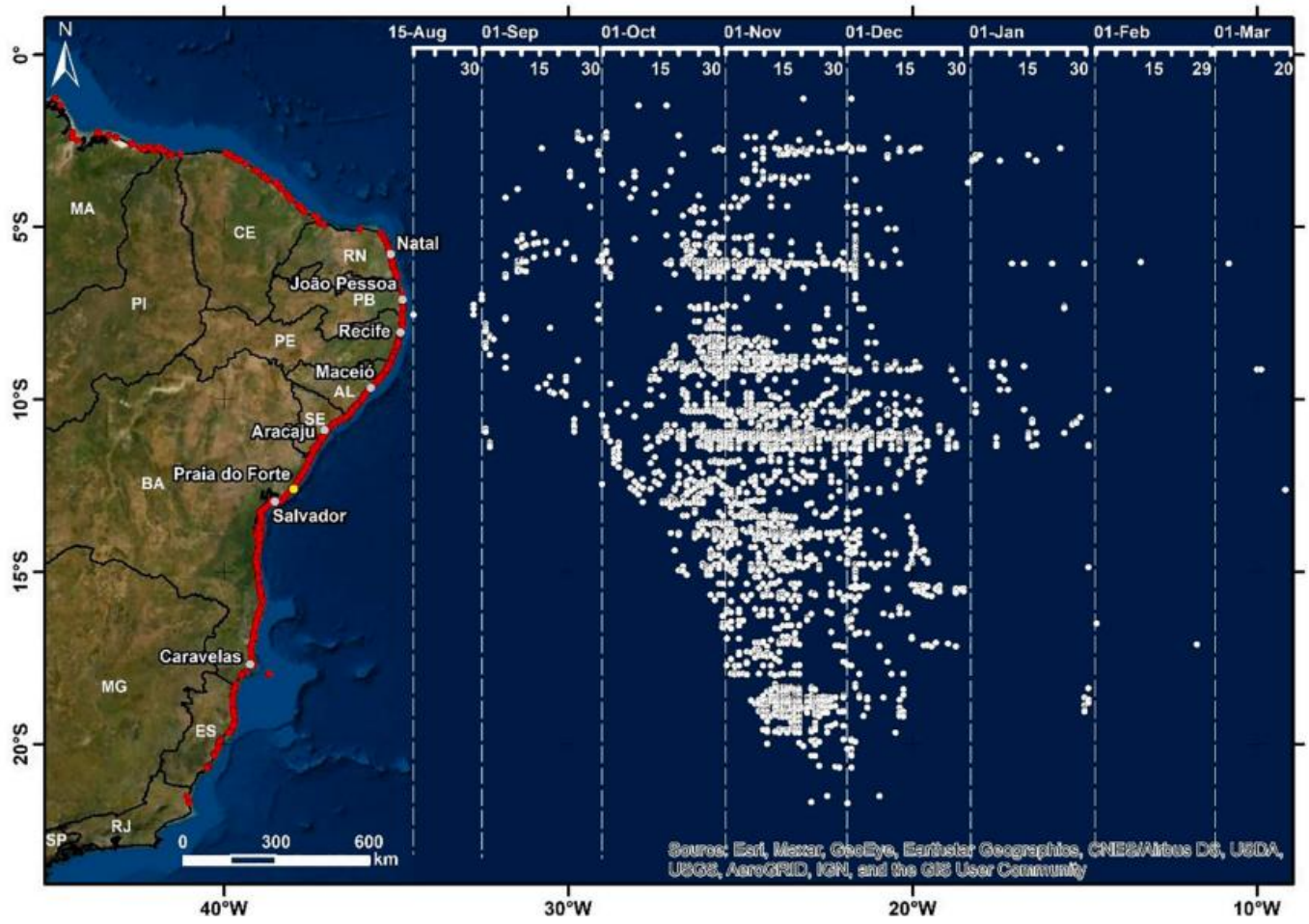
Starting in late August 2019, evidence of oil was found on over 3000 kilometers of Brazilian coastline, reaching over 980 beaches and more than 55 coastal and shallow marine conservation areas (Soares *et al*., 2020), with high toxicity documented on animal life (Soares *et al*., 2021). The authors also pointed out bioaccumulation was prone to occur due to the high concentrations of mercury, cadmium, lead, and copper found after the oil spill. Unfortunately, one of the limitations to study the effects of the spill was the gaps in previous environmental monitoring in the affected regions (Soares *et al*., 2021).

According to the Brazilian Navy (2019), the accident spilled over 4000 tons of crude oil and was marked by the federal government's vastly uncoordinated action during the crisis (Brum, Campos-Silva & Oliveira, 2020; Soares *et al*., 2020; Lessa *et al.* 2021). According to reports by IBAMA (the Brazilian Institute for the Environment and Renewable Natural Resources), oil was first noticed between the states of Pernambuco and Paraíba at the end of August 2019. By September 25th, oil had reached the state of Maranhão, more than 1260 km away from the original spot (Figure III). According to Lessa *et al*. (2021), by 2021 the reports from IBAMA showed a surprisingly low amount of oil considering the enormity of the spill and animal casualties, including birds, marine mammals, and turtles. One of the possible reasons is the apparent subsurface drift of oil in northeastern Brazil.

Although nine times smaller than the Exxon Valdez spill (1989), which leaked 374,000 tons of crude oil (Peterson *et al.*, 2003), the Brazilian spill killed over 250,000 birds and more than 3,100 sea mammals, and was the largest and most impactful of the country's history to date (Pena *et al.* 2020). Figures III and IV show the extent of damage

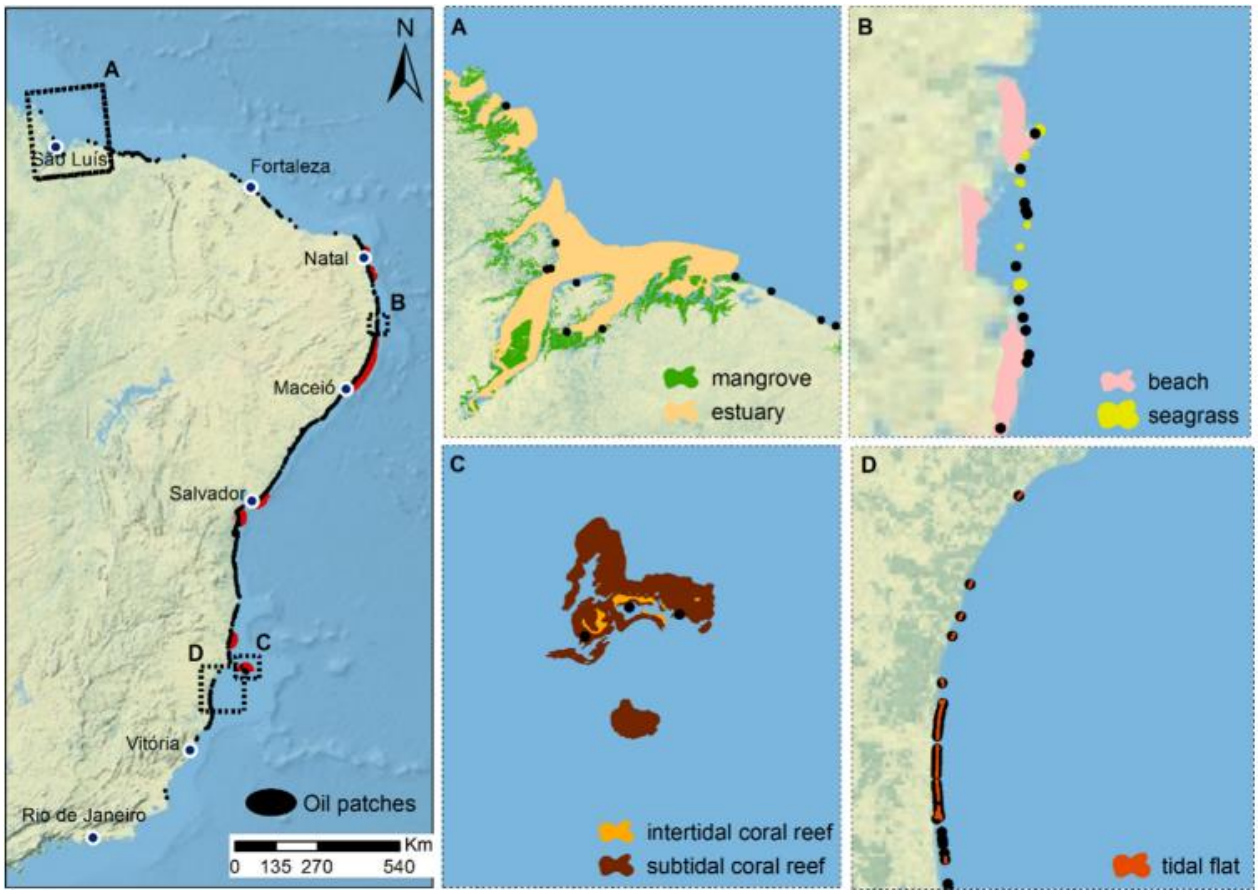
to marine coastal habitats.

Figure III. Locations of oil spilled on the Brazilian coast, chronologically (August 2019 - March 2020)



Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS user community *apud* Lessa et al. 2021. The red dots represent the locations where the oil spilled reached the shore, the yellow dot stands for the current meter mooring site located at Praia do Forte (Salvador-BA), and the white dots show a projection of the latitude of coastal sites indicating the timing of the oil reports.

Figure IV. Map of the preliminary findings on the extent of the impact of the oil spill on marine coastal habitats between August and December 2019.



Source: Magris and Giarrizzo, 2020

Preliminary findings showed varying exposure to oil residue among different marine coastal habitats (Magris and Giarrizzo, 2020):

- Estuaries - 4929.74 km²
- Mangroves - 489.83 km²
- Seagrass meadows - 324.77km²
- Beaches - 185.3 km²
- Tidal flats - 63.64km²
- Intertidal reefs - 45.95 km²
- Subtidal reefs - 9.69 km²

Magris and Giarrizzo (2020) explain that:

> "Potential impacts were estimated as the overlap between each marine coastal habitat (estuaries, mangroves, seagrass meadows, beaches, tidal flats, and subtidal and intertidal coral reefs) and the occurrence of oil patches. The inserts on the right (A-D) show a close-up view of each marine coastal habitat in distinct areas of impact, shown in the dashed squares in the principal map, to the left, which also shows areas of particular concern for assessing current impacts in red. The areas shaded red represent a high relative density of all the potentially impacted marine coastal habitats that were exposed to oil residues" (Magris and Giarrizzo, 2020, p.2).

To provide a wider context, the spill happened during the Jair Messias Bolsonaro administration (2018-2022), marked by extremist liberal economic policies (Abessa *et al.* 2019) that prioritized environmental exploration over conservation. Long before being elected as president, during his years in Congress, Bolsonaro proposed several bills considered harmful to the environment. Some examples are: making the use and sale of pesticides easier (bill no. 6299/2002 - Federal Senate & Maggi, 2002), eliminating or reducing restrictions on environmental licenses for new infrastructure projects and other economic activities (bill no. 3729/2004 - Zica *et al.,* 2004; Abessa *et al.,* 2019), and loosening laws that prohibit hunting wild animals (bill no. 436/2014 - Mendonça, 2014). As Abessa *et al.* (2019) pointed out, attempts to dismantle Brazilian environmental policy are not new, but gained momentum during Bolsonaro's administration. This negative turning point in the history of environmental conservation efforts in the country was even supported by appointed high-ranking officials of the Ministry of the Environment during his mandate (Capelari *et al.*, 2020).

Also, by April 2019, the Brazilian federal government had frozen 42% of the budget of the country's Ministry of Science, Technology, and Innovation (MCTIC), which put universities at risk and reinforced previous challenges such as brain drain (Angelo, 2019).

Contributions to the sociopolitical outcomes from the oil spill of 2019 are limited, as studies have focused largely on biophysical descriptions of the chemical damage caused to the national coast (Escobar, 2019; Magris and Giarrizzo, 2020; Lessa *et al.* 2021). The literature on the political aspects of the oil spill has mostly discussed the institutional limitations Brazil demonstrated during Bolsonaro's administration years, as

in the operations performed by the Environmental Ministry and the disassemblement of the environmental agenda (Scantimburgo, 2018; Soares *et al.* 2020).

When the accident took place, the federal response was widely categorized as late and uncoordinated (Capelari *et al.* 2020). A rapid response was nearly impossible (Soares *et al.*, 2020), since the administration had extinguished the two responsible committees in early 2019 (Brazil, 2019; Soares *et al.*, 2020). The outcome of such conditions, alongside the positioning of the Environment Ministry at the time, undermined the capacity of Brazilian institutions to understand and solve the impacts of this uncontrolled environmental disaster (Soares *et al.*, 2020).

IV. Objectives and Methodology

IV.a. Objectives

The main objective of this study was to evaluate the International Convention on Oil Pollution Preparedness, Response and Cooperation (1990) in terms of its effectiveness in Brazil, with special focus on the 2019 oil spill.

The secondary goals were:

- To construct a collective optimal scenario regarding the implementation of the referred convention in Brazil;
- To construct a non-implementation counterfactual of the referred convention in Brazil;
- To classify the effectiveness of the referred convention in Brazil.

IV. b. Counterfactuals and Hypothesis Testing in Political Studies

Fearon (1991) highlights the important role of counterfactual application in political science, a substantial tool to test non-experimental hypotheses and, most frequently, to apply in case studies where the analyst explicitly and carefully manifests concern in giving a causal explanation for some event or phenomenon. By outlining a clear difference between causes and conditions, the author suggests that one of the most tangible examples of the importance of a counterfactual argument comes from research on the causes of World War I. Over the years of inquiry, many arguments were pointed out by historians and political scientists, regularly in a causal format such as “If X had not been present, the war would not have occurred or would be less likely to occur”.

Fearon (1991) also uses the example of how Brazilian democracy was dismantled by the 1964 *coup d'état.* According to the author, counterfactuals are frequently used to analyze this kind of event in comparative politics and international relations case studies.

In this dissertation, I will explore the effectiveness of the International Convention on Oil Pollution Preparedness, Response and Cooperation (1990) in Brazil based on

the non-regime counterfactual and optimal scenarios.

According to Goodman (*apud* Fearon, 1991, p. 193), a vital issue on the legitimacy of counterfactual propositions rests on what he calls “contenability”:

> A counterfactual assertion is judged true if (i) the counterfactual antecedent, when joined with appropriate theories and facts, implies the consequent; and (2) the counterfactual antecedent is “containable” with the facts or “initial conditions” used to draw the inference, meaning that if the antecedent had actually occurred, the initial conditions could also have occurred.

In other words, analysts using this counterfactual argumentative strategy should pay attention to whether the assumptions of its counterfactuals are containable in the facts and theories used to trace the causal inferences being made.

Thus, when investigating the extension of change caused (if any) by an agreement in terms of effectiveness, objectives stated in the text will be compared with a hypothetical situation in which the proposed regime is absent. The change will also be compared to an optimal scenario of perfect implementation (upper point of reference). Hence, measures of comparison will be taken to evaluate independent variables related to effectiveness (considering effectiveness as the dependent variable) that have already been identified by the literature, providing a real sense of the regime's outcomes.

IV.c. Data

Helm & Sprinz (2000) propose a general model to measure the effectiveness of regimes using counterfactuals, in which a Pareto-optimal[7] scenario displays a set of maximum benefits with no harm to those parts (Underdal, 2002b).

Accordingly, the collective optimum scenario is useful when wanting to establish the point up to which the problem was, in fact, solved by a given regime. On the other hand, the non-regime scenario shows how the situation would be in the absence of the interventions analyzed (Miles *et al.* 2002; Moraes, 2017), i.e., a hypothetical situation in which the regime was never implemented. In this way, according to Underdal (2002b), regime effectiveness can be perceived in terms of the relative improvement entailed by

[7] The Pareto frontier refers back to a complex and hard to measure political standard; in terms of effectiveness, it is projected as the maximum accomplishment under a regime that a group of actors can pursue (Miles et. al. (,=2002a)

the existence of the regime.

Upon the scheme proposed by Steiner & Medeiros (2010), I propose a simplified theoretical model to analyze effectiveness, where the effectiveness score is the result of a function of the difference between real performance and the non-regime scenario over the difference between the collective optimum and the non-regime scenario.

In a broader sense, this study carries out a single case study (Gerring, 2004) of the effectiveness of the Oil Pollution Act in one (Brazil) of the 112 member countries participating in this agreement. The counterfactual scenarios were constructed using official government records and documents provided by Brazil's Ministry of the Environment, the National Environmental Council (CONAMA), the Institute of Environment and Renewable Natural Resources (IBAMA), the federal register (*Diário Oficial da União*), and federal decrees and laws. Therefore, the analysis combined biophysical data with observable political effects to compare the scenarios with the agreement's actual performance.

V. Is the International Convention on Oil Pollution Preparedness, Response and Co-operation effective?

As advised by Fearon (1991), the use of counterfactuals in political science research should be explicit and careful, and its assumptions must be containable by the facts and theories used to design the causal inferences made. Thus, the following scenarios will be designed attentively according to previous models already discussed previously.

In this chapter, two scenarios are constructed, as previously suggested by Underdal (1992): 1) a standard of success (in other words, a collective optimum) and 2) scenario of non-success. The purpose is to determine the actual performance and, consequently, the effectiveness of the regime. The idea is that the real performance is located between the collective optimum and the non-regime counterfactual (as in Figure II) (Helm and Sprinz, 1999; Steiner, 2011).

Breitmeir *et al.* (2011) also highlight the effect of time over regime maturity and relevance, as regimes are not static entities. Therefore, regimes are susceptible to change over time and to develop more compliant mechanisms (Sprinz, 2000; Hejny, 2007; Breitmeir *et al*., 2011; Steiner, 2011).

The chapter is divided into four sections: 1) I first construct the non-regime scenario, considering the international legal status quo before regime implementation; 2) I then construct the collective-optimum scenario, using OPRC's objectives as guidelines; 3) the third step is to present the actual performance of the regime between these two scenarios; 4) finally, the results are discussed with the literature. Both scenarios and the description of actual regime performance were constructed based on reports, official documents, and relevant literature, as stated previously. I also used the 2019 oil spill as an example in both scenarios and to demonstrate actual performance. It is worth mentioning that, given the developments and differences between the prescriptions determined by the regime, Article 6, in particular, will be emphasized.

V.a. Non-regime scenario

According to Underdal (2002b), and considering the agreements preceding the

International Convention on Oil Pollution Preparedness, Response and Co-operation, the non-regime scenario can be set within a context that includes a range of legislations, both national and international, that have accumulated over the decades.

To establish a reference for the particular area we are looking deeper into, we must highlight that the Brazilian Constitution (1988) refers to the environment as a common good, and the coastal zone as national heritage. Oliveira & Nicolodi (2012) recall that the status of national heritage implies an eminent domain of a set of powers granted to society that, regardless of any other status, conditions, subjects or rights, even over private and public property.

Thus, prior to the establishment of the International Convention on Oil Preparedness, Response, and Co-operation, Brazil already participated in several marine treaties, such as the Antarctic Treaty (1959), the International Convention on Civil Liability for Oil Pollution Damage (1969), the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matters (1972), MARPOL 73/78 and the United Nations Convention on the Law of the Sea, the UNCLOS (1982). In fact, Cia Alves, Albuquerque & Steiner (2020) mapped agreements related to ocean protection in force in South America and found that Brazil is part of 54 bilateral and multilateral agreements.

A pioneer among marine norms, the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matters (1972), or London Convention, proposed a preliminary set of preventive measures; when compared to those of the OPRC Convention, they are quite similar to articles 8 and 9. Modernized by the London Protocol of 1996, the London Convention aimed to promote effective control of all sources of marine pollution and resulted in a proven reduction of industrial waste and radioactive dumping (IMO, 2025).

UNCLOS, in turn, provides rather general guidelines regarding oil accidents, which is only mentioned directly in Article 42, 1.b. Beyond this, the treaty lists broad recommendations on chemicals disposed of in the marine environment. Concurrently, the set of laws laid out in the Brazilian domestic and international scenario by October 11th, 1998 - the date of the OPRC Convention entered into force in Brazil - provide a baseline for this non-regime scenario.

Given the overall general prescriptions brought by the aforementioned regimes,

the response to the 2019 oil spill would be rather bureaucratic. After all, the framework of the CLC (1969), the London Convention (1972), MARPOL 73/78, and the UNCLOS (1990) was not as strong in terms of preventive measures and clear guidelines that the member states should follow. When compared to the OPRC Convention, these agreements suggest a narrow range of actions to contain present and future leakings, and focus their forces on the identification (London Convention, 1972), general recommendations for the contamination of marine waters by pollution agents (either chemical or radioactive) (CLC, 1969; MARPOL 73/78; UNCLOS, 1990) and general reporting requirements (CLC, 1969; London Convention, 1972; MARPOL 73/78; UNCLOS, 1990).

In this scenario, there would be no point to which the international system would converge to deal with oil pollution in terms of structured bilateral and multilateral cooperation. Actions beyond the domestic scope of Brazilian law and the leaking vessel's origin country would be determined in far looser terms of joint efforts to resolve the accident's impacts. Furthermore, the institutional arrangements that came as a result of the OPRC Convention built a robust marine conservation legal infrastructure that Brazil might not have reached without it.

Referencing the aforementioned laws and linking them to official documents that were produced in response to the event[8], the no-regime scenario would most likely produce an even more limited response to the 2019 spill. Preventive measures would be based on the few instructions set by the previously ratified regimes, and the National Contingency Plan for Oil Pollution Incidents in Waters under National Jurisdiction (PNC) - a direct result of OPRC implementation - would not have been set. Similarly, other of the regime's supportive measures[9] would not be in place.

Considering articles 1 and 2, the convention covers general provisions and the definitions to be referenced along the regime's text, that do not affect the non-regime scenario in practical terms. Article 3 prescribes an emergency plan to be set by the signatory countries. Thus, without the OPRC convention it is not likely that Brazil would have a contingency plan in place, or perhaps only a less elaborate one, since the only

[8] Dataset from Silva (2023) on tracing the oil pollution containment plan in Brazil.
[9] Articles 6, 8, 9, 10, 11 and 12 of the International Convention on Oil Pollution Preparedness, Response and Cooperation

previous regime to mention general instructions to the establishment of an emergency pollution plan is MARPOL 73/78. According to the OPRC convention:

> Regulation [on the prevention of pollution arising from an oil pollution incidents]: Shipboard oil pollution emergency plan (1) Every oil tanker of 150 tons gross tonnage and above and every ship other than an oil tanker of 400 tons gross tonnage and above shall carry on board a shipboard oil pollution emergency plan approved by the Administration. In the case of ships built before 4 April 1993, this requirement shall apply 24 months after that date. (2) Such a plan shall be in accordance with guidelines developed by the Organization and written in the working language of the master and officers. The plan shall consist at least of: (a) the procedure to be followed by the master or other persons having charge of the ship to report an oil pollution incident, as required in article 8 and Protocol I of the present Convention, based on the guidelines developed by the Organization; (b) the list of authorities or persons to be contacted in the event of an oil pollution incident; (c) a detailed description of the action to be taken immediately by persons on board to reduce or control the discharge of oil following the incident; and (d) the procedures and point of contact on the ship for coordinating shipboard action with national and local authorities in combating the pollution (p.106)

On the other hand, considering articles 4 and 5 of the OPRC convention (on a reporting procedure to pollution accidents), the MARPOL 73/78 lists provisions in Protocol I, and describes the instructions using a similar level of detail.

As for articles 6, 7, and 10, regarding national and regional preparedness and response systems, their promotion and cooperation around it, none of the previous regimes encompass these measures, which could lead to a weaker responsive setting, This would be especially true for the prescriptions set by article 6, as a national contingency plan would have not been designed.

Over research and development (article 8) and technical cooperation (article 9), evidence of such provisions can be located both in the London Convention (1972), MARPOL 73/78, and the UNCLOS (1982); i.e., what was brought by the OPRC convention was not necessarily new.

On the international level, as pointed out by article 11, pieces of evidence of interactions with other international conventions and agreements can be located in the London Convention (1972) and UNCLOS (1982). To that extent, in the non-regime

scenario, although more constrained in terms of its problem-solving capacity, the absence of the regime would not make the type and problem structure of the 2019 event any different.

Also considering the 2019 event, political context was not favorable for environmental issues and the response to the accident might have been even worse without the OPRC convention in place, as discussed in sections V. b and V. c.

V.b. Collective-optimum scenario

The collective-optimum scenario seeks to simulate a situation of perfect implementation. Taking into consideration previous political and legislative arrangements plus the agreement studied, the scenario projects the convention to its optimal limit (Young, 2001). Overall, the prescriptive articles will take the lead in this section, more specifically articles 3 through 13 (as mentioned previously, articles 1 and 2 focus on general provisions and definitions).

Article 3 focuses on oil pollution emergency plans by commercial ships. Thus, the country would have put in place the means to ensure that ships (Art. 3.1), operators' offshore units (Art. 3.2), and authorities or operators in charge of such sea ports and oil handling facilities under its jurisdiction (Art. 3.4) have such plans in place.

Article 4 is similar in the sense that it requires ships (and offshore units, authorities or operators) flying by a country's flag to report discharge (or probable discharge) of oil to the nearest country. Thus, it is important to highlight that the effectiveness of the OPRC regime in any given country is strongly linked to the implementation and effectiveness of the convention in other member countries, since a foreign ship may cause accidents in another member state's waters.

Article 5 is best understood using the 2019 oil spill example. This article describes what countries should do upon receiving an oil pollution report. In this case, the ship that caused the accident would have immediately reported the incident and the Brazilian government would have taken the steps indicated at once (in this case, assessing the incident and providing information to IMO).

Previous to the occurrence of the incident, a national and regional system for preparedness and response was to be set (Article 6), having designated authorities,

national operational contact points, and an authority which is entitled to act on behalf of the State to request assistance. In addition, within its capabilities, Brazil would have set a minimum level of pre-positioned oil spill combating equipment, a programme of exercises for oil pollution response organizations and training of relevant personnel, detailed plans and communication capabilities for responding to the spill and, a mechanism or arrangement to coordinate the response of the event. The country would also have ensured that current information was being provided to IMO, directly or through relevant regional organization or arrangements, concerning the location, any data available, the response equipment and expertise in matters of handling the incident, and its national contingency plan.

Article 7 states that the matter of international cooperation in pollution response ought to have been taken, where other parties would have provided through advisory services, technical support, legal and administrative measures, and equipment for the purpose of responding to the 2019 spill. If requested, Brazil would have also been granted financial support based on the provisions set out by the Convention.

Previous to the event, as stated in article 8, research and development initiatives were to:

> cooperate directly or, as appropriate, through the IMO or relevant regional organization or arrangements in the promotion and exchange of results of research and development programmes relating to the enhancement of the state-of-the-art of oil pollution preparedness and response, including technologies and techniques for surveillance, containment, recovery, dispersion, clean-up and otherwise minimizing or mitigating the effects of oil pollution, and for restoration (IMO, 1990, p. 84).

To that end, countries were to have promoted the organization or arrangements necessary between member states, cooperated on the promotion of symposia, and encouraged the development of standards for compatible oil pollution combating techniques and equipment. On the same note, technical cooperation between the parties and IMO were to have taken place in the training of personnel, insurance of availability of relevant technology, equipment and facilities, facilitation for measures of preparedness, initiated joint research and, undertaken in the transfer of technology in the response of the polluting event (Art. 9).

The final articles assemble the previously articulated agreements, which would have led the scenario to a structured promotion of bilateral and multilateral cooperation in preparedness and response (Art. 10), in touch with other conventions and international agreements (Art. 11); for the Brazilian case, the antecedent regimes signed did not confront the interest of the Oil Convention of 1990, but supported its development. Moving forward, as structured in article 12, institutional arrangements of the regime would have guaranteed an adequate amount of information and technical services, education and training activities, and technical assistance, particularly in developing countries.

Summing up, article 13 posits a rather nonspecific evaluation proposal of the Convention to have been executed after the event:

> Parties shall evaluate within the Organization the effectiveness of the Convention in the light of its objectives, particularly with respect to the principles underlying co-operation and assistance (IMO, 1990, p. 86).

Hereinafter, article 14 sets the convention's amendments; article 15 establishes the matters of signature, ratification, acceptance, approval, and accession; article 16 posits the format in which the Convention would be enforced; article 17 sets out how the regime was to be denounced; article 18 sets out its deposit guidelines; and, lastly, article 19 lists the languages of publication.

V.c. Actual performance, especially in Brazil

Firstly, as mentioned previously, Brazil is also part of several agreements related to marine issues beyond OPRC, which created a favorable setting for this convention.

On the other hand, an important aspect to consider is that the agreement does not have a robust system for implementation review in place on the international level. In other words, considering the definition of Victor et al. (1998) discussed previously, countries do not have to turn in regular reports on the issue, the agreement does not have a formal secretariat or another organization to hold regular meetings and/or assessments, nor a specific fund to aid member states. After all, despite the convention’s

connection to the International Maritime Organization, the IMO does not hold conferences of parts (COPs) for any of its agreements. Additionally, although its website has a series of publications such as agreement texts, manuals and guidelines, it does not include in-depth country profiles or reports on implementation or other related issues. IMO does conduct audits on member states, but only on a list of selected agreements that does not include the OPRC[10]. Even so, specifically for Brazil, it is interesting to note that the country's audit is not publicly available[11], which affects transparency.

However, Victor et al. (1998) also consider nongovernmental actors among such systems. One example, in the case of the OPRC, would be ISCO - the International Spill Control Organization. Among their objectives are:

> "To support the activities of the International Maritime Organisation and to promote the dissemination of its work (...)"; and "To represent ISCO members in the IMO Marine Environment Protection Committee and its technical working group on OPRC and the OPRC HNS Protocol implementation. To disseminate information on the prevention, mitigation and remediation of oil and hazardous materials spills into the environment"[12].

Similarly, the International Tanker Owners Pollution Federation - ITOPF, can also be considered. ITOPF is a highly specialized and experienced non-profit organization founded in 1968 after the Torrey Canyon spill. In fact, the ITOPF claims to have taken part in the response to over 850 oil spills internationally.

Regarding the Brazilian 2019 spill, according to the federation's website, ITOPF provided consulting, trajectory modeling, and imagery reviewing directly through IBAMA's request (ITOPF, 2019). The ITOPF website also states this is an uncommon demand, as help is usually requested by the ship-owner or their insurer. However, as mentioned, this was an unattributed spill, and ITOPF "is well known to the Brazilian authorities and has developed good working relationships with them over recent years, supporting numerous initiatives to promote effective preparedness and response to oil and chemical spills and help build national capacity to deal with pollution incidents"

[10] See https://www.imo.org/en/OurWork/MSAS/Pages/Default.aspx
[11] See https://gisis.imo.org/Public/MSA/ReportsOverview.aspx (website available upon free registration).
[12] See http://spillcontrol.org/2013/02/04/objectives/

(ITOPF, 2019). In fact, at the time of this study, a Brazilian company was part of the ITOPF board (Transpetro)[13]. The ITOPF website also informs that the federation conducted a pollution response workshop for government agencies in Brazil, in 2016[14], and an environmental emergency exercise simulating a spill, in 2018[15].

Nevertheless, no updates were found on the incident on the ITOPF website beyond a note reporting a letter of appreciation received from the Brazilian Navy in August 2020[16], and the country's profile was last updated in June 2014[17].

Another gap is that Brazil does not participate in the United Nations' Environment Program's (UNEP) Regional Seas Program (Figure V)**,** as South America is one of the only regions without a RSCAP (Regional Seas Conventions and Action Plans). Neither does IMO lists any regional agreements that include the southern Atlantic[18].

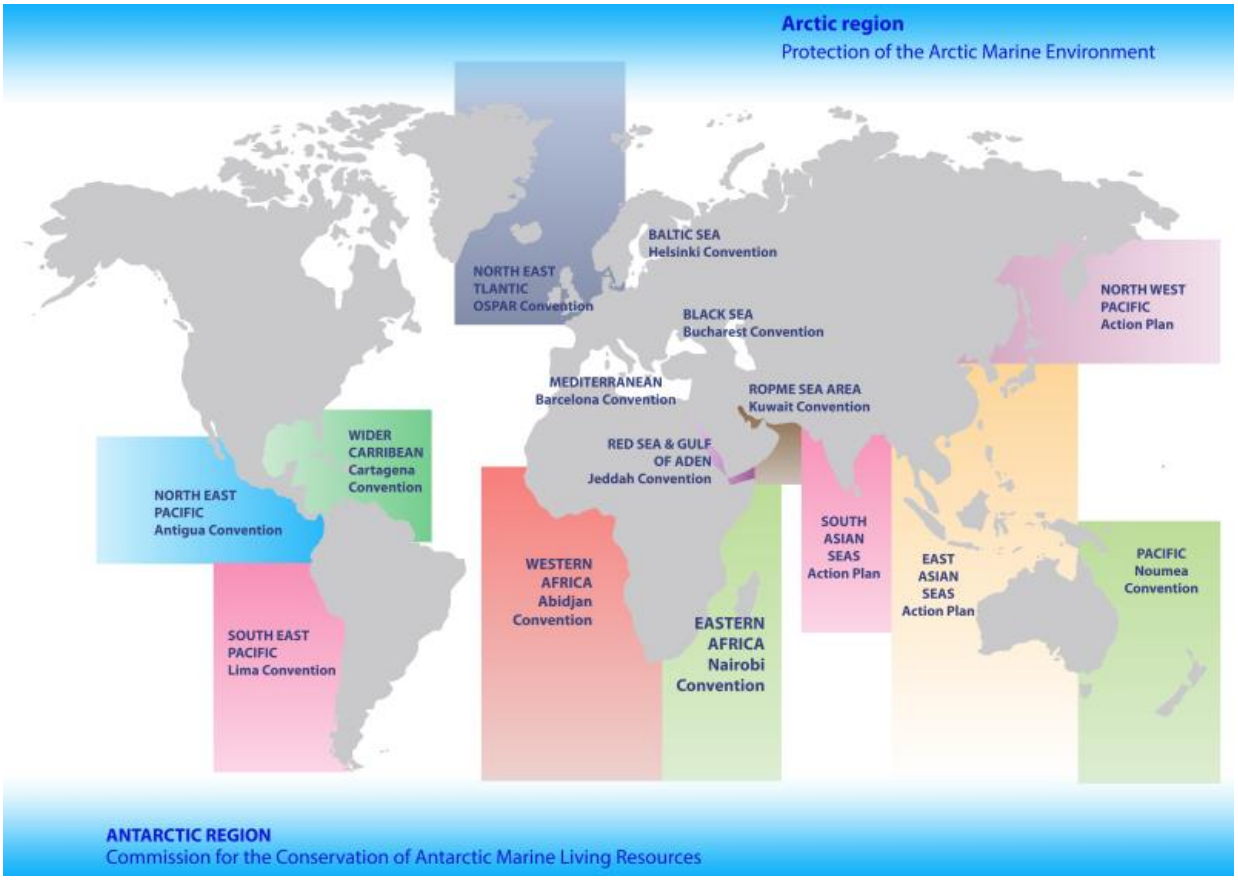
Thus, due to the absence of a more comprehensive, robust SIR, member states' implementation of the agreement lacks transparency and cooperation between countries is hindered, affecting the overall effect. To make things worse, the absence of a SIR makes it harder to reevaluate the convention's adequacy (Victor et al., 1998).

Considering article 3 (oil pollution emergency plans by commercial ships. offshore units, and authorities or operators in charge of such sea ports and oil handling facilities under its jurisdiction), one must look at the Brazilian tanker fleet and related units and operations. According to the Vessel Finder database, the country's fleet includes 15 crude oil tankers, nine oil product tankers and six chemical/oil product tankers[19]. The websites of the five main Brazilian ports for crude oil and petroleum related products all include general environmental and oil-pollution related legislation and official guidelines, port authority environmental norms, and/or oil spill contingency plans (individual

[13] According to the ITOPF website, Jones Alexandre Barros Soares, from Petrobras Transporte SA – Transpetro, Brazil was part of the board. See https://www.itopf.org/about-us/the-board/ (updated December 2024; retrieved May 2025).
[14] See https://www.itopf.org/news-events/news/itopf-runs-pollution-response-workshop-in-brazil/.
[15] See https://www.itopf.org/news-events/itopf-events/environmenal-emergency-exercise-brazil-5th-december-2018/.
[16] https://www.itopf.org/news-events/news/itopf-receives-letter-of-appreciation-from-the-brazilian-navy/ -
[17] See https://www.itopf.org/fileadmin/uploads/itopf/data/Documents/Country_Profiles/brazil.pdf - last retrieved May 2025.
[18] See https://www.imo.org/en/OurWork/Environment/Pages/Regional-Arrengements.aspx. Retrieved May 2025.
[19] As of June/2025. See https://www.vesselfinder.com/vessels.

emergency plans): the Port of Suape[20], the Port of Rio de Janeiro[21], the Port of Santos[22], the Port of Itaqui[23], and the Port of Itaguaí[24].

Figure V. Regional Seas Conventions and Action Plans



Source: UNEP[25].

[20] Summary of the OPRC convention - https://www.suape.pe.gov.br/images/publicacoes/legislacao/4._Convencao_Internacional_Poluicao_por_oleo.pdf and summary of its contingency plan (individual emergency plan) - https://www.suape.pe.gov.br/pt/meio-ambiente-2/plano-de-emergencia-individual-pei

[21] Contingency plan - https://www.portosrio.gov.br/sites/default/files/inline-files/PEI_Porto_do_Rio_de_Janeiro.pdf

[22] List of relevant environmental legislation - https://www.portodesantos.com.br/wp-content/uploads/Requisitos-Legais-MA-E-SSO-Aplicavel-240628.pdf

[23] Contingency plan - https://www.portodoitaqui.com/public/_files/arquivos/PEI_Porto%20de%20Itaqui_01_vers%C3%A3o%20final_58c6aff36e1ef.pdf

[24] Contingency plan - https://www.portosrio.gov.br/sites/default/files/inline-files/PEI_Consolidado___Docas_Itaguai___Rev_00.pdf

[25] See https://www.unep.org/topics/ocean-seas-and-coasts/regional-seas-programme/about-unep-regional-seas-programme. Retrieved May 2025.

To analyze the implementation and effectiveness of article 4, which requires ships (and offshore units, authorities or operators) flying by a country's flag to report discharge or probable discharge of oil to the nearest country, one must analyze incidents involving Brazilian tankers and related operations. On one hand, since the OPRC convention entered into force in the country, over 20 accidents in Brazilian waters involving Brazilian tankers or facilities have been recorded. On the other hand, no records were found of accidents involving Brazilian tankers abroad.

Also, as mentioned previously, this article specifically links the effectiveness of the OPRC regime in any given country to the implementation and effectiveness of the convention in other member countries. If we consider Greek tanker Bouboulina as responsible for the 2019 event, it would be necessary to analyze Greece's implementation and compliance to the OPRC convention, which is not within the scope of this dissertation.

Article 5 provides guidelines on what countries should do upon receiving an oil pollution report. In the case of the 2019 accident, the ship and country responsible for the spill never came forth. Also, Zacharias et al. (2023) suggest Brazil has been receiving more influence from spills on a route of intentional illegal dumping in the South Atlantic, which the authors attribute to lack of international surveillance and gaps and lack of enforcement of marine agreements.

Article 6 describes the national and regional system for preparedness and response, with designated authorities, national operational contact points, and an authority which is entitled to act on behalf of the member state to request assistance. The competent authority in Brazil is IBAMA and the spill notification point is the Brazilian Navy's Maritime Rescue Coordination Center.

The Brazilian National Contingency Plan for Oil Pollution Incidents in Waters under National Jurisdiction (PNC, in Portuguese) (Article 6) was created in 2013 to establish responsibilities, organizational structure, guidelines, procedures and actions in the event of oil pollution incidents. Yet, during the 2019 oil spill, it was only enacted 41 days after the beginning of the event. By the end of August 2019, oil spots were located in various sites across the Brazilian coast. A year later, in August 2020, the Brazilian Navy ended investigations without pointing out who was responsible or the origin of the

disaster that affected hundreds of Brazilian beaches (Oliveira Neto, 2022). To this date no party has claimed responsibility for the 2019 oil spill off the coast of Brazil, and the investigation's conclusions were unclear (Disner and Torres, 2020).

Also, compliance with the OPRC (Cantalice, 2021) did not prevent the Bolsonaro government from extinguishing two committees related to the PNC (Capelari et al., 2023) in April 2019 by federal decree nº 9.759 of April 2019 (Brazil, 2019). Before the decree in question, the PNC relied on an executive and a support committee linked to a wide network, such as the Environmental and Mines and Energy Ministries, the Marines, IBAMA, and the National Petroleum Agency (Neto, 2022).

Table IX presents the effectiveness elements of the OPRC convention in Brazil.

Table IX - **Description and repercussions of the elements of effectiveness of the 1990 Oil Convention in Brazil, with focus on the containment of oil spills in the country in the events of 2019.**

Element of effectiveness	**Component**	**Description**
Type and problem structure	Problem character (benign/malignant)	Malignant
	Knowledge status	Levels of research, public and institutional interest on oil spill legislation and mitigation spike levels after the event.
Political context	Connections with other problems	Connection with marine conservation problems; fossil fuel exacerbated consumption
	Ulterior motives	Fossil fuel overconsumption and systematic oil dumping
	Domestic visibility	Media and Institutional interest rise as the months follow the accident
Problem-solving capacity	Institutional setting	Internationally, lack of a system for implementation review. Within Brazil, legal and institutional apparatus, although lacking dialog between the various sectors

	Power distribution	Highly concentrated by the federal government, with restricted distribution to third-sector agents.
	Political Skill and effort	Moderate to low
	Level of integration of the epistemic community	Significant integration between academic knowledge and prevention and contention agents
	Country's international leadership	No clear international environmental leadership on the subject, but nongovernmental actors (companies, researchers) participate in major nongovernmental organization linked to the topic (ITOPF)

Source: the author

For the very first element and its components of problem character and knowledge status, the malignancy is clear. Considering the characteristics cited by Underdal (2002a), there are multiple actors and preferences involved (the petroleum sector, environmentalists, researchers, governmental and intergovernmental agencies, tanker companies, etc.). Also, although the problem itself is simple to visualize by the population in general, solving it (i.e., cleaning up oil spills) involves intellectually complex procedures. Additionally, although most of the OPRC guidelines were in place in Brazil, there did not seem to be enough knowledge of the procedures or resources to put them into practice (Araújo, Ramalho & Melo, 2020). However, after the spill the government did increase funding for related research. Studies such as those by Zacharias et al. (2021), Reddy et al. (2022), Soares & Rabelo (2023), Alves et al. (2024) Choueri et al. (2024), Müller et al. (2024), Silva et al. (2024) are a few examples of research that resulted from this kind of funding.

Also, as discussed previously, in 2019 the country was being governed by a far-right president with a clear purpose of expanding resource exploitation and dismantling many restrictive environmental protection policies (Araújo, 2020). In addition to

threatening to abolish the Environmental Ministry as a whole, Bolsonaro's administration sought to rupture environmental policies in many instances, and the oil spill response was no exception to it. In that manner, considering the political context that resonated at the time of the event, the repercussions led to an intertwined placement of both connections with other problems and ulterior motives, alongside a reasonable domestic visibility of the event (Richetti and Milaré, 2021; Barbeiro and Inojosa, 2022).

Lastly, as for problem-solving capacity, the institutional setting provided a robust structure in preparation for the occurrence of such events. However, if considering specifically the 2019 event, the government orders at the time provided an unclear course of action, with a highly concentrated power distribution and limited political skill and effort (Barbeiro and Inojosa, 2022).

Yet, as expected, in the whirlwind of elements that made the event's response so questionable, a high level of integration of the epistemic community could be found (Barbeiro and Inojosa, 2022). There was a combination of academic efforts from the extensive public university network in the country and researchers from other institutions, ITOPF (Richetti and Milaré, 2021; Barbeiro and Inojosa, 2022).

At last, the country faced a gap in international leadership, especially when it came to environmental terms (Oliveira Neto, 2022). Specifically for the spill, in October 2019 president Bolsonaro stated that "since it [the oil] wasn't of Brazilian origin, it shouldn't be our responsibility" (Maia, 2019 *apud* Oliveira Neto, 2022).

V.d. Discussion

This section will discuss actual performance of the OPRC regime in Brazil based on a comparison with the two scenarios (collective optimum and non-regime) and the implementation and effectiveness literature.

Considering Miles' (2002) model: as for the type and problem structure of the regime, due to its nature, environmental matters are generally classified as malignant for various reasons, such as lack of coordination, missing information, and no consensus on what causes the problem (Moraes, 2017). In a much similar manner, the OPRC convention proposes wide measures to address an issue that depends not only on the affected party making it quite complex.

In terms of the political context faced during the event, Brazil, as mentioned before, faced an unprecedented shift in the environmental agenda. Thus, the event occurred in a scenario where the oil spill became connected with loss in capacities in other areas. On the other hand, the disaster increased domestic visibility towards the problem of oil pollution, through mass media and social media.

In turn, such visibility might have perhaps generated institutional learning, through the revision of the contingency plan and more financial resources for research on the topic.

Problem-solving capacity can be assessed as low when compared to the potentialities set in the collective optimum scenario. Even though the country was largely compliant with the regime (Cantalice, 2021), the execution of the provisions demonstrated lack of political willpower and skills, and negatively affected effectiveness. Especially in terms of tardiness, the regime was put into action with quite a delay, allowing the situation to worsen as more areas received crude oil residue. Nevertheless, the domestic epistemic community (considering marine protection) proved itself strong and well-articulated.

Thus, the regime's data can be classified as presenting a mixed performance, as stated in Miles et al. (2002), p. 173:

> The line of reasoning that we developed (in Chapter 1) suggests that there are two main roads to mixed performance. One goes through a set of intermediate scores— a combination of problems combining benign and malign features, intermediate problem-solving capacity, and a context that is largely neutral. The other goes through some combination of positive and negative scores—for example, malignant problems and high capacity, or benign problems and low capacity.

The case here can be fit in the first route, accumulating a set of intermediate achievements, both in the positive compliance and preparation aspects of the regime as supported by the extensive documental data here gathered, as well as in the malign ranging features, just discussed in the topic above.

All in all, despite the events that followed the 2019 spill along the Brazilian coast, the OPRC convention can be classified as having mixed performance in terms of

effectiveness.

Also, although the convention covers a large portion of measures to be taken in preparation and response, building a structured national plan, promoting research and technology development, none of its articles account for accidents involving an unclaimed polluter. To that extent, even if Brazil presented a scenario of optimal performance, the agreement would not have been sufficient to effectively prevent or contain the oil pollution (Chang, 2014).

VI. Conclusion

Has the International Convention on Oil Pollution Preparedness, Response and Co-operation (1990) been effective in Brazil? The study focused on the 2019 oil spill.

Answering this question required reviewing the preceding structure of environmental and marine regimes, a compilation of the ten largest modern oil spill accidents, the domestic political context of the event of 2019 on the Brazilian Coast, and a brief look at the impact the event had on the ecosystems affected. Considering the Miles *et al.* (2002) classification, despite Brazil's compliance with the agreement, the convention presents mixed performance in the country.

Furthermore, this research recognizes its constraints in terms of the model's application, since the circumstances of the agreement restrict an unbiased metrification of each action, and both time and resource constraints to the development of this work were issues in gathering data. Thus, it was based exclusively on documental and literature analysis, as well as federal decrees and laws.

Nevertheless, there is still a lot to explore regarding the findings presented here. Future studies may seek out a more in depth investigation by conducting interviews, for instance. Another possibility for a future agenda of studies could also include explaining the possible influences of domestic politics (i.e., the far right government in place at the time of the spill) on the effectiveness of the OPCR convention.

Regardless, I hope this dissertation can subsidize future studies on the political outcomes of the 2019 and other aspects of marine international policy in the country.

VII. References

Abessa, D. Famá, A. Buruaem, L. (2019) The systematic dismantling of Brazilian environmental laws risks losses on all fronts. *Nature Ecology and Evolution*, vol. 3, p. 510-511.

Alves, M. K. M. et al. (2024) Oil spill impact on Brazilian coral reefs based on seawater polycyclic aromatic hydrocarbon contamination, biliary fluorescence and enzymatic biomarkers in damselfish Stegastes fuscus (Teleostei, Pomacentridae). *Marine Pollution Bulletin*, 208: 116958.

Angelo, C. (2019) Brazil freezes science spending. *Nature*, vol. 568 (155).

Araújo, S. M. V. G. (2020). Environmental Policy in the Bolsonaro Government: The Response of Environmentalists in the Legislative Arena. *Brazilian Political Science Review.*

Araújo, M. E. Ramalho, C. W. N. and Melo, P. W. (2020). Pescadores artesanais, consumidores e meio ambiente: consequências imediatas do vazamento de petróleo no Estado de Pernambuco, Nordeste do Brasil. Cadernos de Saúde Pública, nº 36, p. 1-6.

Barbeiro, P. P., Inojosa, F. C. P. (2022) Assessing the actions of the Brazilian Federal Government to respond to the 2019 mysterious oil spill: a perspective of the national environmental agency. *Academia Brasileira de Ciências*, 95(2): 1-25.

Bardin, L. (1977). *Análise de conteúdo*. Lisboa: Edições 70.

Blatter, J.; Blume, T. (2008) In Search of Covariance, Causal Mechanisms or Congruence? Towards a plural understanding of case studies. *Swiss Political Science Review*, 14(2): 315-56.

Bonnieux, F. Rainelli, P. (1993) Learning from the Amoco Cadiz oil spill: damage

valuation and court's ruling. *International & Environmental Crisis Quarterly*, 7(3).

Brazil (1988). *Constituição da República Federativa do Brasil*. Federal Senate.

Brazil (1988) D.O.U. - Law nº 7.661, of May 16th, 1988 - establishes the National Coastal Management Plan and makes other provisions. Published under the D.O.U. of 18.5.1998, Brasília, DF, Brasil. Available at http://www.planalto. gov.br/ccivil_03/leis/L7661.htm

Brazil (1988) Law nº 7.661, May 16, 1988 - establishes the National Coastal Management Plan and makes other provisions. Available at <https://bibliotecadigital.economia.gov.br/bitstream/123456789/462/1/PNGC%20Lei%207661.htm>

Brazil (1990) *Ministério do Meio Ambiente (MMA). Conselho Nacional do Meio Ambiente (CONAMA). Resolução CONAMA nº 06, de 17/10/1990*. *Dispõe sobre normas específicas para o licenciamento ambiental de extração mineral, classe II.*

Brazil (1994) *Ministério do Meio Ambiente (MMA). Conselho Nacional do Meio Ambiente (CONAMA). Resolução CONAMA nº 03, de 04/05/1994*.

Brazil (1994) *Ministério do Meio Ambiente (MMA). Conselho Nacional do Meio Ambiente (CONAMA). Resolução CONAMA nº 10, de 04/05/1994*.

Brazil. (1998) Federal decree nº 2870. Promulgates the International Convention on Oil Pollution Preparedness, Response and Cooperation, signed in London on November 30, 1990.

Brazil. (2000) *Ministério do Meio Ambiente (MMA). Conselho Nacional do Meio Ambiente (CONAMA). Resolução CONAMA nº 265, de 27/01/2000*.

Brazil (2000) *Ministério do Meio Ambiente (MMA). Conselho Nacional do Meio Ambiente (CONAMA). Resolução CONAMA nº269, de 14/09/2000*.

Brazil (2001) *Ministério do Meio Ambiente (MMA). Conselho Nacional do Meio Ambiente (CONAMA). Resolução CONAMA nº 293, de 12/12/2001*.

Brazil (2002) *Ministério do Meio Ambiente (MMA). Conselho Nacional do Meio Ambiente (CONAMA). Resolução CONAMA nº 306, de 05/07/2002*.

Brazil (2003) *Ministério do Meio Ambiente (MMA). Conselho Nacional do Meio Ambiente (CONAMA). Resolução CONAMA nº 326, de 25/04/2003*.

Brazil (2003) *Ministério do Meio Ambiente (MMA). Conselho Nacional do Meio Ambiente (CONAMA). Resolução CONAMA nº 327, de 25/04/2003*.

Brazil (2003) *Ministério do Meio Ambiente (MMA). Conselho Nacional do Meio Ambiente (CONAMA). Resolução CONAMA nº 330, de 25/04/2003*.

Brazil. (2004) D.O.U. - Decree nº 5.300 of December 7th 2004. Regulates the law nº 7.661, of May 16th, 1988, which establishes the National Coastal Management Plan - PNGC, provides for rules on the use and occupation of the coastal zone establishes criteria for managing the seafront, and makes other provisions. Published in D.O.U. of 8.12.2004, Brasília, DF, Brasil. https://www.planalto.gov.br/ccivil_03/_Ato2004-2006/2004/Decreto/D5300.htm.

Brazil (2008) *Ministério do Meio Ambiente (MMA). Conselho Nacional do Meio Ambiente (CONAMA). Resolução CONAMA nº 398, de 11/06/2008*.

Brazil (2009) *Ministério do Meio Ambiente (MMA). Conselho Nacional do Meio Ambiente (CONAMA). Resolução CONAMA nº 420, de 28/12/2009*.

Brazil (2010) *Ministério do Meio Ambiente (MMA). Conselho Nacional do Meio Ambiente (CONAMA). Resolução CONAMA nº 422, de 23/03/2010*.

Brazil (2011) *Ministério do Meio Ambiente (MMA). Conselho Nacional do Meio Ambiente (CONAMA). Resolução CONAMA nº 430, de 13/05/2011.*

Brazil (2012) *Ministério do Meio Ambiente (MMA). Conselho Nacional do Meio Ambiente (CONAMA). Resolução CONAMA nº 450, de 06/03/2012.*

Brazil (2012) *Ministério do Meio Ambiente (MMA). Conselho Nacional do Meio Ambiente (CONAMA). Resolução CONAMA nº 452, de 02/07/2012.*

Brazil (2013) *Ministério do Meio Ambiente (MMA). Conselho Nacional do Meio Ambiente (CONAMA). Resolução CONAMA nº 460, de 30/12/2013.*

Brazil (2013) *Lei no. 6969/2013. Institui a Política Nacional para a Conservação e o Uso Sustentável do Bioma Marinho Brasileiro (PNCMar) e dá outras providências.*

Brazil (2014) *Ministério do Meio Ambiente (MMA). Conselho Nacional do Meio Ambiente (CONAMA). Resolução CONAMA nº 017, de 28/07/2014.*

Brazil (2015) *Ministério do Meio Ambiente (MMA). Conselho Nacional do Meio Ambiente (CONAMA). Resolução CONAMA nº 467, de 16/07/2015.*

Brazil (2015) *Ministério do Meio Ambiente (MMA). Conselho Nacional do Meio Ambiente (CONAMA). Resolução CONAMA nº 472, de 27/11/2015.*

Brazil (2019). *Decreto no. 9.759 de 11 de abril de 2019: Extingue e estabelece diretrizes, regras e limitações para colegiados da administração pública federal*.

Brazil (2019b). *Decreto no. 9.806 de 28 de Maio de 2019: Altera o Decreto nº 99.274, de 6 de junho de 1990, para dispor sobre a composição e o funcionamento do Conselho Nacional do Meio Ambiente - Conama.*

Brazil (2023) *Ministério do Meio Ambiente (MMA)*. *Conselho Nacional do Meio Ambiente*

(CONAMA). O que é o CONAMA.

Brazil (2023b) *Decreto no. 11.417 de 16 de fevereiro de 2023:* Altera o Decreto nº 99.274, de 6 de junho de 1990, para dispor sobre a composição e o funcionamento do Conselho Nacional do Meio Ambiente - Conama.

Brazilian Navy (2019) Press Note. December 17th. *O GAA informa que persiste a situação de estabilização quanto à presença de resíduos oleosos no litoral brasileiro.*

Brazilian senate (2000). Vazamento de óleo lançou 1,3 milhão de litros na Baía de Guanabara. Available at: <https://www12.senado.leg.br/noticias/materias/2000/05/16/vazamento-de-petroleo-lancou-13-milhao-de-litros-na-baia-de-guanabara>

Breitmeir, H. Underdal, A. Young, O. R. (2011) The Effectiveness of International Environmental Regimes: Comparing and Contrasting Findings from Quantitative Research. *International Studies Review*, 13: 576-605

Brown Weiss, E. Jacobson, H. K. (1998). *Engaging countries: Strengthening Compliance with International Environmental Accords*. Cambridge, MA: MIT Press.

Brum, H. D. Campos-Silva, J. V. Oliveira, E. G. (2020) Brazil oil spill response: Government inaction. *Science*, 367 (6474): 155.

Capelari, M. G. M. *et al*. (2020). Mudança de larga escala na política ambiental: análise da realidade brasileira. *Revista de Administração Pública*, 54(6): 169-1710.

Carmo, E. H. Teixeira, M. G. (2020) Technological disasters and public health emergencies: the case of oil spill on the Brazilian coast. *Cadernos de Saúde Pública*, 36(2): 1-7.

Chang, S. E. *et a*l. (2014) Consequences of Oil Spills: A review and framework for

informing planning. *Ecology and Society*, 19(2):26.

Chen, J. *et al*. (2019) Oil spills from global tankers: Status review and future governance. *Journal of Cleaner Production*, 227, p. 20-32.

Choueri, R. B. et al. (2024) PAH residues and toxicity levels two years after an extensive oil spill on the northeast Brazilian coast. *Marine Pollution Bulletin*, 200: 116063.

Cia Alves E. L.; Albuquerque R. B.; Steiner, A. Q. (2020) A governança internacional de sistemas socioecológicos (SSE) marinhos: um estudo de caso da América do Sul. *Monções: Revista de Relações Internacionais da UFGD,* 9(18): 461-484.

Cohen, H. G. (2018) Multilateralism's Life-Cycle. *University of Georgia School of Law Research Paper Series*, Paper No. 2018-01.

Cortell, A. P. Davis Jr. J. W. (2000) Understanding the domestic impact of international norms: a research agenda. *International Studies Review*, 2(1): 65-87.

Daisy, N. S. Hafezi, M. H. Liu, L. Lee. K. (2022) A Comprehensive Review of Canadian Marine Oil Spill Response System through the Lens of Decanting Regulations and Practices. *Journal of Marine Science and Engineering*, 10 (1310).

Diário da República (2001). *Convenção Internacional sobre a preparação, combate e cooperação contra a poluição por hidrocarbonetos, 1990. I série, nº 51.*

Disner, G. R; Torres, M. (2020). The environmental impacts of 2019 oil spill on the Brazilian coast: Overview. *Revista Brasileira de Gestão Ambiental e Sustentabilidade*, 7(15): 241- 255.

Ecolex (2023) *International Convention for the Prevention of Pollution from Ships (MARPOL) as modified by the Protocol of 1978* (MARPOL 73/78) (Feb. 17, 1978).

Edwards, D. T. (1995) IMO'S strategy for the implementation of the OPRC convention. *International Oil Spill Conference Proceedings*, (1):787-789.

Edwards, D.T. Pascoe, D.B. (1991) Outcome of the IMO Conference on International Co-operation on Oil pollution Preparedness and Response. *International Oil Spill Conference Proceedings*, (1):357-360.

Eklund, R. L. *et al.* (2019) Oil Spills and Human Health: Contributions of the Gulf of Mexico Research Initiative. *GeoHealth*, 3:391-406.

Escobar, H. (2019) Mystery oil spills threaten marine sanctuary in Brazil. *Science*, 366 (6466): 155.

Etkin, D. S. *et al*. (1999) Historical Overview of Oil Spills from all sources (1960-1998). *International Oil Spill Conference*, 169.

Fearon, J. D. (1991) Counterfactuals and Hypothesis Testing in Political Science. *World Politics*, 43(2): 169-195.

Federal Senate, Maggi, B. (2002) *Proposta de Lei 6299/2002.*

Feldmann, F. (1997) *Entendendo o Meio Ambiente: Tratados e Organizações Internacionais em Matéria de Meio Ambiente. 2ª. ed. atual. São Paulo: Secretaria de Meio Ambiente de São Paulo,* p. 1 - 35.

Force, R. Davies, M. Force, J. S. (2011) Deepwater Horizon: Removal Costs, Civil Damages, Crimes, Civil Penalties, and State Remedies in Oil Spill Cases. Tulane Law Review, 85 (4):889-982.

Frynas, J. G. (2012) Corporate social responsibility or government regulation? Evidence on oil spill prevention. *Ecology and Society*, 17(4): 4.

Gerring, J. (2004). What Is a Case Study and What Is It Good for? *American Political Science Review*, 98(2): 341-354.

Gulf of Mexico Research Initiative. (2021). About GoMRI. <https://gulfresearchinitiative.org/about-gomri/>

Gundlach, E. R. et al. (1983) The Fate of Amoco Cadiz Oil. *Science*, 221: 121-129.

Harlow, W. F. Brantley, B. C. Harlow, R. C. (2011) BP initial image repair strategies after the Deepwater Horizon spill. *Public Relations Review*, 37:80-83.

Hassler, B. (2011) Accidental Versus Operational Oil Spills from Shipping in the Baltic Sea: Risk Governance and Management Strategies. *Ambio*, 40(2): 170-178.

Hejny, J. (2007) *Evaluating Effectiveness of International Environmental Regimes: A comparative study analysis*. Dissertation (Master of Arts in International Affairs), School of International Service of American University, Washington D.C.

Helm, C. Sprinz, D. (2000) Measuring the Effectiveness of International Environmental Regimes. *Journal of Conflict Resolution*, 44(5): 630-652.

Henderson, J. (2019) Oceans without history? Marine Cultural Heritage and the Sustainable Development Agenda. *Sustainability*, 11, 5080: 1-22.

Horn, S. A. Neal, C. P. (1981) The Atlantic Empress Sinking - A large spill without environmental disaster. Mobil Oil Corporation.

IMO - International Maritime Organization (2025). *Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter.*

Ishak, I. C. Hisham, M. H. H. M. N. (2020) *An integrated management approach and its*

application towards oil spill emergency response at a crude oil terminal. University Kuala Lumpur Malaysian Institute Marine Engineering and Technology, Maritime Management Section.

ITOPF - International Tanker Owners Pollution Federation. (2008). *Causes of Spills.* <http://www.itopf.com/information-services/dataand-statistics/statistics/#causes>.

ITOPF - International Tanker Owners Pollution Federation. (2019). *Oil pollution, Brazil.* <https://www.itopf.org/news-events/news/oil-pollution-brazil/>.

ITOPF - International Tanker Owners Pollution Federation (2023) *Sea Star, Gulf of Oman, 1972.* <https://www.itopf.org/in-action/case-studies/sea-star-gulf-of-oman-1972/>

Jernelöv, A. (2010a) The Threats from Oil Spills: Now, Then, and in the future. *AMBIO*, 39: 353-366.

Jernelöv, A. (2010b). How to defend against future oil spills. *Nature*, 466: 182-183.

Jernelöv, A. Lindén, O. (1981) Ixtoc I: A Case Study of the World's Largest Oil Spill. *Ambio*, 10(6): 299-306.

Krasner, S. D. (1982) Structural Causes and Regime Consequences: Regimes as Intervening Variables. *International Organization*, 36(2): 185-205.

Lessa, G. C. *et al.* (2021) The 2019 Brazilian oil spill: Insights on the physics behind the drift. *Journal of Marine Systems*, 222.

Luoma, E. (2009) Oil Spills and Safety Legislation. Publications from the Centre of Maritime Studies, University of Turku.

Madrid, J. A. J. et al. (2015) Managing large oil Spills in the Mediterranean. arXiv, Cornell

University.

Magris, R.A., Giarrizzo, T. (2020) Mysterious oil spill in the Atlantic Ocean threatens Marine biodiversity and local people in Brazil. *Marine Pollution Bulletin*, 153.

Mahapatra, A. (1995) International Convention on Oil Pollution Preparedness, Response and Cooperation - An overview. *International Oil Spill Conference*, p. 775 - 778.

Majeed, M. T. *et al*. (2017). State capacity and health outcomes: An empirical analysis. *Pakistan Journal of Commerce and Social Sciences*, 11(2): 671-697.

Mason, M. (2003) Civil liability for oil pollution damage: examining the evolving scope for environmental compensation in the international regime. *Marine Policy*, 27: 1-12.

Mendonça, R. P. *Projeto de Lei Complementar 436/2014.*

Merrick Dodd, E. Jr. (1921) The New Doctrine of the Supremacy of Admiralty over the Common Law. *Columbia Law Review*, 21(7): 647-665

Miles, E. L. *et al*. (2002) *Environmental Regime Effectiveness*. The MIT Press.

Mitchell, R. (1993) Intentional Oil Pollution of the Oceans. In: Keohane, R.O.; Haas, P.M.; Levy, M.A. The effectiveness of international environmental institutions. In: Haas, P.; Keohane, R.O; Levy, M.A. (eds) *Institutions for the Earth: Sources of Effective International Environmental Protection*. Cambridge: MIT Press, 448 p.

Mitchell, R. B. (1994) Regime Design Matters: intentional oil pollution and treaty compliance. *International Organization*, 48(3): 425-458.

Mitchell, R. B. (2003) International Environmental Agreements: A Survey of Their Features, Formation, and Effects. *The Annual Review of Environment and Resources*, 28: 429-461.

Mitchell, R. (2006) Problem Structure, Institutional Design, and the Relative Effectiveness of International Environmental Agreements. *Global Environmental Politics*, 6(3): 72-89.

Mitchell, R. B. *et al.* (2020) What we know (and could know) about International Environmental Agreements. *Global Environmental Politics*, 20(1): 103-121.

Moldan. A. J. *et al*. (1985). Some aspects of the *Castillo de Bellver* oil spill. *Marine Pollution Bulletin*, 16: 97-102.

Moraes, H. M. (2017) *Avaliação da eficácia do Sistema dos Tratados Antárticos para a questão ambiental: um estudo de caso do Protocolo de Madrid.* Masters' dissertation (Political Science), Universidade Federal de Pernambuco.

Müller, M. N. et al. (2024) Finding the needle in a haystack: Evaluation of ecotoxicological effects along the continental shelf break during the Brazilian mysterious oil spill. *Environmental Pollution*, 357: 124422.

Oliveira Neto, B. L. (2022) Da lama ao caos: o retrocesso da política e liderança ambiental do Brasil sob o governo Bolsonaro. *Novos Cadernos NAEA*, 25: 59-80.

Nichols, J. A. Moller, T. H. (1991) International cooperation in oil spill response. *International Oil Spill Conference Proceedings* (1): 61-64.

Nobre, P. *et al*. (2022) The 2019 Northeast Brazil Oil Spill: scenarios. *Academia Brasileira de Ciências,* 94(2): 1-23.

Nwilo, P. C. Badejo, O.T.B. (2005) Oil Spill Problems and Management in the Niger Delta. *International Oil Spill Conference Proceedings*, (1): 567-570.

O'Brien, Lt. C. J. L. National strike response to the Ixtoc I blowout - Bay of Campeche. *International Oil Spill Conference Proceedings*, (1): 125-130.

O'Neill, K. (2009). *The Environmental and International Relations.* Cambridge University Press.

Oliveira, M. R. L. Nicolodi, J. L. (2012) A gestão costeira no Brasil e os dez anos do Projeto Orla, uma análise sob a ótica do poder público. *Revista de Gestão Costeira Integrada*, 12(1):89-98.

Osofsky, H. M. (2013) Multidimensional Governance and the BP Deepwater Horizon Oil Spill. *Florida Law Review*, 63 (5): 1-61.

Owens, E. H. Sergy, G. A. (1997) Application of recent technical advances to the decision process for shoreline treatment. *International Oil Spill Conference Proceedings* (1): 289–295.

Pena, P. G. L. *et al*. (2020). The crude oil spill on the Brazilian coast in 2019: the question of public health emergency. *Cadernos de Saúde Pública*, 36(2): 1-6.

Peterson, C. H. *et al.* (2003) Long-term ecosystem response to the Exxon Valdez oil spill. *Science*, 302 (5653): 2082–2086.

Phillip, G. (1999). The Political Constraints on Economic Policy in Post-1982 Mexico: The Case of Pemex. *Bulletin of Latin American Research*, 18(1): 35-50.

Reddy, M. C. et al. (2022) Synergy of analytical approaches enables a robust assessment of the Brazil mystery oil spill. *Energy & Fuels*, 36(22).

Richetti, G . P. Milaré, T. (2021) Oil in Northeastern Brazil: Aspects of Scientific and Technological (il)literacy. *Revista Brasileira de Pesquisa em Educação em Ciências*, 21: 1-29.

Rosendal, G. K. (2000) *The Convention on Biological Diversity and Developing*

Countries. Dordrecht, Kluwer Academic Publisher.

Rosenthal, L. Raper, C. (1985) Amoco Cadiz and limitation of liability for oil spill pollution: domestic and international solutions. *Virginia Journal of Natural Resources Law*, 5(1): 259-295.

Scantimburgo, A. (2018) *O desmonte da agenda ambiental no governo Bolsonaro. Perspectivas,* 52: 103-117

Schoenbaun, T. J. (2012) Liability for Damages in Oil Spill Accidents: Evaluating the USA and International Law Regimes in the Light of Deepwater Horizon. *Journal of Environmental Law*, 24(3): 395-416.

Serikbayeva, B. *et al*. (2020). State capacity in responding to COVID-19. *Munich Personal RePEc Archive*, 101511: 1-21.

Silva, P. M. A. (2023) *Maré de mudanças: rastreando o plano de contenção da poluição por óleo no Brasil.* Trabalho de Conclusão de Curso – Bacharelado em Ciência Política, Centro de Filosofia e Ciências Humanas, Universidade Federal de Pernambuco. Recife

Silva, J. P.; Cardoso, C.; Pereira, C. S. (2022) A reestruturação do CONAMA e os limites para a democracia participativa na gestão ambiental brasileira. *Revista Continentes*, 10(20): 178-203.

Silva, M. F. S. D. et al. (2024) Traces of oil in sea turtle feces. *Marine Pollution Bulletin*, 200: 116088.

Soares, M. O.; Rabelo, E. F. (2023) Severe ecological impacts caused by one of the worst orphan oil spills worldwide. *Marine Environmental Research*, 187: 105936

Soares, M.O., Teixeira, C.E.P., Bezerra, L.E.A. (2020). Oil spill in South Atlantic (Brazil): environmental and governmental disaster. *Marine Policy*, 115: 103879.

Soares, E. C. e*t al.* (2021) Oil impact on the environment and aquatic organisms on the coasts of the states of Alagoas and Sergipe, Brazil - A preliminary evaluation. *Marine Pollution Bulletin*, 171.

Soto-Oñate, D. Caballero, G. (2017) Oil spills, governance, and institutional performance: The 1992 regime of liability and compensation for oil pollution damage. *Journal of Cleaner Production*, 166: 299-311.

Sprinz, D. F. (2000). Research on the Effectiveness of International Environmental Regimes: A Review of the State of the Art. Final Conference of the EU Concerted Action on Regime Effectiveness, Institut D'educació Contínua (IDEC).

Sprinz, D. F. and Helm, C. (1999): The Effect of Global Environmental Regimes: A Measurement Concept. *International Political Science Review*, 20(4): 359-369.

Statista. (2022) *Largest Oil Spills Worldwide.* <https://www.statista.com/statistics/268148/largest-global-oil-spills-since-1967/>

Steiner, A. Q. (2011) *A Eficácia da Convenção sobre Diversidade Biológica: Caso Brasileiro*. Doctoral thesis (Political Science), Universidade Federal de Pernambuco.

Steiner, A. Q. Medeiros, M. A. (2010). How can we know if international environmental conventions really work? *Contexto Internacional*, 32 (2): 695-727.

Underdal, A. (1992). The Concept of Regime Effectiveness. *Cooperation and Conflict*, 27(3): 227-240.

Underdal, A. (2002a). One question, two answers. *In*, Miles, E. L. *et al*. (2002) *Environmental Regime Effectiveness*. The MIT Press.

Underdal, A. (2002b.) Methods of analysis. In: Miles, E. L. *et al*. (2002) *Environmental*

Regime Effectiveness. The MIT Press.

Underdal, A. (2002c) Patterns of regime effectiveness. In: Miles, E. L. *et al*. (2002) *Environmental Regime Effectiveness*. The MIT Press.

Underdal, A.; Young, O. R. (2004) *Regime consequences - methodological challenges and research strategies*. Kluwer Academic Publishers.

UNEP (1991) *Resolution No. 33/01 approving the 1990 International Convention on Oil Pollution Preparedness, Response and Co-operation (OPRC 90).*

United Nations (1972) *Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matters*.

United Nations (1982) *Convention on the Law of the Sea.*

United Nations (1990). *International Convention on Oil Preparedness, Response and, Co-operation.*

United Nations. (1992) *United Nations Conference on Environment and Development,* Rio de Janeiro, Brazil, 3-14 June 1992.

UNTC (1995) *International Convention on oil pollution preparedness, response and cooperation, 1990.*

Vanem, E., Ø. Endresen & R. Skjong (2008). Cost-effectiveness criteria for marine oil spill preventive measures. *Reliability Engineering & System Safety*. 93(9): 1354-1368.

Victor, D. A. (2016). What the Framework Convention on Climate Change Teaches Us About Cooperation on Climate Change. *Politics and Governance*, 4(3): 133-141.

Victor, D. G. *et al*. (1998). *The Implementation and Effectiveness of International Environmental Commitments: theory and practice*. The MIT Press, Cambridge

Wolfe, D. A. *et al*. (1994) The Fate of the Oil Spilled from the Exxon Valdez. *Environmental Science and Technology*, 28(13): 561-568.

Zacharias, D. C. *et al.* (2023) Oil reaching the coast: is Brazil on the route of international oceanic dumping? *Marine Pollution Bulletin*, 196: 115624.

Zica, L. *et al*. (2004) *Projeto de Lei* 3729/2004.

Zimmermann, D. S. B. *et al*. (2016) An Opportunity to Inform and Educate Through the Gulf of Mexico Research Initiative: Outreach efforts surrounding the Deepwater Horizon oil spill. *The Oceanography Society*, 29(3): 38-45.

Zürn, M. (1998) The Rise of International Environmental Politics: A Review of Current Research. World Politics, 50(4): 617-649.