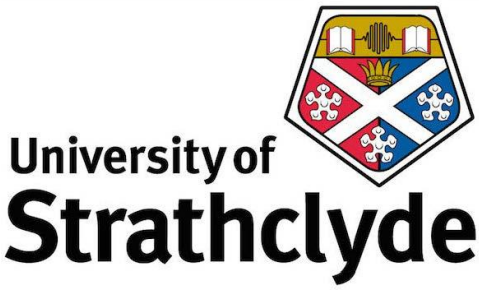

Due Diligence as a Bridge between the Law of the Sea and Domestic Climate Change Litigation

Kathryn M. McKenzie

(B.M., J.D, LL.M)

A thesis submitted in fulfilment of the requirements for the degree of

Doctor of Philosophy

University of Strathclyde School of Law

Glasgow

September 2022

Declaration of Authenticity and Author's Rights

This thesis is the result of the author's original research. It has been composed by the author and has not been previously submitted for examination which has led to the award of a degree.

Signed: 

Date: 1 September 2022

Acknowledgements

As with most things in my life, my journey to, and through, the PhD was anything but straightforward. When I moved from California to Glasgow in 2017 to do an LL.M, I only ever planned to stay for one year but my experience within SCELG and the SCELG community (along with falling head over heels in love with Scotland) made me want to extend my stay. The people and projects, the opportunities for creative involvement in endeavours with real-world impact, made it clear to me that this is where I wanted to be. But I could not have made this journey without the support, love, friendship and generosity of a great many people so I want to take this opportunity to acknowledge and thank some of them.

First and foremost, my family: You have supported me throughout the various untraditional, out-of-the-ordinary adventures I have embarked on, and the PhD is no exception. The love, support and generosity of each of my parental units is unparalleled and I am so, so fortunate to have you in my life. From the bottom of my heart, thank you.

My supervision team: You have inspired and supported me, challenged me, and made me believe in my research and myself. Francesco, your support, friendship and trust in me have meant so much. You were instrumental in my finding a way to pursue a PhD that comfortably straddles the line between academia and practice. You continue to ask the tough questions and to challenge me, which is precisely what I have needed. Dani, you introduced me to the law of the sea, without which this PhD would never have happened. Your continuous encouragement, support and friendship have meant so much to me and I look forward to future collaboration. Steph, my "work wife" and friend, your never-ending capacity for making time, letting me vent and bounce ideas off of your brilliant brain have been so vital to me on this journey. Michael, your steady calm, your broad perspective and your support throughout this PhD journey have been a source of comfort and a guiding light without which getting to this point would have been impossible.

The COVID-19 pandemic, and particularly the first lockdown really turned the volume up on the isolation of what can be a relatively lonely process in the best of times. Somehow through the fog of the pandemic, a tiny little WhatsApp group chat morphed into some of the most important friendships of my adult life. "SCELG and the City", thank you for giving me friendship, closeness, and sanity during the darkest days.

Jo, Greg, Robin and the hens: You have been a lifeline for me. Thank you for grounding me, providing levity (and regular happy hours!), bringing me to Largs and giving me space to breathe and laugh. You have no idea how much it has meant to me.

My C2LI team: Lennart and Gastón, the C2LI magicians, we have been on this journey together from afar and your friendship, collaboration, insights and support have meant the world to me. My SRAs (you'll always be my SRAs!), I can't imagine the last few years without your incredible energy, ambition, curiosity and brilliance. Keep changing the world. You are amazing and the world is better because you are in it.

The SCELG community: your research, ambitions, passions, and support are what inspired me to stay and pursue this PhD in the first place. I look forward to seeing where SCELG goes in the future and to remaining an active member of the community.

Finally, my nearest and dearest far away: You have kept me grounded, supported me, loved me, visited me, and have always been in my corner cheering me on no matter how far away I move or how hairbrained my endeavours are. You are my lifeblood. I can't wait to bring you along on whatever adventure is next.

There are countless people missing from this list of acknowledgements and thanks, of course. I will do my best to personally thank you all. Know that you are not forgotten, and your support and friendships have been instrumental as I wound my way along this journey to get to this point.

From the bottom of my heart, thank you.

I also want to thank my examining committee, Dr Birgit Schippers (convenor), Dr Alexandra Harrington (external examiner) and Dr Elaine Webster (internal examiner), for the engaging and insightful conversation during my viva voce. I am proud not only to have had an all-female examination panel, but one so highly accomplished, kind and thoughtful.

Funding

Funding for this thesis was provided by the University of Strathclyde as an in-kind contribution to the One Ocean Hub, a collaborative research programme for sustainable development project funded by UK Research and Innovation (UKRI) through the Global Challenges Research Fund (GCRF) (Grant Ref: NE/S008950/1).

Table of Contents

Abstract

Concentrations of CO_2 and other greenhouse gases (GHGs) in the atmosphere are the highest they have been in millions of years and continue to rise at unprecedented rates. The ocean has taken up approximately a quarter of all atmospheric CO_2 emissions, acting as a buffer to climate change, and continues to do so. However, the increased carbon saturation in the ocean is showing signs of dramatic impact with dangerous and deadly consequences for marine ecosystems and human life. At the same time, while governments negotiate at the international level, climate policies implemented at the national level to address GHG emissions and resulting climate change remain wholly inadequate to prevent continued dramatic climate change. The ocean, despite its crucial role in regulating the global climate, is historically relegated within climate change actions to an afterthought or footnote. Against this background, climate change litigation, particularly "systemic" climate litigation that seeks to compel a government to take more ambitious climate change mitigation measures, has become a powerful tool of policy change. These cases routinely invoke states' international obligations under the climate change regime and are typically decided along due diligence lines of reasoning. As with the international climate negotiations and national climate policy, the ocean is often mentioned within these cases as evidence of the dangerous consequences of GHG emissions but is not a focus of legal arguments or reasoning. This thesis explores the extent to which individuals can invoke due diligence obligations under both the international climate change regime and the law of the sea convention to hold their governments accountable in national courts for failing to adequately reduce GHG emissions, causing ocean-climate related harms.

Chapter 1: Introduction

The climate crisis continues to worsen, with increased extreme weather events, wildfires and droughts, threats to global food systems, climate change-induced migration, conflict and war. Within this context, the world's governments have been negotiating with each other for thirty years about the best ways to address and mitigate climate change and the related harms. However, two significant barriers remain. First, despite near-global participation in the Paris Agreement,[1] which seeks to address climate change by limiting the global atmospheric temperature to an "acceptable" limit, state action falls significantly short. Second, despite one reference to the UNFCCC's recognition of the ocean as a carbon sink, the Paris Agreement, by focusing solely on atmospheric temperature, seemingly ignores the significance of the contribution of the world's ocean both as a buffer against climate change and as an integral part of the climate system in dire need of protection.

This thesis aims to identify pathways for the inclusion of the ocean as a central focus in one important tool to influence more ambitious and immediate state action toward legitimately effective climate policy: climate change litigation. This chapter provides an introduction to the research topic of this thesis by first establishing its context and background, followed by an articulation of its aims and objectives, along with the significance of the research and findings for the evolving field of climate litigation – both academic and in practice. Finally, this chapter outlines the methodological approach taken within the thesis, along with its limitations, and ends with a structural outline of the thesis.

1.1 Background and Context

Before delving into the context of the research that is the subject of this thesis, I would first like to provide some background regarding my personal journey to this topic. I began my PhD journey with a research topic that was relatively far removed from the subject-matter of this thesis. While I was finding my footing within my PhD, I continued my work with Dr Francesco Sindico on the development of what is now the Climate Change Litigation Initiative (C2LI).[2] I had begun this work prior to the start of my PhD and I found it to be an exciting endeavour with the potential to fill an important gap in access and knowledge within the field of climate change litigation and the capacity to be a vital bridge between academia and practice in this

[1] *The Paris Agreement, adopted by UNFCCC Decision 1/CP21, Adoption of the Paris Agreement,* UN Doc FCCC/CP/2015/10/Add.1, (12 December 2015), entered into force 4 November 2016.
[2] C2LI, 'Climate Change Litigation Initiative' (*C2LI*) <https://www.c2li.org/>.

evolving field of law. In one of our early discussions about the role I would be taking and the time I would devote to C2LI going forward, Dr Sindico asked me one crucial question. He asked me if my involvement in C2LI would distract from my PhD research.

After significant personal reflection, it became clear that my interest in C2LI and climate change litigation as a rapidly evolving topic area would indeed be a distraction from my otherwise largely unrelated PhD research topic. I was clearly more interested in pursuing research related to climate change litigation, which could contribute to and benefit from my work with C2LI. Being embedded through my PhD funding in the One Ocean Hub provided the incentive to think creatively about connecting my interest in climate change litigation to my desire to focus on ocean-related research. Ultimately, this reflection, triggered by that one crucial question, led me to find a significant gap in the research on the ocean-climate nexus, particularly within the field of climate change litigation. This led me to my current research topic and the subject of this thesis.

The subject of this thesis, broadly, is the extent to which due diligence can operate as a bridge between the ocean, via the international law of the sea, and climate change litigation in national settings. Climate change, or more accurately, the climate emergency the world finds itself in, is no longer a niche topic area, but is pervasive in every news broadcast, increasingly touching every area of law and every area of life. The most recent report by the Intergovernmental Panel on Climate Change (IPCC) paints a dire picture, raising the alarm that we now find ourselves in the last decade of possible action to avoid potentially catastrophic levels of climate change.[3] The updated analyses in the newest IPCC reporting strengthen previous IPCC Assessment Reports and its Special Report on the Ocean and Cryosphere[4] in finding that continued intensification of climate change means persistent impacts on the biogeochemical makeup of the ocean.[5] Uptake by the ocean of vast amounts

[3] S Dhakal and others, 'IPCC 2022: Emissions Trends and Drivers' in PR Shukla and others (eds), *Climate Change 2022: Mitigation of Climate Change. Contribution of Working Group III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change* (Cambridge University Press 2022) 23; K Riahi and others, 'IPCC 2022: Mitigation Pathways Compatible with Long-Term Goals' in PR Shukla and others (eds), *Climate Change 2022: Mitigation of Climate Change. Contribution of Working Group III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change* (Cambridge University Press 2022) 69.

[4] HO Pörtner and others (eds), 'IPCC Special Report on the Ocean and Cryosphere in a Changing Climate: Summary for Policymakers' (Cambridge University Press 2019).

[5] SK Gulev and others, 'IPCC 2021: Changing State of the Climate System' in V Masson-Delmotte and others (eds), *Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change* (Cambridge University Press 2021) 349.

of increased heat and anthropogenic greenhouse gas (GHG) emissions is causing changes in the ocean's carbon processes, making the ocean warmer and more acidic.[6] These changes affect the vast biodiversity hosted by the ocean and could severely impact its ability to modulate the earth's climate, with potentially devastating effects.[7]

And yet, a substantial emissions gap remains. The United Nations Environment Programme (UNEP) defines the emissions gap as the gap between the reductions of GHG emissions that are needed to limit the atmospheric temperature to a level that prevents critical climate change and the estimated impact of emissions which will result from existing and planned national climate policies.[8] While the world's governments have been negotiating the best path forward, implementing climate measures, and pledging future ambition on climate change, a significant emissions gap persists and GHG emissions continue to rise.[9] Despite the persistent emissions gap, the IPCC found that the necessary deep reductions in long-term emissions are best achieved through national governance and policy change.[10] For the first time in the IPCC's history, its newest reports include an assessment of the impact of climate change litigation in this arena. It found that climate litigation plays an increasingly substantial role in pressuring governments to take more ambitious actions in response to the risk of climate impacts.[11]

As will be expanded on in the discussion on methodology below, the focus of this thesis is on what is frequently referred to as "systemic" climate change litigation. Systemic climate change litigation in its broadest definition is litigation by civil society challenging their own

[6] JG Canadell and others, 'IPCC 2021: Global Carbon and Other Biogeochemical Cycles and Feedbacks' in V Masson-Delmotte and others (eds), *Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change* (Cambridge University Press 2021) 677.
[7] S Cooley and others, 'IPCC 2022: Ocean and Coastal Ecosystems and Their Services' in HO Pörtner and others (eds), *Climate Change 2022: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change* (Cambridge University Press 2022) 3.
[8] UNEP, 'The Emissions Gap Report 2021. United Nations Environment Programme (UNEP) (2021)' (2021) xxiii.
[9] UNEP (n 8); F Lecocq and others, 'IPCC 2022: Mitigation and Development Pathways in the Near- to Mid-Term' in PR Shukla and others (eds) (Cambridge University Press 2022) 23–23; Dhakal and others (n 3) 4.
[10] N Dubash and others, 'IPCC 2022: National and Sub-National Policies and Institutions' in PR Shukla and others (eds), *Climate Change 2022: Mitigation of Climate Change, Working Group III contribution to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change* (Cambridge University Press 2022) 7–10.
[11] ibid 28–32.

government's overall climate policy.[12] Systemic climate change litigation has been on the rise ever since the famous *Urgenda Foundation* litigation in 2015 that resulted in the Dutch government being required to increase its emissions reductions plans. This rise in systemic litigation also corresponds with an increased trend in all climate litigation since the adoption of the Paris Agreement in 2015.[13] One of the hallmarks of national systemic climate change litigation is the reference to States' international legal obligations under the international climate change regime, particularly the Paris Agreement.

The Paris Agreement is the most recent negotiated agreement under the international climate change legal regime, which includes the United Nations Framework Convention on Climate Change[14] (UNFCCC) and subsequent agreements, protocols and decisions of the Conference of the Parties (COP) negotiated thereunder. Historically, the international climate change regime has considered the role of the ocean primarily in its function as a carbon sink, removing excess heat and GHG emissions from the atmosphere.[15] The Paris Agreement includes the first explicit reference to the ocean beyond its status as a carbon sink (albeit within the preamble rather than its substantive articles) recognising the importance of ensuring the integrity of the ocean in the context of climate change.[16] There has been increased attention paid to the ocean as an integral part of the global climate system, including ocean-related events at the international climate regime's annual COP negotiations, Special Reports by the IPCC,[17] dedicated chapters within the IPCC's newest Assessment Report[18] and regular informal dialogues of the Subsidiary Body for Scientific and Technological Advice (SBSTA) on the ocean and climate change.[19] While this increased attention on the ocean-climate nexus is a significant and important step toward addressing climate change and its vast array of current and future harms, gaps remain. Of most interest

[12] ibid 30.
[13] ibid; J Setzer and C Higham, 'Global Trends in Climate Change Litigation: 2022 Snapshot' (Grantham Research Institute on Climate Change and the Environment and Centre for Climate Change Economics and Policy, London School of Economics and Political Science 2022).
[14] *United Nations Framework Convention on Climate Change (New York, 9 May 1992) 1771 UNTS 107, 31 ILM 849 (1992), entered into force 21 March 1994*.
[15] ibid Article 4.1(d).
[16] *Paris Agreement* (n 1) Preamble. The only other reference to the ocean within the Paris Agreement is via reference to the UNFCCC's Article 4.1(d), ibid.
[17] Pörtner and others (n 4).
[18] B Fox-Kemper and others, 'IPCC 2021: Ocean, Cryosphere and Sea Level Change' in V Masson-Delmotte and others (eds), *Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change* (Cambridge University Press 2021); Cooley and others (n 7).
[19] UN Doc. FCCC/CP/2019/13/Add.1 Decision 1/CP.25 para 31.

to this thesis are those gaps pertaining to direct actions by states through national climate policies and GHG emissions reduction plans that lack a consideration of, or focus on, ocean-related harms.

Having established some of the background and context of the research, the next section identifies the gap in research this thesis seeks to address, along with its overall aim and objectives.

1.2 Research Problem, Aims and Objectives

There is a seemingly endless and ever-expanding supply of academic research on the various aspects of climate change litigation, which spans a remarkable breadth of perspectives and approaches, from deep dive explorations on the regulatory pathways and impacts of climate litigation,[20] analyses on rights-based climate litigation,[21] comparative approaches,[22] analyses of the trends of climate litigation,[23] climate litigation research itself[24] and virtually everything in between. The extraordinary interest in climate change litigation, and the resulting volume of academic research in this field, is logical when you consider the subject matter of the litigation: climate change. As previously mentioned, climate change has become so pervasive that it touches virtually every aspect of law and life. It is a global phenomenon but the most impactful responses and actions necessary to address it take place at the national, sub-national and local level.[25] Within the context of increasingly profound and immediate real-world impacts and the persistent emissions gap, litigation provides a tangible tool to individuals in civil society who find themselves simultaneously directly affected and unable to impact actions through formal negotiation processes at the international level.[26] The proliferation of systemic climate change cases in particular is a good example of this and of

[20] J Peel and HM Osofsky, *Climate Change Litigation: Regulatory Pathways to Cleaner Energy* (Cambridge University Press 2015) 4.
[21] J Peel and HM Osofsky, 'A Rights Turn in Climate Change Litigation?' (2018) 7 Transnational Environmental Law 37; A Savaresi and JSetzer, 'Mapping the Whole of the Moon: An Analysis of the Role of Human Rights in Climate Litigation' [2021] SSRN Electronic Journal <https://papers.ssrn.com/abstract=3787963>.
[22] F Sindico and M M Mbengue (eds), *Comparative Climate Change Litigation: Beyond the Usual Suspects* (Springer Nature Switzerland 2021).
[23] Setzer and Higham (n 13).
[24] J Setzer and LC Vanhala, 'Climate Change Litigation: A Review of Research on Courts and Litigants in Climate Governance' (2019) 10 WIREs Climate Change.
[25] Peel, Jacqueline and Osofsky (n 20) 4.
[26] ibid 13.

the ability of climate litigation to have the desired impact of pushing governments toward more ambitious action.[27]

In this sea of ever-increasing litigation and academic research into climate change litigation, it can be challenging to find any remaining gaps. One area of climate litigation that has received relatively little attention (although it is growing) is the ocean-related dimension within climate change litigation. Despite the vital function of the ocean as an integral part of the climate system and the significant, life-threatening potential of its destruction, ocean-related climate change litigation remains an unexplored avenue in practice. The ocean is discussed, or rather mentioned, within various types of climate change litigation, but legal arguments pertaining specifically to the ocean are missing. It is timely at this point to introduce the (public) international legal regime that governs virtually all activities pertaining to the ocean. The law of the sea regime, and primarily the UN Convention on the Law of the Sea (UNCLOS) is frequently referred to as a "constitution for the ocean" because of its role in regulating all ocean-related activities.[28] It contains a dedicated section devoted to the protection and preservation of the marine environment, which includes extensive obligations for states to prevent, reduce and control the pollution of the marine environment.[29] The academic literature that has begun to explore the prospect of including the law of the sea in climate change litigation focuses primarily on the potential of climate change-related argumentation within the framework of the UNCLOS dispute settlement mechanism.[30] There is at least one study on the possibility of including the law of the sea regime in climate

[27] Dubash and others (n 10) 30.
[28] E Johansen, 'The Role of the Law of the Sea in Climate Change Litigation' (2020) 11 The Yearbook of Polar Law Online 141, 162.
[29] *United Nations Convention on the Law of the Sea (Montego Bay, 10 Dec 1982) 1833 UNTS 3, 21 ILM 1261 (1982), entered into force 16 Nov 1994 (UNCLOS)* XII.
[30] A Boyle, 'Law of the Sea Perspective on Climate Change The 1982 Law of the Sea Convention at 30: Successes, Challenges and New Agendas' [2012] International Journal of Marine and Coastal Law 831; A Boyle, 'Litigating Climate Change under Part XII of the LOSC' (2019) 1 The International Journal of Marine and Coastal Law 1; A Boyle, 'Protecting the Marine Environment from Climate Change: The LOSC Part XII Regime' in Elise Johansen, Ingvild Ulrikke Jakobsen and Signe Veierud Busch (eds), *The Law of the Sea and Climate Change: Solutions and Constraints* (Cambridge University Press 2020); N Klein, 'Adapting UNCLOS Dispute Settlement to Address Climate Change' in Jan McDonald, Jeffrey McGee and Richard Barnes (eds), *Research Handbook on Climate Change, Oceans and Coasts* (Edward Elgar Publishing Limited 2020); C Redgwell, 'UNCLOS and Climate Change' (2012) 106 *Proceedings of the Annual Meeting-American Society of International Law* 406; E Johansen, 'The Role of the Oceans in Regulating the Earth's Climate: Legal Perspectives' in Elise Johansen, Ingvild Ulrikke Jakobsen and Signe Veierud Busch (eds), *The Law of the Sea and Climate Change: Solutions and Constraints* (Cambridge University Press 2020).

litigation within a national setting.[31] However, that analysis stops short, after elaborating the perceived barriers,[32] of going beyond such barriers to explore the potential of the inclusion of UNCLOS-related legal arguments within national climate change litigation.

The most significant barrier that is mentioned to including UNCLOS in national climate change litigation is the fact that only states are Parties to the Convention.[33] The reasoning is that, due to its nature as an international treaty between states, first, individuals cannot raise or rely on UNCLOS because they have no actionable rights thereunder and second, national courts tend only to decide matters of national law.[34] However, as already stated, one of the hallmarks of national systemic climate change litigation is the reliance on states' international obligations under the international climate change regime, and particularly the Paris Agreement. The Paris Agreement is also an international agreement between state Parties. If national courts are willing to include the international climate change regime in their decision-making in systemic climate change litigation, why not also the international law of the sea?

This is the driving question behind the research within this thesis. The contribution of this thesis to the legal scholarship on climate change litigation is further discussed in chapter 6 (6.4).

Given the lack of inclusion of ocean-related legal arguments within systemic climate change litigation, the overarching aim of this thesis is to identify potential pathways toward enabling such inclusion and to evaluate the effectiveness thereof. There is relative commonality of the lines of reasoning within national systemic climate change litigation. National courts in systemic climate change litigation are typically faced with the question of whether the state has met its duty of care to protect its citizens from climate-related harms (legal systems and legal grounds differ, but the question of the relevant form of duty of care is consistent).[35] As will be seen throughout this thesis, national courts in these cases tend to base their determinations of the sufficiency of the state's exercise of its duty of care toward its citizens on whether the state has employed due diligence. This makes sense, of course, as the Paris

[31] Johansen (n 28).
[32] ibid 151.
[33] ibid.
[34] ibid 151–152.
[35] L Maxwell, S Mead and D van Berkel, 'Standards for Adjudicating the Next Generation of Urgenda-Style Climate Cases' (2021) Special Issue 'Climate Litigation and Human Rights: Stocktaking and a Look at the Future' Journal of Human Rights and the Environment 35.

Agreement is generally seen as appropriately interpreted in the light of due diligence and the obligations therein as requiring the exercise of due diligence in their performance.[36] Part XII of UNCLOS, which governs the protection and preservation of the marine environment, is also well established as being based on due diligence obligations,[37] and as being instrumental in the development of due diligence obligations and standards within international law.[38] Indeed, it is the Seabed Disputes Chamber of the International Tribunal of the Law of the Sea (ITLOS) that provided public international law with its most clear articulation of due diligence, finding that it 'is an obligation to deploy adequate means, to exercise best possible efforts, to do the utmost'.[39]

Due diligence has been described as the standard of care which is to be employed in a given situation or circumstance.[40] A "duty of care" entails the obligation, or duty, to act with the same care and diligence that would normally be exercised by others in the same situation.[41] The specific articulation of the duty of care of a state to protect its citizens against climate-related harms depends on the legal system in question and the legal grounds relied upon in a court case (tort law, constitutional law, human rights law, etc.). Due diligence is therefore directly linked to states' duty of care toward their citizens (to protect them against climate-related harm) in that it is the standard of care that is to be employed by the state in its execution of that duty.[42]

Due diligence is the lens through which the obligations within both legal regimes are interpreted, and it provides the standard upon which national courts base their decision-

[36] A Patt and others, 'IPCC 2022: International Cooperation' in PR Shukla and others (eds), *Climate Change 2022: Mitigation of Climate Change. Contribution of Working Group III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change* (Cambridge University Press 2022) 19–23.
[37] Boyle, 'Protecting the Marine Environment from Climate Change' (n 30) 102.
[38] I Papanicolopulu, 'Due Diligence in the Law of the Sea' in Krieger, Heike, Peters, Anne and Kreuzer, Leonhard (eds), *Due Diligence in the International Legal Order* (Oxford University Press 2020) 147–149.
[39] *Responsibilities and Obligations of States Sponsoring Persons and Entities with Respect to Activities in the Area (Advisory Opinion)* [2011] ITLOS Rep 2011 Case No 17 (Seabed Disputes Chamber of the International Tribunal for the Law of the Sea) [110].
[40] ÁJ Hernández, 'Due Diligence Obligations as a Tool to Manage Radical Vulnerability from Climate Change' in Mar Campins Eritja and Rahma Bentirou Mathlouthi (eds), *Understanding Vulnerability in the Context of Climate Change* (Atelier 2022) 71.
[41] S Wartelle, 'Oh the Tides They Are a Changin': Climate Change Due Diligence, and How the Standard of Care Should Change to Reflect the Current Technologies in Flood Mapping Comments' (2022) 10 LSU Journal of Energy Law and Resources 275, 286.
[42] Hernández (n 40) 68.

making in national systemic climate change litigation. The research objective of this thesis is therefore to evaluate the extent to which due diligence can serve as a bridge between the law of the sea and domestic systemic climate change litigation. The strengths and weaknesses of each legal regime are compared through the lens of due diligence in order to determine the value of including the law of the sea regime in national climate change litigation to drive increased climate ambition.

The choice of systemic climate change litigation as the focus of this thesis is further explained in section 1.4 of this chapter which focuses on methodology. For the purpose of establishing the overall research question of this thesis, and the sub-questions each chapter addresses, it is important at this point to clarify the rationale for the focus on the individual and civil society at large in this thesis. Throughout the thesis, the terms 'individual' and 'civil society' are used interchangeably. This is not intended to have legal implications, but rather is done as a function of relying on systemic climate change litigation as a tool to affect increased climate mitigation ambition on the part of states. Systemic climate change litigation typically involves individuals within civil society, often represented by civil society groups or NGOs, challenging a state's overall climate policy. Because this thesis seeks to explore the potential of such litigation as a tool (through the application of international law via the vehicle of due diligence) in national courts, the research question is framed from the perspective of the ability of individuals to invoke certain legal arguments. This focus on the individual (or civil society at large) is therefore intended to indicate the *tool* of systemic climate change litigation, not the *legal implications* (such as questions of standing) of the individual in the court system.

The overall research question of this thesis is therefore: to what extent can individuals invoke due diligence obligations under both the UNFCCC and UNCLOS to hold their governments accountable in national courts for failing to adequately reduce GHG emissions, causing ocean-related climate harm?

The following table outlines the sub-part of the research question that each chapter addresses, along with the underlying investigation specific to each.

Research Question	To what extent can individuals invoke due diligence obligations under both the UNFCCC and UNCLOS to hold their governments accountable in national courts for failing to adequately reduce GHG emissions, causing ocean-related climate harms?		
Chapter	**Title**	**Sub-part of RQ addressed**	**Underlying driving questions**
Chapter 2	Threats to the Ocean from Climate-Change and their Effects on Humans	To what extent can individuals invoke due diligence obligations under both the UNFCCC and UNCLOS to hold their governments accountable in national courts for **failing to adequately reduce GHG emissions, causing ocean-related climate harms**?	▪ What are the ocean-climate related harms from GHG emissions? ▪ How do failures to reduce GHG emissions contribute to ocean-related climate harm?
Chapter 3	Due Diligence and the Role of International Law in National Courts	To what extent can individuals invoke **due diligence obligations** under both the UNFCCC and UNCLOS to **hold their governments accountable in national courts** for failing to adequately reduce GHG emissions, causing ocean-related climate harms?	▪ What is due diligence? ▪ What are States' due diligence obligations in international law? ▪ How do international obligations translate to accountability in national courts?
Chapter 4	Due Diligence in the International Climate Change Regime and Domestic Climate Change Litigation	To what extent can individuals invoke **due diligence obligations under** both **the UNFCCC** and UNCLOS to **hold their governments accountable in national courts** for failing to adequately reduce GHG emissions, causing ocean-related climate harms?	▪ What are States' due diligence obligations under the UNFCCC? ▪ How do national courts treat international climate change law in systemic climate litigation? ▪ What are the implications of relying on due diligence in national systemic climate change litigation?
Chapter 5	Due Diligence in the UN Convention on the Law of the Sea and its Potential Use in National Climate Change Litigation	To what extent can individuals invoke **due diligence obligations under** both the UNFCCC and **UNCLOS to hold their governments accountable in national courts** for failing to adequately reduce GHG emissions, causing ocean-related climate harms?	▪ What are States' due diligence obligations under UNCLOS? ▪ What would the addition of UNCLOS due diligence obligations add to national systemic climate change litigation? ▪ What would the implications of the addition of UNCLOS to national systemic climate litigation be?

1.3 Significance of the Research

Having established the gaps in research this thesis seeks to fill, along with the overall aim and objective and the research questions driving the research, this section now turns to the significance of the research, along with an outline of the findings thereof.

As was outlined within the context and background above, this thesis is positioned between academic research and practical, real-world problem-solving as it pertains to the climate crisis and immediate actions that can – and need – to be taken by states in order to protect their citizens (and the world) from the potentially existential threat of unmitigated climate change. On the one hand, it is critical to explore effective pathways to persuade states to take immediate action to close the persistent emissions gap. On the other, it is vital to expand the academic research and scholarly knowledge beyond the status quo of understanding on climate change litigation.

The scholarly approaches to bringing the ocean into climate change litigation focus on the parameters of UNCLOS as an international convention, to which only states are Parties, and which has a robust dispute resolution mechanism. There have, to date, been no legal claims brought in any international judicial forum under UNCLOS which would legally connect climate change and oceans. The academic literature on climate change litigation explores the potential for this type of litigation in the international sphere, along with the challenges and barriers inherent within it.[43] The only exploration that considers UNCLOS in national judicial settings also stops short along state Party lines.[44] This thesis contributes to the scholarly knowledge on climate change litigation by breaking the barrier between international law and national judicial settings. It does so by establishing the potential of UNCLOS to act as guidance, rather than binding law, in national courts' determinations of whether a state has acted with appropriate diligence in meeting its duty of care to protect its citizens from harm related to the significant impacts of GHG emissions on the ocean and the climate.

The research in this thesis establishes the possibility for oceans to take centre stage in national systemic climate change litigation, providing courts potentially robust legal footing on which to find that states must take more stringent near-term actions, including

[43] Boyle, 'Litigating Climate Change under Part XII of the LOSC' (n 30); Boyle, 'Protecting the Marine Environment from Climate Change' (n 30); Klein (n 30); N Klein, 'Expansions and Restrictions in the UNCLOS Dispute Settlement Regime: Lessons from Recent Decisions' (2016) 15 Chinese Journal of International Law 403.
[44] Johansen (n 28).

immediately increasing emission reductions plans significantly. While climate litigation is certainly not a silver bullet solution to the entire climate emergency, it does provide an important, and increasingly effective, tool to pressure governments to increase climate ambition. The reliance on due diligence as a bridge between UNCLOS and national systemic climate change litigation provides a unique contribution to both academic research and legal practice in the field of climate litigation.

Gaps remain and there are limitations to the research within this thesis, which are outlined in detail in the following section elaborating the methodological approach taken.

1.4 Methodology

Having outlined the findings of the research and its contribution to the field of climate change litigation, this section turns to an explanation of the methodologies employed, the approach taken, and the limitations of the research within this thesis. First, it explains the choice of climate change litigation and the criteria for case-law selection which underlies much of the thesis. It goes on to elaborate the research approaches taken in each chapter. Finally, it outlines the limitations of the research within this thesis and concludes with a note on terminology used throughout the thesis.

As was alluded to above, the choice of systemic climate change litigation as the focus of the thesis is situated within the rapidly evolving field of climate change litigation itself. Climate change litigation is a term that does not yet have one uniform definition within the academic literature. "Climate change litigation" ranges from extraordinarily broad to relatively narrow definitions. On the broad end of the spectrum is the famous early elaboration by Markell and Ruhl which includes 'any piece of federal, state, tribal, or local administrative or judicial litigation in which the party filings or tribunal decisions directly and expressly raise an issue of fact or law regarding the substance or policy of climate change causes and impacts.'[45] On the narrow end of the spectrum is the definition used by UNEP in its reporting on climate litigation, which only includes 'cases that raise material issues of law or fact relating to climate change mitigation or adaptation, or the science of climate change.'[46] The range and diversity of definitions is extensive and led to the observation by Setzer and Vanhala that

[45] D Markell and JB Ruhl, 'An Empirical Assessment of Climate Change in the Courts: A New Jurisprudence or Business as Usual Climate Change Special Issue' (2012) 64 Florida Law Review 15, 27.

[46] Law Division United Nations Environment Programme, 'UNEP, Global Climate Litigation Report, 2020 Status Review' (UNEP, Columbia Law School, Sabin Center for Climate Change Law 2020) 6.

'there are as many understandings of what counts as "climate change litigation" as there are authors writing about the phenomenon'[47] and urged anyone writing on climate change litigation to be explicit about the conceptual parameters of the term.

To that end, this thesis focuses exclusively on systemic climate change litigation, which is defined as climate litigation that challenges a state's overall climate policy, based on pace, extent and efficacy of its GHG emissions reductions plans, with the aim of causing the state to increase its climate mitigation measures.[48] If successful, such a case could lead to the requirement that the state increase its overall climate ambition, causing systemic change within national climate governance, hence the term "systemic" climate change litigation.[49] Because the climate ambition being challenged in these cases is that of the state in response to its obligations under the international climate change regime, and the Paris Agreement specifically, these cases include an international law dimension within national court settings. This was crucial to the choice of type of climate litigation for this thesis, as the international dimension of the law of the sea is a vital component of the research. Other categories of cases do not lend themselves to the analysis underlying the objectives and aims of this thesis. Climate-related litigation challenging the approval of a project, such as an airport runway expansion or oil exploration license approval, would for example be less well-suited to an exploration of the state's international obligations to mitigate climate change on a national scale.

Having selected the type of climate litigation as the focus of my research, I determined that each chapter of this thesis required its own approach. My background is in practice, rather than academia, which informs my perspective and my approach to research. In developing the structure of the thesis, I considered what building blocks were needed, and in which order, to craft a logical structure toward the final conclusions. The first building block was to understand the underlying problem: the extent of ocean-climate related harm and the impact of GHG emissions thereon. As I am not a scientist and have no scientific training, my approach to the problem development of this chapter was to begin with the most extensive reporting on climate change, which is conveniently also the underlying scientific reporting for the entirety of the international climate change regime. The IPCC's reporting is based on the most up-do-date scientific literature and is regularly updated in assessment cycles. The

[47] Setzer and Vanhala (n 24) 3.
[48] Maxwell, Mead and van Berkel (n 35) 2; Dubash and others (n 10) 30.
[49] Maxwell, Mead and van Berkel (n 35) 2–3.

timing of my research benefitted from beginning just after of the extensive 5th assessment cycle, spanned two special reports[50] and, most recently, the publication of reports from the IPCC's 6th assessment cycle. Based on these reports, I selected additional scientific literature specific to the ocean-climate nexus, beginning with literature that was the basis for the IPCC's reporting.

After developing an in-depth understanding of the scientific foundations underlying the research problem and the impact of the failure to adequately reduce GHG emissions on the ocean-climate nexus, I had laid the foundation of the thesis. From here I moved to the next building block. In order to be able to analyse how national courts incorporate due diligence and international legal regimes within their decision-making, it was first necessary to understand due diligence and the mechanism through which national courts incorporate international law. This research required more traditional academic legal desk research, including the development of knowledge on public international law based on academic literature, the historic foundations of due diligence in part based on international case law, and a theoretical understanding of legal systems based on academic scholarship. Through this approach I began to engage with what is sometimes referred to as "research-writing",[51] which led me to develop the framework upon which the remainder of the thesis is built.

Having laid the foundation in terms of the science and developed the scaffolding of the thesis, and in order to address the research questions of the thesis, I then had to define the criteria for the selection of case-law that would underly the analysis of court decision-making. Based on the aim of the research and the underlying questions each chapter addresses, the case-law had to meet certain criteria. First, in order to explore how courts rely on due diligence within their decision-making, the selected case law had to include at least one court decision. This excluded newly filed and pending cases that have not yet been considered by a national court. Second, in order to test the applicability of UNCLOS-related due diligence reasoning, the court must have acknowledged the connection between GHG emissions, climate change and the ocean. The second selection criterion was therefore that the court decision must

[50] Pörtner and others (n 4); IPCC, 2018, *IPCC 2018: Global Warming of 1.5°C. An IPCC Special Report on the Impacts of Global Warming of 1.5°C above Pre-Industrial Levels and Related Global Greenhouse Gas Emission Pathways, in the Context of Strengthening the Global Response to the Threat of Climate Change, Sustainable Development, and Efforts to Eradicate Poverty* (V Masson-Delmotte and others eds, Cambridge University Press 2018).

[51] S Pahuja, 'Methodology: Writing about How We Do Research' [2021] Research Methods in International Law 60, 64.

include mention of ocean-related harm, such as sea level rise, ocean acidification and the like. Third, in order to test the inclusion of UNCLOS due diligence-related obligations within a climate case, the court must have a familiarity with the application of international legal obligations of the state within a national court setting. The third selection criterion was therefore that the international climate change regime and the state's obligations thereunder to take national climate actions were a consideration within the court's decision. Finally, in order to test the usefulness of due diligence as a bridge between UNCLOS and national climate change litigation, the vehicle of due diligence reasoning must be pre-existing within the court's decision-making. The final selection criterion was therefore the court's reliance on due diligence within its determination of the adequacy of the state's actions toward meeting its duty of care to protect its citizens from harm.

Having established the case selection criteria, I utilised the two most prominent climate change litigation databases, along with academic literature pertaining to climate change litigation, to establish a universe of case-law that fell into the category of systemic litigation and included at least one court decision. Within this universe of cases, I then narrowed the case law down by reading the court's outline of the underlying facts to determine if there was an ocean-connection within the stated harms. Having further narrowed the possible field of cases for inclusion, I explored the court's establishment of the underlying legal framework of the case to determine if the court placed the legal questions of the case within the context of the international climate change regime and the state's obligations thereunder. If each of these three criteria were met, I then explored the entirety of the court's decision to surface the reasoning upon which the court based its decision-making and, if due diligence was an underlying basis, the case was included. The following table includes the list of cases that met the selection criteria and are thus included in the analysis of this thesis.

Year decided	Case Name	Court	Jurisdiction
2015	*Urgenda Foundation v The State of the Netherlands*	District Court, The Hague	The Netherlands
2015	*Leghari v Federation of Pakistan*	Lahore High Court Green Bench of Pakistan	Pakistan
2017	*Thomson v Minister for Climate Change Issues*	High Court of New Zealand	New Zealand
2018	*State of the Netherlands v Urgenda Foundation*	The Hague Court of Appeal	The Netherlands
2019	*State of the Netherlands v Stichting Urgenda*	Supreme Court of The Netherlands	The Netherlands
2020	*Friends of the Irish Environment CLG v The Government of Ireland*	Supreme Court	Ireland
2021	*Notre Affaire á Tous v The Republic of France (Preliminary Decision)*	Paris Administrative Court	France
2021	*Notre Affaire á Tous v The Republic of France (Final Decision)*	Paris Administrative Court	France
2021	*VZW Klimaatzaak v Kingdom of Belgium and Others*	Court of First Instance, Brussels	Belgium
2021	*Neubauer and Others v Germany*	German Federal Constitutional Court	Germany

In the two regime-specific chapters, I found the use of writing as 'a mode of thinking'[52] particularly useful. This research-writing was based on the extensive desk research I performed after the initial case-law selection. I chose literature based on initial search terms including "due diligence", "due diligence and climate change", "due diligence and public international law", "due diligence and law of the sea", "law of the sea and climate change", just to list a few. Each academic contribution also served as a source of further literature to review. Choosing which literature to include in my research involved continuously coming back to the research question and the sub-questions I developed for each chapter. I selected literature that added value, informed the development of the answers, and proved relevant to taking my thinking forward. I collected the literature in an excel spreadsheet, categorised by topic area (due diligence, climate law, climate litigation, law of the sea, e.g.), connection (ocean-climate nexus, due diligence in climate litigation, e.g.), relevance and usefulness. In addition to academic literature, I consulted primary sources such as conventions and agreements under each of the two international legal regimes, as well as historic documents, subsequent COP decisions, working group reports, and the like, along with the selected case

[52] ibid.

law. Through feedback from my supervision team and internal reviewer, I included further primary sources that were of relevance to my research.

As this thesis is focused on the practical implications of legal argumentation within the systemic climate change litigation context, it relies heavily on doctrinal research, rather than on various fields of theoretical academic scholarship. Several fields of theoretical academic scholarship and literature may on their surface appear to have relevance for the overall topic of this thesis. However, as the focus of this thesis is on the practical application of international legal argumentation in national court settings, and on systemic climate litigation as a practical tool in the fight against climate change specifically, I do not engage with such theoretical frameworks and their related academic literature.

For example, as this thesis focuses on two international regimes (the climate change regime and that of the law of the sea) and the potential impact of legal arguments grounded in one regime on those grounded in the other, one particularly obvious field of academic theoretical literature is that of international regime interaction, or regime complexity. The challenges associated with the (growing) complexities in international law and governance are many and are the basis of a significant field of academic study.[53] Broadly, this field of academic scholarship explores the interaction between international legal regimes, including potential conflicts, overlaps, how they and their institutions engage with each other, etc.[54] In other words, it is focused on the horizonal, i.e. regime-to-regime, relationship at the international level as a matter of international relations. In this thesis, however, the focus is on how international legal regimes are, or could be, utilised within national court systems as the underlying basis for guiding legal decision-making in national systemic climate cases – via a vertical relationship between international and national law. Therefore, while an exploration of, and engagement with, the academic literature on the horizontal, international relationship between the regimes may tangentially be of interest, it falls outside the scope of this thesis.

[53] T Gehring and S Oberthür, 'Exploring Regime Interaction' in Arild Underdal and Oran R Young (eds), *Regime Consequences: Methodological Challenges and Research Strategies* (Springer Netherlands 2004); KJ Alter and K Raustiala, 'The Rise of International Regime Complexity' (2018) 14 Annual Review of Law and Social Sciences 329; KJ Alter, 'The Promise and Perils of Theorizing International Regime Complexity in an Evolving World' (2022) 17 The Review of International Organizations 375.
[54] Alter (n 53) 375–376.

Another example of a field of theoretic academic literature of possible relevance is that of global climate constitutionalism, which explores the potential connections between environmental constitutionalism and climate justice.[55] Broadly, this field explores the inclusion of, or reliance on, climate-related rights in state constitutions as the underlying grounds for climate justice-related legal action.[56] While there is significant overlap in subject matter between climate constitutionalism and the topic of this thesis, an in-depth engagement therewith would deviate from the focus of this thesis. Specifically, climate constitutionalism would be of interest in exploring the underlying legal grounds that are utilised by plaintiffs in bringing climate justice cases in national courts, such as constitutional or tort law grounds. However, as the focus of this thesis is not the underlying grounds of climate justice cases, but rather on the application of international legal arguments through the vehicle of due diligence to strengthen judicial decision-making in systemic climate change cases, an in-depth engagement with climate constitutionalism is not of direct relevance.

Just as I do not engage with the academic literature in these or other fields of legal theory, this thesis is not intended to contribute to these fields in any way. In contrast to the above-mentioned areas of theoretical academic literature, I do explore the area of transjudicialism as a conceptual framework, along with its relevance within climate change litigation. The conceptual framework of transjudicialism is explained in chapter 3, but is limited to its relevance for the further application thereof to the analysis of the selected case law in chapters 4 and 5. The engagement with this theoretical framework is also not intended to lay the groundwork for a contribution by this thesis to that area of academic scholarship, but rather is included due to its doctrinal implications within the tool of climate change litigation that is the focus of this thesis.

The time and space requirements of this thesis necessarily limit the scope of the research. First, as the conclusion chapter outlines, there are unexplored jurisdictional differences that a broad comparative analysis of case law cannot cover in detail. Second, while there is an ever-increasing number of systemic climate cases being filed, there are a finite number of court decisions that meet the case selection criteria, so this research has significant room for evolution with time and an expanded volume of court decisions. There are also linguistic

[55] JR May and E Daly, 'Global Climate Constitutionalism and Justice in the Courts' [2019] Research Handbook on Global Climate Constitutionalism 235, 235.
[56] ibid 240.

limitations as I am confined by my own language abilities to reading court documents in English, German and to some degree French. This meant that potentially relevant court decisions in other languages with no available translations were excluded from this thesis. Finally, as is further elaborated in the final chapter of this thesis, this research would benefit from future empirical research on how the findings would translate to practical inclusion in systemic climate change litigation from both litigation practitioner and judicial perspectives.

Having outlined the methodological approaches taken within this thesis, along with the limitations of the research, a note on terminology is warranted. Throughout this thesis, the terms "national" and "domestic" are used interchangeably to mean a national setting (as opposed to international or sub-national/municipal settings, or as connoting family or home).

1.5 Outline of the thesis

Following the elaborations and explanations above, all that remains before turning to the substance of the thesis is to briefly outline the structure it follows.

Chapter 2 focuses on the scientific explanation and context of the problem this thesis seeks to address and, as was alluded to above, begins building the foundation upon which the thesis is built. Chapter 3 develops the framework of the necessary fundamental legal building blocks, including six elements of due diligence and the theoretical and practical interplay between international law and national legal systems. Chapter 4 builds on the framework established in chapter 3 in the form of the six elements of due diligence and considers the international climate change regime and the treatment thereof by courts in national systemic climate change litigation. Chapter 5 introduces the law of the sea regime into domestic climate change litigation, again building on the framework of the six due diligence elements developed in chapter 3. Finally, chapter 6 briefly summarises the contents and findings of the thesis, elaborates on the contribution thereof and surfaces opportunities for further research.

This thesis is situated within the context of an ever-worsening global crisis and extremely limited time to take bold, decisive and ambitious action. As Christiana Figueres, architect of the Paris Agreement, said in her recent Countdown TED talk,

> faced with today's facts, we can be indifferent, do nothing and hope the problem goes away, we can despair and plunge into paralysis, or we can

> become stubborn optimists with a fierce conviction that, no matter how difficult, we must – and we can – rise to the challenge.[57]

My sincere hope is that this research can serve as a valuable contribution to the stubborn optimism that is needed in this crucial decade.

[57] 'Christiana Figueres: The Case for Stubborn Optimism on Climate | TED Talk' <https://www.ted.com/talks/christiana_figueres_the_case_for_stubborn_optimism_on_climate?language=en> accessed 29 June 2022.

Chapter 2: Threats to the ocean from climate change and their effects on humans

"Friends, our oceans are in trouble."[58]

The Executive Director of the UN Environment Program, Inger Andersen, opened the recent Ocean Climate Nexus meeting in Stockholm, Sweden with these words. This sentiment is the underlying impetus for this thesis, which seeks to address to what extent individuals can invoke due diligence obligations under both the international climate change regime and the law of the sea regime to hold their governments accountable in national courts for failing to adequately reduce greenhouse gas emissions, causing ocean-related climate harms. To be able to adequately answer this research question, it is necessary to first explore the underlying problem it seeks to address. As this thesis focuses on climate change litigation as a potential tool to address ocean-related climate harms, this chapter develops an accurate picture, based on the most up-to-date scientific literature and reporting, of the impacts of greenhouse gas (GHG) emissions on the global climate and the ocean.

Within the international climate change regime, Parties base international negotiations and subsequent decisions and national measures on the latest climate change science developed by the Intergovernmental Panel on Climate Change (IPCC), which was specifically created to provide states with policy-relevant scientifically sound information.[59] The first section of this chapter therefore provides a brief overview of IPCC report development, along with an explanation of states' involvement in the development and finalization of the IPCC's official reports.[60] The IPCC's reports are the primary basis for the second section of this chapter, which relies heavily on the science of the problem this thesis seeks to address. It outlines the interconnection between the earth's climate and oceans, along with the various impacts of GHG emissions. This section focuses on the three primary drivers of significant harm including ocean acidification, warming and deoxygenation and builds an understanding of how the ocean and the climate affect and are dependent on each other, building the underlying

[58] 'Impact for Our Oceans: The Road to Lisbon' (*UNEP*, 3 June 2022) <http://www.unep.org/news-and-stories/speech/impact-our-oceans-road-lisbon> accessed 19 June 2022.
[59] 'IPCC - Intergovernmental Panel on Climate Change' <http://www.ipcc.ch/news_and_events/docs/factsheets/FS_what_ipcc.pdf> accessed 19 August 2018.
[60] The relevance of state involvement in the approval and adoption of the IPCC's Reports is explored in depth in subsequent chapters.

reasoning for including both the international climate change regime and the law of the sea regime in the research question of this thesis.

This chapter concludes in its final section with an analysis of the measures needed to hold the rise in global temperature to well below 2°C and pursuing efforts to limit it to 1.5°C. As the underlying basis for the type of climate change litigation this thesis analyses, the final section of this chapter establishes, based on currently submitted nationally determined contributions (NDCs), that States' proposed mitigation actions are insufficient to reach the stated temperature goals agreed to in the Paris Agreement.

2.1 IPCC as policy relevant science that informs the climate change regime

The IPCC has a distinct role as the global body tasked with assessing, synthesising and reporting on climate change science, which in turn underlies the creation and development of the global climate change regime and informs states' national actions. In this role, it is vital for the scientific assessment reports to be policy relevant, in that they are intended to enable political action – both in the negotiation of the climate change regime and states' own national policies – based on scientifically sound information.[61]

The IPCC itself does not have formal founding documents such as a constitution or formal rules[62] as might be expected of a global body tasked with the important role of elaborating and defining the state of anthropogenic climate change and its impacts. The IPCC was established in 1988 following joint decisions and a Memorandum of Agreement by the UN Environment Programme (UNEP) and the World Meteorological Organization (WMO).[63] The creation of the IPCC was subsequently endorsed by the UN General Assembly in a Resolution setting out its mandate to develop 'a comprehensive review and recommendations with respect to … [t]he state of knowledge of the science' as well as the 'social and economic impact' and 'possible response strategies to delay, limit or mitigate the impact of adverse climate change'.[64]

[61] M Berg and R Lidskog, 'Pathways to Deliberative Capacity: The Role of the IPCC' (2018) 148 Climatic Change 11, 11.
[62] D French and B Pontin, 'The Science of Climate Change: A Legal Perspective on the IPCC', *Elgar Encyclopedia of Environmental Law* (Edward Elgar Publishing Limited 2016) 12.
[63] *Memorandum of Agreement between the United Nations Environment Programme (UNEP) and the World Meteorological Organization (WMO),* FP/4102-89-01-2001.
[64] UNGA Res 43/53, 'UN Doc A/RES/43/53 (6 December 1988) para 10.

In addition to the mandate to assess the science, impacts and responses to climate change, the Resolution further mandates the IPCC to identify and strengthen 'relevant existing international legal instruments having a bearing on climate' and '[e]lements for inclusion in a possible future international convention on climate'.[65] The clear mandate, thus, was both to assess the science and also to advise and ultimately shape policy in the form of a possible future convention.[66] Indeed, at its first session in 1989, the IPCC decided to include relatively brief policy documents,[67] which later became the Summaries for Policymakers, in order to summarise and put into context the results of its assessment of the existing science.[68]

Based on its mandate, the IPCC prepares and publishes regular Assessment Reports and, when requested by the UNFCCC, Special Reports on specific topic areas. Assessment Reports are generally prepared in four parts, one for each Working Group[69] and a Synthesis Report. Special Reports are developed based on requests from the UNFCCC and are specific to a subject area. All Reports also include a Summary for Policy Makers (SPM).[70]

The IPCC published its first Assessment Report in 1990 and that Report served as the underlying basis for the negotiation of the UNFCCC, which was adopted in 1992 at the Rio Earth Summit. Since then, the UNFCCC and the IPCC have remained in a closely linked relationship in which the Parties to the UNFCCC base negotiations and policy decisions on IPCC Assessment Reports and, in turn ask the IPCC to prepare reports on specific issues as needed. This relationship has been likened to that of 'inseparable siblings'[71] that have 'grown up together and act in concert'[72] although there is no formal relationship between them. The

[65] ibid.
[66] S Agrawala, 'Structural and Process History of the Intergovernmental Panel on Climate Change' (1998) 39 Climatic Change; Dordrecht 621, 634.
[67] IPCC, 'WMO/UNEP Intergovernmental Panel on Climate Change: Report of the First Session of the IPCC Bureau, WCP TD-No. 294' (1989).
[68] Agrawala (n 66) 633.
[69] The IPCC has three Working Groups, each with its own area of focus: Working Group I focuses on the physical science of past, present and future climate change; Working Group II focuses on the impacts, adaptation and vulnerability of socio-economic and natural systems to climate change; Working Group III focuses on mitigation and method for reduction and removal of greenhouse gases from the atmosphere. For more information on each of the Working Groups, see the IPCC in general at https://www.ipcc.ch/.
[70] IPCC, 'IPCC Factsheet: What Is the IPCC?' (*IPCC About*) <https://www.ipcc.ch/site/assets/uploads/2021/07/AR6_FS_What_is_IPCC.pdf> accessed 20 June 2022.
[71] D Sarewitz, 'Does Climate Change Knowledge Really Matter?' (2011) 2 WIREs Climate Change 475, 476.
[72] ibid.

UNFCCC considers the IPCC to be the 'most credible source'[73] of information that is vital to understanding anthropogenic climate change and it is well settled that the IPCC's contribution to states' climate policy decision-making has been significant.[74] The IPCC itself considers its work to be policy-relevant and describes its work as providing 'a scientific basis for governments at all levels to develop climate-related policies'[75] as well as providing the scientific basis for the negotiation of the climate change regime.

The IPCC's most recent reports make up its Sixth Assessment Report (AR6), published in late 2021 and early 2022 and consisting of three Working Group Reports[76] and a Synthesis Report (to be published in late 2022 or 2023).

2.1.1 Development of IPCC reports

The IPCC functions and develops its reports in line with the Principles Governing IPCC Work[77] (Principles) and the Appendix[78] (Appendix) thereto, most recently updated in July of 2021, which set out the rules and procedures for author selection, literature reviewed and the review and approval process.

Participation in the IPCC and its report development is open to all member governments of the United Nations and the Panel currently has 195 members.[79] The IPCC does not engage in independent research or any climate related modelling, but assesses scientific, technical and socio-economic literature that is 'relevant to understanding climate change, its impacts and

[73] 'Science in the Negotiations | UNFCCC' <https://unfccc.int/topics/science/the-big-picture/science-in-the-negotiations> accessed 26 February 2020.
[74] M Hulme and M Mahony, 'Climate Change: What Do We Know about the IPCC?' (2010) 34 Progress in Physical Geography: Earth and Environment 705, 712.
[75] IPCC, 'IPCC Factsheet: What Is the IPCC?' (n 70).
[76] IPCC, 2021, *Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change* (V Masson-Delmotte and others eds, Cambridge University Press 2021); IPCC, 2022, *IPCC, 2022: Climate Change 2022: Impacts, Adaptation, and Vulnerability. Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change* (HO Pörtner and others eds, Cambridge University Press 2022); IPCC, 2022, *Climate Change 2022: Mitigation of Climate Change. Contribution of Working Group III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change* (PR Shukla and others eds, Cambridge University Press 2022).
[77] IPCC, 'Principles Governing IPCC Work' <https://www.ipcc.ch/site/assets/uploads/2018/09/ipcc-principles.pdf> accessed 20 June 2020.
[78] IPCC, 'Principles Governing IPCC Work, Appendix A' <https://www.ipcc.ch/site/assets/uploads/2018/09/ipcc-principles-appendix-a-final.pdf> accessed 26 February 2020.
[79] IPCC, 'IPCC Factsheet: What Is the IPCC?' (n 66); IPCC, 'List of IPCC Member Countries' <https://www.ipcc.ch/site/assets/uploads/2019/02/ipcc_members.pdf> accessed 20 June 2022.

future risks, and options for adaptation and mitigation.'[80] Because of the consensus based nature of the report drafting and approval process, the IPCC uses specific language in its reports to express the degree of certainty and agreement among scientific experts, the strength of the evidence and the level of confidence in the information included in the reports.[81] Assessment Reports and Special Reports include thousands of cited sources, primarily based on peer reviewed scientific journals, and crucial information from other sources such as research institutions, governments, industry and other organizations.[82]

The three most in-depth and comprehensive processes of the IPCC, outside the development of the reports themselves, are author selection, report review and report acceptance. Author selection is governed by specific procedures set out in the Appendix and includes hundreds of Coordinating Lead Authors and Lead Authors who are nominated by governments and IPCC observer organizations.[83] Authors are selected based on their expertise and author teams are comprised of experts who are diverse in scientific, technical and socio-economic expertise, views and backgrounds, gender, as well as regions represented. Author teams may also include experts from industry and non-governmental organizations if they have specific expertise to offer. Chapter teams include Coordinating Lead Authors, Lead Authors, Review Editors and possibly also hundreds of contributing authors who have special expertise in a given area. Additionally, Expert Reviewers participate in Chapter teams. This process is intended to result in reports that are balanced assessments of the science without the bias or influence of special interests. [84]

The Review and Approval process is likewise governed by specific procedures set out in the Appendix and includes multiple stages intended to ensure comprehensive, objective and transparent assessment of the most current state of knowledge.[85] Author teams prepare a First Order Draft which is submitted for review by a broad range of experts who are encouraged to submit comments by governments, IPCC observer organizations, industry and other groups, facilitating as broad a range of comments as possible from diverse expertise,

[80] IPCC, 'IPCC Factsheet: What Literature Does the IPCC Assess?' (*IPCC About*) <https://www.ipcc.ch/site/assets/uploads/2021/07/AR6_FS_assess_literature.pdf> accessed 20 June 2022.
[81] ibid; IPCC, 'Principles Governing IPCC Work, Appendix A' (n 78) 17.
[82] IPCC, 'IPCC Factsheet: What Literature Does the IPCC Assess?' (n 80).
[83] IPCC, 'Principles Governing IPCC Work, Appendix A' (n 78) s 4.3.1, 4.3.2.
[84] IPCC, 'IPCC Factsheet: How Does the IPCC Select Its Authors?' (*IPCC About*) <https://www.ipcc.ch/about/> accessed 26 February 2020.
[85] IPCC, 'Principles Governing IPCC Work, Appendix A' (n 78) s 4.2-4.6.

geographies and viewpoints.[86] Once all of the comments are reviewed, the author teams prepare a Second Order Draft which is subjected to simultaneous review by experts and governments. At the same time, the author teams prepare the Summary for Policymakers which is also subjected to simultaneous expert and government review.[87] Once final comments on the Second Order Draft have been submitted, author teams draft the Final Report. They prepare written responses to both the First and Second Order Drafts and both drafts are made public along with reviewer comments and author team responses once the final report is published.[88] After the first round of government and expert review of the SPM, the final draft of the SPM, along with the Synthesis Report of the full underlying report, are submitted to governments and IPCC observer organizations for a final round of written comments before the approval process begins.[89]

The IPCC's approval process involves different levels for the different types of reports: 'approval', 'adoption' and 'acceptance'. The SPM goes through 'approval' in a detailed line-by-line discussion by governments in consultation with the Coordinating Authors, leading to agreement by consensus by IPCC member states in a full panel plenary session.[90] The inclusion of the Coordinating Authors in this process ensures that the SPM accurately reflects the underlying scientific report.[91] Synthesis Reports are 'adopted' after a section-by-section review by governments, again in consultation with the Coordinating Authors[92] to ensure that the appropriate information from the full underlying report is accurately and adequately included. If there is an SPM of a Synthesis Report it undergoes the same line-by-line approval process by governments as do the full SPM, outlined above.[93] Finally, the full underlying reports authored by Working Groups go through 'acceptance' once the SPM has been approved by member states. 'Acceptance' by governments indicates that the reports represent a balanced and comprehensive review and assessment of the specific subject matter of the report. The 'acceptance' process does not include a line-by-line or section-by-

[86] IPCC, 'IPCC Factsheet: How Does the IPCC Review Process Work?' (*IPCC About*) <https://www.ipcc.ch/about/> accessed 26 February 2020.
[87] ibid.
[88] ibid.
[89] ibid.
[90] IPCC, 'Principles Governing IPCC Work, Appendix A' (n 78) s 4.4.
[91] IPCC, 'IPCC Factsheet: How Does the IPCC Approve Reports?' (*IPCC About*) <https://www.ipcc.ch/about/> accessed 26 February 2020.
[92] IPCC, 'Principles Governing IPCC Work, Appendix A' (n 78) s 4.6.1.
[93] IPCC, 'IPCC Factsheet: How Does the IPCC Approve Reports?' (n 91); IPCC, 'Principles Governing IPCC Work, Appendix A' (n 78) s 4.6.1.

section review, rather reports are approved and accepted by the Working Group responsible for its authorships and by government representatives in a plenary session of the responsible Working Group.[94]

The processes outlined in this section, by which the IPCC develops and publishes its reports and the 'approval', 'adoption' and 'acceptance' by governments are vital components of the reports' legitimacy. As will be seen in chapters 4 and 5, courts routinely reference governments' participation in these various processes as evidence of both knowledge of the best available science on climate change and acceptance of the indicated necessary actions to mitigate against the worst of climate change. Crucially, the IPCC's successive reports build on each other and include ever more sophisticated scientific modelling, evidence and observations to produce the most accurate and highly detailed picture of the state of the climate system.[95]

Having outlined the comprehensive and detailed processes that are involved in developing the IPCC's reporting on the ever-evolving state of climate science and States' involvement and acceptance of the scientific information underlying them, this chapter now turns to an exploration of the state of climate science and the interaction between the earth's atmosphere, ocean and the impacts of GHG emissions on the climate system.

2.2 The Science

The earth's climate and ocean are highly interdependent in that they each both affect and are affected by the other. While this field of science is in many ways well developed, it is also still very much in development. As mentioned above, each successive report by the IPCC builds on previous reports to provide the most accurate picture. The most recent Assessment Report, AR6, outlines that, while AR5 assessed that the human impact on the earth's climate system was unequivocal with changes that are unprecedented over millennia, anthropogenic impacts have continued to increase since then.[96] In order to establish the underlying problem that Inger Andersen was referring to in her opening remarks[97] and the basis of the research question underlying this thesis, this section explores the interconnectedness of the earth's

[94] IPCC, 'Principles Governing IPCC Work, Appendix A' (n 78) s 4.5.
[95] D Chen and others, 'IPCC 2021: Framing, Context, and Methods' in V Masson-Delmotte and others (eds), *Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change* (Cambridge University Press 2021) 157.
[96] ibid.
[97] "Friends, our oceans are in trouble." n 588 above.

climate system, including the atmosphere and the ocean, along with the impacts of anthropogenic GHG emissions on multiple climatic processes, including the three most significant drivers of ocean-related harm: ocean acidification, warming and deoxygenation.

Under the international climate change regime, "climate system" is defined as 'the totality of the atmosphere, hydrosphere, biosphere and geosphere and their interactions.'[98] Beyond this definition, however, the regime has as of yet given this interconnectedness seemingly only cursory attention beyond its recognition of the ocean as a carbon sink that should be conserved and enhanced.[99] In order to develop any basis for potential climate change litigation arising from climate-ocean related impacts, it is vital to understand the science behind them. This section considers the scientific linkages between the earth's climate and the ocean and explores the most significant impacts of those linkages on marine ecosystems and ultimately humans. These include ocean acidification, deoxygenation and warming, along with the related issues of sea level rise, a reduction in calcification and other large-scale impacts on the global food system and supply chain.

2.2.1 The climate system

While this chapter considers GHG emissions and their impact on the climate system broadly, much of the focus of this section will be on CO_2 emissions specifically as the most significant driver of atmospheric temperature change (global warming) and the most substantial impacts on the ocean.[100] There is a near-linear relationship between cumulative anthropogenic CO_2 emissions and the rise in atmospheric temperature, which in turn impacts the ocean as will be seen below.[101] The ocean covers approximately 71% of the earth's surface[102] and all people on earth depend either directly or indirectly on the ocean[103] for things like food (over three billion people worldwide rely on fish as the primary source of animal protein[104]), the oxygen we breathe (it is estimated that about 70% of the oxygen in

[98] *UNFCCC* (n 14) Article 1.3.
[99] ibid Article 4.1(d); *Paris Agreement* (n 1) Article 5.1.
[100] Chen and others (n 95) 158.
[101] Canadell and others (n 6) 743–744.
[102] Pörtner and others (n 4) SPM-3.
[103] Cooley and others (n 7) 3; Pörtner and others (n 4) SPM-3.
[104] United Nations Report, 'Report on the Role of Seafood in Global Food Security. Open-Ended Informal Consultative Process on Oceans and the Law of the Sea' <http://www.un.org/depts/los/consultative_process/documents/adv_uned_mat.pdf> accessed 2 November 2020.

our atmosphere is produced by photosynthetic activity of phytoplankton in the ocean[105]), it provides habitats for nearly 80% of earth's organisms[106] and the vast majority of the world's trade (close to 80%) moves around the world via the ocean.[107] The ocean provides livelihoods for millions of people and protects shorelines through coastal ecosystems such as coral reefs and mangrove forests,[108] along with a host of other important life-sustaining activities.[109]

The impacts of GHG emissions, and CO_2 in particular, on the ocean have become broadly accepted as a major threat to marine organisms, ecosystems and biodiversity, contributing to food insecurity and risks to livelihoods.[110] Additionally, climate change acts as a magnifier of other existing threats, particularly to coastal communities who are vulnerable to sea level rise and extreme weather events.[111] One of the major impacts the ocean has on the earth's climate is evidenced by the fact that, historically, the ocean has absorbed 93% of the excess heat from the atmosphere caused by human GHG emissions[112] and has taken up about a quarter of the carbon dioxide (CO_2) from the atmosphere produced by burning fossil fuels.[113] These have become well-known and oft-cited figures as the basis for discussion of the chemical, biological, and physical changes that this absorption of heat and CO_2 cause.[114] This

[105] Y Sekerci and S Petrovskii, 'Mathematical Modelling of Plankton–Oxygen Dynamics Under the Climate Change' (2015) 77 Bulletin of Mathematical Biology 2325, 2347.
[106] C Turley and J-P Gattuso, 'Future Biological and Ecosystem Impacts of Ocean Acidification and Their Socioeconomic-Policy Implications' (2012) 4 Current Opinion in Environmental Sustainability 278, 281.
[107] ibid.
[108] ibid.
[109] Cooley and others (n 7).
[110] C Redgwell, 'Treaty Evolution, Adaptation and Change: Is the LOSC "Enough" to Address Climate Change Impacts on the Marine Environment?' (2019) 1 The International Journal of Marine and Coastal Law 1, 2; O Hoegh-Guldberg and others, 'The Ocean' in VR Barros and others (eds), *Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part B: Regional Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* (Cambridge University Press 2014); Pörtner and others (n 4).
[111] Redgwell (n 110) 3–4; Hoegh-Guldberg and others (n 110) 1662, 1698; Pörtner and others (n 4) SPM-25, SMP-35; Bruce Glavovic and others, 'IPCC 2022: Cross-Chapter Paper 2: Cities and Settlements by the Sea' in HO Pörtner and others (eds), *Climate Change 2022: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change* (Cambridge University Press 2021).
[112] Gulev and others (n 5) 349; Fox-Kemper and others (n 18) 1214.
[113] Canadell and others (n 6) 699; Pörtner and others (n 4) SPM-9.
[114] See, for example 'Ocean for Climate' (Because the Ocean 2019) <https://www.becausetheocean.org/wp-content/uploads/2019/10/Ocean_for_Climate_Because_the_Ocean.pdf> accessed 16 October 2019; G Galland, E Harrould-Kolieb and D Herr, 'The Ocean and Climate Change Policy' (2012) 12 Climate Policy 764; SR Cooley and others, 'Overlooked Ocean Strategies to Address Climate Change' (2019) 59 Global Environmental Change 101968; YA Eddebbar, ND Gallo and LB Linsmayer, 'The Oceans and the UN Framework Convention on Climate Change' (2015) 24 Limnology and Oceanography Bulletin

in turn means that the ocean is serving as a buffer against the global impact of CO_2 emissions,[115] protecting us by preventing more severe changes in the climate system than we are already experiencing.[116]

The ocean continues to absorb atmospheric CO_2 at a rate of about 23% annually.[117] Although this absorption of CO_2 and heat is acting to protect us from more severe climate changes, it comes at a cost. As the ocean continues this uptake, it becomes more carbon-saturated, the ocean is becoming warmer, its pH level and oxygen content are decreasing.[118] It is now virtually certain that the ocean's surface temperature will increase throughout the 21st century, although the rate of increase is dependent on future GHG emissions.[119] There are signs that the rate of absorption is slowing, indicating a decrease in the ocean's ability to act as a carbon sink and the fraction of emissions it can absorb is expected to decline as emissions continue to increase.[120] However, while there is broad understanding of the biogeochemical processes and changes that occur due to the ocean's absorption of vast amounts of CO_2 and heat, gaps in understanding and knowledge remain about the full extent of the impacts of these changes on marine organisms, ecosystems and the people who rely on them.[121] To be clear, the atmospheric CO_2 concentrations we are experiencing today thanks to anthropogenic activity would be about 55% higher than they are if the ocean did not act as a significant sink of atmospheric CO_2 and a buffer against climate change.[122]

Beyond the food, livelihood, trade, protection and other vital services the ocean provides to humans, the ocean also drives weather patterns, rainfall and atmospheric circulation

69; N Oral, 'Ocean Acidification: Falling between the Legal Cracks of UNCLOS and the UNFCCC Oceans and Climate Change Governance' (2018) 45 Ecology Law Quarterly 9.

[115] 'Ocean for Climate' (n 114) 14.

[116] Galland, Harrould-Kolieb and Herr (n 114) 765; R Baird, M Simons and T Stephens, 'Ocean Acidification: A Litmus Test for International Law Thematic Focus: Climate Change and the Law of the Sea' [2009] Carbon & Climate Law Review 459, 460.

[117] Canadell and others (n 6) 699.

[118] Eddebbar, Gallo and Linsmayer (n 110) 69.

[119] Fox-Kemper and others (n 18) 1223.

[120] Canadell and others (n 6) 677; Cooley and others (n 110) 3; Oral (n 110) 10.

[121] N Gruber, 'Warming up, Turning Sour, Losing Breath: Ocean Biogeochemistry under Global Change' (2011) 369 Philosophical Transactions of the Royal Society A: Mathematical, Physical and Engineering Sciences 1980, 1983; Fox-Kemper and others (n 18) 1314; Cooley and others (n 7) 11.

[122] VJ Fabry and others, 'Impacts of Ocean Acidification on Marine Fauna and Ecosystem Processes' (2008) 65 ICES Journal of Marine Science 414, 414; CL Sabine and others, 'The Oceanic Sink for Anthropogenic C[O.Sub.2]' (2004) 305 Science 369–370.

impacting the entire climate and weather system around the world.[123] The ocean's currents move heat around the world in what is often called a global "conveyor belt"[124] and changes to this system of ocean circulation could have severe impacts on the entire planet's climate.[125] In the icy waters of the Arctic, sea water is heavy enough because it is cold and dense with salt to sink deep toward the ocean floor and then race downhill into the deepening ocean and toward warmer southern waters.[126] This sinking begins the conveyor belt, the movement of which is aided by surface winds, that ultimately finds its way around the entire planet in a continuous loop of warming, rising water being carried back north and cooling and sinking, racing back down.[127] As temperatures increase and there is more ice melt in the cold polar regions of the world, that heavy cold and salty water will become increasingly fresh and, due to the absorption by the ocean of so much atmospheric heat, also warmer. If that sea water becomes too fresh and warm to sink deep to the ocean floor, the conveyor belt will necessarily slow[128] and that would likely trigger even more severe weather events, changing regional climates,[129] more severe sea level rise and flooding.[130] Research shows that the conveyor belt has begun slowing dramatically in the recent decades including a 15% drop in flow in just the last decade.[131]

This brief introduction to the ways in which the ocean and the earth's climate are closely interconnected and interdependent serves as a backdrop to the more detailed exploration below. In the next section each of the three major threats to the ocean from GHG emissions and climate change will be developed in more detail with a particular focus on how those changes impact marine organisms and ecosystems and, ultimately, the people reliant on them, which is to say: all of us.

2.2.2 Ocean-related climate harms and their impacts

As mentioned above, there are three main categories of impacts on the ocean from GHG emissions and climate change: acidification (through CO_2 uptake), warming (through

[123] A Brierley and MJ Kingsford, 'Impacts of Climate Change on Marine Organisms and Ecosystems' (2009) 19 Current Biology R602, R603; Cooley and others (n 7) 3.
[124] C Katz, 'Why Is an Ocean Current Critical to World Weather Losing Steam? Scientists Search the Arctic for Answers' [2019] *National Geographic Magazine*.
[125] Gulev and others (n 5) 355.
[126] Katz (n 124).
[127] ibid.
[128] Brierley and Kingsford (n 123) R604; Katz (n 124).
[129] Galland, Harrould-Kolieb and Herr (n 114) 765.
[130] Katz (n 124).
[131] ibid.

atmospheric heat absorption) and deoxygenation (oxygen loss). Each of these brings with it its own set of issues and consequences. Due to the fact that anthropogenic CO_2 emissions are the common cause for all three, they also act synergistically with and upon one other,[132] meaning that they are independent processes that are also mutually reinforcing.[133] Each is explored in detail in this section to develop the characteristics and the scale of the impacts of GHG emissions on the ocean in order to establish the underlying basis for the problem this thesis seeks to address.

Ocean Acidification

The first of the categories of oceanic impacts from GHG emissions is ocean acidification, which is a direct consequence of excessive anthropogenic CO_2 emissions.[134] It is unequivocal that there is a direct relationship between anthropogenic emissions of CO_2 into the atmosphere and a significant change in the chemical make-up of the world's ocean.[135] As mentioned above, the ocean absorbs vast quantities of CO_2 from the atmosphere which dissolves in seawater, forming carbonic acid which has a variety of consequences, including changes in pH levels, meaning the ocean is becoming more acidic, which in turn means that many forms of sea life are deprived of carbonate that is crucial to their existence.[136] The most recent report from the IPCC, AR6, establishes that atmospheric CO_2 concentrations are at their highest level in millions of years and the rate of increase over the last century is at least ten times faster than at any other time in human history.[137] In 2019, the world saw the highest annual CO_2 emissions ever recorded and, while the COVID-19 pandemic and its global lockdowns caused a reduction in 2020, emissions levels have bounced back and continue to rise.[138]

The IPCC first recognized ocean acidification as a consequence of anthropogenic CO_2 emissions in its 4th Assessment Report in 2007[139] and acidification is now happening at the

[132] Turley and Gattuso (n 106) 281.
[133] Gruber (n 121) 1983.
[134] Canadell and others (n 6) 714; Oral (n 114) 16; Pörtner and others (n 4) SPM-8, SPM-29.
[135] Brierley and Kingsford (n 123) R605; V Masson-Delmotte and others (eds), *IPCC, 2021: Summary for Policymakers. In: Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change* (Cambridge University Press 2021) 4.
[136] Canadell and others (n 6) 715; 'Ocean for Climate' (n 114) 14.
[137] Canadell and others (n 6) 676.
[138] ibid 687.
[139] IPCC, 'Climate Change 2007: Synthesis Report. Contribution of Working Groups I, II and III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change' 9.

highest rate experienced by the planet in the past hundreds of millennia (approximately 1 million tonnes of CO_2 per hour)[140] and will have still unknown consequences for the chemical makeup of the world's ocean for generations to come.[141] What is known is that the future magnitude of ocean acidification will be determined by the amount of CO_2 humans emit into the atmosphere going forward.[142]

While the surface of the ocean is where the initial dissolved carbonic acid is formed, it is then transported into the deeper ocean via currents and the ocean circulation discussed above, which means that all areas of the ocean are affected.[143] One of the important consequences is that the ocean, as it becomes more saturated with carbonic acid, will reduce its ability to continue drawing down and absorbing atmospheric CO_2 with increasing severity of consequences, including the ocean's ability to act as a carbon sink.[144] As a reminder, the ocean regulates global cycles of heat, precipitation and atmospheric elements, thereby modulating the entire global climate system.[145] A reduction in its ability to absorb CO_2 and act as a buffer against climate change would mean an acceleration of atmospheric GHG concentrations and heat with as yet unknown potential to reach tipping points and irreversible extreme climate change.[146]

Another significant and crucial effect of ocean acidification is that it impacts marine organisms in several ways. First, any organisms that rely on calcium carbonate to develop structures, and especially shells, are affected by decreased availability of these vital building blocks.[147] Similarly, metabolic physiology (the ability to regulate internal pH) is affected by a changing chemical makeup of the ocean and organisms from the smallest phytoplankton, starfish and urchins to giant coral systems have calcium-based structures that are severely impacted by higher acidity.[148] This includes organisms that form the basis of vast ocean ecosystems and the bottom of food webs, including molluscs, plankton and crustaceans

[140] Brierley and Kingsford (n 123) R606.
[141] Turley and Gattuso (n 106) 284; Pörtner and others (n 4) SPM-8; Canadell and others (n 6) 720.
[142] Gruber (n 121) 1987; Canadell and others (n 6) 677.
[143] Canadell and others (n 6) 714, 717–720; Cooley and others (n 7) 22; Pörtner and others (n 4) SPM-11; Gruber (n 121) 1988.
[144] Brierley and Kingsford (n 123) R606.
[145] Cooley and others (n 7) 3.
[146] Chen and others (n 95) 196–197, 202–203.
[147] Fabry and others (n 122) 414; Hoegh-Guldberg and others (n 110) 1706.
[148] Brierley and Kingsford (n 123) R607; Hoegh-Guldberg and others (n 110) 1675, 1677, 1678, 1671; Pörtner and others (n 4) SPM-8, APM-13; Cooley and others (n 7) s 3.2.2.3, 3.4.2.1.

whose development and survival is no less severely impacted by acidification.[149] Research has begun to show that the vast majority of calcium carbonate-dependent species demonstrate that ocean acidification affects their calcification ability and escalating impacts of CO_2 absorption by the ocean will disrupt vastly complicated food webs and life cycles.[150] As Dr Cooley of the Woods Hole Oceanographic Institution has said, 'The waters are becoming less and less welcoming for shelled organisms.'[151] It is important to recognize that these organisms make up the nourishment needed by the very fish humans consume in large quantities including cod, haddock, herring, flounder, and even tuna, salmon and swordfish.[152]

However, it is not just organisms at the base of ecosystems and food webs that are directly impacted by ocean acidification. Higher-level organisms were previously thought to be more resilient to these changes due to their more advanced internal pH regulation mechanisms.[153] There are two main bodily impacts of increased acidification in the ocean: hypercapnia, which affects internal tissues through over-accumulation of CO_2, and acidosis, which means bodily fluids are increasingly acidic.[154] Recent research now demonstrates that increased acidity in the ocean has begun to affect these higher-level organisms in their larval stages with the potential for severe to lethal damage to internal organs[155] and, via acidosis, interference with neurotransmitter functions which can have dramatic impacts on sensory preferences.[156] This means that animals may mis-identify or not react to odours, including those of prey, and it may affect their reproductive and feeding behaviours as well.[157]

Given that there are regional differences and constant movement in the ocean, another important impact to consider is that, while many species can move to new areas in response to the changing chemical make-up of their environment, sedentary species such as corals and many shelled organisms cannot.[158] The shift of species however also means a shift in the demographic makeup of ecosystems, potentially affecting growth, size, reproduction, food

[149] Cooley and others (n 7) 94–96; Baird, Simons and Stephens (n 116) 461–462; Hoegh-Guldberg and others (n 110) 1681.
[150] Cooley and others (n 7) 22–23, 83, 90–92.
[151] 'The Socioeconomic Costs of Ocean Acidification' <https://www.whoi.edu/oceanus/feature/the-socioeconomic-costs-of-ocean-acidification/> accessed 3 December 2019.
[152] ibid.
[153] Turley and Gattuso (n 106) 281.
[154] Baird, Simons and Stephens (n 116) 462.
[155] Turley and Gattuso (n 106) 281.
[156] ibid.
[157] Cooley and others (n 7) 99–101, 106.
[158] Brierley and Kingsford (n 123) R605; Hoegh-Guldberg and others (n 110) 1709; Cooley and others (n 7) s 3.5.

availability, and familiarity with predatory species, etc., meaning resistance and resilience of entire ecosystems and populations could be affected.[159] These potentially dramatic impacts on the various life stages of marine organisms and species and potential shifts in nutrient distribution can dramatically impact human food consumption in the form of declined fisheries yields.[160] As mentioned earlier, seafood is an important source of protein for about 3 billion people globally, and provides employment for 38 million people worldwide.[161]

Thus, ocean acidification will potentially have dramatic consequences for marine life but could also drastically alter how humans interact with the ocean, especially when it comes to food sources and other goods and services provided by the ocean[162] by affecting marine organisms, the ecosystems they belong to and the humans who depend on them.[163]

Gaps in knowledge remain but ever evolving science is becoming more sophisticated especially as it pertains to the long-term effects of ocean acidification in general and specifically on large coral reef systems.[164] Aside from being the most species-rich, diverse habitats and economically important ecosystems[165] on earth, coral reefs provide especially important protection for coastal communities – nearly 200 million people – from extreme weather events and the storm surges and waves that come with them.[166] Corals are species that rely heavily on calcium carbonate to build their structures and to function, which acidification is rapidly breaking down, and many reef systems are already severely compromised and it is expected that by 2050, corals will become increasingly rare.[167]

---

[159] Brierley and Kingsford (n 123) R608; Cooley and others (n 7) 99–107; Hoegh-Guldberg and others (n 110) 1678–1679, 1701, 1714; Pörtner and others (n 4) SPM-12.

[160] Cooley and others (n 114) 4; Hoegh-Guldberg and others (n 110) 1701, 1711; SK Moore and others, 'Impacts of Climate Variability and Future Climate Change on Harmful Algal Blooms and Human Health' (2008) 7 Environmental Health S4; TJ Moore and others, 'Exploring Ship Traffic Variability off California' (2018) 163 Ocean & Coastal Management 515; Pörtner and others (n 4) SPM-13, SPM-25, SPM-31; Cooley and others (n 7) 105.

[161] Turley and Gattuso (n 106) 282.

[162] Cooley and others (n 7) 107–108; ER Harrould-Kolieb and D Herr, 'Ocean Acidification and Climate Change: Synergies and Challenges of Addressing Both under the UNFCCC' (2012) 12 Climate Policy 378, 380.

[163] 'The Socioeconomic Costs of Ocean Acidification' (n 151); Hoegh-Guldberg and others (n 110) 1710–1715; Pörtner and others (n 4) SPM-31; Cooley and others (n 7).

[164] Cooley and others (n 7) 44; Baird, Simons and Stephens (n 116) 461.

[165] Brierley and Kingsford (n 123) R610.

[166] F Talbot and C Wilkinson, 'Coral Reefs, Mangroves and Seagrasses: A Sourcebook for Managers' (Australian Institute of Marine Sciences 2001) 16; WWF, 'Living Planet Report - 2018: Aiming Higher' (WWF 2018) 54–55; Cooley and others (n 7) 41–44.

[167] Moore and others (n 160) R610; Hoegh-Guldberg and others (n 110) 1671,1675, 1710, 1715; Pörtner and others (n 4) SPM-26, SPM-29, SPM-35.

It is estimated that coral reef systems provide around US$9 billion in protective functions annually.[168] Additionally, the estimated economic value from reef-related activities, including fishing, tourism, and livelihood provisions is around US$30 billion annually, while the economic damage to coral reefs from ocean acidification is expected to reach as high as US$870 billion annually by 2100[169] and if current rates of emission continue, all coral reefs with be affected in some way by 2050.[170] In other words, as coral reefs continue to decline, millions of people will lose livelihoods, ways of life and protection from extreme weather events with potentially catastrophic and life-ending results.

As established in AR6, the ocean's uptake of CO_2 is very likely to increase with continued anthropogenic emissions through the end of the 21st century[171] and it is virtually certain that this also means that ocean acidification will continue to rise.[172] This means that the impacts of ocean acidification described here will continue to intensify. As detailed in this section, marine organisms' ability to reproduce, grow, and thrive are significantly affected through the change in the chemical makeup of the ocean due to its increased acidity, with substantial consequences for ecosystems, human lives and the global climate. Acidification is therefore established as one of the main drivers of risk from GHG emissions, particularly CO_2.

In the next section, another crucial risk to the ocean, and therefore also for the global climate, ocean warming, is explored in similar detail.

Warming

The second category of oceanic impacts from anthropogenic GHG emissions is ocean warming. Similar to acidification, the warming of the ocean has multiple consequences with devastating impacts on marine ecosystems and ultimately human life. These include the ocean's decreased ability to hold oxygen, increased ice melt and more intense stratification. As mentioned above, the ocean has absorbed approximately 93% of the excess heat caused

[168] Turley and Gattuso (n 106) 282; 'The Socioeconomic Costs of Ocean Acidification' (n 151).
[169] Turley and Gattuso (n 106) 282.
[170] R Warner, 'Preserving a Balanced Ocean: Regulating Climate Change Mitigation Activities in Marine Areas beyond National Jurisdiction' (2007) 14 Australian International Law Journal 99, 99; Cooley and others (n 7) 44.
[171] JY Lee and others, 'IPCC 2021: Future Global Climate: Scenario-Based Projections and NearTerm Information' in V Masson-Delmotte and others (eds), *Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change* (Cambridge University Press 2021) 557.
[172] Canadell and others (n 6) 720.

by anthropogenic GHG emissions[173] and that temperature increase, in the form of ocean warming, has a major effect on other ocean-related processes and is considered one of the most pervasive human impacts on the marine environment.[174] This section explores these impacts in more detail.

Most biochemical and physiological processes are highly dependent on temperature.[175] For example, when temperature rises, organisms – especially higher-level organisms – need more oxygen.[176] Ocean warming, however, also causes a decrease in the ocean's capacity to hold oxygen[177] (ocean deoxygenation will be discussed in more detail below), resulting in the situation that, as the ocean warms, less oxygen is available while, simultaneously, demand increases.

In the high latitudes, when sea ice melts due to global warming, this causes a physical change in the surface from highly heat-reflective ocean ice to heat-absorbing dark ocean water, creating a dangerous feedback loop of ever more warming causing more rapid ice melt, causing more heat to be absorbed by the ocean, causing more ice melt, etc.[178] Ice is slow to regrow as warming water is slower to freeze, escalating the vicious cycle.[179] This has potentially major implications for the previously discussed conveyor belt ocean circulation, which in turn could drive large atmospheric changes, potentially triggering more extreme weather such as heatwaves and extreme storms.[180] AR6 reports that, over the 21st century, regardless of emissions scenario, the vast majority (83%) of the ocean's surface will likely continue to warm[181] and the Arctic ocean will consistently experience completely ice free summers well before 2050.[182] This increased temperature in the global oceans results in marine heatwaves which are associated with mass mortality in marine ecosystems, dramatic loss of biodiversity, collapse of regional fisheries and the risk of sudden shifts in ecosystem functionality.[183] Marine heatwaves have doubled in frequency and have increased in both

[173] Gulev and others (n 5) 349.
[174] Brierley and Kingsford (n 123) R604.
[175] Gruber (n 121) 1986; Hoegh-Guldberg and others (n 110) 1680.
[176] Gruber (n 121) 1991.
[177] ibid 1983.
[178] ibid 1984; Brierley and Kingsford (n 123) R609; Hoegh-Guldberg and others (n 110) 1678, 1681; Pörtner and others (n 4) SPM-19, SPM-21.
[179] Katz (n 124).
[180] ibid; Pörtner and others (n 4) SPM-23.
[181] Fox-Kemper and others (n 18) 1214.
[182] ibid 1215.
[183] Cooley and others (n 7) 86.

intensity and duration since the 1980s, a trend that will continue throughout the 21st century.[184]

Warming also causes increased stratification which affects more substantial changes in the ocean's biochemical makeup and with it, entire ecosystems. Stratification is the separation into distinct layers, each with different properties (chemical make-up, oxygen content and temperature for example) which act as a barrier to mixing of the layers of water.[185] Increased stratification reduces and can ultimately completely inhibit primary production,[186] resulting in anoxia (loss or lack of oxygen). Increased stratification coupled with warming temperatures in the ocean tends to slow ocean circulation[187] which in turn has potential impacts on entire ecosystems through inhibited primary production.[188] Stratification, particularly in the upper levels of the ocean, has increased significantly since publication of the IPCC's 2019 Special Report on the Ocean and Cryosphere in a Changing Climate[189] (SROCC) due to increased surface temperature globally.[190] Another important impact of ocean warming and increased stratification is that it can reduce the ocean's ability to absorb CO_2 and other atmospheric GHGs, which in turn increases the atmospheric concentrations of anthropogenic emissions.[191]

Just as temperature impacts biochemical and physiological processes, biological functions are also highly temperature-dependent and can affect things like muscle development and reproductive output.[192] Even small, non-lethal changes in temperature can impact physical functions in the smallest marine organisms causing mortality if basic but vital functions are affected, for example speed, which can dramatically change predator-prey dynamics.[193] If predator-prey dynamics shift, food chains begin to break down and habitats shift in an ever-

[184] Fox-Kemper and others (n 18) 1227–1228.
[185] See generally, CB Miller, PA Wheeler, *Biological Oceanography* (Wiley-Blackwell) <https://www.dawsonera.com/abstract/9781118223178> accessed 18 February 2020.
[186] Primary production is the process of turning inorganic compounds into organic compounds through conversion (via photosynthesis) of CO_2 and hydrogen into simple sugars and other organic molecules. All life is based on organic compounds and primary producers are the basis of all food webs. See generally DM Sigman, 'The Biological Productivity of the Ocean' (2012) 3 Nature Education.
[187] IUCN, 'Executive Summary - Ocean Deoxygenation: Everyone's Problem' xii <portal.iucn.org/library/sites/files/documents/2019-048-En.pdf> accessed 13 January 2020.
[188] Hoegh-Guldberg and others (n 110) 1672–1673, 1676–1677; Pörtner and others (n 4) SPM-9-10.
[189] Pörtner and others (n 4).
[190] Fox-Kemper and others (n 18) 1215.
[191] Cooley and others (n 7) 108.
[192] Brierley and Kingsford (n 123) R607–R608.
[193] ibid.

escalating chain reaction. The combination of elevated ocean acidity and reduced oxygen levels can trigger a reduction in the thermal tolerance of marine organisms which can add to the stressors that result in shifts in species diversity, habitat loss or change, and ultimately entire ecosystems.[194]

Of course, ocean warming, and with it melting sea ice, contributes to rising sea levels, increased extreme storms and shifts in weather patterns which bring with it a host of other consequences and impacts, including threats to coastal communities and their livelihoods through increased flooding and saltwater intrusion. Ocean warming contributes to sea level rise in two ways. First, higher temperatures cause sea water to become less dense, meaning it increases in volume per mass, a process called thermal expansion.[195] Second, lower salinity (through increased fresh water from melting sea ice and glaciers and escalated precipitation from more extreme weather events) lowers density, further increasing its volume, not to mention the large amounts of additional liquid being introduced to the ocean via these processes.[196] Sea level rose more significantly in the 20th century than in any other century over the last three millennia, with thermal expansion contributing 38% of the additional mass and glacier melt contributing 41%.[197] It is virtually certain that ice loss and thermal expansion will continue to cause global mean sea level to rise throughout the 21st century.[198]

Saltwater intrusion on land, particularly into areas that were previously dominated by fresh water, has potentially profound impacts on agriculture, access to drinking water, coastal protection, displacement, and food security.[199] Very few crops can survive and grow in conditions of high salinity.[200] When agricultural fields are inundated with saltwater, especially if that intrusion begins to occur regularly, the soil composition begins to change: saltwater brings with it large quantities of calcium and magnesium which impact the acidity of the soil, and sodium which can cause the soil to become more dense and clay-like which in turn reduces water filtration and drainage in the soil.[201] In addition to potentially inhospitable soil,

[194] Gruber (n 121) 1991.
[195] Fox-Kemper and others (n 18) 1220–1221.
[196] ibid.
[197] ibid 1287–1288.
[198] ibid 1216–1217.
[199] K Tully and others, 'The Invisible Flood: The Chemistry, Ecology, and Social Implications of Coastal Saltwater Intrusion' (2019) 69 BioScience 368, 368; Cooley and others (n 7) 115, 125; Hoegh-Guldberg and others (n 110) 1670.
[200] Tully and others (n 199) 373–374.
[201] ibid 371.

seeds require water to germinate and if that water is high in salt, which essentially draws water out of cells,[202] the effect is devastating, putting agricultural production at significant risk.

There are a variety of ways in which saltwater can find its way into surface (fresh) water and groundwater. Sea-level rise is a major contributor as are extreme weather events like storms and hurricanes; but more incremental intrusion can happen along coastal landscapes that have been altered by infrastructure-related alterations (for example for navigation or irrigation purposes), or have been subject to fresh water extraction for human consumption (for example due to prolonged drought) or irrigation.[203] These alterations can accelerate saltwater intrusion that would otherwise occur more slowly due to sea-level rise.[204] The consequences can be extremely dire. Infrastructure and water extraction that was intended to aid with irrigation, promote agriculture and to provide much needed drinking water, can now have the reverse impact of facilitating increased salinization.[205] Drinking water is especially at risk. Approximately 40% of the world's human population relies on drinking water that is sourced from within about 100km of a coastline[206] and even small increases in the salinity of drinking water can cause hypertension and stroke.[207]

Sea-level rise and the saltwater intrusion it brings, are both responsible for reducing habitable coastal areas and increasingly causing human displacement, particularly in small island states.[208] One final danger worth noting here is the erosion and loss of coastal forests, which provide protection to coastal communities, via both slow forest retreat due to incremental sea-level rise and die-offs due to single storm events that deposit high levels of salt into previously fresh water inundated coastal forests.[209]

The second category of impacts on the ocean from anthropogenic GHG emissions, ocean warming, includes significant risks including destruction of habitats, biodiversity loss, disruption of food webs both in the ocean and on land, along with driving more intense weather patterns and causing sea level related human migration. Ocean warming also

[202] ibid.
[203] ibid 369.
[204] ibid; Glavovic and others (n 111) 6, 8–10.
[205] Tully and others (n 199) 369.
[206] ibid.
[207] ibid 369–370.
[208] ibid 370; Glavovic and others (n 111) 10; Cooley and others (n 7) 126; Hoegh-Guldberg and others (n 110) 1669, 1708–1709; Pörtner and others (n 4) SPM-18-19, SPM-24, SPM-32-34.
[209] Tully and others (n 199) 373.

impacts the other categories of impacts from GHG emissions by reducing the ocean's ability to absorb both CO_2 and oxygen. The next section explores the final of the three categories, ocean deoxygenation.

Deoxygenation

Loss of oxygen in the ocean – deoxygenation – is the third climate change induced impact on the ocean that is highlighted in this section. As mentioned above, the ocean's capacity to store dissolved oxygen is directly impacted by ocean warming.[210] The two main processes that affect ocean oxygen content are that increased temperature impacts the solubility of oxygen and warming-induced stratification influences the movement of oxygen into the deeper ocean.[211] It follows from this that the rate of deoxygenation in the ocean tends to scale with the rate of warming.[212] Indeed, as was reported in SROCC and in AR6, the ocean has very likely lost up to 3.3% of its dissolved oxygen in the top layer which is the area of most intense ocean warming.[213]

Deoxygenation is a fairly new area of focus and the IUCN, in its 2019 report 'Ocean deoxygenation: Everyone's problem'[214] is careful to highlight that the science is incomplete and that even this new report is 'probably an underestimation of what is happening'[215] in the oceans. In AR6, the IPCC builds on SROCC to provide updated detail in a dedicated, albeit brief, section focusing specifically on the evolving science of deoxygenation.[216] What *is* known is that the current extent of deoxygenation attributable to human activity is so extensive that it is already altering the balance of life in the ocean[217] and is responsible for areas of such low oxygen that entire areas – oxygen minimum zones – of the ocean are becoming inhospitable to multicellular life.[218] Many species of fish and crustaceans are unable to tolerate low oxygen,[219] krill swarms are potentially oxygen-limited and fish schooling behaviour is known to be impacted by changes in oxygen levels.[220] Organisms react

[210] Canadell and others (n 6) 714; Pörtner and others (n 4) SPM-22; Hoegh-Guldberg and others (n 110) 1675, 1680, 1710, 1714.
[211] Gruber (n 121) 1983; Canadell and others (n 6) 714.
[212] Gruber (n 121) 1988.
[213] Canadell and others (n 6) 717.
[214] IUCN (n 187).
[215] ibid x.
[216] Canadell and others (n 6) s 5.3.
[217] IUCN (n 187) x; Canadell and others (n 6) 714.
[218] Brierley and Kingsford (n 123) R607; Cooley and others (n 7) 35.
[219] Gruber (n 121) 1989.
[220] Brierley and Kingsford (n 123) R607.

to deoxygenation in a variety of ways, including changes in physiology and behaviours,[221] for example moving to new habitats to avoid low oxygen levels which can affect predator/prey relationships if group behaviour changes dramatically.[222] Sedentary species, however, do not have that option and must either adapt to lower oxygen levels or die.[223] Feeding behaviour can also be impacted which can affect a species' ability to complete their life cycle because feeding affects everything from growth[224] to reproduction.[225] Deoxygenation to levels that fall under metabolic requirements thus limits the available habitat[226] for a variety of species and causes migration and shifts in species which could have broader impacts on entire ecosystems.[227]

In general, focus on the effects of climate change on the ocean lags behind research focused on land-based impacts[228] and, as mentioned earlier, ocean deoxygenation is a relatively new area of study even in oceanographic climate change research, and thus there are gaps in knowledge, particularly about how human communities are – and will be – affected.[229] Interestingly, the IPCC's most recent Assessment Report, AR6 includes dedicated chapters on the ocean and coastal ecosystems in the reports by both Working Group I[230] (the physical science basis) and Working Group II[231] (impacts, adaptation and vulnerabilities), but not in the report by Working Group III,[232] which is dedicated to the mitigation of climate change.

The most obvious way to quantify impacts on humans is through an economic lens as has been done by the IPCC in its assessment reports. However, the benefits derived from the ocean in the form of ecosystem services go far beyond what can be quantified in economic terms, including critically important issues relating to health, heritage, culture, community and society.[233] Conservatively, the ocean provides an estimated US$2.5 trillion in benefits as

[221] IUCN (n 187) xi; Cooley and others (n 7) 31.
[222] Brierley and Kingsford (n 123) R607.
[223] ibid.
[224] Cooley and others (n 7) 39; Hoegh-Guldberg and others (n 110) 1678.
[225] IUCN (n 187) xi; Cooley and others (n 7) 39.
[226] IUCN (n 187) xii.
[227] Cooley and others (n 7) 31.
[228] H Bassett, A Stote and E Allison, 'Ocean Deoxygenation: Impacts on Ecosystem Services and People' 487 <https://portals.iucn.org/library/node/48892> accessed 13 January 2020; Hoegh-Guldberg and others (n 110) 1679, 1710, 1713.
[229] Bassett, Stote and Allison (n 228) 487.
[230] IPCC, 2021 (n 76).
[231] IPCC, 2022, *IPCC AR6* (n 76).
[232] IPCC, 2022, *IPCC 2022: Mitigation of Climate Change AR6 WGIII* (n 76).
[233] Bassett, Stote and Allison (n 228) 489; Hoegh-Guldberg and others (n 110) 1699–1700; Pörtner and others (n 4) SPM-31, SPM-37.

a "gross marine product"[234] to humans globally but this does not include intangible or unquantifiable benefits. While benefits like food production, tourism,[235] transportation and trade are fairly easy to quantify, benefits such as primary production and atmospheric carbon absorption by the ocean are not. There are a host of additional services the ocean provides to humans that are not easily quantified as monetary gains: the importance of the ocean and its ecosystems for cultural, historic, and religious purposes, the ocean's ecosystems' protection of coastal areas against extreme weather and flooding events, biodiversity and habitat provision, just to name a few.[236] Ocean deoxygenation thus contributes to the dangerous risks and impacts of GHG emissions and climate change on humans in a very real and tangible way by reducing important protections and ecosystem services.[237]

As the detailed exploration in this section demonstrates, it is clear that ocean warming, deoxygenation, and acidification, along with their myriad cascading effects, interconnections and mutually reinforcing aspects, combine to create multiple stressors which are altering the composition of the ocean, marine ecosystems and the benefits they provide to humans. Ocean acidification, warming and deoxygenation contribute to population declines, habitat loss, species extinction, destruction and disruption of food webs, and may impact the global climate and weather systems in ways that we may very well be unprepared for, with potentially dramatic negative consequences.[238] The next section explores the IPCC's reporting in its most recent AR6 on the sufficiency of State action to address GHG emissions and rising atmospheric temperatures, which this section demonstrated are the direct drivers of the most dangerous impact on the ocean.

2.3 Adequacy of State action

Now that the science underlying the most significant ocean-related risks from GHG emissions and climate change has been detailed, it is important to establish an accurate picture of the measures states are taking to address the drivers of these problems. The research question this thesis seeks to answer concerns the extent to which individuals can invoke due diligence obligations under the international climate change regime and the law of the sea regime to hold their governments accountable in national courts for *failing to adequately reduce GHG*

[234] Bassett, Stote and Allison (n 228) 490.
[235] Hoegh-Guldberg and others (n 110) 1704.
[236] Bassett, Stote and Allison (n 228) 489–490.
[237] ibid 493.
[238] Cooley and others (n 114) 1; Cooley and others (n 7) 3.

emissions, causing ocean-related climate harms. The last part of this research question (ocean-related climate harms) was established in the previous section of this chapter. Before delving into the legal questions that are the subject of the next three chapters, this section examines the most up-to-date reporting on the adequacy of state actions to reduce GHG emissions and limit climate change.

The previous section of this chapter relied heavily on the contributions of the IPCC's Working Groups I and II to establish the physical science and the impacts of GHG emissions and rising atmospheric temperatures on the ocean and the global climate. This section relies heavily on the final report in the IPCC's 6th Assessment Cycle, that of Working Group III, which reports on the mitigation of climate change. Working Group III in its report examines the actions state have taken and pledge to take through their most recent nationally determined contributions (NDCs), and whether those actions are sufficient to meet the Paris Agreement's goal of holding the atmospheric temperature to well below 2°C with efforts to limit the temperature increase to 1.5°C.

The emissions considered in AR6 and other reports, such as the Emissions Gap Report prepared by UNEP, rely on past emissions, current state policies and most up-to-date NDCs (up to October 2021) and include detailed information on emissions by sector, industry, region, type of country (developing or developed) and type of GHG. For purposes of this thesis, a broad view is taken that considers overall global GHG emissions, with a focus primarily on CO_2 and the cumulative progress by states toward holding the temperature increase within the Paris Agreement limits. While non-CO_2 GHGs have an important role to play, the focus on CO_2 here is based on the outsize relationship between CO_2 and atmospheric temperature, ocean acidification, warming and deoxygenation, along with other earth systems.[239] This focus is consistent with the previous section of this chapter and provides the most accurate picture at a global level due to its long-term impacts and its dominance among all GHGs in impacting past and future climate change.[240] The exploration here therefore does not include a more nuanced exploration of each industry, sector, GHG, or country, but rather focuses on establishing the broader problem this thesis seeks to address. This section first considers cumulative (historic) emissions to date before examining the level of current emissions. It then explores proposed policies going forward based on

[239] Riahi and others (n 3) 31.
[240] ibid 29.

states' NDCs and mitigation pathways to determine whether states' actions are sufficient to meet the Paris temperature goals and limit the most severe future harms outlined in section 2.2 above.

2.3.1 Cumulative emissions, current policies and projected mitigation pathways

In order to determine the adequacy of state actions to address climate change, lower GHG emissions and meet the Paris Agreement's long-term temperature goals, it is first necessary to establish a picture of the starting point for discussion. This subsection examines past and cumulative emissions to determine this starting point so that the subsequent exploration can build on this established understanding of where we are now.

As has been mentioned several times in this chapter, the IPCC's AR6 builds on previous reports, particularly on AR5 and the Special Report on 1.5°C[241] (SR1.5). As the scientific knowledge advances and the timescales of evidence that can be included grows, each successive report is more nuanced and detailed in its scientific rigor. AR6 is thus more robust in its evidence, modelling and understanding of the underlying science than any previous IPCC report.[242] AR5 focused mainly on the timeframe between 1970 and 2010 and AR6 focuses particularly on the most recent decade between 2010 and 2019.[243] Average emissions on a decadal scale were higher in the most recent decade than in any other decade on record.[244] Cumulatively, emission from 2010 to 2019 were at the same scale as the entire remaining carbon budget available to meet a 1.5°C temperature increase.[245] Indeed, if the emissions levels in 2019 were continued without change, it would only take between 2 and 15 years to emit enough CO_2 to lead to a temperature increase of 1.5°C (approximately 25 years to reach 2°C).[246] To put this in context, of the cumulative CO_2 emitted by humans over the past 169 years, between 1850 and 2019, 17% of emission occurred between 2010 and 2019.[247]

Based on the cumulative emissions since 1850, and particularly the most recent decade, if current policies remain in place, GHG emissions will continue to rise, meaning that the remaining carbon budget available to states to keep the temperature increase below 2°C will

[241] IPCC, 2018 (n 50).
[242] Riahi and others (n 3) 73.
[243] Dhakal and others (n 3) 8.
[244] ibid 20.
[245] ibid 23.
[246] ibid.
[247] ibid.

be exhausted by 2030.[248] Further, the likelihood of keeping the temperature increase to 1.5°C is quickly vanishing.[249] Since publication of SR1.5 in 2018, the likelihood of keeping the global atmospheric temperature increase to 1.5°C has decreased significantly due to the high GHG emissions during the most recent decade, which also indicates higher near-term emissions (leading up to 2030) and, logically, higher cumulative CO_2 emissions.[250] Instead, if current policies maintain in place unchanged, the global temperature increase will reach between 2.4°C and 3.5°C at the end of the 21st century.[251]

The assessments in AR6 include a detailed examination of the most up-to-date NDCs submitted by states to the UNFCCC. This includes current NDCs submitted up to October 2021.[252] AR6 reports that if the mitigation pathways that are included in current NDCs are followed through to 2030, it is no longer possible to limit global warming to 1.5°C without significantly overshooting this temperature and subsequent heavy reliance on negative CO_2 emissions.[253] In fact, only 30% of current NDCs include mitigation pathways that would limit the global temperature increase to 2°C or below and reach net zero carbon emissions within the 21st century.[254] At the time SR1.5 was published, it found that existing mitigation pathways 'would not limit global warming to 1.5°C even if supplemented by very challenging increases in the scale and ambition of emissions reductions after 2030'.[255] AR6, with its more robust evidence and modelling (and the benefit of updated current NDCs) confirms this finding and adds that the likelihood of limiting warming to 2°C is also becoming less likely.[256] Overshooting temperature limits, while expected in most modelled scenarios throughout the IPCC's reporting, has significant consequences and would impact the climate system beyond 2100, including potentially passing dangerous tipping points.[257] Long-term impacts of temperature overshoot would likely include continued sea level rise, permafrost carbon

[248] Riahi and others (n 3) 69.
[249] ibid 4.
[250] ibid 37–38.
[251] ibid 26.
[252] ibid 4.
[253] ibid 43, 68.
[254] ibid 39–40.
[255] V Masson-Delmotte and others (eds), 'IPCC, 2018: Summary for Policymakers. In: Global Warming of 1.5°C. An IPCC Special Report on the Impacts of Global Warming of 1.5°C above Pre-Industrial Levels and Related Global Greenhouse Gas Emission Pathways, in the Context of Strengthening the Global Response to the Threat of Climate Change, Sustainable Development, and Efforts to Eradicate Poverty' 18.
[256] Riahi and others (n 3) 73.
[257] Lee and others (n 171) 617.

release, loss of ice sheets, continued acidification and warming of the ocean, and could make a reversal of overshoot impossible.[258]

The evaluation of current NDCs, including 105 updated NDCs, does demonstrate that, compared to states' first NDCs, progress has been made and emissions pathways in current NDCs include reductions.[259] However, a significant gap remains between what states are pledging and what is needed to meet the Paris temperature goals. The most recent Emissions Gap Report from UNEP[260] defines emissions gap as follows:

> [T]he difference between projected global greenhouse gas emissions assuming full implementation of the mitigation pledges that countries have made for 2030, and emissions under least-cost pathways consistent with the Paris Agreement's long-term goal of limiting global average temperature increase to "well-below 2°C" and pursuing efforts to limit it to 1.5°C compared with pre-industrial levels.[261]

Based on current NDCs, both AR6 and the UNEP in its 2021 Report demonstrate a remaining significant emissions gap that confirms a 90% likelihood that the emission pathways in latest NDCs would lead to a temperature increase of 3.3°C by the end of the 21st century.[262] In other words, given the size of the remaining gap between emissions pathways in the NDCs and those necessary to limit the temperature increase to the Paris Agreement's goals, it is clear that current NDCs are simply inadequate.[263]

In sum, based on the most up-to-date NDCs and the best available science, building on previous reporting by the IPCC, it is clear that States are not taking sufficient actions to reduce GHG emissions, and particularly CO_2 emissions, to be on a trajectory to reach the Paris Agreement's temperature goals.

2.4 Conclusions

This chapter has established that GHG emissions, and particularly CO_2 emissions, have significant harmful impacts on the ocean and the marine environment in the form of ocean acidification, ocean warming and deoxygenation. These, in turn, lead to sea level rise, significant risk of species extinction, disruption of food webs, increased severe weather events and decreased protection for coastal communities, loss of livelihoods and homes and

[258] ibid 618.
[259] Lecocq and others (n 9) 7.
[260] UNEP (n 8).
[261] ibid 29.
[262] ibid 36.
[263] Lecocq and others (n 9) 23–24.

escalating climate disruption on a global scale. It has further established that the actions states have taken in the past and pledged through their current NDCs to take in the future are inadequate to meet the Paris Agreement's temperature goals without risking significant overshoot which exacerbates the potential of dangerously high atmospheric temperatures by the end of the 21st century. This chapter therefore lays the foundations on which the following chapters build in order to answer the legal aspects of the research question of this thesis: to what extent can individuals invoke due diligence obligations under both the UNFCCC and UNCLOS to hold their governments accountable in national courts for failing to adequately reduce GHG emissions, causing ocean-related climate harms?

The next chapter explores the development of due diligence obligations in general international law and whether, and if so how, national courts can rely on international law in domestic legal challenges. In the following chapters, the specific due diligence obligations under the UNFCCC and UNCLOS will be explored, along with an analysis of national systemic climate change cases. Ultimately, this thesis seeks to address the problem of continued devastating impacts on the ocean from anthropogenic GHG emissions. In the words of Jane Lubchenco, former administrator of the U.S. National Oceanic and Atmospheric Administration and the first U.S. Science Envoy for the Ocean, the ocean 'is not too big to fail, nor is it too big to fix. It *is* too big to ignore.'[264]

[264] J Lubchenco and SD Gaines, 'A New Narrative for the Ocean' (2019) 364 Science 911, 911 (*emphasis added*).

Chapter 3: Due Diligence and the Role of International Law in National Courts

The important issues raised in chapter 2 – ocean acidification, warming and deoxygenation – are caused by the direct and indirect effects of climate change and are mutually reinforcing, their multiplying effects and impacts greater than the sum of their parts.[265] It is clear from the science that limiting global warming to below 2˚C is crucial, and limiting CO_2 emissions severely is absolutely vital, to the survival of humanity.[266] Even if the bare minimum temperature goal (well below 2°C) is reached, we will have to find ways of living with extraordinary sea level rise and the extinction of some of the world's most important coral reef species, just to name two of the most severe problems.[267] The implications for humans are far-reaching and devastating and range from food insecurity, loss of home and heritage, loss of livelihood and storm resiliency to loss of life. Yet, after decades of increasingly sophisticated scientific evidence and discussions and commitments by the international community to address these now severe problems, emissions continue to rise and the ocean is becoming ever more inhospitable to life. How, then, can states' international obligations be employed to solve these problems?

The question this thesis seeks to answer is to what extent individuals can invoke due diligence obligations under both the UNFCCC and UNCLOS to hold their governments accountable in national courts for failing to adequately reduce GHG emissions, causing ocean-climate related harms. This chapter addresses two important aspects of this overarching question. The first part explores due diligence in international law and the second analyses how national courts treat international law.

This chapter first develops a comprehensive understanding of due diligence and states' related obligations in general international law, and what constitutes a breach of a state's due diligence obligations. A broad range of international law has contributed to the development of due diligence, including human rights law, humanitarian law, investment law, and others. International environmental law in particular has been at the forefront of

[265] J Harrison, 'Introduction', *Saving the Oceans Through Law: The International Legal Framework for the Protection of the Marine Environment* (Oxford University Press 2017) 2.
[266] Masson-Delmotte and others (n 255); IPCC, 2022, *IPCC 2022: Mitigation of Climate Change AR6 WGIII* (n 76).
[267] BG Guilloux, 'Ocean and Climate Regime Interactions' (2020) 34 Ocean Yearbook Online 43, 46; Pörtner and others (n 4).

developing due diligence obligations in international law. This section therefore includes a detailed exploration of case law and international treaty language in order to develop a general description of the baseline of due diligence-related obligations in international law. Broadly, due diligence is a determining factor of the level of care a state is expected to take in the performance of its obligations. The first section explores six interrelated elements that go into determining whether a state's actions are appropriately diligent: the level of risk of harm, flexibility, objectivity, the continuous need for diligence, knowledge of the risk of harm involved, and reasonableness. Importantly, due diligence is a criterion for determining whether a state has breached an international obligation by its failure to act, rather than by a positive action taken by the state.[268] The first section of the chapter thus includes an exploration of evidence a court may consider when determining whether a state has breached its due diligence obligations.

Former ICJ Judge Sir Kenneth Keith pointed out that, most of the time, international law operates through national institutions, including, particularly, national courts.[269] This necessarily leads to an exploration of national courts' application of, or reliance on, international law. This is the subject of the second section of this chapter, which explores how national courts access and use international law in domestic decisions, and whether national courts can rely on international due diligence obligations to hold a state accountable for harms faced by its own citizens. First, this section of the chapter briefly explores the shift in international law from primarily governing horizontal relationships between states to increased significance for individuals. In a more globalised world, the subject matter of international law includes issues that impact individuals such as, for example, human rights law, humanitarian law and increasingly also climate law. Not only the subject matter but, importantly, the consequences of breaching international law obligations can directly impact individuals. For example, a state's failure to take adequate action to address climate change (as required by international climate law) directly impacts individuals (the consequences of which were described in detail in chapter 2). This is precisely the scenario underlying the whole of this thesis.[270]

[268] J Kulesza, 'Introduction', *Due Diligence in International Law* (Brill Nijhoff 2016) 2.
[269] K Keith, 'ICJ Judge Keith: The Role of International Law in National Law (Part I)' (*United Nations Web TV*, 9 July 2009).
[270] As a reminder, this thesis focuses on systemic climate change litigation, in which individuals (or civil society at large) sue their own government in national court for failing to adequately reduce GHG emissions which lead to ocean-climate related harms.

While there is a discernible increase in the connection of individuals to international law, access to international judicial fora is, by and large, reserved for states.[271] Individuals are thus left to rely on their national judiciary for recourse when their own state's actions (or omissions), based on international obligations, have a negative impact on them. This raises the crucial question of how national courts treat international law. The second section of the chapter therefore concludes with an investigation and analysis of national courts' application of international law in practice and surfaces some interesting trends, including increased transjudicialism and judicial global self-awareness.

3.1 Due Diligence in International law

As described above, this chapter seeks to establish the content of due diligence obligations of States in general international law and whether national courts can, and do, rely on such international obligations in their decision-making. In order to accomplish this, it is first necessary to understand what states' due diligence obligations are and where such obligations stem from. Section 3.1 of this chapter therefore provides a brief history of due diligence in international law before exploring in detail the six interrelated elements of determining duly diligent behaviour.

3.1.1 What is Due Diligence and What are States' Due Diligence Obligations under International Law?

As will be seen, particularly in the first section of this chapter, it is challenging to be precise when it comes to due diligence, so a note on terminology is warranted. Throughout this chapter, and indeed the entirety of this thesis, due diligence is referred to in a variety of ways. The term "due diligence" itself is often referred to as a 'concept' or a 'notion', meaning the *idea* that duly diligent behaviour is expected in some form. The question of what level of diligence is 'due' depends on the elements that are developed in detail in the first section of this chapter. Terms such as due diligence 'principle', 'rule', or 'standard', are meant to indicate the minimum level of diligence that is generally expected, or that a court would deem adequate, given the circumstances. There is a significant amount of discussion throughout this chapter of "due diligence obligations", which – given the lack of a clear and precise definition in general international law – are more accurately described as obligations

[271] There are notable exceptions to this, such as the international human rights system which expressly provides access to international adjudication to individuals.

of a due diligence nature, or due diligence-related obligations. These are obligations that flow from the concept of due diligence, in the absence of more precise or express obligations. Broadly, "due diligence obligations" signifies that a state is expected, or obliged, to act in a way that rises to the level of due diligence.

"Due diligence" itself is a term that is frequently used in law and most people will have a sense of what it means, but there is no formal rule or statement of what due diligence entails in general international law,[272] which is why the International Law Association (ILA) created a study group[273] in 2012 to undertake an analysis of the notion of due diligence in international law. Specifically, the study group was tasked to 'consider the extent to which there is a commonality of understanding between the distinctive areas of international law in which the concept of due diligence is applied.'[274]

The ILA began this work shortly after the ITLOS Seabed Disputes Chamber, in its 2011 *Advisory Opinion*, determined that due diligence in international law means that states have the 'obligation to deploy adequate means, to exercise best possible efforts, to do the utmost'.[275] Notwithstanding this relatively concise statement, the concept of due diligence and its development in international law have a long history, which the following sub-section explores.

Historical overview of due diligence

This sub-section maps the historical development of "due diligence" in international law to provide historical context and to begin teasing out some of the important factors to consider when discussing due diligence in international law. It is well understood that much of international law as we know it today has its origins in European legal traditions and the concept of due diligence is no exception.[276] From Roman law and the diligent head of household (the smallest unit of responsibility within the state) to Grotius and those who followed him in the 17th century, due diligence was a concept that considered prudent,

[272] International Law Association (ILA), 'Study Group on Due Diligence in International Law, First Report' (2014) 1; N McDonald, 'The Role of Due Diligence in International Law' (2019) 68 International & Comparative Law Quarterly 1041, 1042.
[273] International Law Association (ILA), 'Due Diligence in International Law, Mandate'.
[274] ibid; ILA, 'First Report' (n 272) 1.
[275] *Advisory Opinion* (n 39) para 110.
[276] JA Hessbruegge, 'The Historical Development of the Doctrines of Attribution and Due Diligence in International Law' (2003) 36 New York University Journal of International Law and Politics 265, 4; J Crawford, 'Introduction', *Brownlie's Principles of Public International Law* (9th edn, Oxford University Press 2019) 5.

reasonable, or diligent behaviour as the accepted standard of conduct.[277] These early iterations of reasonableness or diligence translated from the individual family unit to the sovereign for actions happening within its *control*, rather than specifically within its territory.[278] The idea being that the sovereign had control over its subjects and, thus, responsibility for their actions could ultimately flow to the sovereign itself, reflecting a tribal rather than territorial sense of the reach of a state.[279] Building on the 17th century writings of Hugo Grotius, it was Christian Wolff and Emmerich de Vattel who in the 18th century were instrumental in shifting this view from a focus on the monarchic sovereign to the modern conception of the state for purposes of establishing responsibility for actions taking place within the state.[280]

It was the 19th century that saw the active normative development of what we now recognise as due diligence in international law.[281] Even then, the standard established in Roman law as *bonus pater familias* still informed both the international and national development of due diligence.[282] In the late 19th century, British writer Sir Robert Phillimore and his compatriot William Edward Hall began to outline the notion that a state had an obligation to act in a diligent and reasonable manner to avoid harm.[283] Hall clarified, relying in part on the submissions made by the parties in the *Alabama Claims Arbitration,*[284] that a state acts with due diligence '[i]f a government honestly gives so much care as may seem to an average intelligence to be proportioned to the state of things existing at the time, it does all it can be asked to do'.[285]

With increased activity across borders and between states in the 19th century, issues relating to due diligence were becoming more visible on the international legal stage and, finally, it

[277] Hessbruegge (n 276); ILA, 'First Report' (n 272) 2.
[278] Hessbruegge (n 276) 287.
[279] ibid.
[280] N Greenwood Onuf, 'Civitas Maxima: Wolff, Vattel and the Fate of Republicanism' (1994) 88 American Journal of International Law 280, 283; Hessbruegge (n 276) 287–291.
[281] ILA, 'First Report' (n 272) 3; Hessbruegge (n 276) 292–294; G Bartolini, 'The Historical Roots of the Due Diligence Standard' in Krieger, Heike, Peters, Anne and Kreuzer, Leonhard (eds), *Due Diligence in the International Legal Order* (Oxford University Press 2020) 25.
[282] Bartolini (n 281) 35.
[283] Hessbruegge (n 276) 292–293.
[284] *Alabama Claims Arbitration (United States of America v Great Britain)* (1872) 29 Rep Int Arbitr Awards RIAA 125.
[285] WE Hall, 'Sovereignty in Relation to the Territory of the State Part II: The Law Governing States in Their Normal Relations: Chapter IV', *Treatise on International Law*, vol 1 (1890) 216; *see also* Hessbruegge (n 276) 294.

was the *Alabama Claims Arbitration*[286] that provided the first clear statement on due diligence that is still relied on and referenced today, whereby due diligence is to be exercised 'in exact proportion to the risks'[287] involved.

In the *Alabama Claims Arbitration*, the United States claimed that the United Kingdom had built and provided ships to the American South (the Confederacy) to be used in the American Civil War, which was, the U.S. claimed, in direct contravention of Great Britain's declaration of neutrality, and which brought the two countries back to the brink of war.[288] The UK maintained its position that it was unaware that the ships were to be used as war ships, claiming instead that the ships were built to be merchant vessels.[289] However, the Tribunal found that, given the risks involved in supplying any vessels to Confederate Americans at this time, the UK had a heightened obligation of due diligence in its role as a neutral state.[290]

The *Alabama Claims Arbitration* is the first expression of due diligence directly linked to the risk involved and, flowing from this, the notion that due diligence is therefore a flexible concept and one that is context- and fact-specific.[291] This expression that risk is a crucial element in the determination of due diligence and the obligations flowing from it deserves more nuanced and detailed consideration. Risk, like reasonableness, is a thread that runs throughout much of the due diligence discourse beginning with the *Alabama Claims Arbitration* and leading through much of the jurisprudence relevant to the development of due diligence in international law. Risk ultimately plays a significant role in determining the scope and character of states' obligations and the standard of conduct that can be expected of states today.

While there is no general due diligence 'rule' expressed in international law, the various iterations of due diligence and the case law that develops the rule further lay out some

[286] *Alabama Claims Arbitration* (n 284).
[287] ibid 129.
[288] T Bingham, 'The Alabama Claims Arbitration' (2005) 54 The International and Comparative Law Quarterly 1.
[289] Papers Relating to the Foreign Relations of the United States, Transmitted to Congress with the Annual Message of the President, December 2, 1872, Part II, Volume I - Office of the Historian 412.
[290] *Alabama Claims Arbitration* (n 284) 130.
[291] ILA, 'First Report' (n 272) 2; A Peters, H Krieger and L Kreuzer, 'Due Diligence in the International Legal Order: Dissecting the Leitmotif of Current Accountability Debates' in Krieger, Heike, Peters, Anne and Leonhard Kreuzer (eds), *Due Diligence in the International Legal Order* (Oxford University Press 2020) 5–6; F Violi, 'The Function of the Triad "Territory", "Jurisdiction", and "Control" in Due Diligence Obligations' in Krieger, Heike, Peters, Anne and Kreuzer, Leonhard (eds), *Due Diligence in the International Legal Order* (Oxford University Press 2020) 76.

essential elements. These include that 1) due diligence is about risk of harm and risk prevention[292] and that the diligence required is linked to the severity of risk of harm;[293] 2) that its application is fact- and context-specific[294] and is therefore flexible; 3) it is an objective standard of conduct that can change over time and 4) is therefore a continuous obligation;[295] 5) it involves both actual and constructive knowledge;[296] and 6) it is grounded in reasonableness.[297] The following subsections of this chapter develop each of these six elements in detail in order to gain a full understanding of the nuances of due diligence and its related obligations. These elements will also serve to guide the discussion and development of due diligence-related obligations under the climate change regime in chapter 4 and under the law of the sea regime in chapter 5.

3.1.1.1 Due diligence, harm and risk

The first element of due diligence pertains to risk and harm prevention. Due diligence is grounded in the prevention of the risk of harm, and the diligence that is required of a state is directly linked to the severity of the risk of harm.

The act of assessing risk is well understood in the private industry context: a company will take certain actions to determine its risk of financial loss, potential existing legal liability and the risk of possible future litigation before undertaking major projects, acquisitions, mergers and the like.[298] This assessment of risks is commonly understood as the accepted form of due diligence in the private business world.[299] In the international legal arena, where the notion of due diligence is historically less clear, the assessment of the risk of harm as a determining

[292] *Alabama Claims Arbitration* (n 284); *United States v Arjona, 120 US 479 (1887)*.
[293] *Alabama Claims Arbitration* (n 284); *Pulp Mills on the River Uruguay (Argentina v Uruguay)* [2010] ICJ Rep 14; *In the Matter of the South China Sea Arbitration (The Republic of Philippines v The People's Republic of China), Award* [2016] Permanent Court of Arbitration 2013-19.
[294] *Case concerning application of the Convention on the Prevention and Punishment of the Crime of genocide (Bosnia and Herzegovina v Serbia and Montenegro): Judgment of 26 February 2007* (International Court of Justice (ICJ)); *Pulp Mills* (n 293).
[295] *Alabama Claims Arbitration* (n 284); *Advisory Opinion* (n 39).
[296] *Corfu Channel Case (Merits)* [1949] ICJ Rep 1949; *Bosnia and Herzegovina v. Serbia and Montenegro* (n 294); *South China Sea Arbitration* (n 293).
[297] International Law Association (ILA), 'Study Group on Due Diligence in International Law, Second Report' (2016) 7–10.
[298] J Bonnitcha and R McCorquodale, 'The Concept of "Due Diligence" in the UN Guiding Principles on Business and Human Rights' (2017) 28 European Journal of International Law 899, 901–902.
[299] ibid 901; ILA, 'Second Report' (n 297) 27–39.

factor flows from such well known and generally accepted legal principles as precaution,[300] prevention,[301] and the no harm rule.[302]

In its Second Report, the ILA Study Group on Due Diligence detailed that the concept of due diligence, at its core, is about determining the reasonable standard of conduct that is expected of states to avoid harmful consequences of acts or omissions, as a form of assigning accountability for those consequences.[303] In other words, it is about assessing the risk of harm and taking actions to minimise or avoid that harm. The early and most cited expression of the no harm rule dates back to the *Trail Smelter* arbitration,[304] in which the Tribunal held that 'no State has the right to use or permit the use of its territory in such a manner as to cause injury by fumes in or to the territory of another'.[305] In making this determination in the arbitration between Canada and the United States for harm caused by air pollution from the smelter at issue, the Tribunal considered a host of both international and national cases[306] to guide its decision, including the *Alabama Claims Arbitration*. The *Trail Smelter* Tribunal found that acts to adequately diminish the 'probability of damage'[307] were necessary and that, based on scientific advances, more protections against harm were increasingly possible.[308] Taken in its entirety then, the no harm rule articulated by the *Trail Smelter* Tribunal is not only a prohibition against causing transboundary harm but also includes the underlying requirement of preventing the risk of that harm in the first instance.

The no harm rule, as expressed in *Trail Smelter,* has been referred to as the 'conceptual core'[309] or the 'cornerstone'[310] of international environmental law. The prohibition against causing harm, as described in *Trail Smelter*, however, requires there to be both *conduct* by the state to avoid, i.e. prevent, potential harm and the actual *result* of harm avoidance,[311] i.e.

[300] ILA, 'First Report' (n 272) 26; *Advisory Opinion* (n 39).
[301] *Pulp Mills* (n 293).
[302] *Trail Smelter* [1941] 3 RIAA 1938.
[303] ILA, 'Second Report' (n 297) 2.
[304] *Trail Smelter* (n 302).
[305] ibid 1965.
[306] ibid 1963–1965.
[307] ibid 1965.
[308] ibid 1964–1965.
[309] J Brunnée, 'Procedure and Substance in International Environmental Law (Volume 405)' [2019] Collected Courses of the Hague Academy of International Law 115.
[310] P Sands and J Peel, *Principles of International Environmental Law* (3rd edn, Cambridge University Press 2012) 200.
[311] H Krieger and A Peters, 'Due Diligence and Structural Change in the International Legal Order' in Krieger, Heike, Anne Peters and Kreuzer, Leonhard (eds), *Due Diligence in the International Legal Order* (Oxford University Press 2020) 359.

no harm. Thus, the no harm rule and the prevention rule 'are two sides of the same coin',[312] harm *prevention* being an evolutionary product of the original no harm rule expressed in *Trail Smelter*. As Pisillo-Mazzeschi pointed out in his work on due diligence and state responsibility, a state has an obligation to protect, which includes both an obligation to prevent harm and also an obligation to punish if harm does occur.[313] He goes further still, stating that, '[a]s far as the *obligation to prevent* is concerned, there is no doubt that it is conditioned by the due diligence rule.'[314]

The obligation to prevent harm is found in a multitude of areas of international law, most significantly in human rights law but also in obligations to prevent genocide and crimes against humanity and in international humanitarian law. In these areas of law, this obligation is often referred to as the duty to protect and there are many examples of obligations that are phrased in due diligence language.[315] For example, obligations in international humanitarian law are largely based on due diligence to ensure protection from possible harms.[316] Many obligations, particularly in the Additional Protocol to the Geneva Conventions of 12 August 1949[317] (Protocol II, or APII), are drafted in due diligence language, such as the obligations that 'all possible measures shall be taken ... to protect'[318] (Article 8) and 'all appropriate steps shall be taken' (Article 4(3)).[319]

The obligation to prevent genocide, while stated clearly in the Convention on the Prevention and Punishment of the Crime of Genocide,[320] does not include an explanation or elaboration of what the obligation to prevent actually entails. Article 1 of the Genocide Convention simply states that 'genocide ... is a crime under international law which [the Parties] undertake to prevent and punish.'[321] Interestingly, while much of the Convention is devoted to the

[312] Brunnée (n 309) 116.
[313] R Pisillo-Mazzeschi, 'The Due Diligence Rule and the Nature of the International Responsibility of States' (1992) 35 German Yearbook of International Law 9, 22, 26.
[314] ibid 26 (*emphasis in original*).
[315] M Longobardo, 'Due Diligence in International Humanitarian Law' in Krieger, Heike, Peters, Anne and Kreuzer, Leonhard (eds), *Due Diligence in the International Legal Order* (Oxford University Press 2020) 193; L van den Herik and E Irving, 'Due Diligence and the Obligation to Prevent Genocide and Crimes Against Humanity' in Krieger, Heike, Peters, Anne and Kreuzer, Leonhard (eds), *Due Diligence in the International Legal Order* (Oxford University Press 2020) 201.
[316] Longobardo (n 315) 199.
[317] OHCHR | Protocol II Additional to the Geneva Conventions of 12 August 1949.
[318] ibid Article 8.
[319] ibid Article 4(3).
[320] OHCHR | Prevention and Punishment of the Crime of Genocide
[321] ibid Article 1.

punishment of genocide, Article 1 contains the full extent of the language on prevention in the Genocide Convention and there is no further elaboration on what this duty to prevent entails.[322] The elaboration of this obligation, and its underlying due diligence, is thus left to the courts in the absence of any guidance provided by the Convention itself.[323] The ICJ, in its 2007 judgment in the *Bosnia Genocide* case, did just this when it stated clearly that the prevention of genocide articulated in Article 1 of the Genocide Convention meant an obligation 'to employ all means reasonably available to them, so as to prevent genocide so far as possible.'[324] The Court, in further elaborating the obligation to prevent, found that 'the notion of "due diligence" … is of critical importance.'[325]

In international environmental law, harm prevention as an element of due diligence has its roots in Principle 2 of the 1992 Rio Declaration on Environment and Development,[326] setting out states' 'responsibility to ensure that activities within their jurisdiction or control do not cause damage to the environment of other states or of areas beyond the limits of national jurisdiction.'[327] In the *Pulp Mills* case in 2010, the ICJ clarified both the *Trail Smelter*[328] and *Corfu Channel*[329] cases by pointing out that 'the principle of prevention, as a customary rule, has its origins in the due diligence that is required of a State in its territory.'[330] It further clarified that a state must 'use all the means at its disposal in order to avoid activities which take place in its territory, or in any area under its jurisdiction, causing significant damage to the environment of another State.'[331]

It is important to point out that the Tribunal in *Trail Smelter* seems to put parameters on the prevention rule in the form of the term 'significant damage'[332] which the *Alabama* Tribunal did not. In the *Alabama Claims Arbitration*,[333] no such limitation was put on the due diligence required of a state. This distinction, while it may seem purely theoretical, is not insignificant and demonstrates an important distinction between the prevention principle and due

[322] WA Schabas, *Genocide in International Law: The Crime of Crimes* (2nd edn, Cambridge University Press 2009) 81.
[323] van den Herik and Irving (n 315) 200.
[324] *Bosnia and Herzegovina v. Serbia and Montenegro* (n 294) para 430.
[325] ibid.
[326] *Rio Declaration on Environment and Development,* UN Doc A/CONF151/26 (1992).
[327] ibid 2.
[328] *Trail Smelter* (n 302).
[329] *Corfu Channel (Merits)* (n 296).
[330] *Pulp Mills* (n 293) para 101.
[331] ibid.
[332] ibid.
[333] *Alabama Claims Arbitration* (n 284).

diligence obligations.[334] Specifically, in a strict application of the prevention principle in international law, a court might find a breach of the principle only if a state failed to prevent *significant* harm, whereas a failure of due diligence can be found regardless of whether any harm has indeed occurred.[335] In other words, while the *level of diligence* that is required is dependent on the significance of the harm to be prevented, the obligation itself exists regardless of the level of harm.

In sum, the first element of due diligence obligations is an assessment of the risk of harm and the attempt to prevent that harm. Further, the degree of diligence required is directly linked to the severity of the risk of harm involved. Chapters 4 and 5 consider climate change case law through the lens of first the international climate change regime and then the law of the sea regime. The risk of harm from climate change, including ocean acidification, warming, and deoxygenation, that was discussed in detail in chapter 2, will be of significant importance when analysing whether states have employed the appropriate level of diligence.

3.1.1.2 Due diligence and flexibility

Building on risk, the second element of due diligence that must be highlighted is flexibility. Due diligence is highly fact- and context-specific and is therefore necessarily flexible. Due diligence and the related behaviour that is expected of a state is somewhat vague in that there is no specific rule that applies to every area of law and every situation. The ambiguity of due diligence can be useful and is sometimes employed as a tool in order to overcome deadlocks in international negotiations where specificity of certain expected results can be a barrier to progress.[336] The international climate change regime provides a useful example of this. States were able to move from the stringent, substantive requirements of the Kyoto Protocol[337] towards more flexible and ambiguous goals negotiated in the Paris Agreement,[338] resulting in the near universal support and participation that the Kyoto Protocol lacked.[339]

---

[334] JE Viñuales, 'Due Diligence in International Environmental Law: A Fine-Grained Cartography' in Krieger, Heike, Peters, Anne and Kreuzer, Leonhard (eds), *Due Diligence in the International Legal Order* (Oxford University Press 2020) 116–117.
[335] ibid.
[336] Peters, Krieger and Kreuzer (n 291) 3–4.
[337] *Kyoto Protocol to the United Nations Framework Convention on Climate Change* (adopted 11 December 1997), entered into force 16 February 2005, 2303 UNTS 162.
[338] *Paris Agreement* (n 1).
[339] L Rajamani, 'Due Diligence in Climate Change Law' in Krieger, Heike, Peters, Anne and Kreuzer, Leonhard (eds), *Due Diligence in the International Legal Order* (Oxford University Press 2020) 163–164.

While a more ambiguous, objectively reasonable[340] standard of diligent conduct might seem more cumbersome, it allows for states to adapt and customise their conduct depending on the particular facts and context of a given situation. Different circumstances require different levels of diligence and language that is capable of capturing this flexibility in law-making is preferable, and frankly more realistic.[341] states, in developing and creating international law – and with it the rules they agree to abide and be bound by – certainly understand the benefits of clear and unambiguous standards and the ability to achieve specific, desired outcomes. They are, however, simultaneously reluctant to be overly prescriptive, recognising the potential pitfalls of too much rigidity.[342] It is unsurprising then that due diligence finds its way into so many areas of international law.

An important hallmark of due diligence is its variability, its dependence on context. The requisite level of diligence in a given situation depends on the facts and context of the risk of harm in that situation.[343] In other words, the diligence required is directly tied to the context-specific risk involved. In the *Alabama Claims Arbitration,* the U.S. argued that the applicable standard of diligence ought to be what the Tribunal considered appropriate for the relevant facts in issue in a specific case and not, as the UK argued, its own domestic standard of diligence.[344]As mentioned above, the *Alabama* Tribunal ultimately decided that due diligence must be exercised 'in exact proportion to the risks'[345] involved, thus agreeing with the U.S. position that diligence is context-specific.

This position was more recently reiterated in the 2011 ITLOS *Advisory Opinion* when the Seabed Disputes Chamber specified the content of due diligence obligations by stating that '[t]he standard of due diligence has to be more severe for the riskier activities.'[346] In order to make a determination on the scope of due diligence required, in *Pulp Mills* the Court established that, unless 'all appropriate measures'[347] were employed, due diligence would be breached. Highlighting how context-specific a determination of what precisely 'all appropriate measures' meant in this case, the Court then engaged in a careful and detailed

[340] ILA, 'First Report' (n 272) 8–9.
[341] Longobardo (n 315) 195.
[342] ILA, 'Second Report' (n 297) 46.
[343] Bonnitcha and McCorquodale (n 298) 906.
[344] Bartolini (n 281) 34; Albert de Lapradelle, *Recueil Des Arbitrages Internationaux, Tome II: 1856-1872* (Perdone 1923) 784–796.
[345] *Alabama Claims Arbitration* (n 284) 129.
[346] *Advisory Opinion* (n 39) para 117.
[347] *Pulp Mills* (n 293) para 197.

analysis of specific facts, circumstances, data, and law relied on by the parties before making its final determination of whether obligations were breached.[348]

As can be seen from the case law and academic literature discussed here,[349] the range of legal areas in which due diligence applies, and the need for careful analysis of the specific facts of a situation to determine the diligence required, all speak to the flexibility of due diligence.[350]

The flexibility of due diligence obligations also serves to preserve state discretion and autonomy in choosing the best and most effective measures by which to discharge international obligations without offending the notion of sovereignty or any rights associated therewith.[351] It is well established that sovereignty provides states with broad discretion regarding action or inaction taken within their borders and applying strict liability for any and all harm under international law would be seen as overreach into state discretion. Thus, as established above, not *all* harm can be expected to be prevented, as long as states act to prevent the risk of harm by engaging in appropriately diligent conduct. Sovereignty, however, comes with responsibility. The case law establishes, for example, that at a minimum states have the responsibility to ensure that actions within their territory or control do not cause harm beyond their borders.[352] Other examples of curbs on unlimited state discretion come from human rights law that examines internal policies, actions and affairs of states;[353] the duty to protect or prevent found, for example, in humanitarian law and the Geneva Conventions;[354] and the duty to have 'due regard' of other states' interests as determined by the Permanent Court of Arbitration in the *South China Sea Award*.[355] These well-established limitations on state sovereignty are the crux of due diligence and are primarily important in cases where a state fails to prevent a wrongful act.[356] In *South China Sea*, the Tribunal determined that due diligence obligations do place limits on unfettered sovereign acts,

[348] ibid 198–228.
[349] The case law discussed here is far from exhaustive given the centuries-spanning jurisprudence and discourse on the subject.
[350] Violi (n 291) 77; B Baade, 'Due Diligence and the Duty to Protect Human Rights' in Krieger, Heike, Peters, Anne and Kreuzer, Leonhard (eds), *Due Diligence in the International Legal Order* (Oxford University Press 2020) 100.
[351] ILA, 'Second Report' (n 297) 2.
[352] ILA, 'First Report' (n 272) 25; *Corfu Channel (Merits)* (n 296); *Trail Smelter* (n 302); *Pulp Mills* (n 293); *Rio Declaration* (n 326) s 2.
[353] ILA, 'First Report' (n 272) 14.
[354] 'OHCHR | Protocol II Additional to the Geneva Conventions of 12 August 1949' (n 317).
[355] *South China Sea Arbitration* (n 293).
[356] Pisillo-Mazzeschi (n 313) 27.

including that merely adopting measures to limit unlawful behaviour is not enough, but rather that both adoption and enforcement of those measures are required.[357]

In conclusion, adding to risk, the second element that determines whether a state's actions are duly diligent is the context-specific, flexible nature of due diligence. In chapters 4 and 5, this element is explored in detail when discussing specific case law, where the facts and context of each case serve as important determinants of the appropriateness of a state's behaviour. The elaboration in *South China Sea* that mere adoption of measures may not be enough, but that additional actions to enforce those measure are required in order for a state's conduct to be duly diligent, will be of particular importance in the following chapters.

3.1.1.3 Due diligence as an objective standard of conduct

The third element of due diligence is about objectivity and conduct: due diligence is determined through the application of an objective standard of conduct. One of the challenges in determining the precise scope of due diligence in international law is that the term "due diligence" itself is rarely used in international legal language, or even in the International Law Commission's (ILC) Draft Articles on State Responsibility, which are largely based on the concept of due diligence.[358] Instead, the language typically used to describe the conduct that is expected of a state in preventing the risk of harm – in other words to employ due diligence – is what is sometimes called 'due diligence slang'.[359] Examples include the expectation that states 'exert appropriate efforts',[360] or 'take appropriate measures',[361] 'all measures necessary',[362] or 'all appropriate and effective measures'.[363] Given the ambiguity and the variety of the terminology used to describe due diligence in international law, it is

[357] *South China Sea Arbitration* (n 293) 473 paragraph 1203 B.
[358] ILA, 'First Report' (n 272) 4–5; ILC, 'Draft Articles on Responsibility of States for Internationally Wrongful Acts - with Commentaries'.
[359] Bartolini (n 281) 29; Peters, Krieger and Kreuzer (n 291) 9–10.
[360] Convention on the Regulation of Antarctic Mineral Resource Activities (Not yet in Effect) Article 7 (5).
[361] Vienna Convention for the Protection of the Ozone Layer (22 March 1985) 1513 U.N.T.S. 293 Article 2; Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal (22 March 1989) 1637 U.N.T.S. 57 Article 2 (2); Convention on the Law of Non-Navigational Uses of International Watercourses (21 Mary 1997) 2999 U.N.T.S. Article 3 (10); Convention on the Protection and Use of Transboundary Watercourses and International Lakes (17 March 1992) 1936 U.N.T.S. 269 Article 2 (1).
[362] *UNCLOS* (n 29) para 194 (2).
[363] Convention on the Prevention of Marine Pollution by Dumping Wastes and Other Matter (19 November 1972) 1046 U.N.T.S. 120 Article 1.

again up to tribunals and courts to translate this ambiguity and variety of due diligence slang into clear obligations of a due diligence nature.

The ICJ, in *Pulp* Mills,[364] was tasked with determining whether Uruguay had acted with the requisite degree of due diligence in constructing two pulp mills along the River Uruguay without notifying Argentina, who claimed significant damage as a result. In its judgment, the ICJ referred back to *Corfu Channel*[365] and the *Nuclear Weapons Advisory Opinion*[366] when it held that due diligence obliges a state 'to use all the means at its disposal'[367] to avoid the significant damage complained of in the case. The following year, the ITLOS Seabed Disputes Chamber further built upon the ICJ's *Pulp Mills* Judgment in its response to Nauru and Tonga's request for an Advisory Opinion on the responsibilities and obligations of states sponsoring private companies undertaking seabed mining operations in areas beyond their national jurisdiction.[368] The due diligence terminology the Seabed Disputes Chamber sought to clarify in its Advisory Opinion was the expression 'responsibility to ensure' in Article 139 of UNCLOS[369] and it found that a state's

> obligation "to ensure" is not an obligation to achieve, in each and every case, the result that the sponsored contractor complies with the aforementioned obligations. Rather, it is an obligation to deploy adequate means, to exercise best possible efforts, to do the utmost, to obtain this result. To utilize the terminology current in international law, this obligation may be characterized as an obligation "of conduct" and not "of result", and as an obligation of "due diligence".[370]

With this, the Seabed Disputes Chamber provided international law with a usable definition of due diligence obligations. It also reinforced the distinction between obligations of conduct and obligations of result. While the term "due diligence" might not be used regularly in international law-making, the terminological variations have in common the purpose of regulating states' obligations to conduct themselves in a certain way, not to achieve a specific result. In fact, the varied terminology (or "slang") described above all include some version of best efforts being made, the doing of something, indicating a results-independent obligation of conduct. Due diligence is a standard against which a state's conduct in the face

[364] *Pulp Mills* (n 293).
[365] *Corfu Channel (Merits)* (n 296).
[366] *Legality of the Use by a State of Nuclear Weapons in Armed Conflict, Advisory Opinion* ICJ Rep 1996.
[367] *Pulp Mills* (n 293) para 101.
[368] *Advisory Opinion* (n 39).
[369] *UNCLOS* (n 29) para 139.
[370] *Advisory Opinion* (n 39) para 110.

of the risk of harm can be measured, where the occurrence of that harm may be an indicator of a lack of due diligence, but is not itself the determining factor.[371] The ICJ made this point clearly in its judgment in the *Bosnia Genocide* case where it went into detail on the obligation to prevent genocide, holding that,

> it is clear that the obligation in question is one of conduct and not one of result, in the sense that a State cannot be under an obligation to succeed, whatever the circumstances, in preventing the commission of genocide: the obligation of States parties is rather to employ all means reasonably available to them, so as to prevent genocide so far as possible. A State does not incur responsibility simply because the desired result is not achieved; responsibility is however incurred if the State manifestly failed to take all measures to prevent genocide which were within its power, and which might have contributed to preventing the genocide.[372]

The distinction between obligations of conduct and obligations of result is also exemplified in the distinction between due diligence and strict liability. For example, in *Asian Agricultural Products v Sri Lanka*, [373] the International Centre for the Settlement of Investment Disputes (ICSID) was called upon to consider Sri Lanka's liability toward a shrimp farm's foreign owners.[374] The Tribunal made a careful distinction between due diligence and strict liability, stating that an obligation to protect against a risk of harm could not be construed as an 'absolute obligation which guarantees that no damage will be suffered, in the sense that any violation thereof creates automatically a "strict liability"'.[375]

In the area of international human rights law, the distinction between due diligence and strict liability is also an important one. An unlimited, complete duty to protect against all harms, in other words a strict liability standard, would not only be overly burdensome to the state, it could also have unintended consequences. A state could find itself paralysed in decision-making for fear of running afoul the duty to protect against all possible harm.[376] The more

[371] Krieger, Heike and Peters, Anne (n 311) 359–360.
[372] *Bosnia and Herzegovina v. Serbia and Montenegro* (n 294) para 430.
[373] *Asian Agricultural Products Ltd v Republic of Sri Lanka (Final Award)* [1990] Case No ARB873 (International Centre for the Settlement of Investment Disputes [ICSID]).
[374] The case involved an investment law dispute between a Hong Kong corporation who owned a shrimp farm located in Sri Lanka and the Sri Lankan government after the shrimp farm was damaged and ultimately closed due to a conflict between a counter-insurgency operation and Sri Lankan security forces. ibid 3.
[375] ibid para 48.
[376] Baade (n 350) 107.

flexible, objective standard of conduct required by due diligence to prevent the risk of harm to individuals is thus a more pragmatic approach to protecting human rights.[377]

Strict liability can be especially problematic in international environmental law, the area of law that has arguably contributed the most to the modern development of due diligence.[378] International environmental law is primarily concerned with preventing harm. Applying a strict liability standard to calculating damage, the cause of which is often uncertain, context-specific and might include a multitude of actors, is thus decidedly problematic. A standard of care that relies on objectively appropriate conduct to prevent the risk of harm strikes a practical balance and provides a tangible standard in a highly complex area of law.[379]

In sum, the third element of due diligence, after risk and flexibility, is that a state's conduct must be objectively appropriate to prevent the risk of harm, regardless of the actual outcome or result. In chapters 4 and 5, where specific case law is explored through the lens of regime-specific due diligence obligations, this factor is of particular importance. In climate change-related cases, the harm that is to be prevented often lies in the future and is likely irreversible if it comes to pass. Therefore, a focus on the conduct required to prevent the risk of future harm, rather than a focus on how to undo or repair the future (irreversible) result, takes on heightened importance.

3.1.1.4 Due diligence as a continuous obligation

The fourth element is that due diligence and related obligations are continuous in nature. Due diligence obligations in international law are not static, but rather evolve over time: changes in circumstances, advances in scientific knowledge, enhanced technological capabilities, each of these are factors that exemplify the necessity for a state's due diligence obligations being continuous.[380] In the *Alabama Claims Arbitration,* the Tribunal found the UK's actions, even after the vessels had been built and delivered to the Confederacy, to be in contravention of its due diligence obligations as a neutral state. The Tribunal found that the UK's actions after the fact 'were so imperfect as to lead to no result, and therefore cannot

[377] ibid.
[378] International environmental law is responsible for the development of due diligence in that the precautionary principle, the no harm principle and the prevention principle discussed earlier in this chapter all find their roots in international environmental law.
[379] Krieger, Heike and Peters, Anne (n 311) 378.
[380] ILA, 'Second Report' (n 297) 3,21.

be considered sufficient to release Great Britain from the responsibility incurred.'[381] Indicating a continuing obligation to employ due diligence in the matter, the Tribunal considered several actions on the part of the UK in its determination,[382] including the allowance of the vessels to be admitted to ports under UK jurisdiction and its delay in issuing arrest orders.[383]

More recently, building on the *Alabama Claims Arbitration*, the *Trail Smelter* Tribunal was explicit regarding the continuous and evolving nature of due diligence obligations. Referencing technical advancements, the Tribunal stated that 'damage may occur in the future unless the operations of the Smelter shall be subject to some control, in order to avoid damage occurring'[384] and developed a technical regime that could respond to changing 'future conditions.'[385] Even more recent and explicit, the ITLOS *Advisory Opinion* commented on the variable nature of due diligence, finding that,

> '[i]t may change over time as measures considered sufficiently diligent at a certain moment may become not diligent enough in light, for instance, of new scientific or technological knowledge. It may also change in relation to the risks involved in the activity.'[386]

The evolving, continuous nature of due diligence obligations makes them necessarily broad, ambiguous and potentially unpredictable. To combat this ambiguity, international law-making and treaty practice employ terms and concepts intended to provide guidance to states on measures they must employ to adequately meet their continuing due diligence obligations.[387] This includes terms such as 'best available science'[388] or reference to 'international rules, standards and recommended practices'.[389] The use of such terms in treaty language imbues due diligence obligations with specificity *and* flexibility, providing states with benchmarks and common standards on which they can rely in changing circumstances. It also allows states to avoid the impracticality that comes both with rigidity and ambiguity, striking a balance that makes due diligence obligations both knowable and

[381] *Alabama Claims Arbitration* (n 284) 130.
[382] ibid 130–131.
[383] Viñuales (n 334) 113.
[384] *Trail Smelter* (n 302) 1966.
[385] ibid 1973.
[386] *Advisory Opinion* (n 39) para 117.
[387] P Birnie, A Boyle and C Redgwell, *International Law & the Environment* (Third Edition, Oxford University Press 2009) 149.
[388] *Paris Agreement* (n 1) Articles 4, 7, 14.
[389] *UNCLOS* (n 29) Article 197.

achievable, and ultimately enabling the broadest possible participation in international treaty regimes.[390]

In conclusion, the fourth element of due diligence, after risk, flexibility, and objective standard of conduct, is that due diligence obligations are of a continuous nature. This element will be of tremendous significance for the case law analysis in chapters 4 and 5, as climate change-related cases tend to be highly reliant on science and scientific evidence. As the exploration of the scientific nexus between the climate and the ocean in chapter 2 revealed, scientific knowledge and understanding evolve rapidly and are of particular importance when considering states' continuous obligations to conduct themselves in a duly diligent manner.

3.1.1.5 Due diligence and knowledge

The fifth element of due diligence involves both actual and constructive knowledge on the part of the state of the risk of harm. The ILA, in its First Report highlighted objective factors used to determine the adequacy of a state's due diligence, including whether the risk of harm was foreseeable and whether a state had effective control over its own territory.[391] Foreseeability implies knowledge.

The Court in *Corfu Channel*[392] was asked to determine whether Albania bore responsibility for loss of life and damage caused to British warships by exploding naval mines in Albanian territorial waters, even though the Court found it impossible to determine who was directly responsible for laying the mines.[393] In response to Albania's insistence that it did not know about the mines, the Court held that Albania's exclusive control over its own territory had a bearing on establishing 'the knowledge of that State as to such events'.[394] It further found that the laying of mines in Albania's territorial waters 'could not have been accomplished without the knowledge of the Albanian Government.'[395] The Court determined that the question of whether Albania had knowledge of mines being laid in its territorial waters could be ascertained 'from inferences of fact, provided that they leave *no room* for reasonable

[390] N Pain and B Rheinberger, 'The Due Diligence Principle from International to Domestic Law: Applying the Principle in Practice Special Volume: Selected Papers Presented at the ILA 78th Biennial Conference Sydney, 19-24 August 2018' (2018) 25 Australian International Law Journal 81, 84–85.
[391] ILA, 'First Report' (n 272) 4.
[392] *Corfu Channel (Merits)* (n 296).
[393] ibid 17.
[394] ibid 18.
[395] ibid 22.

doubt.'[396] The Court ultimately found that, at a minimum, Albania had constructive knowledge that landmines were placed in its territorial waters[397] and was therefore responsible for the damage caused by mine explosions in its territorial waters.[398]

Constructive or objective, rather than actual, knowledge is well established and developed as a crucial element in determining duly diligent conduct in international human rights[399] and humanitarian[400] law. In other words, it is enough that a state ought to have known of a risk to trigger due diligence obligations to prevent the risk of harm.[401] The most poignant statement of this principle comes from the *Bosnia Genocide* case,[402] where the Court, in considering whether a state had an obligation to prevent a wrongful act (in this case genocide) only once the harm had begun, declared that,

> [t]his obviously does not mean that the obligation to prevent genocide only comes into being when perpetration of genocide commences; that would be absurd, since the whole point of the obligation is to prevent, or attempt to prevent, the occurrence of the act. In fact, a State's obligation to prevent, and the corresponding duty to act, arise at the instant that the State learns of, or should normally have learned of, the existence of a serious risk that genocide will be committed.[403]

In conclusion, the fifth element of due diligence involves both actual and constructive knowledge. This includes what a state should have known, along with what a state actually knows. This fifth element, after risk, flexibility, objective standard of conduct, and the continuous nature of due diligence obligations, will be of particular interest in chapters 4 and 5 where climate change-related cases are analysed. First, those chapters explore whether the knowledge that climate change-related impacts will only get more significant and pronounced with time is determinative in whether a state has met its due diligence obligations. Second, as scientific advancements continue, especially in the nexus between climate change and the ocean, they explore the implications of the foreseeability of climate-related harms for imputing constructive knowledge to a state.

---

[396] ibid 18. (*emphasis in original*).
[397] ibid 22.
[398] ibid 36.
[399] Baade (n 350) 98.
[400] van den Herik and Irving (n 315) 210.
[401] Bartolini (n 281) 38; Baade (n 350) 98; Violi (n 291) 76.
[402] *Bosnia and Herzegovina v. Serbia and Montenegro* (n 294).
[403] ibid 431.

3.1.1.6 Due diligence and reasonableness

The sixth and final element is that due diligence is grounded in reasonableness. One of the areas the ILA Study Group focused on in both their First and Second Reports was the notion of reasonableness, finding that it is a recurring concept, a 'golden thread'[404] in the relevant case law, treaty practice and academic literature on international due diligence.[405] This makes sense, of course, considering that due diligence can be traced back to a reasonable person standard, as mentioned above.[406] The concept of reasonableness plays an important role in international law as a tool to adapt the law to any number of situations. Courts and tribunals routinely employ reasonableness as a benchmark in determining whether a state has breached or honoured its obligations.[407] The use of reasonableness as a tool to determine a state's responsibility for actions taken was employed early in the relevant case law. For example, in 1890 in the *Wipperman* case,[408] the U.S.-Venezuela Claims Commission was asked by the U.S. to hold Venezuela responsible for acts by individuals within its territory that caused harm to a U.S. citizen.[409] The Commission rejected the claim by the U.S., holding that a state cannot be held responsible for harms that cannot be prevented even when a state employs 'reasonable foresight and ordinary precaution'.[410]

Reasonableness is an important and pervasive concept in international law and there are a multitude of examples in international legal areas, including diplomatic protection, investment law, human rights, genocide prevention, corporate law, transnational criminal law and the law of state responsibility, all of which the ILA relied on in its broad analysis of reasonableness as a factor in due diligence.[411] Reasonableness is also not an unfamiliar concept in domestic legal systems, often employed as a determining factor in tort law and various forms of negligence.[412] The term itself, as pervasive as it is in both domestic and international law, remains ambiguous, providing a measure of evaluation of rational

[404] ILA, 'Second Report' (n 297) 8.
[405] ILA, 'First Report' (n 272) 9.
[406] See 49 above.
[407] O Corten, 'The Notion of "Reasonable" in International Law: Legal Discourse, Reason and Contradictions' (1999) 48 The International and Comparative Law Quarterly 613, 615–616.
[408] Frederick Wipperman v. United States of Venezuala (10 July 1890) United States and Venezuela Commission, *Opinions Delivered by the Commissioners in the Principle Cases* (1899).
[409] In this case, a consular official whose personal property was stolen and damaged by a group of Indigenous Peoples in a remote area of Venezuela as he made his way back to the U.S. ibid 132–134.
[410] ibid 135.
[411] ILA, 'First Report' (n 272) 3–5; ILA, 'Second Report' (n 297) 7–10.
[412] Corten (n 407); BC Zipursky, 'Reasonableness in and out of Negligence Law' (2014) 163 University of Pennsylvania Law Review 2131.

behaviour, a standard that can be objectively applied across legal areas, facts, and circumstances.[413] Reasonableness is especially relevant in international law where there is an expectation that parties can rely on standards to be applied objectively rather than subjectively: focusing on what is objectively reasonable in a given situation rather than attempting to determine the specific intentions or motivations of the party involved.[414]

In sum, the sixth and final element of due diligence is that it is grounded in reasonableness. All of the other elements (risk, flexibility, objective conduct, continuous, and knowledge) ultimately must be seen through a lens of reasonableness. This element will again be relevant in the case law analysis in chapters 4 and 5.

To conclude this section, while it is fair to say that there is no common due diligence standard in international law, it remains that there is a core due diligence-related obligation that is understood as a baseline of expected conduct, in the absence of more specific rules.[415] Clearly, distinct areas of law and specific treaties include more stringent and explicit due diligence obligations than others, but states have a basic obligation to ensure that any actions (or omissions) over which they have jurisdiction or control do not harm anyone's rights or interests.[416] Of crucial importance to this thesis is the ILA's finding in its Second Report that '[e]ven if the content of due diligence is very general, it is clear that its requirements are defined at the level of international, rather than national law.'[417]

It remains then, that there is no precise expression of one due diligence obligation in general international law. The six elements explored in this section do, however, provide a common understanding of the baseline expectations of state behaviour. According to these six elements, due diligence broadly is about the risk of harm and harm prevention, flexibility based on the specific context, it is an objective standard of conduct, includes continuous obligations, covers both actual and constructive knowledge, and is grounded in reasonableness. As mentioned at the close of each subsection above, these six elements will guide the exploration of due diligence obligations in chapter 4 under the international climate change regime and in chapter 5 under the law of the sea regime. For purposes of this chapter, now the question becomes how to determine when, or whether, such due diligence

[413] ILA, 'First Report' (n 272) 3.
[414] Bonnitcha and McCorquodale (n 298) 902.
[415] ILA, 'First Report' (n 272) 4; ILA, 'Second Report' (n 297) 5–6.
[416] ILA, 'Second Report' (n 297) 5–6.
[417] ibid 6.

obligations have been breached. The following section explores this question more specifically.

3.1.2 What Constitutes a Breach of International Due Diligence Obligations?

Based on the elements analysed in the previous section, due diligence requires a state to prevent the risk of harm, do so in a manner that is appropriate for the context and facts at hand, is objectively appropriate, takes new developments into consideration and makes continuous adjustments to the level of diligence, while also remaining actively knowledgeable about the potential risk of harm, all of which must be done in a reasonable manner. What does this mean in practice? And how can a state's conduct be measured as appropriately diligent? To begin to answer these questions, this section explores how a court determines whether a state has breached its due diligence-related obligations, along with the kind of evidence a court might consider in making its determination.

Let us consider each of the six determining elements of due diligence in turn, beginning again with the risk of harm. It was determined above that due diligence is about assessing the risk of harm and taking actions to minimise or avoid that harm, based in large part on the no harm rule articulated in *Trail Smelter*[418] and the harm prevention principle found in Principle 2 of the Rio Declaration.[419] A state, in order to employ adequately diligent behaviour must take appropriate measures to determine the risk of harm from a given activity prior to engaging in it, and must take actions to avoid or minimise the risk of that harm.[420] Falling short of this could cause the state to be in breach of its due diligence obligations.

It is difficult to crystalise what specific behaviour would be required of the state to prevent the risk of harm precisely because of the second determining element of due diligence, that of its flexibility, its context-specificity. As the 2011 ITLOS *Advisory Opinion* sets out, the level of diligence required will be higher when the risk is more severe.[421] More specifically, a state must take all measures that are appropriate in the given circumstances to avoid the risk of potential harm.[422] The conduct of a state must be objectively appropriate, given the circumstances, to avoid the risk of harm, which gives the state leeway in determining the best action to take. And, as long as the state can objectively show it has taken the appropriate

[418] *Trail Smelter* (n 302) 1965.
[419] *Rio Declaration* (n 326) s 2.
[420] See section 3.1.1.1 *Due diligence, harm and risk*.
[421] *Advisory Opinion* (n 39) para 117.
[422] *Pulp Mills* (n 293) para 197.

conduct that rises to the level of risk of harm involved, the state will have acted with the diligence required, even if harm ultimately does occur.[423]

A state's due diligence obligation does not end there. Rather, as developed in detail above, the actions taken by a state to prevent the risk of harm must evolve with the level of risk along with any scientific and technological advances. Thus, in order to not run afoul of their due diligence-related obligations, states must keep abreast of both the level of risk and the measures available to avoid that risk of harm, which may change over time given advancements in the best available science[424] and changes in international rules and standards.[425]

Similarly, a state cannot hide behind a claim of lack of knowledge when it comes to the risk of harm from its activities or activities within its territory. The Court in *Corfu Channel* was clear in its determination that a state is considered to have at least constructive knowledge of activities occurring within its territory that bear the risk of causing harm.[426] To act with due diligence then, a state has the obligation to actively seek the requisite knowledge regarding to potential risks of harm from activities taking place in its jurisdiction. States are held to the heightened standard of both constructive and actual knowledge when it comes to taking appropriate actions to avoid the risk of harm for which they bear direct responsibility.

Finally, a state's actions must be objectively reasonable to avoid the risk of harm of a given situation. The conduct must rise to the level of conduct that would be considered reasonable in the circumstances, given the other elements discussed. The following two sub-sections explore how a court might make these determinations.

3.1.2.1 Determining breach of obligations of conduct vs result

Given the discretion afforded to states and the context-specificity inherent in due diligence obligations, determining whether a state's behaviour is appropriately diligent is, as has been mentioned, frequently left to adjudicating bodies. The question of how to determine whether a state has acted with due diligence in a given situation takes us once again to the notion of obligations of conduct as distinct from obligations of result. As mentioned above,[427]

[423] Krieger, Heike and Peters, Anne (n 311) 378.
[424] *Paris Agreement* (n 1).
[425] *UNCLOS* (n 29) Article 197.
[426] *Corfu Channel (Merits)* (n 296) 22.
[427] See section 3.1.1.3 *Due diligence as an objective standard of conduct*.

due diligence obligations are obligations of conduct, not of result. This section analyses how courts determine a state's breach of its obligations of conduct, as opposed to obligations of result.

In determining whether a state has breached an obligation of *result*, a court or tribunal must only determine whether the desired result was in fact obtained.[428] If not, then the obligation has been breached. An obligation of *conduct*, however, requires an endeavour, action taken, conduct engaged in, in the advancement of a desired outcome. Regarding the breach of an obligation of conduct thus, it is the failure to make the endeavour, the failure to carry out the actions, not the end result or outcome itself, that is determinant.[429]

In its judgment in the joined cases of *Costa Rica v Nicaragua* and *Nicaragua v Costa Rica,* jointly referred to as *Certain Activities Carried Out by Nicaragua in the Border Area*,[430] the Court expressly separated its consideration of the alleged breaches of obligations of conduct from those of result. Each party alleged that the other had failed to meet obligations to conduct appropriate impact assessments and that activities carried out resulted in transboundary harm.[431] Costa Rica alleged that Nicaragua's dredging of a section of the Colorado River and the creation of several canals caused damage to wetlands in Costa Rica, whereas Nicaragua alleged that Costa Rica's construction of a road along the San Juan River caused harm to Nicaragua.[432] The Court considered each allegation in turn.

The Court first considered whether Nicaragua had breached its obligation of conduct – that of carrying out an appropriate environmental impact assessment to assess the risk of harm – before turning to considering whether Nicaragua had breached its obligation of result – the obligation not to cause significant transboundary harm.[433] The Court relied heavily on both *Pulp Mills* and *Corfu Channel* in determining whether a transboundary environmental impact assessment fell within Nicaragua's obligation under international environmental law to take all measures necessary to avoid causing significant transboundary harm, stating that,

---

[428] B Mayer, 'Obligations of Conduct in the International Law on Climate Change: A Defence' (2018) 27 Review of European, Comparative & International Environmental Law 130, 131.
[429] ibid.
[430] *Certain Activities Carried Out by Nicaragua in the Border Area (Costa Rica v Nicaragua), and Construction of a Road in Costa Rica Along the San Juan River (Nicaragua v Costa Rica), Judgment, ICJ Reports 2015, p 665*.
[431] ibid 56–64.
[432] ibid.
[433] ibid 100.

> to fulfil its obligation to exercise due diligence in preventing significant transboundary environmental harm, a State must, before embarking on an activity having the potential adversely to affect the environment of another State, ascertain if there is a risk of significant transboundary harm, which would trigger the requirement to carry out an environmental impact assessment.[434]

The Court considered a prior impact assessment carried out by Nicaragua and determined that Nicaragua's planned dredging activities did not carry a risk of causing significant transboundary harm, and that Nicaragua did not need to carry out a new, transboundary impact assessment in order to meet its due diligence obligations. [435] The Court then considered the alleged breach by Nicaragua of its obligation of result. Costa Rica claimed that Nicaragua was liable for harm caused to Costa Rica by its activities, regardless of whether or not Nicaragua was duly diligent in its conduct to prevent harm to Costa Rica's environment.[436] The Court specified that, to demonstrate a breach of this obligation, Costa Rica must provide evidence of actual harm to its environment caused by Nicaragua's dredging activities.[437] Failing to do so, the Court concluded that there was no evidence of a breach by Nicaragua of this obligation of result.[438]

The Court again separated the alleged breach of obligations of conduct and result when it considered the further allegations made by Nicaragua that Costa Rica had failed to conduct an appropriate impact assessment prior to constructing the road along the San Juan River,[439] and that this resulted in damage to the river within Nicaragua's territory.[440] In its consideration of whether Costa Rica had breached its obligation of conduct, the Court recalled its prior reference to both *Pulp Mills* and *Corfu Channel,* stating that states have a due diligence obligation to prevent significant transboundary harm. [441] It determined that Costa Rica had a due diligence obligation 'to assess the existence of a risk of significant transboundary harm prior to the construction of the road, on the basis of an objective evaluation of all the relevant circumstances.'[442] The Court engaged in a detailed discussion of *Pulp Mills*, reiterating that the due diligence obligation is a continuous one, flowing

[434] ibid 104.
[435] ibid 105.
[436] ibid 117.
[437] ibid 118–120.
[438] ibid 120.
[439] ibid 146–152.
[440] ibid 174.
[441] ibid 153.
[442] ibid.

throughout the life of a project and, particularly, that this obligation requires an assessment of the risk of harm *ex ante*, 'prior to the implementation of a project'.[443] In this case, however, Costa Rica only engaged in environmental impact assessments and reports of potential harm *post hoc*, well after construction had begun, failing to evaluate the risk of future harm.[444] Further, in contrast to its decision that Nicaragua appropriately assessed the risk of harm of its activities, in the case of Costa Rica, the Court held that,

> if the environmental impact assessment confirms that there is a risk of significant transboundary harm, a State planning an activity that carries such a risk is required, in order to fulfil its obligation to exercise due diligence in preventing significant transboundary harm, to notify, and consult with, the potentially affected State in good faith, where that is necessary to determine the appropriate measures to prevent or mitigate that risk.[445]

The Court thus determined that Costa Rica had failed to comply with its obligation to conduct an appropriate impact assessment prior to commencing construction, and that it remains under a continuing obligation to assess the risk of significant transboundary harm for any future works.[446]

Finally, the Court turned to the question of whether Costa Rica had breached its obligation of result, clarifying here that '[t]he core question before the Court is whether the construction of the road by Costa Rica has caused significant harm to Nicaragua.'[447] After a lengthy evaluation and discussion of the various harms alleged, the Court determined that Nicaragua had not provided evidence of significant transboundary harm caused by Costa Rica's road construction and thus concluded that, in the absence of such harm, Costa Rica had not breached its obligation (of result) to not cause significant transboundary harm.[448] The ICJ, in *Certain Activities*, therefore demonstrated that, in determining whether a state has met its obligation of due diligence, it is not the result (e.g. a lack of transboundary harm) that is important, but the action taken by the state to *prevent* such harm, or the risk thereof.

What, then, is the evidence a court will consider in determining whether a state has met its obligations of conduct? Due diligence provides the necessary criteria to determine whether a state has complied with its obligations of conduct.[449] The sole question before a court is

[443] ibid 161.
[444] ibid.
[445] ibid 168.
[446] ibid 173.
[447] ibid 187.
[448] ibid 217.
[449] J Kulesza, *Due Diligence in International Law* (Brill Nijhoff 2016) 266.

thus precisely as the ITLOS Seabed Disputes Chamber framed it: whether a state has deployed adequate means, whether it has exercised its best possible efforts, whether it has done the utmost[450] in order to protect against the risk of harm.

3.1.2.2 Evidence of breach of due diligence obligations

Continuing with the exploration of what courts will consider in determining whether a state has breached its obligations, this sub-section analyses the type of evidence a court or tribunal might consider in its determination of whether a state has done enough to meet its due diligence obligations.

The *South China Sea Arbitration*[451] provides an illustrative example. The *South China Sea Arbitration* entailed a complex arbitration instituted by the Philippines against China before the Permanent Court of Arbitration (PCA), alleging a variety of breaches of international law including, among others, failure to protect and preserve the marine environment and failure to prevent exploitation of resources.[452] The most important allegations for this discussion are the Philippines' contention that China engaged in harmful fishing practices and construction activities causing environmental harm to the marine environment.[453] The Philippines relied on the due diligence obligations in UNCLOS,[454] specifically Article 192 which includes the general 'obligation to protect and preserve the marine environment'[455] and Article 194 which specifically concerns 'measures to prevent, reduce and control pollution of the marine environment.'[456]

The Tribunal, after considering the facts, evidence and submissions regarding the relevant claims, stated that the obligations in Articles 192 and 194 of UNCLOS together create due diligence obligations pertaining to activities directly engaged in by states, and an obligation to ensure that 'activities within their jurisdiction and control do not harm the marine

[450] *Advisory Opinion* (n 39) para 110.
[451] *South China Sea Arbitration* (n 293).
[452] ibid 22. The Philippines claimed that China protected and supported Chinese fishing vessels engaged in destructive fishing and extraction practices in the South China Sea, and that the Chinese government's island building activities included heavy and harmful equipment, all of which resulted in 'irreversible and widespread damage to the biodiversity and ecological balance of the South China Sea'. ibid 835-860.
[453] ibid 817.
[454] ibid 905–910. The due diligence obligations in UNCLOS will be developed in detail in chapter 5 below.
[455] *UNCLOS* (n 29) Article 192.
[456] ibid 194.

environment.'[457] Going further, and relying on both *Pulp Mills* and the ITLOS *Advisory Opinion*, the Tribunal clarified that this obligation to ensure 'requires "due diligence" in the sense of a flag state not only adopting appropriate rules and measures, but also a "certain level of vigilance in their enforcement and the exercise of administrative control."'[458] In making its determination, the Tribunal considered that China knew of the risk of harm to the marine environment, was aware of ongoing harmful fishing practices, supported and defended these activities through the use of government vessels, and itself engaged directly in seabed dredging and other dangerous land reclamation activities. The Tribunal thus decided that China's failure to take necessary measures to protect and preserve the marine environment, or to reduce and control pollution of the marine environment, constituted a breach of these obligations under UNCLOS Articles 192 and 194.[459]

Specifically, the Tribunal determined that 'while Chinese fishing vessels are within China's jurisdiction and control as the flag state, the obligation to ensure that those fishing vessels do not take measures to pollute the marine environment is one of due diligence.'[460] The Tribunal highlighted that the adoption by China of rules and measures to prohibit the harmful activities complained of was, on its own, not enough to comply with its due diligence obligations, and that, instead, it must also take steps to actively enforce them.[461]

Here, the Tribunal in the *South China Sea Arbitration* reinforces a crucial element in the determination of whether a state has acted with due diligence. A state must go beyond administrative actions, such as adopting rules and measures, and must take steps to enforce them as well. This requirement of specificity was first articulated in *Pulp Mills*, where the Court found that due diligence obligations require not only 'the adoption of appropriate rules and measures, but also a certain level of vigilance in their enforcement and the exercise of administrative control'.[462]

To conclude, returning to the question of what a court might consider as evidence of a breach of obligations of conduct such as due diligence, the discussion in this sub-section clarifies that courts will look to a state's domestic actions in these determinations. The breach of such an

[457] *South China Sea Arbitration* (n 293) para 944.
[458] ibid.
[459] ibid 960.
[460] ibid 971.
[461] ibid 964.
[462] *Pulp Mills* (n 293) para 197.

obligation may be established by a state's failure to implement measures necessary to further a particular objective, but it may also be established by a state's failure to ensure the *enforcement* of those measures.[463] The question of what constitutes a breach of due diligence obligations is thus more nuanced than considering a single action taken by the state. While states retain discretion in the measures adopted to prevent the risk of harm, a determination of whether those measures rise to the appropriate level of diligence requires more detailed consideration of whether the necessary actions to *enforce* those measures have also been taken.

The discussion in this section will guide the exploration in chapters 4 and 5. It provides the framework for developing an analysis of whether states have indeed met due diligence obligations under both the international climate change regime and the law of the sea regime, respectively. First, however, the discussion turns toward the next important question that must be answered: to what extent international obligations can be invoked before national courts.

3.2 International Due Diligence Obligations in National Courts

Central to the overall research question of this thesis is the extent to which individuals can hold their own governments accountable in national courts for breaching international legal obligations. In particular, the thesis, in chapters 4 and 5, explores the possible breach of a state's due diligence-related obligations under the international climate change regime and the law of the sea regime, respectively, in the context of climate change related impacts on the ocean. This section therefore first briefly considers international law and the individual's place within it. It then turns to an exploration of national courts and how international law finds its way into national courts, ultimately becoming accessible to individuals in that setting.

3.2.1 How Do International Obligations Translate to National Accountability?

This first sub-section focuses on how states' international obligations might translate to national accountability. The discussion first explores how international law treats individuals, and whether states' international obligations can indirectly create actionable rights for individuals in the absence of explicit rights. It then considers how national courts, depending

[463] Mayer (n 428) 139.

on the legal system in which they operate, rely on and refer to international law in determining whether a state has breached its international obligations.

3.2.1.1 International law and the individual

This part of the chapter explores whether individuals are represented in international law and whether international law allows individuals to have recourse in international law in the absence of expressly stipulated access to international judicial fora. As was outlined in chapter 1, the purpose of focusing on "the individual" in international law is to develop an understanding of the manner in which international law is, or can be, utilised in national legal action brought by individuals or civil society at large.

There is no lack of scholarly discussion of the "enforcement conundrum"[464] or the "compliance question"[465] – two sides of the same coin – in international law. After engaging in the law-making process to develop standards and norms, the question of bindingness remains. Some would argue that states are never truly, fully bound by international law due to a lack of institutions empowered to enforce compliance with international law.[466] Treaty law-making in particular seems to have little impact on state behaviour unless it is in a state's interest to comply with certain provisions, even where a state has explicitly consented to being bound thereby.[467] Some argue that state compliance with international law, and treaties in particular, is a demonstration of a state's social value system,[468] while others argue that states comply out of a sense of fairness and belonging.[469] It is fair to say that one of the reasons states engage in international law-making processes in the first place is to create stability. For a state, stability means being able to anticipate the behaviour of other states, having a sense of how its own actions will be perceived, tackling global issues and creating reliable global standards and norms.[470] Louis Henkin famously stated that 'almost all nations observe almost all principles of international law and almost all of their obligations almost all

[464] E Colombo, 'Enforcing International Climate Change Law in Domestic Courts: A New Trend of Cases for Boosting Principle 10 of the Rio Declaration Student Comments' (2017) 35 UCLA Journal of Environmental Law and Policy 98, 107.
[465] HH Koh, 'Why Do Nations Obey International Law Review Essay' (1996) 106 Yale Law Journal 2599, 2611.
[466] K Knop, 'Here and There: International Law in Domestic Courts Millennium Issue: Shaping the Parameters of International Law in the New Millennium' (1999) 32 New York University Journal of International Law and Politics 501, 503–504, 513.
[467] A Boyle and C Chinkin, *The Making of International Law* (Oxford University Press 2007) 15.
[468] Knop (n 466) 511.
[469] Koh (n 465) 2601; A Chayes and A Handler Chayes, *The New Sovereignty: Compliance with International Regulatory Agreements* (Harvard University Press 1995) 27.
[470] Koh (n 465) 2600.

of the time.'[471] Still, realists argue that international law is not law at all simply because it has no true enforcement mechanism.[472]

While states do face the possibility of being held to account under international law by other states, the relevant question for this thesis is the extent to which states can also be held to account under international law by individuals within a state's own jurisdiction. Even a cursory look at the development of international law over the past seventy years, as the world has become more globalised, indicates a shift in subject matter and a shift in the manner in which individuals are considered in international law.[473] Increasingly, individuals are affected by international issues and norms. The traditionally horizontal relationship between states in international legal subject matters involving, for example, the movement of goods or trade relations, only indirectly affect individuals. More and more, however, individuals are becoming connected to international law, a point that is underscored by Hersch Lauterpacht's contention that individuals are the justification for the making of international law in the first place. [474] Increasingly, the subject matter underlying the making of international law – international affairs that are traditionally governed by horizontal relationships – have significant and direct impacts on individuals.[475]

Consider for example national security, human rights, and climate change: states assume international obligations on behalf of individuals. Put another way, states accept international obligations, the benefits of which ultimately accrue to individuals because those obligations regulate state behaviour to protect individuals' rights to freedom from torture and war crimes, the right to life, property, etc.[476] Do these international obligations rise to the level of creating actionable individual rights? One prominent argument is that individuals are granted rights under international law if a treaty obligates states to take action that would benefit individuals, or more specifically, if a state's failure to take an agreed action

[471] ibid 2599.
[472] ibid 2602.
[473] A Clapham, 'The Role of the Individual in International Law' (2010) 21 European Journal of International Law 25, 27.
[474] J Crawford, 'The Relations of International and National Law', *Brownlie's Principles of Public International Law* (9th edn, Oxford University Press 2019) 45–46; H Lauterpacht, *International Law and Human Rights* (Shoe String Press Inc 1950) 70.
[475] E Benvenisti, 'Reclaiming Democracy: The Strategic Uses of Foreign and International Law by National Courts' (2008) 102 American Journal of International Law 241, 245.
[476] Clapham (n 473) 27; J Crawford, 'Subjects of International Law', *Brownlie's Principles of Public International Law* (9th edn, Oxford University Press 2019) 111.

would burden individuals.[477] In other words, even under the traditionally horizontal relationship between states, an internationally wrongful act by a state – the breaching of an agreed treaty provision for example – may have direct, and therefore legal, consequences for parties other than states.[478] The question is whether the state's behaviour directly affects individuals, thus creating putative or residual rights for individuals.[479]

James Crawford, while serving as the ILC's Special Rapporteur on State Responsibility, remarked that the ILC Draft Articles on State Responsibility 'clearly envisage that some "person or entity other than a State" may be directly entitled to claim reparation arising from an internationally wrongful act of a state.'[480] Whether a treaty implicitly creates such a right, however, is broadly considered to be a question of treaty interpretation.[481] Whether non-explicit, or residual individual rights under international law carry some form of vindication or enforceability comes down to a question of whether, and by whom, a state can be held accountable. As early as 1906, scholars, such as Anzilotti, were adamant that only states have the right to invoke state responsibility, and then only once harmed, asserting that '[a] State may indeed be obliged to treat certain individuals in a certain way, but the State's obligation does not exist vis-à-vis individuals, it exists vis-à-vis another State'.[482] The theoretical basis for this assertion has been questioned, of course, and the ILC's Draft Articles on State Responsibility are not explicit regarding states' obligations toward individuals. Nevertheless, it is widely understood that international law has as its primary focus states' rights, obligations, and horizontal relationships, with only limited opportunities for recourse for individuals in international law.[483]

---

[477] Dd Sloss, *The Role of Domestic Courts in Treaty Enforcement: A Comparative Study* (Cambridge University Press 2009) 46–47.
[478] S Wittich, 'Domestic Courts and the Content and Implementation of State Responsibility International Law and Practice: Symposium on Domestic Courts as Agents of Development of International Law' (2013) 26 Leiden Journal of International Law 643, 647.
[479] J Crawford, 'International Human Rights', *Brownlie's Principles of Public International Law* (9th edn, Oxford University Press 2019) 625.
[480] Sloss (n 477) 51–52.
[481] D Sloss, 'When Do Treaties Create Individually Enforceable Rights - The Supreme Court Ducks the Issue in Hamdan and Sanchez-Llamas' (2006) 45 Columbia Journal of Transnational Law 20; Sloss (n 477) 46.
[482] J Crawford, 'Consequences of an Internationally Wrongful Act', *Brownlie's Principles of Public International Law* (9th edn, Oxford University Press 2019) 567.
[483] D Bodansky, J Brunnée and L Rajamani, *International Climate Change Law* (Oxford University Press 2017) 35.

It is therefore necessary to consider in more detail whether individuals have recourse in domestic settings to invoke international obligations. Theoretically, individuals have the opportunity to participate in the political process within their own state (in functioning democracies, at least). That, in turn, determines the policies that are agreed to at the international level, although some would argue the impact of individuals on the making of international law in this sense is minimal – and likely retroactive – in practice.[484] Still, the state is representative of its citizenry, acting on its behalf in the international arena. While treaties are negotiated, agreed and accepted by states, individuals are recognized more frequently as the beneficiaries of that state consent, especially when a treaty governs state behaviour specific to the treatment of humans such as, for example, human rights treaties.[485] However, states are generally afforded a significant margin of appreciation and deference because the state is considered to be best placed to make decisions regarding its own citizens and the public policy that affects them.[486]

It is clear that international law does not operate in a vacuum, but is dependent on state action, and national law plays a significant role in implementing and enforcing states' international obligations.[487] Contrary to the international arena, 'where lawless anarchy is the default condition unless punctuated by ratified treaty obligations, or the elevated threshold of international law',[488] national systems are built on legal structures reliant on binding rules for their functioning. It was the 1992 Rio Declaration[489] that significantly extended the reach of international law into matters internal to states, requiring not only the implementation and enforcement of national laws to address international and global environmental issues, but also requiring access to judicial remedies within national systems and access to decision-making processes.[490] Multilateral treaties routinely require states to

[484] Benvenisti (n 475) 272.
[485] Sloss (n 477) 556; Crawford, 'International Human Rights' (n 479) 610.
[486] J Crawford, 'The Claims Process', *Brownlie's Principles of Public International Law* (9th edn, Oxford University Press 2019) 688–689.
[487] J Harrison, 'The Role of International Law in Saving the Oceans and Future Challenges for the Legal Framework', *Saving the Oceans Through Law: The International Legal Framework for the Protection of the Marine Environment* (Oxford University Press 2017) 309.
[488] M Mehling, 'The Comparative Law of Climate Change: A Research Agenda' (2015) 24 Review of European, Comparative & International Environmental Law 341, 346.
[489] *Rio Declaration* (n 326).
[490] P Birnie, A Boyle and C Redgwell, 'Rights and Obligations of States Concerning Protection of the Environment' in Patricia Birnie, Alan Boyle and Catherine Redgwell (eds), *International Law and the Environment* (3rd edition, Oxford University Press 2009) 128–129. Prior to the Rio Declaration there was some reach into national legal systems by multilateral treaties, but they were very specific to particular issues like hazardous waste disposal and wildlife conservation.

take domestic action such as implementing and enforcing national rules and regulations. For example, as we saw in the discussion on obligations of conduct in section 3.1.2.1 above[491] (and as is developed in much more detail in chapters 4 and 5 below), both UNCLOS and the UNFCCC regime include obligations of conduct specifically requiring the implementation and enforcement of national legislation to protect the marine environment and to take action on climate change, respectively. [492] However, states are ultimately most likely only to take the necessary steps that are a priority for their own constituencies and that are in their own interest.[493] Given that individuals generally have relatively direct access to national courts as a way to settle legal disputes (in contrast to international courts and tribunals where such access is limited), it is not surprising that individuals are turning to national judicial fora for adjudication of questions regarding states' obligations, including those under international law.[494]

Generally speaking, when a state implements national laws as required by an international treaty, that national law itself may be a matter of national jurisdiction, but the action of implementing and enforcing that national law remains an international responsibility. As was discussed above,[495] in *South China Sea*, the enforcement of national laws was found to be an important component of the state's international due diligence obligation.[496] Therefore, failure to implement and enforce national regulations as required by international law may constitute a breach of international due diligence obligations.[497] Whether failure by a state to implement and enforce national policies adequate to prevent the risk of harm from climate change, ocean acidification, warming and deoxygenation is also a breach of its international due diligence obligations is a question at the heart of this thesis. The following two chapters will engage in a detailed exploration of this question through an analysis of national climate change litigation.

As the discussion in this sub-section shows, it is unsettled whether individuals have actionable rights under international law (where not explicitly stated). Without justiciable

[491] See section *3.1.2.1 Determining breach of obligations of conduct vs result*.
[492] *UNCLOS* (n 29) Article 207; *Paris Agreement* (n 1) Article 4.2.
[493] Harrison, 'The Role of International Law in Saving the Oceans and Future Challenges for the Legal Framework' (n 487) 309.
[494] V Lowe, 'The Principles of the International Legal System', *International Law* (Oxford University Press 2007) 126.
[495] See (n 427).
[496] *South China Sea Arbitration* (n 293) para 944.
[497] Crawford, 'The Relations of International and National Law' (n 474) 47.

rights in international law, recourse to international judicial fora also appears out of reach. We must turn then to national courts where states are, at a minimum, required to justify, in a public forum open to the scrutiny of their own citizens, the actions or inactions that have impacted its citizenry.[498] Why consider litigation at the national level to address international commitments pertaining to climate change, ocean acidification, warming and deoxygenation, rather than at the international level? First, as the discussion in this section has shown, the ability of individuals to bring litigation at the international level is vague at best and more likely non-existent where it is not expressly authorized (as is the case with much of the international human rights systems, for example).

At the international level, where individuals' access to judicial fora appears dependent on express treaty provisions, states could bring suit against other states on behalf of their citizens. This scenario brings with it its own host of potential concerns and challenges. It does not, however, address the issue at hand, where a state has failed to protect its own citizens from the risk of harm from, for example, climate change-related impacts on the ocean such as those detailed in chapter 2 of this thesis. In contrast to the international legal arena, domestic legal systems generally do provide recourse to individuals through the national judicial system.[499] The following sub-section explores national courts in further detail.

3.2.1.2 How do national courts treat international law?

This chapter considers the extent to which individuals can invoke international due diligence obligations in national courts. In order to make such a determination, this sub-section explores the nuanced differences between legal systems and how courts apply, refer to, and rely on international law in their decision-making in national legal disputes.

Modern international treaty law, and particularly the international climate change regime, includes a complex interplay between procedural and substantive obligations. Each treaty regime has its own complexities and mix of obligations, including binding and non-binding provisions, and obligations to take action at both the international and national level (the following chapters explore these complexities in more detail as it pertains to the international climate change regime and the law of the sea regime). Turning to national

[498] J Harrison, 'Addressing the Marine Environmental Impacts of Climate Change and Ocean Acidification', *Saving the Oceans Through Law: The International Legal Framework for the Protection of the Marine Environment* (Oxford University Press 2017) 257.
[499] V Lowe, 'Introduction and Overview: The Ambit of International Law', *International Law* (Oxford University Press 2007) 32.

courts to litigate international treaty obligations thus requires an understanding of the interplay between international and national obligations. It also requires an understanding of a court's authority to apply international law within a national legal system. Much of this depends on the domestic legal system and the judiciary's role within that system.[500]

National legal systems differ, of course, and this is examined in more detail below,[501] but while every legal system takes a different theoretical approach to the interpretation and incorporation of international law into the national system, in practice these abstract and theoretical distinctions are less stark.[502] Much of this practice is developed by the manner in which national courts apply, interpret and consider issues with respect to international law in general and international treaty obligations in particular. It is national courts, after all, who are tasked with deciding how and when international law is relevant and applicable, and who must ultimately determine the scope of interchange between international and national law.[503]

Courts take on multiple roles within national legal systems, including holding governments to account for their actions as they pertain to their own citizens, filling gaps between internationally agreed objectives and internal domestic policy and, relatedly, interpreting international obligations that have direct domestic impact.[504] There are limits to, and variations on, the role national courts can play in treaty interpretation, of course, but they do play a potentially significant role.[505] International law in general does not purport to subsume national legal systems without consent, i.e. without some action being taken at the national level by either the executive or the legislative branches of a state.[506] Given the increase in the reach into national legal systems found in modern international law, domestic courts and national law are of significant importance to treaty compliance and enforcement, although there is broad disagreement between the specific modalities and technicalities

[500] A-J Saiger, 'Domestic Courts and the Paris Agreement's Climate Goals: The Need for a Comparative Approach' (2020) 9 Transnational Environmental Law 37, 40.
[501] See 3.2.1.3 *The technicalities of international law in national legal systems: monism, dualism and something in between*.
[502] Crawford, 'The Relations of International and National Law' (n 474) 47.
[503] ibid 52–55.
[504] Saiger (n 500) 40–41.
[505] Sloss (n 477) 6.
[506] MP Van Alstine, 'The Role of Domestic Courts in Treaty Enforcement - Summary and Conclusions' in David Sloss (ed), *The Role of Domestic Courts in Treaty Enforcement: A Comparative Study* (Cambridge University Press 2009) 555–556.

involved.[507] To fully appreciate the differences in the roles national courts play in international treaty interpretation and application requires a deeper understanding of the differences between monist, dualist and hybrid systems within both common law and civil law systems, regardless of constitutional make-up.[508]

Again, generally the state is presumed to be in the best position to act on behalf of its citizens through the implementation and enforcement of legislation, and courts tend to respect that discretion so long as it is not manifestly unreasonable.[509] Historically, national courts were likely to align their own findings with the actions of the other branches of the state, affording the state great deference in international affairs, but with the increasing reach of international law into national legal affairs, there has been a discernible trend toward national courts' willingness to restrict their own governments' actions.[510] As national courts move toward more aggressively safeguarding their own independent status within the political organisation of a state, international law is a natural tool on which to rely: international law is 'being transformed from the shield that protected government from judicial review to the sword by which government's (or governments') case is struck down.'[511] Indeed, more national courts are beginning to apply more international law in more sophisticated ways than ever before.[512] For example, New Zealand's Supreme Court determined that the country's deportation powers are limited by its obligations under the Refugee Convention and the Convention against Torture,[513] the Israeli Supreme Court severely limited the government's national border policy based on its international legal

[507] ibid 557–558; Van Alstine (n 506); SD Murphy, 'Does International Law Obligate States to Open Their National Courts to Persons for the Invocation of Treaty Norms That Protect or Benefit Persons?' in David Sloss (ed), *The Role of Domestic Courts in Treaty Enforcement: A Comparative Study* (Cambridge University Press 2009).
[508] Van Alstine (n 506) 558–559.
[509] Crawford, 'International Human Rights' (n 479) 640.
[510] Benvenisti (n 475) 242–243.
[511] ibid 243.
[512] A Tzanakopoulos and CJ Tams, 'Introduction: Domestic Courts as Agents of Development of International Law International Law and Practice: Symposium on Domestic Courts as Agents of Development of International Law' (2013) 26 Leiden Journal of International Law 531, 531–532; Y Shany, 'National Courts as International Actors: Jurisdictional Implications' [2008] Hebrew University International Law Research Paper No. 22-08 4.
[513] *Zaoui v Attorney-General (No 2), [2006] 1 NZLR 289 (Supreme Court of New Zealand)*.

commitments,[514] and federal courts in Canada have relied on the state's international obligations to limit Canada's deportation powers.[515]

In fulfilling its many roles as it pertains to international obligations, treaty interpretation and national policy, the domestic judiciary's independence from the state's executive and legislative bodies – and therefore its ability to make independent determinations – is one of the most important factors.[516] A state's executive is imbued with the authority to negotiate and agree to international treaties, while its legislative bodies have a prominent role in developing national legislation and procedures. Necessarily, this means that these bodies are instrumental in determining the application and interpretation of international obligations in domestic policy.[517] As mentioned previously, citizens have the opportunity to participate in their state's political system (assuming the state is a functioning democracy) by, for example, electing their representatives. This makes a state's legislative bodies inherently political as well, subject to the pressures of electoral currents and political loyalties. National courts, on the other hand, are generally presumed to be, to a far greater extent than either the executive or legislative organs of a state, unburdened by political whims, loyalties and affiliations and free to more faithfully interpret international obligations.[518] Still, regardless of a national court's independence from other organs of the state, or the role a court plays and how it chooses to play it, domestic procedural law will determine whether, how and what subject matter a court can consider as it pertains to international law.[519]

Whatever the process by which a state internalizes international law, domesticising international law, weaving it into the fabric of the national legal system, is a potentially powerful driver of compliance with international treaties.[520] Indeed, making the most use of national institutions, particularly the domestic judiciary, elevates the incorporation of international law into national legal systems by way of judicial treaty interpretation.[521] In

[514] *HCJ 7957/04 Mara' be v Prime Minister of Israel, 45 ILM 202 (2006)*.
[515] *Re Jaballah, [2006] FCJ No 1706, at para 86 (Canadian Federal Court, Toronto, Ontario)*; *Canadian Council for Refugees v Canada, 2007 Fed CC LEXIS 1550*.
[516] Saiger (n 500) 41.
[517] P-H Verdier and M Versteeg, 'International Law in National Legal Systems: An Empirical Investigation Exploring Comparative International Law' (2015) 109 American Journal of International Law 514, 521.
[518] ibid.
[519] Saiger (n 500) 45,51.
[520] Koh (n 465) 2627–2628; R Fisher, 'Use of Domestic Courts and Procedures Part II: Second-Order Compliance Coping with Apparent Noncompliance - Chapter IX', *Improving Compliance with International Law*, vol 1 (1981) 212.
[521] Koh (n 465) 2631.

other words, domestic courts play a significant role in treaty interpretation when they rely on international law to guide their interpretation of national law, thus helping to domesticise international obligations through judicial internalization.[522]

While it is important to gain a deeper understanding of the differences between national systems, the following section will show that, while the path may be different, the ultimate destination is relatively similar in two important respects. First, domestic courts tend to interpret international treaty law in a way that is largely consistent with treaty interpretation principles formally laid out in the Vienna Convention on the Law of Treaties[523] (VCLT) and second, domestic courts broadly adhere to the fundamental principle that national law should be interpreted in a way that is consistent with the state's international treaty obligations.[524]

3.2.1.3 The technicalities of international law in national legal systems: monism, dualism and something in between

In this sub-section, the theoretical approaches to incorporating international law into national legal systems is explored in more depth before turning to an analysis of how theoretical distinctions play out in practice.

While the manner in which state executives gain the authority to bind their state in international law by negotiating and agreeing to treaties may differ, that authority itself is generally accepted. And in virtually all states, regardless of constitutional system, legislative or parliamentary bodies have a role to play, either prior to treaty negotiation or afterwards. The main question of importance for this thesis, however, pertains to national courts and their ability to recognize and apply treaty-based international law.[525] As Sir Kenneth Keith said during his term as an ICJ judge, '[m]ost of international law most of the time operates through national institutions, ... [including] through national courts.'[526] He adds that 'it is for national legal systems ... to determine how to give effect to their international obligations.'[527] Domestic incorporation, and consequently judicial interpretation, of international law, how

[522] Murphy (n 507) 19; Koh (n 465) 2657.
[523] *Vienna Convention on the Law of Treaties (*adopted 23 May 1969), entered into force 27 January 1980 1155 UNTS 331.
[524] Van Alstine (n 506) 589,593.
[525] ibid 564.
[526] Keith (n 269).
[527] ibid.

and under which circumstances it becomes binding in a national legal system, are issues that are not uniform across states and must therefore be considered in more detail.[528]

In theory, in the most general terms, the relationship between international and national law is viewed from two perspectives. *Monism* considers international and national law to be part of one and the same global system, while *dualism* considers the two to be different, wholly separate, legal systems.[529] When this is applied to the manner in which a domestic legal system treats international law, the most basic difference between the two lies in how international treaties gain legal effect in national legal systems. In strict monist systems, international treaties gain the force of national law upon ratification (also called direct effect) while in dualist systems, some legal implementing action by the legislature is required before a treaty becomes binding in national law.[530]

In reality however, most states are neither strictly monist nor strictly dualist in their approach to giving international law domestic legal effect and tend to adopt aspects of each approach.[531] Even in many monist systems, some form of legislative action is required for full treaty implementation. This could, for example, take the form of a requirement for legislative approval prior to ratification or acceptance of a treaty, consequently shifting a theoretically purely monist state into a hybrid monist system in practice.[532]

In strict dualist states, the authority to make international treaty law is understood as being a function of the executive, and domestic law-making a function reserved for the legislative bodies of a state.[533] This distinction between international treaty-making and domestic treaty implementation means that the legislature in these systems must enact a treaty implementing statute incorporating the treaty within domestic statutory law or adapting existing law to conform with the treaty in order for it to gain legal effect within the national system.[534] Until the legislature takes such action, it can technically be true that the executive has bound the state at the international level but a treaty has no formal legal effect within domestic law.[535] Implementing action by the legislature is frequently as simple as including

[528] Knop (n 466) 535.
[529] Sloss (n 477) 6.
[530] Colombo (n 464) 112.
[531] Verdier and Versteeg (n 517) 516.
[532] ibid 524; Van Alstine (n 506) 569–570.
[533] Sloss (n 477) 17.
[534] Van Alstine (n 506) 566.
[535] ibid 567.

the text of the treaty in an implementing statute. Alternatively, existing domestic law is amended or adapted to conform with a treaty's requirements. Either of these approaches mean that, technically it is the domestic statute, not the international treaty, that has legal effect within the national legal system.[536]

On their own, these theoretical and technical descriptions of the manner in which international law takes effect within national legal systems are misleading because they do not capture the influence of international law within domestic systems in practice, especially in national courts.[537] While it is of course important to have an understanding of the distinctions between dualist and monist legal systems, what emerges from any study of multiple systems, including different constitutional make-ups, common law and civil law traditions, is that national courts' roles in interpreting and applying international treaty law show tremendous functional similarities across systems.[538] Referring to the difference between monist and dualist systems, Judge Keith remarked that '[t]hat's not a difference which in practice is as sharp as it might at first appear.'[539]

This section of this chapter, in sum, has crystallised the importance of national courts when individuals are looking for recourse for harms caused by their own government, particularly where there is no express access to international courts. Let us look then to practice. How do national courts behave when confronted with legal questions that pertain to the application and interpretation of international treaties? The following section explores how national courts behave in practice in more detail.

3.2.2 National Courts in Practice

As we saw above, the formal distinction between dualism and monism (or hybrid monism) makes a difference in whether treaties have direct or indirect effect within a legal system, whether they remain unincorporated or have been incorporated into the national legal system by legislative action. But the indication is that these formal distinctions may not be the drivers of how courts behave. This section therefore explores how domestic courts treat international law when confronted with it in practice on the basis of examples of court action and legal decision-making from a range of jurisdictions with both monist and dualist legal

[536] Sloss (n 477) 17–18.
[537] Van Alstine (n 506) 568.
[538] ibid 566.
[539] Keith (n 269).

traditions, civil and common law legal systems and across a broad geographic distribution. The examples in this section are intended to develop a broad overview of national court practice across jurisdictions and is not intended to be an exhaustive list, but rather an indicative one.

Courts in both types of legal systems look to international treaties for guidance in interpreting a state's responsibilities. For example, in Germany, the Netherlands, and Poland – all countries where treaties have direct effect – courts will nonetheless look to the foundations of international treaties to promote compliance with international obligations by relying on them when interpreting both the treaty and domestic law.[540] In traditionally dualist countries like the United Kingdom, Australia, and Canada, courts still look to international law foundations even when treaties have been fully incorporated into domestic law.[541] Specifically, courts in all of these countries look to the VCLT for guidance on how to interpret international treaties.[542] The VCLT governs the interpretation of treaties and courts look to it for guidance when considering a state's obligations under an international treaty, regardless of the country's legal tradition or constitutional system.[543] From there, national courts – again regardless whether a dualist, monist, or hybrid system – turn to the international law foundations that underly treaties when applying and interpreting the treaties themselves and – crucially – when interpreting any national implementing legislation that incorporate them.[544] In other words, even when the domestic law incorporating an international treaty is the applicable law in question before it, a national court may still turn to the underlying treaty and the VCLT for guidance on the interpretation of the state's responsibilities and obligations.

Another area of interpretation that bridges the monism-dualism divide is a broad adherence to the well-known *Charming Betsy* doctrine, which simply states that domestic law should be interpreted to avoid conflict with a state's international treaty obligations.[545] Courts in traditionally monist or hybrid monist states like Poland, Russia, South Africa, and Germany and courts in traditionally dualist states like India, Israel, Australia, and the United Kingdom all prefer to promote consistency with international treaty obligations when interpreting

[540] Sloss (n 477) 13.
[541] ibid 19.
[542] *Vienna Convention* (n 523).
[543] Van Alstine (n 506) 588.
[544] ibid 612.
[545] Verdier and Versteeg (n 517) 527.

domestic law.[546] This means that national courts respect international treaty obligations even when interpreting purely domestic law that derives from international law.

National courts are bound by the laws applicable to them and must, as both legal theorists and their critics agree, base their judgments on sound legal reasoning to avoid arbitrariness and the risk of losing their status as legitimate arbiters of legal questions.[547] By the same token, a judge is not constrained by anything that would prevent her looking to international law as guidance to inform her legal reasoning. In the words of Canadian Supreme Court Justice L'Heureux-Dubé, the values captured in international treaty law 'may help inform the contextual approach to statutory interpretation and judicial review.'[548] Despite the monism-dualism divide in theory then, practice demonstrates that national courts do consider international law – sometimes as binding law, sometimes as guidance or as an interpretive aid.

Among the many tools domestic courts employ in interpreting international law, transjudicialism is gaining in prominence, including in climate change litigation, which is developed in depth in chapter 4 of this thesis. Transjudicialism in the simplest terms, is the practice by domestic courts to consider how courts in other jurisdictions have dealt with similar questions about the same international treaty. While judgments from other jurisdictions have no legal authority in national law, the reference to other national courts' consideration or interpretation of the same legal norms in a shared treaty can indeed guide a court's reasoning and can increase the authority of international law as a legitimate source for legal interpretation.[549]

The growing trend, especially in some areas of international law, of national courts speaking to each other in this way, referencing each other's judgments in questions involving the interpretation of the same treaty has a variety of motivations. Among them are respect for the rule of law, increased global self-awareness of domestic judges and heightened

[546] Van Alstine (n 506) 593–594.
[547] Knop (n 466) 503.
[548] *Baker v Canada (Minister of Citizenship and Immigration)* (1999) 2 SCR 817 (Supreme Court of Canada) 861.
[549] Benvenisti (n 475) 252.

sophistication of national courts in their understanding of the importance of international law, and a recognition of their role in finding solutions to global problems.[550]

The "rule of law imperative" can be summed up as the understanding that, once a state ratifies an international treaty, it has bound itself by that law and a national court has the obligation to hold its government to account for its legal commitments.[551] Once a state has consented to legally binding obligations by ratifying an international treaty, national courts must, according to this imperative, defend the rule of law against hypocrisy on the part of their own government.[552] Examples of national courts relying on the rule of law imperative in their decisions are plentiful. In *Grootboom v. Oostenberg Municipality*,[553] the South African Court looked to the international treaty underlying the state's obligations and its subsequent national policies pertaining to a housing programme. The Court went further still and also considered the General Comments of the treaty drafting committee to understand and clarify the nature of, and reasoning behind, the state's international obligations.[554] The Australian Court in *Minister of State for Immigration and Ethnic Affairs v. Ah Hin Teoh*[555] based its decision on the reasoning that the ratification of an international treaty endowed the Australian people with a legitimate expectation that the Australian government would comply with the international obligations it agreed to within that treaty. The Indian Supreme Court, in *Vishaka v. State of Rajasthan*[556] was explicit about the imperative of ensuring 'governance of the society by the rule of law' and its reliance on international treaty obligations as an interpretive guide to its decision-making to accomplish this goal.[557]

Whether states adhere to their obligations under international law or not, the examples here demonstrate that national courts consider ratification of a treaty – regardless of the status of incorporation into domestic law – to be evidence of a commitment by the state and they will hold the state to those commitments.

---

[550] R Bahdi, 'Globalization of Judgment: Transjudicialism and the Five Faces of International Law in Domestic Courts' (2002) 34 George Washington International Law Review 555.
[551] ibid 560.
[552] ibid 560–561.
[553] *Grootboom v Oostenberg Municipality* (2000) 3 BCLR 277 (High Court of South Africa).
[554] ibid 285.
[555] *Minister of State for Immigration and Ethnic Affairs v Ah Hin Teoh* (1995) 128 ALR 353 (High Court of Australia).
[556] *Vishaka v State of Rajasthan* (1997) 1997 AIR 3011 (Supreme Court of India).
[557] ibid 3013–3014.

Global self-awareness of domestic judges and the reference to courts in other jurisdictions who have considered similar questions of international law is especially evident in high-profile cases, or in cases dealing with high-profile issues, where judges are aware that the global community, particularly the global judicial community, is watching.[558] Climate change litigation increasingly falls into this category as we will see in more detail in chapter 4. Such global self-awareness promotes consideration of other jurisdictions' reliance on international law to guide decision-making. It can also act as a form of judicial restraint: judges tend not to want to be outliers, especially on high-profile issues.[559] Consideration of how other jurisdictions have dealt with similar questions of international treaty law, especially in high profile situations, serves two important legitimising functions. First, looking to other courts' reliance on international law to answer similar questions legitimises a domestic court's own reliance on international law in its decision-making. Second, this practice can add legitimacy to a court's particular interpretation of an international treaty when courts in other jurisdictions have come to similar conclusions, thus lending additional weight to the value of looking to international law not as binding law but as persuasive guidance.[560]

Broadly, transjudicialism highlights the growing role national courts play in providing real world solutions to global problems, and to the lack of compliance with international obligations by giving more weight to the persuasiveness of international law than relying purely on the bindingness of international law within the domestic context.[561] One interesting consequence of transjudicialism is an increased move away from the traditional model of deference afforded to the state's executive and legislative branches. An increased reliance on other jurisdictions can bring diverse judiciaries together to speak with one voice on a particular topic across jurisdictions, breaking from the tradition of speaking with the same voice as the political branches within the state.[562] This is particularly noticeable when a state has failed to comply with its international obligations. As we have seen, domestic courts are keen to interpret national laws to advance conformity with a state's international obligations and may eschew deference to its political branches if confronted with a state's

[558] Bahdi (n 550) 590.
[559] ibid 595.
[560] ibid 586.
[561] Knop (n 466) 535.
[562] Benvenisti (n 475) 269.

non-compliance with international treaty obligations.[563] Again, this is true in both dualist and monist states.

Courts are granted an elevated discretionary role in monist states where the legislature is not empowered to change treaty obligations through national implementing legislation.[564] Courts in traditionally dualist states have been known to rely on international treaty law to limit discretion otherwise granted to its political branches and administrative bodies.[565] A court's rejection or limitation of such discretion or deference to the other branches of its government is, of course, dependent on its own independence and willingness to enforce international treaty obligations in opposition to the state's political branches and is by no means a foregone conclusion.[566]

The bottom line is that formal, theoretical distinctions between dualism, monism and even hybrid monism really do not capture reality. In reality, national courts are willing to look to international treaties, whether as directly applicable or as the underlying foundational source of domestic law. They no longer feel as bound by traditional deference to the executive and the legislature as they might previously have been, and they are both aware of and interested in what courts in other jurisdictions are doing when faced with similar legal questions pertaining to a given international treaty.

In summary, this section of the chapter explored the several questions pertinent to whether individuals can invoke international law in national courts.[567] It first considered the relationship between international and national law, with an exploration of the theoretical differences between monism and dualism. It then analysed whether national courts can – and do – rely on international law in their judgments, finding that they do so in a variety of ways. Most relevant to answering the research question of this thesis is that national judges, when asked whether the state has breached a law, can – and do – refer to international law

[563] Van Alstine (n 506) 593.
[564] Verdier and Versteeg (n 517) 525.
[565] Van Alstine (n 506) 609.
[566] Verdier and Versteeg (n 517) 526.
[567] As will be seen in chapter 4, human rights law often provides an important bridge for individuals to access national courts in climate change litigation based on international law. However, as the subject of this thesis – and this chapter in particular – is international due diligence obligations, a detailed exploration of human rights law would be misplaced in this context. Not least because an exploration of national court decisions under international human rights law would not provide an accurate comparison to general international law because it explicitly provides for access to national courts for individuals where a state has breached its international obligations.

as an interpretive guide, a tool to decide issues of national law. This reliance on, or reference to, international law (and related obligations), particularly when it is the foundation of national legislation, will inform the analysis in the next two chapters of this thesis.

3.3 Conclusion

This chapter has addressed two vital sub-questions of the overall research question of this thesis. Specifically, it addressed the question of what due diligence is and the extent to which international law can be invoked in national courts.

To do this, the first section of the chapter briefly explored the historical context of the concept of due diligence in international law and developed six elements for determining the adequacy of state behaviour when due diligence is required. The six elements are that 1) due diligence is about risk of harm and the prevention of said harm; 2) it is context-specific and therefore flexible; 3) it requires an objective standard of conduct; 4) it entails continuous obligations; 5) it assumes both actual and constructive knowledge on the part of the state regarding the risk of harm to be prevented and 6) due diligence is grounded firmly in reasonableness. These elements were then applied to an analysis of the evidence courts may consider in determining a breach of due diligence-related obligations. The six elements developed in the first part of the chapter, along with the types of evidence a court will consider, are the guiding framework for the exploration of climate change-related case law that will be the subject of the next two chapters. In chapter 4, the analysis will focus on due diligence related obligations under the international climate change regime and in chapter 5 the analysis will focus on the due diligence related obligations set out in the law of the sea regime.

The second section of this chapter focused on whether national courts can consider international law in national litigation. To answer this sub-part of the research question, this section engaged in a detailed exploration of how international law finds its way into national legal systems in their various forms, whether monist, dualist, or something in between. Based on the theoretical distinctions, the analysis included an exploration of how national judges treat international law in practice, including both as binding upon them and as guidance in the interpretation of national laws and obligations, especially when domestic legislation is based on, or a result of, international law. The interpretive power of international law will be of particular interest in the discussion of climate change related case law in the next two chapters, particularly because climate change related cases against governments for failing

to adequately reduce GHG emissions tend to refer to international climate change obligations.

The general discussion and the hypothetical application of international due diligence obligations in national courts has reached its limit and, in order to adequately answer the overarching question of this thesis, it is now necessary to focus on specific case law. The following two chapters will therefore entail focused and specific examinations of whether national courts can rely on international due diligence obligations to hold a state accountable for ocean-related climate change harms faced by its own citizens.

Chapter 4: Due Diligence in the International Climate Change Regime and Domestic Climate Change Litigation

The previous chapter detailed the development of due diligence and states' related obligations in general international law, along with an exploration of how national courts treat international law. It therefore addressed two important sub-parts of the overall research question of this thesis. Building on chapter 3, this chapter seeks to address the next sub-part of the thesis. Specifically, this chapter explores whether individuals can invoke a state's *due diligence obligations under the climate change regime to hold their governments accountable in national court cases* for failing to adequately reduce GHG emissions, thereby causing ocean-related climate harm.

In chapter 3, based on its historic development, six distinct elements of due diligence in international law and states' related obligations were developed. These elements are 1) the risk of harm and the need to prevent it; 2) flexibility in the application of due diligence; 3) due diligence must rely on an objective standard of conduct; 4) due diligence obligations are continuous; 5) a state is considered to have both direct and constructive, or indirect, knowledge of the risk of harm; and 6) that due diligence is grounded firmly in reasonableness. Further, national courts' application of, and reliance on, international law as both binding law and as non-binding guidance demonstrates that domestic courts routinely rely on the interpretive power of international law. This practice is of particular interest in this chapter's analysis of domestic climate change litigation.

In order to address the ocean-related consequences of the climate crisis, ambitious and urgent action is required on the part of states to regulate and reduce GHG emissions. Although states continue to come together to negotiate how to address the climate crisis, they also consistently acknowledge, indeed '[*e]mphasiz[e]* with serious concern',[568] that there is a persistent and significant gap between what is needed in order to hold the temperature increase to well below 2°C (and preferably below 1.5°C) and what is being done or even pledged to achieve this.[569] This chapter explores whether states can be held to a standard of due diligence under the international climate change regime in order to trigger

[568] UNFCCC Decision 1/CP21*, Adoption of the Paris Agreement,* UN Doc FCCC/CP/2015/10/Add.1*,* (12 December 2015) 2. (*emphasis* in original)
[569] Lecocq and others (n 9) 23–24; UNEP (n 8) 36.

more ambitious action to eventually meet the objectives of the regime and avoid the calamitous harm that is near certain without such action.[570]

This chapter follows a similar structure to chapter 3 which developed the six elements of due diligence and considered in depth the reliance on international law in national courts. In Section 4.1, after a brief review of the evolution of the international climate change regime, each of the six elements of due diligence will be explored in turn, surfacing how each one is articulated therein. Section 4.2 begins with a discussion about how the international climate change regime is treated generally by national courts, i.e. whether it is indeed relied on as guidance in climate litigation that seeks to hold a state accountable. Following this is an exploration of how domestic courts treat each of the six elements of due diligence under the climate change regime in their decision-making. Section 4.3 builds on the previous two sections to determine the extent to which individuals have been able to invoke *due diligence obligations under the international climate change regime to hold their governments accountable in national court*s for failing to adequately reduce GHG emissions, thereby causing ocean-related climate harm.

The domestic case law analysed in this chapter was selected because it meets the following criteria: first, each case involves individuals (or groups of individuals, i.e. civil society) challenging a state's national climate policy and its regulation of GHG emissions as insufficient to address the climate crisis. Second, each case includes mention of the ocean-related impacts of climate change. The purpose of this second determinant is two-fold. The overall research question of this thesis pertains specifically to ocean-climate related harms and the case law considered in this chapter is again considered in chapter 5 where the due diligence obligations under the law of the sea regime are examined. The third criterion for case selection is that international law be discussed within the context of the case. The fourth and final criterion is that the court discusses due diligence within the decision. By applying these selection criteria, the extensive existing case law has been narrowed down to the ten case law decisions outlined chapter 1.[571]

[570] Rajamani (n 339) 179–180.
[571] For a detailed discussion of the methodology of case law selection, see chapter 1, section 1.4 *Methodology*.

4.1 Due Diligence in the International Climate Change Regime

Before investigating each of the six elements of due diligence under the international climate change regime, it is first necessary to consider the history and evolution of the climate change regime as it pertains to the development of due diligence. The first part of this section will therefore provide a brief overview of the evolution of the international climate change regime before exploring the six elements of due diligence under the regime.

4.1.1 Historical overview of the international climate change regime and due diligence

The international climate change regime consists of the United Nations Framework Convention on Climate Change (UNFCCC),[572] the Kyoto Protocol,[573] the Paris Agreement,[574] and numerous Decisions by the Conference of the Parties (COP). The UNFCCC is a framework convention that allows states to negotiate and agree to measures to address climate change based on robust underlying scientific reporting on the causes thereof and a recognition that states must take some action to address it.[575] Beginning with a framework convention allowed Parties to approach solutions in an incremental manner without first having to secure consensus on precise substantive matters.[576] It also allowed Parties to create a structure within which they could continue to negotiate and make progress on substantive obligations, create institutions and come to agreements as scientific knowledge evolved and Parties overcame initial reluctance to take on demanding obligations.[577] Because of its nature, the international climate change regime continues to be developed and elaborated on through negotiations based in large part on the continued evolution of scientific knowledge and political will.[578]

The overall objective of the international climate change regime is unchanged and subsequent negotiated agreements, protocols, and decisions refer to the objective 'to achieve ... stabilization of greenhouse gas concentrations in the atmosphere at a level that

[572] *UNFCCC* (n 14).
[573] *Kyoto Protocol* (n 337).
[574] *Paris Agreement* (n 1).
[575] *UNFCCC* (n 14).
[576] D Bodansky, 'The United Nations Framework Convention on Climate Change: A Commentary' (1993) 18 Yale Journal of International Law 451, 494.
[577] ibid 495.
[578] J Depledge, 'Foundations for the Paris Agreement - A. The Legal and Policy Framework of the United Nations Climate Change Regime' in Daniel Klein and others (eds), *The Paris Agreement on Climate Change - Analysis and Commentary* (Oxford University Press 2017) 28.

would prevent dangerous anthropogenic interference with the climate system.'[579] The UNFCCC set out early guiding principles which include 'protect[ing] the climate system for the benefit of present and future generations of humankind, on the basis of equity and in accordance with their common but differentiated responsibilities and respective capabilities'[580] and the 'specific needs and special circumstances' of developing countries are to be given 'full consideration.'[581] Further, the UNFCCC sets out that Parties 'should take precautionary measures to anticipate, prevent or minimize the causes of climate change and mitigate its adverse effects'[582] and that policies and measures developed 'should take into account different socio-economic contexts, be comprehensive, cover all relevant sources, sinks and reservoirs of greenhouse gases[583] and adaptation, and comprise all economic sectors.'[584] As for actual commitments and obligations, the UNFCCC primarily includes obligations of a procedural nature and obligations of conduct (as opposed to obligations of result). These include the development and publication of 'national inventories of anthropogenic emissions by sources and removals by sinks of greenhouse gases ... using comparable methods to be agreed upon by the Conference of the Parties;'[585] the formulation and implementation of national measures 'to mitigate climate change by addressing anthropogenic emissions by sources and removals by sinks'[586] and, significantly, that each Annex I Party 'shall adopt national policies to take corresponding measures on the mitigation of climate change, by limiting its anthropogenic emissions of greenhouse gases and protecting and enhancing its greenhouse gas sinks and reservoirs.'[587]

In these principles and commitments, we see the beginnings of due diligence language in the 1992 UNFCCC prior to negotiating any further agreements. These include specific principles on flexibility (in the form of common but differentiated responsibilities and respective capabilities, specific needs and special circumstances, and the consideration of socio-economic contexts), objective standards of conduct (comparable methods to be agreed by

[579] *UNFCCC* (n 14) Article 2.
[580] ibid Article 3.1.
[581] ibid Article 3.2.
[582] ibid Article 3.3.
[583] As is developed in more detail in chapter 5, 'sinks and reservoirs of greenhouse gases' is the manner in which the ocean is referred to within the substantive sections of the climate change regime.
[584] *UNFCCC* (n 14) Article 3.3.
[585] ibid Article 4.1(a).
[586] ibid Article 4.1(b).
[587] ibid Article 4.2(a).

the COP), the continuous nature of the issue (in the form of benefitting present and future generations) and equity (also found in reasonableness). Each of these are expanded upon in the next sub-part of this section.[588]

The first negotiated treaty under the UNFCCC was the Kyoto Protocol[589] in which the Parties sought to strengthen Annex I Parties' commitments, included specific quantified targets[590] for Annex I countries and a strong compliance mechanism.[591] The Kyoto Protocol was adopted in 1997 but did not enter into force until 2005 due to intense continued negotiation around questions of flexibility of implementation[592] and changing political landscapes.[593] The stark difference between the obligations of conduct in the UNFCCC and the clear obligations of result in the form of specific emissions reduction targets in the Kyoto Protocol ultimately proved too challenging for Parties and the second commitment period of reduction targets struggled to find full acceptance and only entered into force the day the commitment period ended.[594]

The second negotiated treaty under the international climate change regime is the Paris Agreement[595] which reverted to primarily relying on obligations of conduct and those of a procedural nature, giving states far more flexibility to determine their own GHG reduction ambitions and relying heavily on the concept of due diligence, even if it is not expressly articulated in the Paris Agreement. These obligations are the subject of the following sections of this chapter. The Paris Agreement's approach of leaving the specific details to the states was far more palatable to the Parties and it entered into force within a year of being negotiated, far earlier than anticipated.[596]

This very brief overview of the evolution of the international climate change regime demonstrates Parties' preferences for obligations of conduct over obligations of result, privileging national determination and with it greater flexibility and autonomy for states, and

[588] See 4.1.2 *The Elements of Due Diligence in the International Climate Change Regime*.
[589] *Kyoto Protocol* (n 337).
[590] ibid Annex B.
[591] ibid Article 18.
[592] Depledge, Joanna (n 578) 34.
[593] The USA's announcement in 2001 that it would not ratify the Kyoto Protocol made entry into force significantly more challenging.
[594] *Doha Amendment to the Kyoto Protocol*, UN Doc. FCCC/KP/CMP/2021/13/Add. 1, Decision 1/CMP.8, 8 December 2012 (entered into Force 31 December 2020)'.
[595] *Paris Agreement* (n 1).
[596] ibid.

therefore also a broader reliance on due diligence to deliver on the ambitious goals of the regime.[597] As was discussed in chapter 3,[598] obligations of conduct (rather than result) are more conducive to due diligence, which was defined by the ITLOS Seabed Disputes Chamber in the 2011 *Advisory Opinion* as the 'obligation to deploy adequate means, to exercise best possible efforts, to do the utmost'.[599] This definition of the due diligence obligation in international law includes the concept of ambition, which is a central concept within the international climate regime. The Paris Agreement relies heavily on ambition and progression, operationalised through its articulation of the aspirational long-term temperature goal ('pursuing efforts to limit the temperature increase to 1.5°C'[600]), the many aspects of progression (in the form of the cycle of the global stocktake[601]) and the frequent mentions of 'highest possible ambition'[602] found throughout. This concept of ambition so pervasive in the Paris Agreement provides Parties with a standard of due diligence that is required of them within their national contexts.[603]

The operationalisation of the Paris Agreement and Parties' obligations pertaining to the reduction of GHG emissions to a degree sufficient to meet the overall objective of the international climate regime is fundamentally grounded in the requirement to take national action: 'Parties shall pursue domestic mitigation measures, with the aim of achieving the objectives' of their nationally determined contributions to achieving the long-term temperature goal.[604] This places the substantive obligations enumerated in the Paris Agreement squarely within the national domain, i.e. in domestic settings and therefore also within the reach and, as is developed in section 4.2 of this chapter, within the purview of national courts.

Within the Paris Agreement then, Parties' obligations include developing successive nationally determined contributions[605] (NDCs) and the obligation to take national mitigation

[597] Rajamani (n 339) 163.
[598] Chapter 3, Section 3.1.2 *3.1.2 What Constitutes a Breach of International Due* Diligence Obligations?
[599] *Advisory Opinion* (n 39) para 110.
[600] *Paris Agreement* (n 1) Article 2.1(a).
[601] ibid Article 14.
[602] ibid Article 4.3.
[603] C Voigt, 'The Paris Agreement: What Is the Standard of Conduct for Parties?' (2016) 26 QIL QDI 17, 24.
[604] *Paris Agreement* (n 1) Article 4.2.
[605] ibid.

measures with the aim of achieving those contributions,[606] thus eventually meeting the long-term temperature goal. Further, each successive NDC is to reflect a progression beyond the previous one and should reflect the Party's highest possible ambition depending on their national circumstances.[607] What is striking within these sections of the mitigation obligations of the Paris Agreement is that Parties are not required to meet their nationally determined contributions, but to *aim* to meet them, which is reminiscent of the 'due diligence slang' that was discussed in chapter 3.[608] Similarly, the expectation that Parties' successive NDCs reflect their highest possible ambition to meet the long-term temperature goal of the Paris Agreement indicates that each Party is expected to do '*as well as it can*'[609] in its efforts to achieve the Agreement's objectives. The following section of this chapter investigates in detail the due diligence obligations of states by first summarising each of the six elements developed in chapter 3 and then exploring how each element is articulated within the international climate regime.

4.1.2 The Elements of Due Diligence in the International Climate Change Regime

This section is organised similarly to chapter 3, in that each of the six elements of due diligence is explored in turn, beginning with the risk of harm, moving on to the allowance for flexibility in actions taken, the objectivity of the standard of care, the continuous nature of due diligence obligations, the expectation of knowledge of the risk of harm involved, and finally ending with the reasonableness of actions taken to meet due diligence obligations under the international climate change regime. At the end of the discussion of each element, a summarizing table will be included to highlight where in the climate change regime each element is articulated.

4.1.2.1 Due diligence, harm and risk

The first element of due diligence and related state obligations is an assessment and recognition of the risk of harm and the corresponding prevention of such harm. It was determined in chapter 3 that the degree of diligence required is directly proportional to the severity of the risk of harm identified. In the case of climate change and ocean-related risks of harm, there is no lack of detailed information. While the science is still evolving, the entirety of the international climate change regime is based on the scientific assessments

[606] ibid.
[607] ibid Article 4.3.
[608] See 58 above.
[609] Voigt (n 603) 24.

made by the IPCC. After its creation in 1988 by the UN General Assembly, in 1990 the IPCC issued its first report, which was the basis for the negotiations of the UNFCC.[610] The preamble of the UNFCCC begins with the acknowledgment of the changing climate, its adverse effects and the concern that anthropogenic GHG emissions will add to global warming.[611] The UNFCCC also established the Subsidiary Body for Scientific and Technological Advise with the mandate to provide information and advice, along with assessments of scientific knowledge relating to climate change.[612] Importantly, the overall objective of the international climate change regime is couched in the recognition of the immense risk climate change poses, and is articulated in UNFCCC Article 2 thus:

> The ultimate objective of this Convention and any related legal instruments that the Conference of the Parties may adopt is to achieve ... stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system. Such a level should be achieved within a time-frame sufficient to allow ecosystems to adapt naturally to climate change, to ensure that food production is not threatened and to enable economic development to proceed in a sustainable manner.[613]

As was discussed at length in chapter 2,[614] the IPCC continues to provide the underlying scientific basis for negotiations under the international climate change regime and the UNFCCC considers the IPCC to be the most credible source of vital information regarding anthropogenic climate change.

The long-term temperature goal in the Paris Agreement includes the express recognition that limiting the temperature increase to well below 2°C, with efforts to limit the temperature increase to 1.5°C 'would significantly reduce the risks and impacts of climate change'.[615] The Glasgow Climate Pact, which was the outcome of the negotiations of the Conference of the Parties in Glasgow in November 2021 (COP26), recognizes the importance of 'the best available science for effective climate action and policymaking;'[616] '[*e]xpresses alarm and utmost concern* that human activities have caused around 1.1°C of global warming to date

[610] *United Nations Framework Convention on Climate Change Handbook* (UNFCCC 2006) 18. See also Chapter 2, section 2.1 *IPCC as policy relevant science that informs the climate change regime*.
[611] *UNFCCC* (n 14) Preamble.
[612] ibid Article 9.
[613] ibid Article 2.
[614] Chapter 2, section 2.1.1 *Development of IPCC reports*.
[615] *Paris Agreement* (n 1) Article 2.1(a).
[616] *Glasgow Climate Pact - Draft Decision* -/CP26, UN Doc FCCC/CP/2021/L13 (13 November 2021) I. 1.

and that impacts are already being felt in every region'[617] and '[*s]tresses* the urgency of enhancing ambition and action ... in pursuit of the ultimate objective of the Convention and its long-term global goal.'[618] Finally, similar to other negotiated agreements and COP decisions under the international climate regime, there is a recognition in the preamble of the Glasgow Climate Pact of the importance of 'ensuring the integrity of all ecosystems, including ... the ocean'[619] along with the protection of biodiversity.

The IPCC reports that underly and inform the continued negotiation and development of the international climate regime provide ever more sophisticated evidence of the risk of harm that unchecked GHG emissions and climate change pose for the ocean. This was explored in detail in chapter 2 of this thesis.[620] The risk of harm caused by GHG emissions and climate change, specifically as it pertains to the ocean, is therefore not only well documented in the vast literature on which Parties base their decision-making under the international climate change regime, but states expressly approve and accept the IPCC reports through the process that was described in detail in chapter 2.[621]

The risk of harm from anthropogenic GHG emissions and climate change is literally the reason states created the international climate change regime in the first place. It cannot be said, therefore, that the risk of ocean-related harm from climate change is anything less than dire. Indeed, the language used throughout the international climate regime indicates an understanding of the severity of the risk of harm to the ocean due to GHG emissions. Based on the discussion in chapter 3 on the development of due diligence obligations in international law,[622] and built on the clear articulation in the *Alabama Claims Arbitration* that a state's diligence must be 'in exact proportion to the risks involved',[623] the understanding of the enormous risk of significant ocean-related climate harm at temperatures above 1.5°C calls for correspondingly high due diligence within the international climate change regime.[624] Accordingly, due diligence would require that the measures taken to prevent such risk of harm be in proportion to the severity of the risk. The Parties recognize this, reaffirming in the Glasgow Climate Pact in November 2021 that the long-term temperature expressed in

[617] ibid I.3.
[618] ibid I.4.
[619] ibid Preamble.
[620] Chapter 2, section 2.2 *The Science*.
[621] See (n 614).
[622] Chapter 3, section 3.1 *3.1 Due Diligence in* International law.
[623] *Alabama Claims Arbitration* (n 284) 129.
[624] Rajamani (n 339) 178.

the Paris Agreement 'would significantly reduce the risks and impacts of climate change'[625] and recognizing that deep and sustained reductions in GHG emissions are required[626] to limit global warming.

In summary then, the international climate regime recognizes the extreme risk of severe harm GHG emissions pose to the climate and the ocean and accepts that urgent, deep and sustained action in the form of GHG emissions reductions are required to prevent such harm. The first element of due diligence is thus well established and expressed within the regime.

Table 4.1.1.1 Risk

Element	int'l climate regime	detail
risk	UNFCCC Article 2 (Objective)	Objective of the regime is to achieve stabilization of GHG emissions to prevent dangerous anthropogenic climate change
	PA Article 2.1(a) temperature goal	Long-term temperature goal of well below 2°C and pursuing efforts to limit temperature increase to 1.5°C
	IPCC Reports	States approve and accept each successive report description of evolving risk to ocean and climate

4.1.2.2 Due diligence and flexibility

Building on risk, the second element of due diligence is the context-specific, flexible nature of the obligation. It was established that due diligence is not one specific rule that is to be followed in every situation, but rather that by its very nature, it depends on the context and specific realities within the state.[627] This section considers how context-specificity and flexibility are articulated in the international climate regime as part of states' due diligence related obligations. There are two distinct features within the international climate change regime pertaining to the flexibility, or context-specificity, of states' due diligence obligations: differentiation and discretion. This section explores each in turn, beginning with the differentiation found within the regime and its evolution in the Paris Agreement, and then examining the discretion afforded to states within the regime.

Differentiation in the international climate regime is, as Rajamani terms it, 'a many-headed beast'[628] and focuses not only on the economic capacity of a state but also on historic responsibility, a distinction that has been shaped and reshaped throughout the international climate change regime. Differentiation is first articulated in the form of distinctions between

[625] *Glasgow Climate Pact* (n 616) IV. 15.
[626] ibid IV. 17.
[627] Chapter 3, section 3.1.1.2 *Due diligence and flexibility*.
[628] Rajamani (n 339) 173.

Annex I and non-Annex I countries in the UNFCCC[629] and the Kyoto Protocol,[630] and further through the principle of common but differentiated responsibilities and respective capabilities (CBDRR) that evolved in the Paris Agreement to include the consideration of national circumstances.[631] Even though the Parties moved toward a dilution of the stark differentiation between developed and developing countries by eliminating explicit references to different obligations for Annex I countries in the Paris Agreement, differentiation is still pervasive throughout the Agreement and remains a critical factor in assessing the extent of any due diligence required of Parties.[632]

This principle of differentiation can be found throughout the Paris Agreement, beginning at the outset with Article 2 where the purpose of the entire Agreement is elaborated. Article 2 establishes that the 'Agreement will be implemented to reflect equity and the principle of common but differentiated responsibilities and respective capabilities, in the light of different national circumstances.'[633] As mentioned above, this demonstrates a move away from the strict differentiation between Annex I and non-Annex I countries and ensures that, rather than grouping similarly situated countries together, the focus is on the specific circumstances of each Party. The addition of 'national circumstances' to the principle of CBDRR in Article 2 of the Paris Agreement provides enhanced flexibility in that, as national circumstances change, so too should the ambition and actions taken by the Party.[634] What is expected of a state with well-established and high functioning government institutions and structures will necessarily differ from the due diligence that is expected of a state that is still in the process of establishing and expanding such governmental functions.[635]

Differentiation between Parties works in concert with the discretion afforded to Parties in the international climate change regime. Flexibility and context-specificity run throughout the UNFCCC, as Parties have found the allowance for discretion to be the most productive way to agree on substantive progress in negotiations that can at times be politically

[629] *UNFCCC* (n 14) Article 4.2.
[630] *Kyoto Protocol* (n 337) Article 1.7.
[631] *Paris Agreement* (n 1) Preamble.
[632] Rajamani (n 339) 176.
[633] *Paris Agreement* (n 1) Article 2.2.
[634] L Rajamani and E Guérin, 'Central Concepts in the Paris Agreement and How They Evolved' in Daniel Klein and others (eds), *The Paris Agreement on Climate Change: Analysis and Commentary* (Oxford University Press 2017) 84.
[635] Voigt (n 603) 26.

divisive.[636] The UNFCCC first introduced flexibility in the form of language that permits states to adjust their own actions according to their specific circumstances, with terms such as 'to the extent feasible'[637] and 'to the extent its capacities permit'[638] to qualify requirements placed on Parties. In order to determine the level of due diligence expected of a state under the international climate change regime in a given situation therefore, its specific circumstances must be considered.[639]

The Paris Agreement develops and expands on flexibility significantly beyond what was introduced in the UNFCCC. This applies to the main substantive elements and commitments in the Paris Agreement such as mitigation[640] and sinks,[641] and also the reporting and review requirements found in the enhanced transparency framework[642] and the global stocktake.[643] Discretion is articulated through the use of 'as appropriate' and the focus on the nationally determined nature of each Party's contributions toward reaching the long-term temperature goal. The Paris Agreement is built on the foundation that each Party determines for itself what it is willing and able to contribute to achieving the overall goal of the regime, and the NDCs are the primary tool by which these contributions are communicated.[644] Article 3 is the first place where we see flexibility built into the Agreement for the purposes of assisting developing countries in their efforts to implement the Agreement by specifically 'recognizing the need to support developing country Parties for the effective implementation of this Agreement.'[645] This flexibility specifically afforded to developing country Parties adds to the due diligence nature of the international climate change regime in that it acknowledges that the specific context of a Party's circumstances is highly influential on the diligence that is due.

Further flexibility is afforded to Parties regarding their mitigation actions in Article 4. First, Parties may adjust existing NDCs at any time, however this must be done 'with a view to enhancing its level of ambition',[646] making it clear that backsliding is not acceptable in

[636] Rajamani (n 339) 172.
[637] *UNFCCC* (n 14) Article 4.1(f).
[638] ibid Article 12.1(a).
[639] Voigt (n 603) 19.
[640] *Paris Agreement* (n 1) Article 4.
[641] ibid Article 5.
[642] ibid Article 13.
[643] ibid Article 14.
[644] A Sharma (ed), *Guide to the Paris Agreement* (Oxford Climate Policy 2020) 40; *Paris Agreement* (n 1) Article 3.
[645] *Paris Agreement* (n 1) Article 3.
[646] ibid Article 4.11.

performing due diligence under the Paris Agreement. Finally, the term 'as appropriate' is used in the Agreement to indicate further flexibility in the context of NDCs, including that 'Parties should take into account, as appropriate, existing methods and guidance'[647] in light of the transparency framework later described.[648] 'As appropriate' is also used to indicate flexibility to Parties in the only mention of oceans in the Paris Agreement, aside from the preamble (and even so, it is an indirect mention as a sink of greenhouse gases). Article 5.1 makes clear that 'Parties should take action to conserve and enhance, as appropriate, sinks and reservoirs of greenhouse gases as referred to in Article 4, paragraph 1 (d), of the Convention.'[649] Article 4.1(d) of the UNFCCC specifically includes oceans and marine ecosystems in its description of 'sinks and reservoirs of all greenhouse gases'.[650]

Framing crucial mitigation commitments in due diligence language (aiming to meet expectations and doing as well as each Party can rather than strict obligations) embeds within the Paris Agreement an important driving force.[651] This flexibility within the Paris Agreement recognizes that Parties have different starting places. The expectation of due diligence rather than specific results provides a crucial 'direction of travel'[652] for Parties to work towards in meeting the overall goals of the international climate change regime. Flexibility as a component of due diligence is not unlimited, however. Article 4.13 of the Paris Agreement limits flexibility by requiring Parties to 'account for their nationally determined contributions'[653] and, '[i]n accounting for anthropogenic emissions and removals corresponding to their nationally determined contributions, Parties shall promote environmental integrity, transparency, accuracy, completeness, comparability and consistency, and ensure the avoidance of double counting'.[654]

Additional elements of the Paris Agreement that include 'built-in flexibility'[655] are the enhanced transparency framework[656] and its mutually complementing global stocktake.[657] As these central elements of the Paris Agreement go mostly to reporting requirements and

[647] ibid Article 4.14.
[648] ibid Article 13.
[649] ibid Article 5.1.
[650] *United Nations Framework Convention on Climate Change Handbook* (n 610) Article 4.1(d).
[651] Rajamani, Lavanya and Guérin (n 634) 77.
[652] ibid 78.
[653] *Paris Agreement* (n 1) Article 4.13.
[654] ibid.
[655] ibid Article 13.1.
[656] ibid Article 13.
[657] ibid Article 14.

the standards required therein, these are discussed at length in the next section where due diligence as an objective standard is explored, and again in the sections on the continuous nature of due diligence and knowledge.

In summary, flexibility, or context-specificity, is articulated within the international climate change regime in two main ways. Differentiation and discretion provide Parties the flexibility to take into consideration their national circumstances when developing measures to address ocean-climate related harms. This element of due diligence is therefore also well-articulated within the international climate change regime.

Table 4.1.2.2 Flexible

Element	int'l climate regime	detail
flexible	PA Article 2.2 (CBDRR+NC)	PA to be implemented with consideration of the specific context within each state
	UNFCCC Article 4.1(f)	to the extent feasible
	UNFCCC Article 12.1(a)	to the extent its capacities permit
	PA Article 4.14 (NDCs)	Parties should take into account, as appropriate, existing methods and guidance under the Convention
	PA Article 4.3 (NDCs, CBDRR+NC)	successive NDCs to represent progression and highest possible ambition, reflecting CBDRR and national circumstances
	PA Article 13 (Enhanced Transparency Mechanism)	flexibility based on national circumstances
	PA Article 14 (Global Stocktake)	outcome of stocktake to inform successive NDS, in a nationally determined way

4.1.2.3 Due diligence as an objective standard of care

The third element of due diligence after risk and flexibility is that a state's conduct must be objectively appropriate. The previous section on flexibility makes clear that the Paris Agreement is anything but straightforward or prescriptive, and that the elements of due diligence are interrelated. Objective standards can help Parties – and ultimately courts – determine the level of due diligence required in a given circumstance. While it steps away from the internationally negotiated prescriptive GHG reduction targets of the Kyoto Protocol, the Paris Agreement nonetheless provides ample clarity on the standard of care states are expected to exercise in their responses to ocean and climate-related harm from anthropogenic GHG emissions.[658] This section explores the standards, thresholds and guidelines within the international climate change regime that enable an objective assessment of whether a state's actions are sufficiently diligent to meet their obligations under the regime.[659] These include the enhanced transparency mechanism[660] and the global

[658] Voigt (n 603) 17.
[659] ibid 18–19.
[660] *Paris Agreement* (n 1) Article 13.

stocktake,[661] as well as common timeframes for NDCs. Building on the long-term temperature goal, these elements of the Paris Agreement provide the parameters within which Parties must act to adequately meet their due diligence obligations under the international climate change regime. Importantly, as with due diligence obligations generally, the objective standards within the regime are the floor, the minimum, of what is required of Parties to meet their due diligence obligations under the regime.[662]

Beginning with the long-term temperature goal, the Paris Agreement states as its purpose in Article 2 the 'aim to strengthen the global response to the threat of climate change'[663] and enhancement of the implementation of the UNFCCC. It will do this by

> holding the increase in the global average temperature to well below 2°C above pre-industrial levels and pursuing efforts to limit the temperature increase to 1.5°C above pre-industrial levels, recognizing that this would significantly reduce the risks and impacts of climate change.[664]

While the IPCC's Special Report on 1.5°C explicitly explained that the risks involved with a temperature increase of 2°C were significantly higher than if the temperature increase were limited to 1.5°C,[665] the IPCC's AR6 expanded on the increasing severity of those risks.[666] The increased risks at 2°C of temperature increase compared to 1.5°C include mass coral bleaching and mortality resulting in total loss of reefs in many regions, ice-free Arctic summers resulting in continued warming of the ocean, sea level rise, and a change in the chemical make-up of the ocean,[667] just to name a few of the risks elaborated in chapter 2.[668] Thus, although the 1.5°C temperature goal is articulated as aspirational in the Paris Agreement, it is widely understood that this has become the benchmark against which states' mitigation efforts will be measured.[669] The long-term temperature goal thus provides an important and clear foundation upon which states' national mitigation actions must be based. The provision in Article 4 that the temperature goal should be achieved by reaching

[661] ibid Article 14.
[662] M Doelle, 'Assessment of Strengths and Weaknesses' in Daniel Klein and others (eds), *The Paris Agreement on Climate Change: Analysis and Commentary* (Oxford University Press 2017) 385.
[663] *Paris Agreement* (n 1) Article 2.1.
[664] ibid Article 2.1(a).
[665] Hoegh-Guldberg and others, 'Special Report: Global Warming of 1.5°C - Chapter 3: Impacts of 1.5°C of Global Warming on Natural and Human Systems', *IPCC 2018: Global Warming of 1.5°C* (2018).
[666] IPCC, 2022, *IPCC AR6* (n 76); IPCC, 2021 (n 76).
[667] Hoegh-Guldberg and others (n 665) 254; Cooley and others (n 7) 3.
[668] Chapter 2, section 2.2.2 *Ocean-related climate harms and their impacts*.
[669] Rajamani and Guérin (n 634) 76; Doelle (n 662) 377.

net zero by mid-century[670] offers further guidance to Parties on the adequacy of the diligence with which they develop their national emissions reduction plans in response to the ocean-related risks involved with climate change.[671]

Building on the long-term temperature goal as the basis for action under the international climate change regime, the transparency framework created by the Parties within the regime provides another objective standard. The stated purpose of the regime's transparency framework 'is to provide a clear understanding of climate change action in light of the objective of the Convention.'[672] A marker of the Agreement's move toward less prescriptive measures is that the nationally determined nature of actions taken by the Parties is paired with extensive transparency and reporting requirements that expand and build on existing reporting and review requirements in the Convention. Under the enhanced transparency framework established in Article 13, Parties must provide national inventories of GHG emissions and removals by sinks[673] and information necessary to track the progress they make toward achieving their NDCs.[674] Crucially for the due diligence element of objectivity, the information Parties must provide under the enhanced transparency framework must be prepared using 'good practice methodologies accepted by' the IPCC and agreed to by the Parties.[675] As mentioned in the previous section, the transparency framework recognizes that each Party is starting from a different place and thus builds in flexibility based on national circumstances. The Parties have agreed to a set of common-sense modalities, procedures and guidelines that provide common methodologies, parameters and metrics for data to be provided based on the IPCC's guidelines and methods.[676] These agreed rules are designed to enhance clarity and ease of understanding of the data provided in each Party's biennial transparency reports and NDCs so that the collective global progress toward meeting the Agreement's long-term temperature goal can be measured.[677] They also serve to establish a

[670] *Paris Agreement* (n 1) Article 4.1. The precise language of achieving 'a balance between anthropogenic emissions by sources and removals by sinks of greenhouse gases in the second half of the century' is generally accepted as meaning the achievement of net zero emissions by 2050.
[671] Doelle (n 662) 377–378.
[672] *Paris Agreement* (n 1) Article 13.5.
[673] As a reminder, sinks are the only mention, albeit an indirect mention, of oceans in the substantive articles of the Paris Agreement. See section 4.1.2.2 *Due diligence and flexibility* above.
[674] *Paris Agreement* (n 1) Article 13.7.
[675] ibid Article 13.7(a).
[676] Decision 18/CMA.1 *Modalities, Procedures and Guidelines for the Transparency Framework for Action and Support Referred to in Article 13 of the Paris Agreement*, UN Doc FCCC/PA/CMA/2018/3/Add.2.
[677] *Paris Agreement* (n 1) Article 13.5.

clear set of standards, or guardrails, for Parties as they determine the most appropriate actions to take, given their national circumstances, in responding to the risk of ocean-climate related harm.

The transparency framework feeds directly into the global stocktake which is another fundamental feature of the Paris Agreement that provides objective standards against which states can measure the adequacy of their diligence. The global stocktake,[678] in combination with the NDCs, creates a continuous feedback loop of progression and highest possible ambition that allows Parties to assess the adequacy of their actions to address climate change: NDCs inform the global stocktake and the global stocktake informs Parties' successive NDCs.[679] Specifically, the global stocktake is meant to assess Parties' collective progress toward meeting the objectives and goals of the climate change regime[680] by establishing cycles of taking stock of the national actions (identified and described in each Party's NDC), beginning 'in 2023 and every five years thereafter'.[681]

The importance of the five-year cycle created by the Article 14 global stocktake is further discussed in the next section on the continuous nature of due diligence obligations, but it does indicate for Parties an objective goalpost in the form of a timeline on which they can expect their action to be assessed. It is the feedback loop, however, that is most determinative for an objective standard of care in Article 14. This is the requirement that Parties update and enhance their national actions, specifically their successive NDCs, based on the outcome of the global stocktake:

> [t]he outcome of the global stocktake shall inform Parties in updating and enhancing, in a nationally determined way, their actions and support in accordance with the relevant provisions of this Agreement, as well as in enhancing international cooperation for climate action.[682]

This allows Parties to have a knowable, objective threshold on which to base their ambition and to test whether the measures taken at the national level rise to the standard of conduct expected of Parties under the due diligence obligations of the international climate change regime.

[678] ibid Article 14.
[679] Rajamani and Guérin (n 634) 79.
[680] *Paris Agreement* (n 1) 14.1.
[681] ibid 14.2.
[682] ibid Article 14.3.

Further to the five-year cycle created in Article 14 for the global stocktake, and because NDCs can differ widely due to the flexibility afforded Parties, the Paris Agreement requires Parties to develop some agreed standardization on the timeframes covered by Parties' NDCs and recently made some progress on this front.[683] Article 4.10 of the Paris Agreement provides that the Parties 'shall consider common time frames for nationally determined contributions'.[684] The Parties were unable to agree on the specifics of common timeframes initially and raised the possibility of five-year, ten-year or hybrid timeframes, giving Parties the option to choose[685] (and thus further expanding flexibility). Parties therefore originally only agreed to apply common timeframes beginning in 2031.[686] Ultimately, at the Glasgow negotiations in 2021, the Parties agreed to five-year timeframes[687] which align well with the five-year global stocktake. The five-year timeframe for NDC content serves not only to provide an objective standard for Parties with which they can align their national measures, it may also generate additional pressure for states to take more immediate action[688] to meet the long-term goals of the international climate change regime. In the context of due diligence, these common timeframes provide another level of objective standard for Parties regarding the content included in their NDCs.

The five-year cycle of the global stocktake and the common timeframes for the NDCs point to another important aspect of the international climate change regime, namely progression. Progression is a critical theme of the Paris Agreement and is another objective standard against which a Party's diligence can be measured. This notion of progression is elaborated in Article 4.3 in the form of the expectation that Parties' successive NDCs will 'reflect its highest possible ambition.'[689] Together with the global stocktake, progression – increased ambition toward the long-term goal – provides Parties with another clear guide of the diligence required under the international climate change regime. The critical importance of

[683] W Obergassel and others, 'Turning Point Glasgow? An Assessment of the Climate Conference COP26' (2021) 15 Carbon & Climate Law Review (CCLR) 271, 3.
[684] *Paris Agreement* (n 1) Article 4.10.
[685] Decision -/CMA.3 *Common Time Frames for Nationally Determined Contributions Referred to in Article 4, Paragraph 10, of the Paris Agreement*, Advance Unedited Version.
[686] Decision 6/CMA.1 *Common Time Frames for Nationally Determined Contributions Referred to in Article 4, Paragraph 10, of the Paris Agreement,* UN Doc FCCC/PA/CMA/2018/3/Add.1 (Advance Version) para 2.
[687] *Glasgow Climate Pact* (n 616).
[688] Obergassel and others (n 683) 277.
[689] *Paris Agreement* (n 1) Article 4.3.

progression is further discussed in the next section on the continuous nature of due diligence obligations.

In summary, the international climate change regime, and especially the Paris Agreement, provides Parties with several objective standards against which to measure the appropriateness of the actions taken to meet due diligence obligations in the prevention of ocean-climate related harms. The first of these is the long-term temperature goal that frames all actions to be taken under the regime, including the need to reach net zero by mid-century. Flowing from the temperature goal are the enhanced transparency framework, the global stocktake, common timeframes for NDCs and the requirement of progression. Parties therefore have ample and robust guidance along which the diligence they are expected to employ can be objectively measured.

Table 4.1.2.3 Objective

Element	int'l climate regime	detail
objective	PA Article 2.1(a) (temperature goal)	holding the increase in global average temperature increase to 1.5°C
	PA Article 4.1 (mitigation)	net zero by mid-century
	PA Article 4.3 (progression, highest possible ambition)	successive NDCs will represent progression and reflect highest possible ambition
	PA Article 13 (Enhanced Transparency Framework)	provide national inventories of emissions and removals, and information necessary to track progress toward achieving NDCs, using good practices and methodologies accepted and agreed by IPCC and COP.
	PA Article 14 (Global Stocktake)	5-year global stocktake; outcome of stocktake to inform NDCs and enhance international cooperation
	Glasgow Climate Pact (common timeframes for NDCs)	NDCs to cover 5-year timeframes

4.1.2.4 Due diligence as a continuous obligation

After risk, flexibility and the requirement of an objective standard of care, the fourth element of due diligence is that due diligence related obligations are continuous in nature. This factor is of tremendous importance in ocean-climate related contexts due to the high reliance on science and the rapid pace of scientific advancements, along with the slow-onset and long-term nature of the harms involved. This section explores how the continuous nature of due diligence related obligations is articulated in the international climate change regime.

The entire purpose of the international climate change regime, and of the Paris Agreement in particular, is articulated in language that makes clear the continuous, ongoing nature of obligations to meet the objectives of the regime. In Article 2 of the UNFCCC, the objective is

to achieve stabilization of GHG levels.[690] The purpose of the Paris Agreement is articulated as holding the temperature increase to a limit[691] that enhances the response to climate change. Stabilization of GHG levels and holding the temperature increase below a certain limit are not static results that can be achieved once. Given the nature of anthropogenic climate change, the *stabilizing* of GHG emissions and the *holding* of the temperature below a particular limit will necessarily require ongoing, continuous actions to be taken by the Parties.

As was mentioned in the discussion on objective due diligence standards within the regime,[692] progression is a critical element of the international climate change regime. Article 3 of the Paris Agreement clearly sets out this progression in the declaration that '[t]he efforts of all Parties will represent a progression over time.'[693] Not only does the articulation of 'efforts' of the Parties indicate the requirement of due diligence in the form of due diligence 'slang'[694] but the expectation of progression over time is a clear articulation of the continuous nature of the due diligence obligation.[695] Progression is also found in the requirement, not only for *successive* NDCs, but that each successive NDC must represent a *progression beyond previous* NDCs.[696] The enhanced transparency framework was established specifically to track progress toward the long-term goals of the regime[697] and the requirement for the regular provision of information necessary to track progress[698] is a clear articulation of the continuous nature of the due diligence obligation under the regime. Similarly, the five-year cycle of the global stocktake makes clear that the regime's due diligence obligations are continuous with the expectation that each cycle brings a progression in ambition over the previous one.[699] Taken together, the requirement of progression of the successive NDCs, the enhanced transparency framework and the cyclical global stocktake make clear that the nature of the due diligence obligations within the climate change regime are continuous.

The further obligation that each successive NDC will reflect the Party's 'highest possible ambition'[700] strengthens the due diligence obligations within the regime. It requires Parties

[690] *UNFCCC* (n 14) Article 2.
[691] *Paris Agreement* (n 1) Article 2.
[692] See section 4.1.2.3 *Due diligence as an objective standard of care*.
[693] *Paris Agreement* (n 1) Article 3.
[694] See (n 608).
[695] Rajamani (n 339) 169.
[696] *Paris Agreement* (n 1) Article 4.3.
[697] ibid Article 13.5.
[698] ibid Article 13.7.
[699] ibid Article 14.
[700] ibid Article 4.3.

to be ambitious, to do as well as they can in order to achieve, over time, the long-term objective of the international climate regime.[701] Embedding 'highest possible ambition' into the progression of successive NDCs creates the expectation that there will be no back-sliding in Parties' progress toward the long-term temperature goal.[702] These requirements were introduced to address the gap between what Parties indicated could be achieved in their collective NDCs and what measures are needed to achieve the long-term temperature goal and the overall ambition of the regime.[703] This gap is continuously evaluated, updated and published in the UNEP's annual Emissions Gap Reports[704] which brings the discussion back to the scientific basis on which the entire international climate change regime is built. The IPCC continues to update and publish new reports, demonstrating the continuous nature of the development of the relevant science, and also the ongoing evolution and increasing sophistication of the available science on which Parties must base their efforts in order to meet the objectives of the regime.

The science underlying the regime is discussed in more detail in the next section on due diligence and knowledge, but for purposes of the continuous nature of the due diligence obligation under the international climate change regime, it is important to note that Parties must base their efforts to achieve the long-term temperature goal on the 'best available science'.[705] This requirement of basing national actions to address climate change on the best available science further solidifies the continuous nature of the due diligence obligation to address ocean-climate related harms. As was discussed at length in chapter 2,[706] our understanding of the connections between the climate and ocean, and the impacts of climate change on the ocean, continue to evolve and become more sophisticated with increased investigation and knowledge. Therefore, the Parties' inclusion of 'best available science' in the operative articles of the Paris Agreement that pertain to progression within the pursuit

[701] Voigt (n 603) 24–25.
[702] Rajamani and Guérin (n 634) 77–78.
[703] ibid.
[704] United Nations Environment Programme, 'UNEP, The Emissions Gap Report 2017. United Nations Environment Programme (UNEP) (2017)' (2017); United Nations Environment Programme, 'UNEP, The Emissions Gap Report 2018. United Nations Environment Programme (UNEP) (2018)' (UNEP 2019); United Nations Environment Programme, 'UNEP, The Emissions Gap Report 2019. United Nations Environment Programme (UNEP) (2019)' (UNEP 2019); UN Environment, 'UNEP, The Emissions Gap Report 2020. United Nations Environment Programme (UNEP) (2020)' (2020); UNEP (n 8).
[705] *Paris Agreement* (n 1) Article 4.1.
[706] See (n 620).

of the long-term temperature goal solidify the ongoing, continuous nature of the due diligence demanded of Parties under the regime.[707]

All of these requirements lead back to the overall objective of the regime: the long-term temperature goal. The temperature goal itself indicates the continuous nature of the due diligence obligations in the international climate change regime, in that Parties must pursue 'efforts to limit the temperature increase to 1.5°C'.[708] The requirement is not to meet, but to pursue efforts to hold temperatures at or below the *long-term* temperature goal. The international climate change regime is couched in progression over time, each requirement indicating the continuous nature of the due diligence obligations under the regime.

In summary, framed in long-term goals, the international climate change regime clearly articulates the continuous nature of due diligence obligations through the requirements of progression over time, successive NDCs, the employment of Parties' highest possible ambition and the reliance on ever evolving best available science.

Table 4.1.2.4 Continuous

Element	int'l climate regime	detail
continuous	UNFCCC Article 2 (Objective)	Objective of the regime is to achieve stabilization of GHG emissions to prevent dangerous anthropogenic climate change
	PA Article 2 (temperature goal)	holding the increase in global average temperature increase to 1.5°C
	PA Article 3 (NDCs)	The efforts of all Parties will represent a progression over time.
	PA Article 4.1 (best available science)	Parties aim to undertake rapid reductions in GHG in accordance with best available science, achieving net zero in second half the century
	PA Article 4.3 (Mitigation, successive NDCs)	successive NDCs will represent a progression beyond current NDC and reflect highest possible ambition
	PA Article 13.7 (enhanced transparency framework)	regularly provide information necessary to track progress toward achieving NDC
	PA Article 14 (global stocktake)	outcome of stocktake to be used to update and enhance successive NDCs, progression every 5 years

4.1.2.5 Due diligence and knowledge

The fifth element of due diligence involves both actual and constructive knowledge. It includes an expectation of what a state should have known regarding the risk of harm in addition to what a state actually knows. Since the international climate change regime is based on the underlying scientific understanding of climate change, this factor is well articulated in the regime. This section explores the details of how this element goes to determining whether a state's actions are duly diligent, particular as it concerns continued advancements in the scientific understanding of the nexus between climate change and the

[707] Rajamani (n 339) 169.
[708] *Paris Agreement* (n 1) Article 2.1(a).

ocean and the implications for the foreseeability of ocean-climate related harms for imputing constructive knowledge on states.

As has been noted several times already, the international climate change regime makes only limited reference to the ocean,[709] but with ever increasing scientific evidence, the connection between the climate and the ocean has become a more central focus of the regime in recent years.[710] The IPCC's Special Report on the Ocean and Cryosphere, along with the IPCC's Assessment Reports in recent years, particularly AR6, highlight the interconnection between the climate and the ocean and – crucially – the risks to the ocean and the related risk to humans. In chapter 2, the process by which IPCC reports are finalized and approved was discussed in some length[711] and the importance of state acceptance of the reports must be reiterated here. The entirety of the international climate change regime is based on the scientific reports published by the IPCC, and states approve each report in significant detail.[712] States therefore have direct and full knowledge of the risk of ocean-related harms of GHG emissions, so how is the knowledge element of the due diligence obligations articulated in the international climate change regime?

Beginning again with the long-term temperature goal found in Article 2 of the Paris Agreement, the lower goal of 1.5°C (which over time has become the benchmark target[713]) was included in the Paris Agreement because of the serious concerns about the dramatic increase in the risk of significant and dangerous ocean-related harm that come with temperatures above 1.5°C.[714] These risks are faced especially by states whose very existence is threatened by ocean-related climate harms such as Small Island Developing States (SIDS) and the Independent Alliance of Latin America and the Caribbean (AILAC), who were

[709] According to Article 5.1 of the Paris Agreement, "Parties should take action to conserve and enhance, as appropriate, sinks and reservoirs of greenhouse gases as referred to in Article 4, paragraph 1 (d), of the Convention, including forests." And Article 4.1(d) of the UNFCCC provides that Parties shall "promote sustainable management, and promote and cooperate in the conservation and enhancement, as appropriate, of sinks and reservoirs of all greenhouse gases not controlled by the Montreal Protocol, including biomass, forests and oceans as well as other terrestrial, coastal and marine ecosystems."
[710] Pörtner and others (n 4); Fox-Kemper and others (n 18); *Glasgow Climate Pact* (n 616).
[711] See (n 621).
[712] IPCC, 'Principles Governing IPCC Work, Appendix A' (n 78) 17.
[713] Rajamani, Lavanya and Guérin (n 634) 76; Doelle (n 662) 377.
[714] Report of the Subsidiary Body for Scientific and Technological Advice on the Structured Expert Dialogue on the 2013-2015 Review. UN Doc. FCCC/SB/2015/INF.1.

ultimately responsible for pushing the other Parties to include the lower temperature goal in the final text of the Paris Agreement.[715]

Aside from the long-term temperature goal, the most specific requirement within the international climate change regime regarding knowledge is the requirement that states base their national actions to reduce GHG emissions on the 'best available science'.[716] Additionally, the dual prongs of knowledge exchange created by the enhanced transparency framework[717] and the five-year cycle of the global stocktake[718] serve to embed the element of knowledge in states' due diligence obligations within the international climate change regime. Parties gain a 'clear understanding of climate change action ... including clarity and tracking of progress towards achieving'[719] their individual NDCs through the transparency framework. Crucially, they are subsequently obliged to use the information gained through the global stocktake: 'The outcome of the global stocktake shall inform Parties in updating and enhancing'[720] their national actions under the Agreement. In other words, Parties must act on the knowledge gained through these processes and calibrate their national measures to achieve the long-term temperature goal of the regime. This is a clear articulation of the knowledge element of due diligence within the international climate change regime.

The gap between what is needed to meet the long-term goals of the international climate change regime and what is currently being done by the Parties was discussed in the previous section on the continuous nature of due diligence obligations.[721] The significance of AR6 and the UNEP Gap Reports for this element of due diligence is that the underlying scientific analysis and the updated articulation of the emissions gap function to further impute knowledge, including what states *should* know, on Parties for purposes of due diligence obligations under the international climate change regime.[722] The Parties specifically

[715] T Ourbak and AK Magnan, 'The Paris Agreement and Climate Change Negotiations: Small Islands, Big Players' (2018) 18 Regional Environmental Change 2201, 2203; 'Press Release: AOSIS Ministers Lay Out Priorities Ahead of Week Two' (*AOSIS*, 7 December 2015) <https://www.aosis.org/press-release-aosis-ministers-lay-out-priorities-ahead-of-week-two/> accessed 9 February 2022.
[716] *Paris Agreement* (n 1) Article 4.1.
[717] ibid Article 13.
[718] ibid Article 14.
[719] ibid Article 13.5.
[720] ibid Article 14.3.
[721] See section 4.1.2.4 *Due diligence as a continuous obligation*.
[722] Rajamani (n 339) 177–178.

articulated this knowledge in the COP Decision adopting the Paris Agreement and in the Glasgow Climate Pact.[723]

In summary, knowledge as an element of due diligence obligations is articulated in the international climate change regime through the underlying science behind the long-term temperature goal, along with the requirement for states to use the best available science in the development of national measures to address ocean and climate harms from GHG emissions. It is further augmented by the preparation and exchange of information through the enhanced transparency framework and the global stocktake. The imputation of constructive knowledge on states occurs through states' reliance on information provided in the annual UNEP Gap Reports and the ever-evolving IPCC reports that underly the international climate change regime and its continued evolution, along with repeated references made by the Parties in COP Decisions.

Table 41.2.5 Knowledge

Element	int'l climate regime	detail
knowledge	PA Article 2 (temperature goal)	the need to hold the increase in global average temperature increase to 1.5°C
	PA Article 13 (enhanced transparency framework)	information necessary to track progress
	PA Article 14 (global stocktake)	5-year cycles of information to take stock of progress toward achieving the purpose of the climate regime; information gained to be used in successive NDCs
	COP Decision 1/CP21 (Emissions Gap)	COP decision adopting the PA recognizing the gap in emissions reductions
	Glasgow Climate Pact (Emissions Gap)	Recognizing continued existence of dangerous emissions gap

4.1.2.6 Due diligence and reasonableness

The sixth and final element of due diligence is that all of the previous elements (risk, flexibility, objective standard of care, continuity of the obligation, and knowledge) must be viewed through the lens of reasonableness. This section investigates how the international climate regime builds reasonableness into states' due diligence related obligations.

The various obligations within the international climate change regime that were discussed above, including NDCs and taking and communicating domestic mitigation action, are to be fulfilled in way that is expected of a responsible state, in the context of flexibility, objective standards, and available knowledge. In other words, what is expected of states is what is

[723] *Paris Agreement* (n 1) 2; *Glasgow Climate Pact* (n 616) para I. 4.

reasonable with a view toward achieving the long-term temperature goal and the overall objectives of the regime.[724]

In the Paris Agreement, the Parties agreed that actions taken by states in response to climate change are to be determined at the national level, indicating the Parties' commitment to state sovereignty. In the discussion of the element of flexibility,[725] state discretion and the margin of appreciation afforded to states was crucial. However, this discretion must be overlaid with the expectation that the state is still acting reasonably. Regardless of the discretion afforded to states, the expectation remains that whatever measures a state takes to reduce GHG emissions and mitigate climate change must be balanced and reasonably capable of achieving the long-term goals and objectives of the international climate change regime, within the context of specific national circumstances.[726] Reasonableness as an element of due diligence within the international climate change regime can therefore be said to put limits on the considerable level of flexibility, i.e. discretion, afforded to states in their national actions to address climate change.[727] This limitation on discretion is found in Article 4.2, which obliges states to 'pursue domestic mitigation measures' (state discretion) 'with the aim of achieving the objectives of such contributions'[728] (limiting state discretion to measures that are reasonably capable of achieving the overall objectives).

Reasonableness as an overlay on each of the other elements of due diligence is further articulated in the international climate change regime by the term 'as appropriate' in what is often considered to be a qualifying, or weakening, of otherwise binding obligations.[729] The application of this term was included above in the discussion on flexibility[730] and it is doing double duty here to also limit flexibility in the form of reasonableness. Article 5.1, the only (indirect) mention of the ocean in the substantive articles of the Paris Agreement, calls on Parties to 'conserve and enhance, as appropriate'[731] sinks such as the ocean, as well as coastal

[724] Voigt (n 603) 18–19.
[725] See section 4.1.2.2 *Due diligence and flexibility*.
[726] Mayer (n 428) 135; Voigt (n 603) 27; M Malaihollo, 'Due Diligence in International Environmental Law and International Human Rights Law: A Comparative Legal Study of the Nationally Determined Contributions under the Paris Agreement and Positive Obligations under the European Convention on Human Rights' (2021) 68 Netherlands International Law Review 121, 133–134.
[727] Rajamani and Guérin (n 634) 84–85.
[728] *Paris Agreement* (n 1) Article 4.2 (emphasis added).
[729] L Rajamani, 'The 2015 Paris Agreement: Interplay Between Hard, Soft and Non-Obligations' (2016) 28 Journal of Environmental Law 337, 343; D Bodansky, 'The Legal Character of the Paris Agreement' (2016) 25 Review of European, Comparative & International Environmental Law 142.
[730] See section 4.1.2.2 *Due diligence and flexibility*.
[731] *Paris Agreement* (n 1) Article 5.1.

and marine ecosystems.[732] In the elaboration of the enhanced transparency framework of Article 13, the Parties are once again to apply reasonableness when they 'adopt common modalities, procedures and guidelines, as appropriate'[733] to enable transparency.

Finally, the focus on ambition within the Paris Agreement indicates that reasonableness is an overarching lens through which Parties' due diligence is evaluated. This is articulated throughout the Paris Agreement in the expectation of the highest possible ambition,[734] the expectation that Parties will do their best to work toward achieving the goals and objectives of the international climate change regime,[735] the focus on equity[736] and the successive progression in ambition.[737] Taken together, the language in these provisions of the regime make it clear that any actions that fall short of these high expectations will also fall short of reasonableness.[738]

In sum, the notion of reasonableness is the overarching standard to determine whether or not the actions a state takes in meeting its obligations under the international climate change regime, specifically the national measures taken to reduce GHG emissions and mitigate climate change, are appropriately diligent.[739]

Table 4.1.2.6 Reasonable

Element	int'l climate regime	detail
reasonable	PA Article 4.2 (mitigation)	Parties to pursue domestic mitigation measures with the aim of achieving the objectives of the climate regime (including temperature goal)
	PA Article 4.3 (mitigation)	successive NDCs to reflect 'highest possible ambition'
	PA Article 5.1 (sinks)	Parties are to conserve and enhance sinks (including oceans, coastal and marine ecosystems) 'as appropriate'
	PA Article 13 (Enhanced Transparency Framework	Parties are to adopt modalities, procedures and guidelines 'as appropriate'
	PA 3, 4.2, 13.5, 13.7, 14	ambition in the form of expectation to work toward achieving the objectives and goals of the regime
	PA 2.2, 4.1, 14.1	focus on equity

[732] *UNFCCC* (n 14) Article 4.1(d).
[733] *Paris Agreement* (n 1) Article 13.13.
[734] ibid Article 4.3.
[735] ibid Articles 3, 4.2, 13.5, 13.7, 14.
[736] ibid Preamble, Articles 2.2, 4.1, 14.1.
[737] ibid Articles 4, 14.
[738] Doelle (n 662) 387.
[739] Malaihollo (n 726) 141.

As can be seen throughout this section, each of the six elements of states' due diligence obligations in the international climate change regime are elaborate and extensive. They are, however, diffuse and are found across a variety of Articles throughout the regime, and particularly in the Paris Agreement. Having established each of the elements of due diligence and their articulation within the regime, it can be maintained that the international climate change regime contains due diligence obligations. The next section turns to an exploration of how the same six elements find their way into national climate-related court decision.

Table 4.1 The six elements of due diligence in the international climate change regime

Element	int'l climate regime	detail
risk	UNFCCC Article 2 (Objective)	Objective of the regime is to achieve stabilization of GHG emissions to prevent dangerous anthropogenic climate change
	PA Article 2.1(a) temperature goal	Long-term temperature goal of well below 2°C and pursuing efforts to limit temperature increase to 1.5°C
	IPCC Reports	States approve and accept each successive report description of evolving risk to ocean and climate
flexible	PA Article 2.2 (CBDRR+NC)	PA to be implemented with consideration of the specific context within each state
	UNFCCC Article 4.1(f)	to the extent feasible
	UNFCCC Article 12.1(a)	to the extent its capacities permit
	PA Article 4.14 (NDCs)	Parties should take into account, as appropriate, existing methods and guidance under the Convention
	PA Article 4.3 (NDCs, CBDRR+NC)	successive NDCs to represent progression and highest possible ambition, reflecting CBDRR and national circumstances
	PA Article 13 (Enhanced Transparency Mechanism)	flexibility based on national circumstances
	PA Article 14 (Global Stocktake)	outcome of stocktake to inform successive NDS, in a nationally determined way
objective	PA Article 2.1(a) (temperature goal)	holding the increase in global average temperature increase to 1.5°C
	PA Article 4.1 (mitigation)	net zero by mid-century
	PA Article 4.3 (progression, highest possible ambition)	successive NDCs will represent progression and reflect highest possible ambition
	PA Article 13 (Enhanced Transparency Framework)	provide national inventories of emissions and removals, and information necessary to track progress toward achieving NDCs, using good practices and methodologies accepted and agreed by IPCC and COP.
	PA Article 14 (Global Stocktake)	5-year global stocktake; outcome of stocktake to inform NDCs and enhance international cooperation
	Glasgow Climate Pact (common timeframes for NDCs)	NDCs to cover 5-year timeframes
continuous	UNFCCC Article 2 (Objective)	Objective of the regime is to achieve stabilization of GHG emissions to prevent dangerous anthropogenic climate change
	PA Article 2 (temperature goal)	holding the increase in global average temperature increase to 1.5°C
	PA Article 3 (NDCs)	The efforts of all Parties will represent a progression over time.
	PA Article 4.1 (best available science)	Parties aim to undertake rapid reductions in GHG in accordance with best available science, achieving net zero in second half the century
	PA Article 4.3 (Mitigation, successive NDCs)	successive NDCs will represent a progression beyond current NDC and reflect highest possible ambition
	PA Article 13.7 (enhanced transparency framework)	regularly provide information necessary to track progress toward achieving NDC
	PA Article 14 (global stocktake)	outcome of stocktake to be used to update and enhance successive NDCs, progression every 5 years
knowledge	PA Article 2 (temperature goal)	the need to hold the increase in global average temperature increase to 1.5°C
	PA Article 13 (enhanced transparency framework)	information necessary to track progress
	PA Article 14 (global stocktake)	5-year cycles of information to take stock of progress toward achieving the purpose of the climate regime; information gained to be used in successive NDCs
	COP Decision 1/CP21 (Emissions Gap)	COP decision adopting the PA recognizing the gap in emissions reductions
	Glasgow Climate Pact (Emissions Gap)	Recognizing continued existence of dangerous emissions gap
reasonable	PA Article 4.2 (mitigation)	Parties to pursue domestic mitigation measures with the aim of achieving the objectives of the climate regime (including temperature goal)
	PA Article 4.3 (mitigation)	successive NDCs to reflect 'highest possible ambition'
	PA Article 5.1 (sinks)	Parties are to conserve and enhance sinks (including oceans, coastal and marine ecosystems) 'as appropriate'
	PA Article 13 (Enhanced Transparency Framework	Parties are to adopt modalities, procedures and guidelines 'as appropriate'
	PA 3, 4.2, 13.5, 13.7, 14	ambition in the form of expectation to work toward achieving the objectives and goals of the regime
	PA 2.2, 4.1, 14.1	focus on equity

4.2 International Climate Change Regime Due Diligence Obligations in National Courts

This chapter examines the extent to which individuals can invoke due diligence obligations under the international climate change regime to hold their governments accountable in national courts for failing to adequately regulate GHG emission, causing ocean-related climate harm. Building on the examination in the previous section, the analysis now turns to how national courts treat the same six elements of due diligence and whether they base their climate-related decisions on states' due diligence obligations – or failures to meet their due diligence obligations. Based on the selected climate-related case law, the first subsection below explores how national courts integrate the international climate change regime into their decision-making with a particular focus on how states' international obligations under the regime translate into requirements for domestic action. In the second subsection, each of the six elements of due diligence under the international climate change regime are considered once again, through the lens of national climate change litigation. The analysis in this chapter serves as the foundation on which the following chapter investigates the extent to which the inclusion of due diligence obligations under the law of the sea regime would impact the outcome in the same climate-change related cases in national courts.

4.2.1 National Courts in Practice – International Climate Change Regime Due Diligence in Domestic Climate Litigation

Given the extensive national focus within the international climate change regime, states have essentially outsourced international law to national settings, simultaneously protecting their sovereignty, and also opening themselves up to scrutiny within their own jurisdictions.[740] Article 4.2 of the Paris Agreement is the most direct example of this, stating in its second sentence that 'Parties shall pursue domestic mitigation measures'.[741] This requirement to take domestic action, in the form of national laws and regulation is intended to help Parties achieve the objectives set out in their own NDCs. The language is familiar due diligence slang in that the domestic measures must be pursued with the *aim*[742] of achieving

[740] ibid 144.
[741] *Paris Agreement* (n 1) Article 4.2.
[742] ibid.

the reductions outlined in their NDCs, which is best qualified as a due diligence obligation that must be undertaken in the domestic setting.[743]

This requirement of domestic action aimed at achieving their NDCs in accordance with the overall objective of the Paris Agreement means Parties must take national action in the form of political, legal, even economic transformation, and must also enforce and administer those measures.[744] Mere enactment of laws and regulations without the enforcement and administration thereof misses the purpose, the *aim*, of achieving the objectives set out in their NDCs. Indeed, national implementation – followed by enhancement on a five-year cycle – and enforcement thereof is critical to the success of the international climate change regime.[745] This requirement to also administer and enforce domestic legislation enacted as part of the obligations under the international climate change regime was discussed in chapter 3[746] in the establishment of the overall scope of due diligence obligations and is found again here.

As mentioned, this outsourcing of international law to national settings opens states to scrutiny within their own jurisdiction. The most recent report by UNEP on the status of global climate change litigation demonstrated that climate change litigation can be effective in compelling states to accelerate their mitigation plans by providing people a forum to hold their own governments accountable to the commitments made at the international level.[747] Further, for the first time in its 30+ year history, the IPCC included in its most recent Assessment Report, AR6, an examination of the impact of climate-related litigation on shaping national climate policy.[748] In its Litigation Report, UNEP found that, not only are the number of cases and countries that see climate litigation expanding, so too are the legal theories and the judicial precedent thus created.[749] Importantly, the UNEP Litigation Report underscores the critical role national courts are playing in addressing the climate crisis.[750] While the UNEP Litigation Report considers a variety of climate change litigation (while using a relatively narrow definition[751]), this thesis considers only one type of case: cases often

[743] Bodansky, Brunnée and Rajamani (n 483) 231; Rajamani (n 339) 169.
[744] Voigt (n 603) 20.
[745] Doelle (n 662) 387–388.
[746] Chapter 3, section 3.1.2.2 *Evidence of breach of due diligence obligations*.
[747] UNEP, Global Climate Litigation Report, 2020 Status Review (n 46) 2, 9.
[748] Dubash and others (n 10) 26–32.
[749] UNEP, Global Climate Litigation Report, 2020 Status Review (n 46) 5.
[750] ibid 2–12.
[751] ibid 6.

referred to as 'systemic climate litigation'[752] because they challenge a state's overall climate policy as inadequate to reduce GHG emissions to a level that is consistent with the international climate change regime's long-term temperature goal. The IPCC's AR6 found that systemic climate change litigation has the potential to impact both the stringency and ambition of domestic climate governance, although the degree to which these cases result in more ambitious national climate policy is still uncertain.[753] Still, the IPCC acknowledges the 'increasing academic agreement that climate litigation has become a powerful force in climate governance'.[754]

While it is true that there is an increase in this type of litigation, particularly after the famous *Urgenda* decisions, a review of systemic climate cases over the past decade has shown a level of unease among domestic courts with the perceived lack of consistent legal standards against which states' mitigation ambition can be measured.[755] This concern is a function of the international climate change regime effectively outsourcing its most crucial obligations to the national level. The regulation of state behaviour at the international level is notoriously difficult[756] and, as the international climate change regime makes clear, states have the best expertise and are best positioned to take the necessary actions to meet the overall goals of the regime, placing the adjudication of such actions squarely within the jurisdiction of national courts.[757] This also places the need to act with due diligence to prevent the risk of ocean and climate-related harm from GHG emissions squarely within each state's national jurisdiction. After all, as was discussed at length in the first section of this chapter,[758] the underlying premise of the international climate change regime is that states are to determine the most effective actions to take, depending on their specific circumstances, and are obliged to undertake their own best efforts to meet the regime's long-term goals, employing highest ambition and progressing over time. As the District Court in *Urgenda Foundation v The State of the Netherlands* stated, 'a state must take due diligence into account in its policy.'[759]

[752] See n.571.
[753] Dubash and others (n 10) 31.
[754] ibid.
[755] Maxwell, Mead and van Berkel (n 35) 3.
[756] Chapter 3, section 3.2.1.1 *International law and the individual*.
[757] Malaihollo (n 726) 132.
[758] See section 4.1 *Due Diligence in the International Climate Change Regime*.
[759] *Urgenda Foundation v The State of the Netherlands (Ministry of Infrastructure and Environment)* (2015) C/09/456689/HA ZA 13-1396 (English Translation) (District Court, The Hague) [5.3.3].

Ultimately, it is courts that must determine whether a state has exercised due diligence in developing, implementing, and enforcing its climate policy.[760]

It can be seen from the UNEP Climate Litigation Status Report[761] and from the recent survey of systemic cases by Maxwell, Mead and van Berkel[762] that these cases are not brought on due diligence grounds, but rather on rights-based, tort, or public law grounds. Claims based on each of these legal grounds rely on states' obligations to take reasonable measures appropriate to protect against, or prevent, the risk of foreseeable harm, referred to as the duty of care.[763] The precise duty of care in question differs by jurisdiction and legal ground, but each of the courts surveyed engages in an assessment of whether the state has 'adopted the minimum measures reasonably required to minimise the risk of harm posed by climate change to the protected right(s) or interest(s) at stake.'[764] While due diligence itself is not the legal basis for the claims in systemic climate change litigation, courts in these cases engage in lengthy and repeated discussions of each of the six elements of due diligence (risk, flexibility, objective standard, continuous, knowledge and reasonableness) to determine whether the state has met its duty of care (regardless of the specific underlying legal definition of the duty in question). This section explores the strengths and weaknesses of the elements of due diligence under the international climate change regime in determining whether states have met their duty of care. First though, an examination of how courts treat international climate change law in domestic climate litigation is needed.

4.2.1.1 How do national courts treat international climate change law?

In order to establish whether individuals can invoke due diligence obligations under the international climate change regime to hold their governments accountable in national courts for failing to adequately reduce GHG emissions, it is first necessary to explore how national courts treat international law in climate-related cases. Throughout the systemic climate cases explored in this thesis,[765] courts regularly reference international climate law, various international rules, and the various reports developed and published by the IPCC and UNEP. This section explores the varying degrees to which national courts invoke and rely on international climate law in guiding their own decision-making. Following this is an in-depth

[760] Malaihollo (n 726) 151.
[761] UNEP, Global Climate Litigation Report, 2020 Status Review (n 46).
[762] Maxwell, Mead and van Berkel (n 35).
[763] ibid 7.
[764] ibid 8.
[765] The criteria for the case selection in this thesis is elaborated in detail in Chapter 1, see (n 571).

analysis of the six elements of due diligence in systemic climate change litigation before national courts.

Each of the cases included in the discussion below at a minimum reference international institutions and organisations, such as UNEP[766] and the IPCC. Most include lengthy discussions of the history of the UNFCCC, the negotiations, various COPs, COP Decisions, the Kyoto Protocol and the Paris Agreement along with elaborations on the IPCC and its reports at the outset of the judgment to set the context within which the case was brought.[767] Beyond this level setting, in several of the cases, the court bases its decision in part on the fact that the national climate change law or policy that is being challenged in the case is directly based on the international climate change regime.

In the German Constitutional Court case of *Neubauer and Others v Germany*, for example, the Court specifically mentions that the German Climate Act in question is based directly on the Paris Agreement and that this informs the States' duty to protect against climate harms.[768] The Court in *Neubauer* goes further, stating that the overarching goal of the national climate law is to concretize the Paris Agreement, and specifically the internationally negotiated and agreed long-term temperature goal, noting that the legislature makes 'conscious and specific reference' thereto in the national climate law.[769] Likewise, in the District Court's judgment in *Urgenda Foundation v The State of the Netherlands*, the Court notes that the Dutch climate law in question is based on the internationally agreed climate change regime[770] and that, as a signatory to the UNFCCC, the State accepts the IPCC's reports as factual and bases its GHG emissions reduction targets on both the regime and the IPCC's reports.[771] The Dutch Supreme Court later updates this discussion in its own decision by

[766] The Judgment in *Leghari* begins with a quote from the UNEP Executive Director. *Leghari v Federation of Pakistan [2015] WP No 25501 (Lahore High Court Green Bench Pakistan)* 1.
[767] *Neubauer and Others v Germany* [2021] German Federal Constitutional Court 1 BvR 2656/18, 1 BvR 96/20, 1 BvR 78/20, 1 BvR 288/20, 1 BvR 96/20, 1 BvR 78/20 [16–21, 161]; *Urgenda District Court (2015)* (n 755) para 4.11-4.13, 4.3; *State of the Netherlands (Ministry of Infrastructure and the Environment) v Urgenda Foundation* [2018] The Hague Court of Appeal C/09/456689/ HA ZA 13-1396, ECLINLRBDHA20157196 Off Engl Transl [4–18]; *State of the Netherlands v Stichting Urgenda* [2019] Supreme Court of The Netherlands 19/00135, ECLINLHR20192007 Off Engl Transl 9–13; *Thomson v Minister for Climate Change Issues* [2017] HC, New Zealand CIV 2015-485-919, 2017 NZHC 733 [8–17, 19–42, 89–90]; *VZW Klimaatzaak v Kingdom of Belgium and Others* [2021] French-speaking Court of First Instance of Brussels 2015/4585/A, 2021 JUG-JGC N° 167 [6–42].
[768] *Neubauer (2021)* (n 767) paras 159–162.
[769] ibid 209–210.
[770] *Urgenda District Court (2015)* (n 759) para 4.37.
[771] ibid 4.27–2.31.

adding more recent IPCC Reports and the Paris Agreement to its discussion of the history of Dutch climate policy that underlies the litigation.[772] The High Court of New Zealand in its decision in *Thomson v. Minister for Climate Change Issues* not only notes that the national emissions reductions targets for New Zealand were set pursuant to the Paris Agreement,[773] but goes further still, explicitly stating that New Zealand's Climate Act was enacted specifically to enable New Zealand to meet its obligations under the UNFCCC.[774]

National courts in these cases also frequently refer to their state's ratification of the international climate change regime as an explicit acceptance of the obligations laid out therein. In both the *Urgenda (2015)* and *Thomson* cases, the Courts explain that the State becoming a signatory to the international climate change regime is an express acceptance of its international obligations, and that the international climate regime must therefore be recognized as an aid in the Court's interpretation of the national law in question and the actions the State has taken thereunder.[775] Courts in the systemic cases discussed in this thesis also recognize that no state can act alone to prevent the hazards of dangerous climate change and that the international climate change regime requires both national action on the part of each individual state and collective action at the international level (including in the form of continued negotiation, NDC progression and the global stocktake). Examples include the *Neubauer* Court's finding that, not only does the German climate law require the State to take both national and international action, but that climate law – as the climate itself – has an international dimension.[776] In the *Neubauer* case, in fact, the Court held that parts of the German climate law were unconstitutional specifically because the emissions reductions required thereunder were insufficient to meet overall internationally agreed long-term goals.[777] Another example comes from the Brussels Court of First Instance in *VZW Klimaatzaak v. Kingdom of Belgium and Others*, where the Court rebuffed the State's argument that failure to comply with a norm of international law can only give rise to national liability where that international norm has direct effect within the domestic legal system.[778] Instead, the Court noted that international agreements, such as the Paris Agreement, where they have been ratified and accepted by the State, have been 'received in the domestic order,

[772] *Urgenda Supreme Court (2019)* (n 767) 9–13.
[773] *Thomson (2017)* (n 767) para 7.
[774] ibid 43–48.
[775] *Urgenda District Court (2015)* (n 759) para 4.66; *Thomson (2017)* (n 767) paras 19–42.
[776] *Neubauer (2021)* (n 767) paras 197–203.
[777] ibid 243.
[778] *Klimaatzaak (2021)* (n 767) 58.

in which they are likely to produce effects, whether direct or indirect.'[779] The Court further held that, even in a diffuse federalist system such as Belgium, the context of the climate emergency and the international commitments made by the State mean that the federal government is not exempt from its obligations to take appropriate measures to prevent ocean-climate harms.[780] Likewise, the *Urgenda (2018)* Court found that even though no state can solve the climate crisis alone, this does not exempt each state from its obligation to take domestic action within its capabilities and in concert with others to protect its citizens from dangerous climate change.[781]

An important point of discussion in chapter 3 was that individuals lack recourse in international law for harms that their government failed to protect against.[782] While that remains true, it is important to consider here how domestic courts determine whether individuals can rely on international climate change law to hold their governments to account in national settings. The District Court in *Urgenda* was first to address this issue when it recognized that individuals cannot in fact rely on international law for relief in this type of case.[783] However, the Court also found that this does not exempt the State from still being required to meet its international obligations, and the Court explicitly stated that a state's international obligations have a 'reflex effect' in national law.[784] In other words, as the Court explains later, even though individuals cannot derive legal rights from the State's international obligations under the international climate change regime, those obligations can still have an impact through the Court in national law.[785] In a similar vein, the *Thomson* Court, in response to the State's argument that international obligations not incorporated into domestic law were not open to domestic judicial review, found that it was not determinative that an international obligation had not been incorporated into the domestic legal order, but rather that the Court could look to the international obligation to inform its decision on national actions taken by the State.[786] Finally, as it pertains to states' due diligence obligations, courts have held that the scope of a state's duty of care in systemic

[779] ibid 59.
[780] ibid 74–75.
[781] *Urgenda Appellate Decision (2018)* (n 767) para 62.
[782] Chapter 3, section 3.1.1 *3.1.1 What is Due Diligence and What are States' Due Diligence Obligations under* International Law?.
[783] *Urgenda District Court (2015)* (n 759) para 4.12.
[784] ibid 4.13.
[785] ibid 4.44.
[786] *Thomson (2017)* (n 767) paras 102–103.

climate change litigation can only be determined with the inclusion of the objectives and underlying principles of international law.[787] Broadly, due diligence is a determining factor of the level of care a state is expected to take in the performance of its obligations under the international climate change regime.

In sum, while individuals may not be able to derive legal rights from international climate law and states' international climate change obligations directly, this does not preclude those norms and obligations from nonetheless having an impact in domestic settings. National courts recognize that international climate law and principles, while not necessarily having direct effect in national law, do determine to great extent the framework for and the manner in which a state exercises its own duties and whether the domestic measures taken are sufficiently diligent to prevent ocean and climate-related harms.

Having established that domestic courts look to international climate law in determining the scope of the state's duty of care and whether their actions meet such duty, the next section explores in detail the six elements of due diligence under the international climate regime and how – and whether – national courts rely on these elements in their decision-making in systemic climate change litigation.

4.2.2 The Elements of Due Diligence of the International Climate Change Regime in Domestic Litigation

The previous sections of this chapter found that all six elements of due diligence are clearly elaborated within the international climate change regime and demonstrated national courts' willingness to include international climate law in their decision-making. However, while the due diligence obligations of states under the international climate change regime are indisputable, the vagueness of due diligence established in chapter 3 remains.[788] The six elements of due diligence are relatively diffuse within the regime, being spread across several articles of the Paris Agreement and the Convention. It now remains to determine whether each of the six elements of due diligence are found within national court decisions and, if so, how they impact the decision-making of courts faced with systemic climate change litigation where a state's compliance with obligations under the regime are challenged. In the sub-section immediately preceding this one, it was clearly established that national courts do look to the international climate change regime, regardless of its direct effect within the domestic

[787] *Urgenda District Court (2015)* (n 759) para 4.52-4.59; *Klimaatzaak (2021)* (n 767) 57.
[788] Chapter 3, section 3.2.2 *3.2.2 National Courts* in Practice.

legal system, for guidance in deciding the cases brought before them. This section now turns to an analysis of each of the six elements of due diligence in national (systemic) climate change litigation.

4.2.2.1 Due diligence, harm and risk

Beginning again with the risk of harm as the first element of due diligence, under the international climate change regime it is clear that the risk of harm is established by the underlying data upon which the entirety of the regime is based. The overall purpose of the regime and the long-term temperature goal articulated in the Paris Agreement are based on the risk of harm from unabated climate change, articulated in the various IPCC reports.

Similarly, national courts, when faced with climate litigation that challenges the actions taken by a state as insufficient toward meeting the overall goals of the international climate change regime, also rely heavily on IPCC reports to establish the risk of harm. Consistently, all courts in this case study acknowledge the significant hazards of GHG emissions and climate change in terms of sea level rise, coastal flooding, increased storm events, heavy rainfall, and the like. The Court in *Notre Affaire à Tout and Others v. France*, while not specifically elaborating the risks, treats the risks of climate change as established fact when deciding that the State must take measures to prevent the damages associated with the worsening of climate change.[789] More explicitly, the *Klimaatzaak* Court expounds repeatedly on the dangers of sea level rise, citing the increased risk of storms, flash flooding that can cause severe damage and reduced efficacy of breakwaters and quay walls, describing these as concrete threats based on the most authoritative climate science.[790] Consequently, the Court finds that, based on climate science, there can no longer be any room for doubt that the threat from climate change is very real.[791]

The Irish Supreme Court in *Friends of the Irish Environment v Government of Ireland* acknowledges that the dangers of climate change are not in dispute, but articulates them nonetheless because they underlie the legal dispute at hand, including the 'practical irreversibility'[792] of significant risks such as sea level rise and increased extreme weather

[789] *Notre Affaire à Tous v The Republic of France* [2021] Paris Administrative Court N° 1904967, 1904968, 1904972 1904976/4-1, 44-008 60-04-02-02 54-07–03 R 31–32.
[790] *Klimaatzaak (2021)* (n 767) 48–50.
[791] ibid 50, 61.
[792] *Friends of the Irish Environment CLG v The Government of Ireland, Ireland and the Attorney General* [2020] The Supreme Court Appeal No: 205/19 [3.7].

events which can cause significant risks both to the life and health of Irish citizens.[793] Further, in its discussion of the Irish climate plan the Court specifically finds that 'there is significant consensus both on the causes of climate change and on the likely consequences'.[794] The Court in *Leghari*[795] similarly relies on the established risks of climate change as the underlying reason for the necessity for climate-related action. The Court describes the risk of increased saltwater intrusion adversely affecting agriculture, mangrove forests and marine breeding grounds and cites both sea level rise and higher ocean temperatures as significant threats to water, food, and energy security, signalling significant survival concerns for the Pakistani population.[796]

The *Thomson* Court devotes three pages at the beginning of its judgment to an explanation of climate change based on the IPCC's AR5, describing in detail the ocean-related climate change risks along with the consequences of these dangers, which include concerns related to food insecurity, increased internal displacement and risks to health.[797] The Court further devotes significant time to a discussion, again based on AR5, of the dangers and consequences of sea level rise and increased ocean temperatures[798] before ultimately clarifying that New Zealand is a Party to the international climate change regime precisely because it accepts the risk of these dangerous consequences of inaction on climate change.[799] Likewise, the *Neubauer* Court devotes significant space at the outset of its decision to the 'scientific clarity of anthropogenic climate change'[800] and an in-depth discussion of the risk of harm from ice melt, sea level rise, temperature increase in the North Atlantic contributing to the instability of the ocean conveyor belt and related weather systems, droughts, extreme weather events, heat waves and floods.[801]

Each of the three *Urgenda C*ourts devote significant attention to discussion about the IPCC and its reports, along with UNEP reports, in setting out the hazards of climate change.[802] The District Court held that the State, as a signatory to the international climate regime accepts

[793] ibid 3.3, 3.6.
[794] ibid 4.5.
[795] *Leghari (2015)* (n 766).
[796] ibid 5.3, 9.
[797] *Thomson (2017)* (n 767) paras 8–12.
[798] ibid 15–17.
[799] ibid 140.
[800] *Neubauer (2021)* (n 767) para 18.
[801] ibid 20.
[802] *Urgenda District Court (2015)* (n 759) para 4.11-4.30; *Urgenda Appellate Decision (2018)* (n 767) paras 4–18; *Urgenda Supreme Court (2019)* (n 767) para 2.1.

IPCC reports, including the hazards of a 2°C temperature rise as opposed to 1.5°C.[803] The Dutch Supreme Court, in quoting the Appellate Court's *Urgenda* decision, reiterates that there is 'a real threat of dangerous climate change, resulting in the serious risk that the current generation of citizens will be confronted with loss of life and/or a disruption of family life.'[804]

The *Neubauer* Court found that the State's duty of care includes the requirement to address anthropogenic climate change specifically through actions that 'reduce the risks of climate change'.[805] Similarly, the Dutch District Court in *Urgenda* found that 'due to the severity of the consequences of climate change and the great risk of hazardous climate change occurring – without mitigating measures – the court concludes that the State has a duty of care to take mitigation measures.'[806] The Dutch Supreme Court ultimately found that the 'mere existence of a sufficiently genuine possibility that this risk will materialize' means that the State has a duty to take 'suitable measures' to protect against it.[807]

As can be seen from the various courts' discussions of the risk of significant harm of unchecked climate change, there seems to be a consensus, at least among the domestic courts surveyed here, that the risk of harm is an underlying element of the legal questions relating to the states' duty of care to protect its citizens. In none of the cases is there a dispute of the risk of harm, but courts tend to expound on these risks as 'underlying the legal questions'[808] at hand. As elaborated above, each of the courts establishes a clear connection between the risk of harm and the state's duty of care to prevent that harm. The first element of due diligence is therefore unsurprisingly robust in systemic climate change litigation, just as it is within the international climate change regime itself. Based on this survey of domestic case law, there appears to be a clear understanding, based on the most authoritative climate science, that if states fail to act in a manner sufficiently diligent to address the risks of harm, they have failed in their duty of care.

Table 4.2.2.1. Risk

Element	Case	Court's findings
risk	*Leghari* (2015)	* Established risk of climate change is underlying reason for necessity for climate action by the State

[803] *Urgenda District Court (2015)* (n 759) para 4.11-4.19.
[804] *Urgenda Supreme Court (2019)* (n 767) para 4.7.
[805] *Neubauer (2021)* (n 767) para 144.
[806] *Urgenda District Court (2015)* (n 759) para 4.83.
[807] *Urgenda Supreme Court (2019)* (n 767) para 5.6.2.
[808] *Friends of the Irish Environment (2020)* (n 792) para 3.1.

	Urgenda (2015) District Court	* As signatory to international regime, State accepts IPCC reports * Due to the severity of climate change, State has a duty of care to take mitigating measures * Given its duty of care, the State must make an adequate contribution to prevent hazardous climate change
	Thomson (2017)	* State is a Party to the international climate regime so accepts the risks are real and its obligations under the regime.
	Urgenda (2018) Appellate Court	* There is a real threat of climate change
	Urgenda (2019) Supreme Court	* The mere existence of a genuine possibility of risk means the State must take suitable measures to prevent it.
	Friends of the Irish Environment (2020)	* The dangers of climate change are not in dispute but underly legal questions in case. * The consequences of failing to address climate change are accepted by both sides.
	Neubauer (2021)	* Scientific clarity of anthropogenic climate change * State's duty of care includes requirement to reduce the risk of climate change
	Notre Affaire à Tout (2021)	Court treats risk as fact
	Klimaatzaak (2021)	* In the light of scientific knowledge of the risk of climate change, the State has a positive obligation to prevent harm. * In light of the risks the State failed to act with prudence and diligence.

4.2.2.2 Due diligence and flexibility

The second element of due diligence is flexibility, or context-specificity. The most significant way in which this is enumerated in the international climate change regime is through the principle of common but differentiated responsibilities and respective capabilities with the addition in the Paris Agreement of the need to take into account national circumstances. This element is also clearly articulated in the nationally determined nature of each Party's contribution to the global reduction in greenhouse gas emissions via their NDCs and the related processes of progression.

The way this translates to domestic courts is typically through the focus on the nationally determined nature of the NDCs which is, as states often argue, within the purview of the legislature and therefore barred from judicial review. This separation of powers argument is relatively common within the case law surveyed in this thesis. The other area where flexibility is evident within the domestic case law as it pertains to states' due diligence obligations under the international climate change regime is that this element is where those cases that do fail,[809] fail along the lines of this element. For example, the *Thomson* Court found no evidence of an error on the part of the State because the Minister had followed the

[809] "Failure" here means that the plaintiffs were unsuccessful in holding the state accountable for inadequate emissions reduction plans in that the court rules in favour of the state.

international framework and the plaintiff in this case had not demonstrated that 'the NDC decision was outside the Minister's power under this framework.'[810] The reasoning of the *Thomson* Court was that, although the level of ambition within the NDC was likely insufficient to prevent the risks of dangerous climate change, it was not so inconsistent with the goal articulated in the Paris Agreement 'such that the NDC does not meet our international obligations and is outside the proper bounds of the Minister's power.'[811]

Similarly, the Court in *Friends of the Irish Environment* reiterated that, on the question of discretion, Ireland was not at this stage in violation of its international obligations under the international climate change regime, noting however that this could change depending on the future trajectory of Irish GHG emissions.[812] The *Neubauer* Court also found that the State had not yet gone beyond its margin of appreciation in its duty to protect because it had in fact created GHG emission reduction plans.[813] The Court held that, because of the broad discretion afforded states within the duty to protect, a breach of such a duty would be proven only by wilful absence of measures taken to prevent dangerous climate change and this was not the case here.[814] However, the *Neubauer* Court also reiterated that there are limits on state discretion in the form of the Paris Agreement's long-term temperature goal, which is after all based in the IPCC's reports.[815] Both the German and Irish Courts did find that portions of the national climate law in question were unconstitutional because the States failed to include enough specificity in how the required emissions reductions would lead to carbon neutrality by mid-century.[816]

The *Neubauer* Court, however, found the separation of power argument valid and recognized the broad discretion provided to the State under the German climate law and agreed that it is not in the purview of the courts to prescribe the specific quantified emissions reductions targets needed.[817] However, the Court warned that unlimited discretion could lead to the national climate law being nothing but an empty promise and therefore found that courts maintain oversight to ensure appropriate measures are taken by the state to adequately

[810] *Thomson (2017)* (n 767) para 179.
[811] ibid 176.
[812] *Friends of the Irish Environment (2020)* (n 792) para 4.6.
[813] *Neubauer (2021)* (n 767) para 207.
[814] ibid 165, 171–172.
[815] ibid 211.
[816] ibid 243, 262.
[817] ibid 207.

reduce GHG emissions in order to meet the goals of the international climate change regime.[818]

The *Urgenda* District Court dismissed the State's separation of powers argument declaring that, although the State is afforded significant flexibility in determining the specific measures it adopts to achieve appropriate levels of GHG emissions reductions, the Court maintains its authority to determine whether the State is falling short in its duty to protect its citizens.[819] In a similar vein, the Court in *Klimaatzaak* held that it had the authority to determine the legality of government measures that could cause significant risk of harm to the citizenry due to the State's exercise of its discretion.[820] The Court ultimately found that the State had failed to act with appropriate diligence due to its lack of 'good climate governance' in the form of appropriately stringent GHG reduction measures to prevent the risk of harm from climate change.

The above exploration of flexibility as an element of due diligence in national courts demonstrates that this element results in inconsistent outcomes as it pertains to states' due diligence obligations. Courts recognize the discretion afforded to states in determining the specific measures to be taken to meet the overall goals of the international climate regime, and therefore confirm the flexibility in their due diligence obligations. However, domestic courts maintain that there are limits to that flexibility and where a state fails to meet its duty of care by taking inadequate steps to prevent the harmful risks associated with climate change, courts retain the authority to hold the state accountable.

Table 4.2.2.2 Flexibility

Element	Case	Court's findings
flexibility	*Leghari* (2015)	
	Urgenda (2015) District Court	* The State is afforded broad discretion on specific measures taken, but Court retains authority to determine whether State fails in its duty to protect citizens.
	Thomson (2017)	* Court found no failure of duty on the part of the State because, although likely insufficient, national measures not inconsistent with State's obligations under the international regime.
	Urgenda (2018) Appellate Court	* State has failed to show why its lower targets are sufficient to prevent risk of harm.
	Urgenda (2019) Supreme Court	* While State has discretion on specific measures, Courts maintains jurisdiction to assess whether the State approached the problem with due diligence.

[818] ibid.
[819] *Urgenda District Court (2015)* (n 759) para 4.94-4.102.
[820] *Klimaatzaak (2021)* (n 767) 45.

	Friends of the Irish Environment (2020)	* The State at this point has not violated its obligations under the international regime due to discretion allowed.
	Neubauer (2021)	* The State has not gone beyond its margin of appreciation in its duty to protect. * Duty to protect would be violated only by wilful absence of measures to protect against climate change.
	Notre Affaire à Tout (2021)	
	Klimaatzaak (2021)	* The Court retains oversight over legality of State measures taken with broad discretion * State failed to act with appropriate diligence due to the insufficiency of measures to prevent risk of harm.

4.2.2.3 Due diligence as an objective standard of care

The third element of due diligence is that the measures a state takes must be objectively appropriate. In section 4.1.2 above, several objective standards within the international climate change regime upon which states should base their actions were detailed.[821] The first of these is the long-term temperature goal[822] of the Paris Agreement that national measures must aim toward, including by aiming to achieve net zero emissions by mid-century.[823] Building on the long-term temperature goal, other standards or guidance found in the international climate change regime, and the Paris Agreement specifically, include the enhanced transparency framework[824] which requires Parties to include necessary information to track their progress toward meeting the temperature goal. Finally, the five-year global stocktake[825] and common timeframes for NDCs developed during the Glasgow negotiations[826] provide further objective standards on which states should base their own national measures. This section explores how domestic courts approach this element of due diligence as elaborated in the international climate change regime in their decision-making.

As a reminder, the type of domestic climate litigation that this thesis considers is systemic litigation challenging a state's overall policy to reduce greenhouse gas emissions in a manner sufficient to meet the goals set out in the international climate change regime. Several courts specifically mention the long-term temperature goal set out in the Paris Agreement as the underlying basis for the dispute, such as the *Neubauer* Court which extensively quotes the Paris Agreement and explicitly states that the German climate law that is the subject of the

[821] See section 4.1.2.4 *Due diligence as a continuous obligation*.
[822] *Paris Agreement* (n 1) Article 2.1(a).
[823] ibid Article 4.1.
[824] ibid Article 13.
[825] ibid Article 14.
[826] *Glasgow Climate Pact* (n 616).

case is directly based on the Paris Agreement's temperature goal.[827] So too the Court in *Friends of the Irish Environment* specifically mentions the Paris Agreement's long term temperature goal and clarifies that the lower 1.5°C goal is now the accepted standard: 'scientific thinking has moved in the direction of a lower figure which is in the region of 1.5°C above pre-industrial levels'.[828] The Court in *Notre Affaire* frames the legal question at issue as whether the State has set insufficient emissions reduction targets to maintain the temperature increase below 1.5°C.[829] The *Thomson, Leghari,* and *Urgenda (2015)* Courts, while not specifically focusing on the long-term temperature goal, all considered whether their respective states' emissions reductions targets are sufficient to meet the goals and obligations enumerated in the international climate change regime.[830] The *Urgenda* Appellate Court explicitly connects the meeting of temperature goals in the international climate change regime to the State's duty of care by finding that an assessment of whether the State has met its duty of care must begin with an examination of the sufficiency of the emissions reduction targets to meet the temperature goals set out in the regime.[831]

This line of reasoning is prevalent in the cases surveyed for this thesis, frequently based on states' emission reductions plans to reach significant reductions by 2030 and net zero by 2050. The Court in *Friends of the Irish Environment* considered the State's plan to reach net zero by 2050 and found that the plan 'falls well short of the level of specificity required' to provide adequate information on how that goal will be met. As was detailed above,[832] the objective appropriateness of a state's actions can be measured through the transparency framework set out in Article 13 of the Paris Agreement.[833] Reiterating the objective adequacy required within due diligence obligations, the Court in *Friends of the Irish Environment* recalls the language in the domestic statute that requires an emissions reductions plan that will meet net zero by 2050 to include clear, understandable information necessary to track progress toward the stated goal.[834] The language in the Irish law closely mirrors that of the Article 13 enhanced transparency framework and the Irish Supreme Court found that the

[827] *Neubauer (2021)* (n 767) para 7.
[828] *Friends of the Irish Environment (2020)* (n 792) para 3.4.
[829] *Notre Affaire à Tous (2021)* (n 789) 28–29.
[830] *Thomson (2017)* (n 767) paras 6–7, 43–69; *Leghari (2015)* (n 768) paras 7–10; *Urgenda District Court (2015)* (n 759) para 4.27, 4.37, 4.44.
[831] *Urgenda Appellate Decision (2018)* (n 767) para 49.
[832] See section 4.1.2.3 *Due diligence as an objective standard of care*.
[833] *Paris Agreement* (n 1) Article 13.
[834] *Friends of the Irish Environment (2020)* (n 792) para 6.39; *Paris Agreement* (n 1) Article 13.5, 13.7.

State failed to demonstrate that its measures were objectively adequate to meet the required level of diligence under the international climate change regime. Interestingly, while the Court discusses the need for five-year cycles of information in this context, mirroring the common timeframes developed in the Glasgow Climate Pact and the global stocktake, it did not find the lack of sufficient five-year plans determinative for this element of due diligence.[835] The legal requirement under the Irish law for five-year plans is discussed in more detail in the next section on the continuous nature of due diligence.

The *Neubauer* Court also focused on the requirement to objectively assess the adequacy of states' measures to meet their obligations under the international climate change regime by noting that the transparency and specificity required by the Paris Agreement is key to creating trust and increased ambition among the Parties.[836] Just as the Irish Supreme Court did, the German Constitutional Court ultimately found parts of the national climate law in question to be unconstitutional, in part because of the lack of sufficient specificity on the necessary emissions reductions the State intended to take to meet its 2050 goals.[837] In making this determination, the *Neubauer* Court underwent a detailed discussion, based on the most current available IPCC reporting, of the remaining carbon budget available to Germany in order to meet the long-term goals of the international climate regime.[838] The Court explored the available emissions pathways to meet both 1.5°C and 2°C of temperature rise, the dangers of going beyond these levels, and remaining uncertainty in the calculations.[839] Based on these dangers, the Court determined that the State is subject to a heightened obligation of due diligence to take appropriate measures to meet the long-term temperature goals via adequate emissions reductions plans.[840] Ultimately, the *Neubauer* Court found that, while the State's 2030 plan was not technically unlawful[841] (because it was still hypothetically achievable), the remaining carbon budget available thereafter[842] and the lack of specificity in how the State planned to meet its 2050 goal meant portions of the long-term plan were unconstitutional.[843]

[835] *Friends of the Irish Environment (2020)* (n 792) para 6.20, 6.33.
[836] *Neubauer (2021)* (n 767) para 204.
[837] ibid 243, 262–263.
[838] ibid 214–229.
[839] ibid 215–239.
[840] ibid 229.
[841] ibid 237.
[842] ibid 230–234.
[843] ibid 243.

The Court in *Notre Affaire* similarly underwent a calculation of the remaining carbon budget based on the IPCC's reporting[844] and ordered the State to provide specificity on the measures it intended to take to meet the long-term temperature goal via emissions reductions.[845] The Court in *Klimaatzaak* for its part explored the extensive specific detail provided by the government. It also underwent a lengthy and detailed examination of the various calculations and emissions trajectories each of the regional states and the federal government underwent in their development of the emissions reduction plans, all of which are based on the emissions pathways presented in various IPCC reports.[846] Based in part on these figures, the Court determined that the State had failed to act with prudence and diligence in developing a plan sufficient to prevent dangerous ocean-related climate impacts.[847] The Dutch Supreme Court also underwent a detailed exploration of the calculations and figures (based in large part on international consensus, such as in the IPCC reports) underlying the Dutch government's lower emissions targets[848] and found that, based in part on the remaining carbon budget, the State had failed to sufficiently demonstrate that the targets represented a responsible climate policy.[849]

Based on the survey of cases, the third element of due diligence under the international climate change regime, which requires a state's measures to be objectively assessed as adequate, appears to be an important driver of courts finding states to have failed to meet their duty of care. In the domestic case law surveyed here, this tends to turn on the sufficiency and specificity of the measures a state intends to take to meet the long-term temperature goals by, among other things, reaching net zero by mid-century. In sum, courts tend to find a lack of due diligence where there is a corresponding lack of sufficient information that would enable an objective assessment of the adequacy of the diligence employed by the state.

Table 4.2.2.3 Objective

Element	Case	Court's findings
objective	*Leghari* (2015)	* Are State's actions sufficient to meet climate related goals?
	Urgenda (2015) District Court	* Are State's emissions reductions targets sufficient to meet objectives and goals of the international cc regime?

[844] *Notre Affaire à Tous (2021)* (n 789) paras 29–31.
[845] ibid 29.
[846] *Klimaatzaak (2021)* (n 767) 76–78.
[847] ibid 79.
[848] *Urgenda Supreme Court (2019)* (n 767) 7.2.1-7.4.6.
[849] ibid 7.5.1; *Urgenda District Court (2015)* (n 759) para 4.20-4.30; *Urgenda Appellate Decision (2018)* (n 767) paras 46–53.

	Thomson (2017)	* The purpose of the State's climate change law is to meet obligations under the international regime (including guidance and principles).
	Urgenda (2018) Appellate Court	* Duty of care examination begins with sufficiency of reduction targets to meet temperature goals in international regime.
	Urgenda (2019) Supreme Court	* Based on IPCC and internationally agreed emissions scenarios, the State's lower targets are not sufficient to be a responsible policy.
	Friends of the Irish Environment (2020)	* 1.5°C in P.A. is the temperature goal that Irish Plan must work toward. * State failed to demonstrate objective adequacy of 2050 Plan because of a lack of specificity necessary.
	Neubauer (2021)	* The German climate law is based directly on the P.A. temperature goal. * Portions of German law unconstitutional because lack of specificity makes objective assessment of adequacy impossible (based in part on remaining carbon budget).
	Notre Affaire à Tout (2021)	* The legal question here is whether the State's reduction targets are sufficient to maintain temperatures below 1.5°C. * Court orders State to provide necessary information to determine adequacy of emissions targets.
	Klimaatzaak (2021)	* From the figures and calculations based on IPCC emissions pathways and remaining carbon budget, Court can determine that the State failed to act with diligence.

4.2.2.4 Due diligence as a continuous obligation

The fourth element of a state's due diligence obligation is its continuous nature. This is articulated in the international climate change regime through progression over time via the cycle of successive NDCs and the global stocktake described in Article 14 of the Paris Agreement. As was discussed above,[850] the continuous nature of the due diligence obligation under the international climate change regime is also found in the requirement to employ the highest possible ambition and to base successive NDCs and domestic actions thereunder on the best available science. This section explores how national courts treat this element of due diligence and whether it impacts their decision-making in domestic systemic climate cases.

One significant way in which courts consider the continuous nature of states' obligations is the question of whether states must take into account future harms in the development of measures to address ocean-related climate change harms. The *Neubauer* Court was directly asked to make a ruling on this issue and the Court found that the State's duty of care is forward-looking (i.e. does not require plaintiffs to demonstrate existing or past harm before

[850] See section 4.1.2.4 *Due diligence as a continuous obligation*.

taking effect)[851] and includes the duty to protect specifically against climate-related harms.[852] The Court further found that the State has a continuous obligation in that it must consider the future impacts of climate change on existing generations (although it did not find such an obligation toward future, i.e. currently unborn, generations).[853] The Court termed this obligation an 'eingriffsähnliche Vorwirkung',[854] which literally translates to a 'pre-effect likely to interfere', finding that the State must consider future impacts of climate change in its current development of any plans toward meeting the long-term goals of the climate law.[855] The Court found that, because a failure to act now could severely impact future rights,[856] the duty to protect against climate harms must take future risks into account.[857] On the basis of the continuous nature of the duty of care, the Court found that the State's plan was unconstitutional because its emissions reduction plan lacked the necessary articulation of measures beyond 2030.[858]

As was briefly mentioned in the discussion on the need for due diligence to be exercised in an objectively adequate fashion,[859] the Irish Supreme Court also found a lack of specificity in the government's plan to be a fatal flaw.[860] Part of the Irish Court's consideration on the specificity required in the State's 2050 plan was the necessity within the law for five-year plans. Specifically, the Court found that this requirement was not for a *new* plan every five years, but rather a 'series of rolling plans each of which must be designed to specify'[861] how the 2050 goal of net zero would be achieved. Further articulating the continuous nature of the State's obligation, the Court found as follows:

> The sole relevance of the five-year provision in [the Irish legislation] is that it recognises that circumstances generally, scientific knowledge and technology and, doubtless, other matters may alter so that it would be appropriate to adjust the Plan from time to time to reflect prevailing circumstances.[862]

[851] *Neubauer (2021)* (n 767) para 146.
[852] ibid 148.
[853] ibid 187.
[854] ibid.
[855] Translation by the author.
[856] *Neubauer (2021)* (n 767) para 192.
[857] ibid 194.
[858] ibid 195.
[859] See section 4.2.2.3 *Due diligence as an objective standard of care*.
[860] *Friends of the Irish Environment (2020)* (n 792) para 9.3.
[861] ibid 6.20.
[862] ibid.

The Court, in recognizing the continuous nature of the State's obligation to work toward meeting the long-term temperature goal and reaching net zero, found that the recognition of the need to adjust on a five-year cycle indicated the future possibility of further detail in future five-year periods of time.[863] This was a further basis for the Court's finding that the specificity required was both a current and ongoing obligation.

Just as the Irish Court acknowledged that the scientific knowledge is ever changing, the *Urgenda (2015)* Court focused its duty of care determination in part on whether the State was acting according to the best available science, finding that the State's presented reduction policy did not meet the necessary standard of appropriate duty of care.[864] Similar to the German court in *Neubauer* (and indeed, the *Neubauer* Court makes reference to *Urgenda*), [865] the Dutch District Court held that less strict reductions in the near-term would lead to a significant future contribution to the hazards of climate change and were therefore insufficient.[866] The Court based its finding in large part on the scientific knowledge available at the time of its decision-making and acknowledged that the sufficiency of the targets required to meet the duty of care were 'the absolute minimum'[867] given the continuous nature of both the hazards of climate change and the development of scientific knowledge. Similarly, the Court in *Klimaatzaak,* in its consideration of the State's obligation to act with due diligence, noted the continuous nature of the best available science as evidenced by successive IPCC reports.[868]

In sum, regarding the fourth element of due diligence, that of the continuous nature of the obligation, national courts view states' duty of care under the international climate change regime as a forward-looking, continuous duty to ensure that the measures taken at the national level are sufficient to prevent present *and* future ocean-climate harms. The references throughout the case law to best available science (as evidenced by the courts' reliance on successive IPCC reports and their findings that states' actions are insufficient when they do not adequately consider the future) indicates a strong reliance on the continuous nature of due diligence in domestic courts' decision-making.

[863] ibid.
[864] *Urgenda District Court (2015)* (n 759) para 4.84.
[865] *Neubauer (2021)* (n 767) paras 157, 161, 200.
[866] *Urgenda District Court (2015)* (n 759) para 4.85.
[867] ibid 4.86.
[868] *Klimaatzaak (2021)* (n 767) 59.

Table 4.2.2.4 Continuous

Element	Case	Court's findings
continuous	*Leghari* (2015)	
	Urgenda (2015) District Court	* Duty of care includes whether State acts according to best available science. * State's current policy fails to meet standard of care because current emissions reductions will lead to future need for significant reductions.
	Thomson (2017)	* The court found that although the State's current emissions reduction plans are relatively low and will mean future increased costs associated with more stringent future reductions, they are not inconsistent with the overall goal under the Paris Agreement.
	Urgenda (2018) Appellate Court	* Court found State had failed in its duty of care for inadequate current reductions plan because postponing reductions uses up the available carbon budget, requiring more ambition later.
	Urgenda (2019) Supreme Court	* The State's policy to postpone ambition is unlawful.
	Friends of the Irish Environment (2020)	* Court found portions of State's climate law unconstitutional because future emissions reductions lacked specificity. * 5-year plans are actually a continuous rolling cycle successive 5-year plans. * Court recognizes the need for evolving science and circumstances to inform future specificity in 5-year plans (ongoing obligation)
	Neubauer (2021)	* Court found portions of State's climate law unconstitutional because future emissions reductions lacked specificity. * Court found State's reduction plan insufficiently diligent because ambition is too low and will lead to future need for significant reductions. * Findings based on scientific knowledge available at time of decision-making.
	Notre Affaire à Tout (2021)	
	Klimaatzaak (2021)	* Court acknowledges continuous nature of due diligence obligation based on continuous nature of the best available science, evidenced by successive IPCC reports.

4.2.2.5 Due diligence and knowledge

The fifth element of due diligence, knowledge, is articulated within the international climate change regime in several ways. The first is the imputation of knowledge based on the fact that the negotiations of the regime itself are based on successive IPCC reports. As was developed above,[869] the international climate change regime further deepens the knowledge element of due diligence obligations by the various processes that bring regular information to the Parties in the form of the enhanced transparency framework[870] and the global

[869] See section 4.1.2.5 *Due diligence and knowledge*.
[870] *Paris Agreement* (n 1) Article 13.

stocktake.[871] Finally, the imperative that NDCs, and the national measures outlined within them, be based on the best available science further indicates the strong position the element of knowledge occupies within the regime. This section explores how this element of knowledge is treated by courts when determining whether states have met their due diligence obligations in systemic climate change litigation.

In the national climate change case law surveyed in this thesis, there are two specific areas of knowledge discussed by domestic courts in the context of states' duty of care. The first is that a state's knowledge as implied by participation in negotiation and ultimate ratification and acceptance of the Convention and the protocols and agreements thereunder. The second pertains to the application of best available science in decision-making on appropriate measures to adequately reduce GHG emissions to meet the international climate regime's long-term goals.

As was discussed at length above,[872] domestic courts rely on the premise that the state was involved in the negotiation and acceptance of the Convention and its subsequent agreements and frequently make specific reference to the knowledge this imputes to the state. The *Urgenda* District Court, for example, states early on in its decision that the State, as a signatory to the Convention accepts the underlying IPCC reports, including the necessity to strive to meet the lower threshold of 1.5°C of warming.[873] It goes on to reference international agreements and the negotiation of the international climate change regime as the basis for the State's own GHG emissions reduction targets.[874] Explicitly, the Court later finds that '[w]hen the State became a signatory to the UNFCCC and the Kyoto Protocol, the State expressly accepted its responsibility for the national emissions level and in this context accepted the obligation to reduce this emission level as much as needed to prevent dangerous climate change.'[875] The *Urgenda* District Court ultimately found that based on the knowledge of ocean-climate related harm, the Dutch State had failed in its duty of care to make an adequate contribution to the prevention of that harm.[876] The Dutch Appellate Court

[871] ibid Article 14.
[872] See section 4.2.1.1 *How do national courts treat international climate change law?*.
[873] *Urgenda District Court (2015)* (n 759) para 4.14.
[874] ibid 4.27.
[875] ibid 4.66.
[876] ibid 4.89.

reiterated that when a state has knowledge of such an imminent threat, it has a positive obligation to protect its citizens.[877]

In a similar vein, the *Neubauer* Court makes repeated reference[878] to the fact that the international climate change regime, and the Paris Agreement specifically, are the basis for the German climate law at issue in the dispute, including the long-term temperature goal[879] based on IPCC reports. In the same context, the Court also references the State's status as a Party to the Paris Agreement and its reliance on the regime in developing its own approach to emissions reductions.[880] Likewise, the *Leghari* Court references Pakistan's role as a 'responsible member of the global community in combating climate change'[881] to support efforts to reduce GHG emissions.[882] The *Thomson* Court, very early in its decision references the fact that New Zealand's 2030 target, which is of issue in the case, was developed and set pursuant to the Paris Agreement[883] before devoting significant space to a detailed exploration and explanation of climate change, its ocean-related harms, consequences, and an in-depth elaboration of the international climate change regime.[884] This detailed exploration concludes with a description of New Zealand's ratification of the Paris Agreement and the creation of its first NDC.[885] The Court later again reiterates that New Zealand's 2030 target was developed 'pursuant to New Zealand's international obligations under the Paris Agreement.'[886] The *Thomson* Court explicitly remarks that the reason why New Zealand is a Party to the international climate change regime is precisely because 'it accepts the dangerous consequences of inaction'.[887]

The Irish Supreme Court in *Friends of the Irish Environment*, before giving its overview of the science and consequences of climate change including sea level rise and increased extreme weather events, clarifies that the State does not dispute these.[888] The Irish Court explains that the Plan in question was developed for the purpose of enabling the State to 'pursue and

[877] *Urgenda Appellate Decision (2018)* (n 767) para 43.
[878] *Neubauer (2021)* (n 767) paras 4, 7–9, 159–163.
[879] ibid 7.
[880] ibid 208–210.
[881] *Leghari (2015)* (n 766) para 7.
[882] ibid 5.4.
[883] *Thomson (2017)* (n 767) para 7.
[884] ibid 8–57.
[885] ibid 58–69.
[886] ibid 101.
[887] ibid 140.
[888] *Friends of the Irish Environment (2020)* (n 792) para 3.1.

achieve'[889] the international climate change regime's objectives. The Court in *Notre Affaire* also devotes time to the State's acceptance of the UNFCCC and the Paris Agreement and treats the knowledge of the underlying science as established fact.[890] The Court in *Klimaatzaak* too begins its decision with a detailed and lengthy elaboration of the historical background of the international climate change regime and the State's policy declarations and issuance of royal decrees and reports on emissions based on the IPCC.[891] The Belgian Court later expressly acknowledges that the State has approved the Paris Agreement among other international acts,[892] has participated in successive international climate negotiations,[893] and that the State does not dispute the seriousness of the risk of harm from climate change.[894] The State's knowledge is the basis for the Court's finding that the State failed to act with sufficient diligence to prevent the risk of harm to its citizens.[895]

As has been mentioned multiple times throughout this chapter and the preceding one, the elements of due diligence are closely interlinked and frequently overlap. The need for a reliance on the best available science was already explored in the context of the continuous nature of due diligence obligations and it is also significant in the element of knowledge. For example, the *Neubauer* Court acknowledged the IPCC as the source of the most current scientific understanding and scientific clarity on anthropogenic climate change before it commenced its lengthy discussion on how warming impacts ocean-related climate harms.[896] Later in its decision the German Court makes reference to the need to rely on best available science when holding that if, based on new science, the Paris Agreement goals were changed, the ambition by the German government must also change.[897] The *Urgenda* Appellate Court not only found that the State had long-term knowledge of the underlying science and the reductions necessary based on IPCC reports,[898] but in its explanation of the duty of care found that the government must take appropriate action in the face of the imminent threat of climate change 'which the government knew or ought to have known.'[899]

[889] ibid 4.1.
[890] *Notre Affaire à Tous (2021)* (n 789) 27–30.
[891] *Klimaatzaak (2021)* (n 767) 6–42.
[892] ibid 59.
[893] ibid 65.
[894] ibid 63.
[895] ibid 79.
[896] *Neubauer (2021)* (n 767) paras 16–20.
[897] ibid 212.
[898] *Urgenda Appellate Decision (2018)* (n 767) para 51.
[899] ibid 42.

Looking to future scientific knowledge of the ocean-climate related dangers, the Court in *Friend of the Irish Environment* included a determination that the successive, rolling five-year plans required within the State's 2050 plan to reach net zero will be based on successively sophisticated and updated science, allowing for future increased specificity.[900] The Court in *Klimaatzaak* also looked to the future in its finding that the State has a positive obligation to prevent harm based on the scientific knowledge available at any given moment and acknowledges that the successive IPCC reports demonstrate the continued evolution of climate science, indicating an expectation of the State's knowledge of such evolution.[901]

In summary, every court surveyed here discusses the knowledge element of the due diligence in the context of the international climate change regime and the scientific reports by the IPCC that underlie the regime, along with each state's participation in successive negotiations and as Parties to the regime and members of the global community. Further, several Courts explicitly refer to both actual and constructive knowledge ('ought to have known') and thus apply the knowledge element of the due diligence obligation under the international climate change regime in their decision-making.

Table 4.2.2.5 Knowledge

Element	Case	Court's findings
knowledge	*Leghari* (2015)	* Court found that, as a responsible member of the global community, the State has the duty to take climate mitigation action.
	Urgenda (2015) District Court	* Court assigns knowledge to State as participant in negotiation and signatory to the international climate regime. * Court finds, based on this knowledge, the State has failed in its duty of care to adequately reduce emissions to prevent ocean-climate harms.
	Thomson (2017)	* Court finds that as a Party to the international regime, the State expressly accepts the knowledge on which the international regime is based.
	Urgenda (2018) Appellate Court	* State has had long-term knowledge of underlying science and corresponding necessary reductions. * Duty of care includes taking appropriate action based on what the State knew or ought to have known.
	Urgenda (2019) Supreme Court	
	Friends of the Irish Environment (2020)	* The State does not dispute the science and consequences of climate change.
	Neubauer (2021)	* State accepts climate change science, national law is based on P.A. temperature goal and underlying science.
	Notre Affaire à Tout (2021)	* Court treats science underlying climate change and its consequences as facts not disputed in the case.

[900] *Friends of the Irish Environment (2020)* (n 792) para 6.20.
[901] *Klimaatzaak (2021)* (n 767) 59–60.

	Klimaatzaak (2021)	* Court finds that as a Party to the international regime, the State expressly accepts the knowledge on which the international regime is based. * Based on the fact of this knowledge, the State has failed to act with sufficient diligence to prevent the risk of harm.

4.2.2.6 Due diligence and reasonableness

The sixth and final element of due diligence is that of reasonableness. It was determined above[902] that reasonableness is the overarching lens through which actions taken in advancement of the goals of the international climate change regime are considered. Each of the other elements of due diligence (risk, flexibility, objective standard of care, continuity of the obligation, and knowledge) must be viewed through this lens. This section explores how national courts apply the element of reasonableness in their decision-making on states' due diligence obligations under the international climate regime.

In some instances, a national court is explicit in its understanding of reasonableness being a necessary component of the state's duty of care. One such example is the Appellate Court in *Urgenda* which, in its explanation of the duty of care, lays out that a government's actions in response to an imminent threat such as climate change must be reasonable.[903] In other cases, such as *Leghari,* the Court refers to the State's duty to be reasonable in less concrete terms such as reminding the State of its role as a 'responsible member of the global community'.[904] The *Thomson* Court also refers to reasonableness in the context of the broader global community in describing the process by which the State set its NDC and its 2050 and 2030 targets. Specifically, the Court highlights that the State set its 2050 target in relation to other states' targets[905] and that the process for developing the NDC and 2030 target was intended to find New Zealand's 'fair share'[906] of global emissions reductions. The *Thomson* Court further acknowledges the Paris Agreement's demand that contributions from states represent their 'highest possible ambition'.[907] However, it ultimately found that the actions taken in developing New Zealand's NDC and the 2030 target were within the scope of what could be considered reasonable, even if likely insufficient to meet the overall temperature

[902] See section 4.1.2.6 *Due diligence and reasonableness*.
[903] *Urgenda Appellate Decision (2018)* (n 767) para 42.
[904] *Leghari (2015)* (n 766) para 7.
[905] *Thomson (2017)* (n 767) paras 49–54.
[906] ibid 56–58.
[907] ibid 139.

goal.[908] The Irish Supreme Court also found that, while the level of specificity in the overall 2050 plan was lacking, the amount of detail the State included in the current version of its successive five-year plans was reasonable given the current level of scientific knowledge.[909] Conversely, the Court in *Klimaatzaak* found that the State had not acted reasonably given its extensive knowledge of the ocean-climate related risks within its own country and was therefore found to have failed to act with due diligence.[910]

Another important test of reasonableness that domestic courts undertake was previously explored in the discussion on the element of the continuous nature of due diligence.[911] That is the discussion of proportionality between the short-term and long-term measures taken. The *Urgenda* and *Neubauer* Courts considered it to be unreasonable to push more stringent measures to combat climate change to the future in exchange for less stringent measures in the short term.[912] Specifically, the *Urgenda* Appellate Court found that the State had failed to show why current lower emissions reduction targets were reasonable considering the serious risks Dutch citizens would face from ocean-climate related dangers in the future.[913] The *Neubauer* Court admonished the State, finding that the current law fails to ensure that future reductions can be realized in a timely manner and is therefore unreasonable.[914]

One final way in which domestic courts test the reasonableness of a state's actions to mitigate climate change and prevent ocean-climate related dangers is to look to other states' measures. While in the international climate regime, this is done through the process of the global stocktake and the enhanced transparency mechanism, in national court decisions this takes the form of transjudicialism. Transjudicialism was discussed in chapter 3[915] and, as a reminder, it is the practice whereby domestic courts look to courts in other jurisdictions to see how they have dealt with similar issues. In the context of the due diligence obligations under the international climate change regime, domestic courts tend to reference each other specifically when they are testing the reasonableness of the state's measures. Unsurprisingly,

[908] ibid 179.
[909] *Friends of the Irish Environment (2020)* (n 792) para 6.20, 6.33.
[910] *Klimaatzaak (2021)* (n 767) 79.
[911] See section 4.2.2.4 *Due diligence as a continuous obligation*.
[912] *Urgenda District Court (2015)* (n 759) para 4.89; *Urgenda Appellate Decision (2018)* (n 767) paras 52–53; *Neubauer (2021)* (n 767) para 258.
[913] *Urgenda Appellate Decision (2018)* (n 767) paras 52–53, 45.
[914] *Neubauer (2021)* (n 767) para 258.
[915] Chapter 3, section 3.2.2 *3.2.2 National Courts* in Practice.

as the first well-publicised domestic case of this type, *Urgenda* is frequently referenced by other national courts.

The *Neubauer* Court references the *Urgenda (2015)* decision in its finding that Germany's emissions must be reasonable within the global context of other states' emissions reduction measures.[916] The *Neubauer* Court went further, referencing the *Thomson* and other *Urgenda* cases to rebuff the State's actions as insufficiently reasonable, determining that pointing to other states' emissions does not excuse the requirement to take sufficient national actions and that Germany must instead act in a way to lead others in the fight against climate change.[917] The Court in *Klimaatzaak* noted its agreement with the Dutch Supreme Court's decision in *Urgenda* when it determined that the global dimension of climate change did not excuse Belgium from its international obligations to address climate change.[918] *Neubauer* also references *Friends of the Irish Environment* in determining that Germany's national ambition must be reasonable in order to fit into the international climate regime's overall goals[919] and in finding the level of specificity included in the German law to be unreasonable.[920] Similar to the *Neubauer* Court, the *Thomson* Court refers to cases in other jurisdictions extensively[921] and includes an in-depth exploration and analysis of the *Urgenda* Courts' determination of the duty of care required in the face of grave ocean-climate related harms due to climate change.[922] The *Thomson* Court specifically mentions the important role transjudicialism plays in domestic courts' determination of the adequacy of national climate policies.[923]

In sum, domestic courts place high value on states acting reasonably in the measures taken to prevent significant ocean-climate related dangers from GHG emissions, considering not only the nature of the measures taken to meet the level of risk, but also the proportionality with future necessary emissions reductions and the comparison with measures taken by other states. Each of these is relevant in a domestic court's determination of whether the

[916] *Neubauer (2021)* (n 767) para 200.
[917] ibid 203.
[918] *Klimaatzaak (2021)* (n 767) 61.
[919] *Neubauer (2021)* (n 767) para 218.
[920] ibid 262.
[921] *Thomson (2017)* (n 767) paras 105–132.
[922] ibid 127–132.
[923] ibid 133.

state's actions are sufficiently reasonable to meet their due diligence obligations in the context of the international climate change regime.

Table 4.2.2.6 Reasonableness

Element	Case	Court's findings
reasonableness	*Leghari* (2015)	* Court reminds the State that it is a 'responsible member of the global community'.
	Urgenda (2015) District Court	* Court found the balance between current proposed and future necessary emissions reductions unreasonable, therefore State failed.
	Thomson (2017)	* The State's actions must be reasonable in comparison to other states ('fair share'). * Court found that P.A. demands 'highest possible ambition' but ultimately New Zealand acted reasonably within the scope of the Agreement.
	Urgenda (2018) Appellate Court	* Court explains duty of care: government's action in response to an imminent threat such as climate change must be reasonable. * State failed to show current level of emissions were reasonable considering the risks faced by Dutch citizens.
	Urgenda (2019) Supreme Court	* Global problem/other states' emissions plans to do not excuse the State from its duty of due diligence in climate actions.
	Friends of the Irish Environment (2020)	* Amount of detail included in current version of successive, rolling 5-year plans is reasonable given the current level of scientific knowledge and allowing for future specificity based on evolved scientific knowledge. * The national level of ambition must be reasonable in the context of the international regime's overall goals.
	Neubauer (2021)	* Court found it unreasonable to include only lower emissions reductions in the short-term in exchange for more stringent emissions in the future. * Court found the current law fails to ensure future reductions can be realized in a timely manner and is therefore unreasonable. * State's emissions must be reasonable within the global context of other states' emissions. * The court determined that Germany's national ambition must be reasonable in order to fit into the international regime's overall goals.
	Notre Affaire à Tout (2021)	
	Klimaatzaak (2021)	*Global dimension of climate change does not excuse Belgium from its international obligations to address climate change.

In summary, the above analysis demonstrates that national courts do apply the six elements of due diligence in their decision-making on whether states have met their duty of care to protect their citizens from climate (and ocean-related) harms. This application brings mixed results, however. Some elements appear to be more determinative of a lack of diligence than others and therefore more likely to demonstrate a failure by the state to meet its requisite

duty of care. Others are less determinative in finding a lack of due diligence in systemic climate change litigation. The analysis in chapter 5 will demonstrate the extent to which the addition of the six due diligence elements under the law of the sea regime may (or may not) strengthen the legal arguments for holding governments accountable for failing to adequately reduce GHG emissions in the face of significant risk of devastating climate-ocean related harms.

Having explored each of the elements of due diligence obligations first under the international climate change regime itself and then within domestic climate change litigation, the following conclusion summarises the findings of this chapter in order to answer this chapter's relevant portion of the research question: the extent to which individuals can invoke due diligence obligations under the international climate change regime to hold their governments accountable in national courts for failing to adequately regulate GHG emissions, causing ocean-related climate harm.

Table 4.2 Due Diligence in Domestic Litigation

Element	Case	Court's findings
risk	*Leghari* (2015)	* Established risk of climate change is underlying reason for necessity for climate action by the State
	Urgenda (2015) District Court	* As signatory to international regime, State accepts IPCC reports * Due to the severity of climate change, State has a duty of care to take mitigating measures * Given its duty of care, the State must make an adequate contribution to prevent hazardous climate change
	Thomson (2017)	* State is a Party to the international climate regime so accepts the risks are real and its obligations under the regime.
	Urgenda (2018) Appellate Court	* There is a real threat of climate change
	Urgenda (2019) Supreme Court	* The mere existence of a genuine possibility of risk means the State must take suitable measures to prevent it.
	Friends of the Irish Environment (2020)	* The dangers of climate change are not in dispute but underly legal questions in case. * The consequences of failing to address climate change are accepted by both sides.
	Neubauer (2021)	* Scientific clarity of anthropogenic climate change * State's duty of care includes requirement to reduce the risk of climate change
	Notre Affaire à Tout (2021)	Court treats risk as fact
	Klimaatzaak (2021)	* In the light of scientific knowledge of the risk of climate change, the State has a positive obligation to prevent harm. * In light of the risks the State failed to act with prudence and diligence.
Flexibility	*Leghari* (2015)	
	Urgenda (2015) District Court	* The State is afforded broad discretion on specific measures taken, but Court retains authority to determine whether State fails in its duty to protect citizens.
	Thomson (2017)	* Court found no failure of duty on the part of the State because, although likely insufficient, national measures not inconsistent with State's obligations under the international regime.
	Urgenda (2018) Appellate Court	* State has failed to show why its lower targets are sufficient to prevent risk of harm.
	Urgenda (2019) Supreme Court	* While State has discretion on specific measures, Courts maintains jurisdiction to assess whether the State approached the problem with due diligence.
	Friends of the Irish Environment (2020)	* The State at this point has not violated its obligations under the international regime due to discretion allowed.
	Neubauer (2021)	* The State has not gone beyond its margin of appreciation in its duty to protect. * Duty to protect would be violated only by wilful absence of measures to protect against climate change.
	Notre Affaire à Tout (2021)	
	Klimaatzaak (2021)	* The Court retains oversight over legality of State measures taken with broad discretion * State failed to act with appropriate diligence due to insufficiency of measures to prevent risk of harm.
Objective	*Leghari* (2015)	* Are State's actions sufficient to meet climate related goals?
	Urgenda (2015) District Court	* Are State's emissions reductions targets sufficient to meet objectives and goals of the international cc regime?
	Thomson (2017)	* The purpose of the State's climate change law is to meet obligations under the international regime (including guidance and principles).
	Urgenda (2018) Appellate Court	* Duty of care examination begins with sufficiency of reduction targets to meet temperature goals in international regime.

	Urgenda (2019) Supreme Court	* Based on IPCC and internationally agreed emissions scenarios, the State's lower targets are not sufficient to be a responsible policy.
	Friends of the Irish Environment (2020)	* 1.5°C in P.A. is the temperature goal that Irish Plan must work toward. * State failed to demonstrate objective adequacy of 2050 Plan because of a lack of specificity necessary.
	Neubauer (2021)	* The German climate law is based directly on the P.A. temperature goal. * Portions of German law unconstitutional because lack of specificity makes objective assessment of adequacy impossible.
	Notre Affaire à Tout (2021)	* The legal question here is whether the State's reduction targets are sufficient to maintain temperatures below 1.5°C * Court orders State to provide necessary information to determine adequacy of emissions targets.
	Klimaatzaak (2021)	* From the figures and calculations based on IPCC emissions pathways, Court can determine that the State failed to act with diligence.
continuous	*Leghari* (2015)	
	Urgenda (2015) District Court	* Duty of care includes whether State acts according to best available science. * State's current policy fails to meet standard of care because current emissions reductions will lead to future need for significant reductions.
	Thomson (2017)	* The court found that although the State's current emissions reduction plans are relatively low and will mean future increased costs associated with more stringent future reductions, they are not inconsistent with the overall goal under the Paris Agreement.
	Urgenda (2018) Appellate Court	* Court found State had failed in its duty of care for inadequate current reductions plan because postponing reductions uses up the available carbon budget, requiring more ambition later.
	Urgenda (2019) Supreme Court	* The State's policy to postpone ambition is unlawful.
	Friends of the Irish Environment (2020)	* Court found portions of State's climate law unconstitutional because future emissions reductions lacked specificity. * 5-year plans are actually a continuous rolling cycle successive 5-year plans. * Court recognizes the need for evolving science and circumstances to inform future specificity in 5-year plans (ongoing obligation)
	Neubauer (2021)	* Court found portions of State's climate law unconstitutional because future emissions reductions lacked specificity. * Court found State's reduction plan insufficiently diligent because ambition is too low and will lead to future need for significant reductions. * Findings based on scientific knowledge available at time of decision-making.
	Notre Affaire à Tout (2021)	
	Klimaatzaak (2021)	* Court acknowledges continuous nature of due diligence obligation based on continuous nature of the best available science, evidenced by successive IPCC reports.
knowledge	*Leghari* (2015)	* Court found that, as a responsible member of the global community, the State has the duty to take climate mitigation action.
	Urgenda (2015) District Court	* Court assigns knowledge to State as participant in negotiation and signatory to the international climate regime. * Court finds, based on this knowledge, the State has failed in

		its duty of care to adequately reduce emissions to prevent ocean-climate harms.
	Thomson (2017)	* Court finds that as a Party to the international regime, the State expressly accepts the knowledge on which the international regime is based.
	Urgenda (2018) Appellate Court	* State has had long-term knowledge of underlying science and corresponding necessary reductions. * Duty of care includes taking appropriate action based on what the State knew or ought to have known.
	Urgenda (2019) Supreme Court	
	Friends of the Irish Environment (2020)	* The State does not dispute the science and consequences of climate change.
	Neubauer (2021)	* State accepts climate change science, national law is based on P.A. temperature goal and underlying science.
	Notre Affaire à Tout (2021)	* Court treats science underlying climate change and its consequences as facts not disputed in the case.
	Klimaatzaak (2021)	* Court finds that as a Party to the international regime, the State expressly accepts the knowledge on which the international regime is based. * Based on the fact of this knowledge, the State has failed to act with sufficient diligence to prevent the risk of harm.
reasonable	*Leghari* (2015)	* Court reminds the State that it is a 'responsible member of the global community'.
	Urgenda (2015) District Court	* Court found the balance between current proposed and future necessary emissions reductions unreasonable, therefore State failed.
	Thomson (2017)	* The State's actions must be reasonable in comparison to other states ('fair share'). * Court found that P.A. demands 'highest possible ambition' but ultimately New Zealand acted reasonably within the scope of the Agreement.
	Urgenda (2018) Appellate Court	* Court explains duty of care: government's action in response to an imminent threat such as climate change must be reasonable. * State failed to show current level of emissions were reasonable considering the risks faced by Dutch citizens.
	Urgenda (2019) Supreme Court	* Global problem/other states' emissions plans to do not excuse the State from its duty of due diligence in climate actions.
	Friends of the Irish Environment (2020)	* Amount of detail included in current version of successive, rolling 5-year plans is reasonable given the current level of scientific knowledge and allowing for future specificity based on evolved scientific knowledge. * The national level of ambition must be reasonable in the context of the international regime's overall goals.
	Neubauer (2021)	* Court found it unreasonable to include only lower emissions reductions in the short-term in exchange for more stringent emissions in the future. * Court found the current law fails to ensure future reductions can be realized in a timely manner and is therefore unreasonable. * State's emissions must be reasonable within the global context of other states' emissions. * The court determined that Germany's national ambition must be reasonable in order to fit into the international regime's overall goals.
	Notre Affaire à Tout (2021)	
	Klimaatzaak (2021)	*Global dimension of climate change does not excuse Belgium from its international obligations to address climate change.

4.3 Conclusions

This chapter builds on the analysis of due diligence in international law and the development of six specific elements thereof that was the subject of chapter 3 of this thesis. This chapter surfaced how the six elements of due diligence obligations are articulated within the international climate change regime and then explored how national courts treat these same elements in systemic climate change cases against governments for failing to adequately reduce GHG emissions, causing ocean-climate related harm. This final section builds on the foregoing to answer the sub-question of this chapter: to what extent can individuals invoke the due diligence obligations under the international climate change regime to hold their governments accountable in national courts for failing to adequately reduce GHG emissions, causing ocean-climate related harm? To that end, this section first summarizes the findings of the chapter. This will surface whether the various elements of due diligence under the international climate change regime are determinative in national courts' decision-making to hold governments accountable for failing to adequately reduce GHG emissions. Finally, this section explores what the potential barriers or challenges are to the reliance on due diligence in systemic climate change cases against governments for causing ocean-climate related harms by failing to adequately reduce GHG emissions.

Given that the international climate change regime moved away from prescriptive substantive obligations in the Paris Agreement, the regime now appears to rely heavily on states' good faith application of due diligence in their national measures to achieve its overall objectives. In other words, due diligence obligations are expected to do the heavy lifting when it comes to delivering on the ambition of the international climate change regime.[924] Without the Parties' dedication to a high standard of due diligence, the ambitious goals of the international climate regime – and let us not forget, the prevention of devastating and life-threatening ocean-climate harm – will remain out of reach. However, due diligence remains a vague and difficult to articulate norm. It is in stark contrast, for example, to the far clearer concept of strict liability that allows straight-forward assessment of liability. Due diligence, rather, requires a consideration of a number of elements, along with objectivity and ultimately, the very nebulous application of reasonableness.

[924] Rajamani (n 339) 179.

The Parties negotiated an international climate regime that relies heavily on ambition and progression, while at the same time allowing for immense flexibility in the form of differentiation and discretion. There is potential within the regime that, if each Party does indeed employ a high standard of due diligence in developing, enacting and enforcing the necessary national measures, it could trigger an ever-progressing cycle of ambition toward meeting the long-term temperature goal.[925] However, if history is any guide at all, expecting – and waiting for – Parties to hold each other to account for their obligations under the regime to make significant progress toward the long-term temperature goal is a futile exercise. The question this thesis seeks to answer therefore is to what extent individuals can invoke the due diligence obligations under the international climate change regime and the law of the sea regime to hold their governments accountable in national courts for failing to adequately reduce GHG emissions, causing ocean-climate related harm?

Section 4.1 in this chapter found that each of the elements of due diligence is well articulated within the international climate change regime.[926] However, each element is articulated across multiple articles and sections of the regime, frequently overlapping, feeding into each other, and building on each other. The complex and diffuse nature of the due diligence elements throughout the international climate change regime – and the Paris Agreement in particular – creates an interconnected regime that relies heavily on due diligence as the force behind the ambition needed to ultimately meet the long-term objectives and goals of the regime. Still, the elements of due diligence within the international climate change regime, diffuse as they are, tend to centre around the handful of substantive articles that come up repeatedly. These are the long-term temperature goal, articles pertaining to mitigation, the NDCs, the enhanced transparency framework and the global stocktake. This is not a surprising list, of course, as these are the articles that entail the binding legal obligations within the Paris Agreement. Upon close inspection, each element relies heavily on the long-term temperature goal within the Paris Agreement as the driving force of the due diligence obligations within the international climate change regime.[927] Similarly, the enhanced transparency framework and the global stocktake are immensely important to this

[925] ibid 180.
[926] See section 4.1.2 *The Elements of Due Diligence in the International Climate Change Regime*.
[927] The element of flexibility is the only element in which the temperature goal was not surfaced as a necessary component. It could be argued that the articulation of the goal as both well below 2°C and the pursuit toward 1.5°C inherently provides flexibility in the temperature goal. However, as was established throughout this chapter, the lower limit of 1.5°C is now widely accepted as the only appropriate long-term temperature goal in order to avoid calamitous ocean-climate harms.

exploration as these mechanisms are both crucial driving elements of the regime and important for multiple elements of the due diligence obligation, as are progression and the nationally determined nature of Parties' contributions toward the regime's objectives.

Because due diligence permeates the international climate change regime so extensively, references to due diligence in national court decisions do not provide a consistent roadmap for the application thereof. Section 4.2 highlighted that the implications of relying on the due diligence obligations articulated in the international climate change regime come with mixed results. What follows is a brief summary of the outcome of each element in the cases surveyed in this chapter.

The first element of risk is discussed by all surveyed courts as the underlying reason the state is expected to take action to mitigate against climate change. Several even explicitly tie the risk of calamitous harms associated with climate change to a state's due diligence obligations.[928] In each decision surveyed, there was no question of this risk, and most courts acknowledge that there is no dispute as to the ocean-related harms from GHG emissions. The risk of harm from anthropogenic GHG emissions and climate change is the clear underlying fact of each of the cases surveyed.

The second element of flexibility showed far less consistent treatment by the courts. All of the decisions surveyed found that the state was granted significant discretion to determine the specific details of appropriate measures to mitigate ocean-climate risks, but only the *Urgenda* Courts found that, despite this discretion, the State failed to employ adequate diligence in its national climate policy.[929] The others found the element of flexibility and the discretion afforded the state so significant that it barred the court from finding a lack of diligence (although some of them found a failure based on other elements).[930] Even given this very broad discretion however, and contrary to each state's argument along separation of powers lines, the surveyed courts consistently found that the judiciary maintained oversight over the legality and ultimate sufficiency of the overall climate policy of the state.

[928] *Leghari (2015)* (n 766); *Urgenda District Court (2015)* (n 759); *Urgenda Appellate Decision (2018)* (n 767); *Urgenda Supreme Court (2019)* (n 767); *Thomson (2017)* (n 767); *Neubauer (2021)* (n 767); *Klimaatzaak (2021)* (n 767).
[929] *Urgenda District Court (2015)* (n 759); *Urgenda Appellate Decision (2018)* (n 767); *Urgenda Supreme Court (2019)* (n 767).
[930] *Thomson (2017)* (n 767); *Neubauer (2021)* (n 767); *Friends of the Irish Environment (2020)* (n 792).

The third element of objectivity provides the most varied application by courts, but ultimately relatively consistent findings of a lack of diligence on the part of the state. Courts consistently refer to the long-term goals of the international climate change regime, most finding that the 1.5°C temperature limit of the Paris Agreement is the appropriate goal the state must strive toward.[931] The finding of a lack of diligence on the part of the state, however, varies. Some found the state lacking for failing to employ its highest possible ambition.[932] Others found a failure by the state to provide adequate information to track its progress toward the long-term goal to be the deciding element.[933] Still others found that the state had failed to appropriately apply agreed methods and guidance in the development of its climate policy.[934]

The fourth element of the continuous nature of due diligence again showed rather mixed results. Of the courts that found no failure on the part of the state to employ due diligence based on this element, each included a nuanced finding. The *Thomson* Court for example found that the overall policy of the State was likely insufficient to meet this element of due diligence but found that the State nonetheless acted within the scope of the international climate regime.[935] This indicates a balancing of elements against each other and, here, the flexibility afforded to the State tipped the balance. The Irish Supreme Court found that the rolling five-year plans' lack of specificity was allowed, while the overall 2050 Plan's lack of sufficient information for the achievement of the long-term future goal of net zero by mid-century indicated a lack of diligence on the part of the State.[936] The Court therefore found the State failed on the element of the continuous nature of its obligation. Most other courts surveyed found a lack of due diligence based on the state's failure to apply best available science[937] and to provide sufficient information.[938]

---

[931] *Urgenda District Court (2015)* (n 759); *Urgenda Appellate Decision (2018)* (n 767); *Urgenda Supreme Court (2019)* (n 767); *Friends of the Irish Environment (2020)* (n 792); *Thomson (2017)* (n 767); *Neubauer (2021)* (n 767); *Notre Affaire à Tous (2021)* (n 789); *Klimaatzaak (2021)* (n 767).
[932] *Urgenda District Court (2015)* (n 759); *Urgenda Appellate Decision (2018)* (n 767); *Urgenda Supreme Court (2019)* (n 767); *Klimaatzaak (2021)* (n 767).
[933] *Friends of the Irish Environment (2020)* (n 792); *Neubauer (2021)* (n 767); *Notre Affaire à Tous (2021)* (n 789).
[934] *Leghari (2015)* (n 766); *Klimaatzaak (2021)* (n 767); *Urgenda District Court (2015)* (n 759); *Urgenda Appellate Decision (2018)* (n 767); *Urgenda Supreme Court (2019)* (n 767).
[935] *Thomson (2017)* (n 767).
[936] *Friends of the Irish Environment (2020)* (n 792).
[937] *Urgenda District Court (2015)* (n 759); *Urgenda Appellate Decision (2018)* (n 767); *Urgenda Supreme Court (2019)* (n 767); *Klimaatzaak (2021)* (n 767).
[938] *Neubauer (2021)* (n 767); *Klimaatzaak (2021)* (n 767).

The fifth element of knowledge is similar to the first element of risk in that all courts surveyed in this chapter acknowledge the state had sufficient knowledge of the risks of ocean-climate related harms. It is only the *Urgenda* Courts and the Belgian Court that found a lack of diligence based on their States' knowledge of the risk of dangerous harms from anthropogenic GHG emissions.[939] The other courts tend to accept this knowledge is not in dispute and do not discuss the diligence required based on this element specifically.

The sixth and final element of reasonableness runs along similar lines as objectivity, in that only the *Thomson* Court is an outlier by finding that the State's actions, while likely insufficient, did not present a lack of diligence and the State's actions were therefore reasonable within the scope of the international climate change regime.[940] The remaining courts found either that the balance between present and future necessary emission reductions was unreasonable[941] or that the state failed to act reasonably as a member of the global community.[942]

Overall, this summary of the implications of due diligence elements under the international climate change regime in national systemic climate change cases demonstrates mixed results. National courts do apply the elements of due diligence in their decision-making on whether states have met their duty of care through the adoption and enforcement of climate policies and emissions reductions plans. Some elements appear to be more determinative of a lack of diligence and therefore a failure to meet the requisite duty of care, and ultimately unlawfulness of the climate policy. Others carry less weight, proving more problematic for holding governments accountable for failing to adequately reduce GHG emissions in the face of significant risk of devastating climate harms.

This chapter demonstrates that one of the remaining challenges to invoking due diligence obligations under the international climate change regime in national systemic climate change cases is the vague and diffuse nature of due diligence. The elements of due diligence in the international climate regime are found across five substantive articles and well over twenty sub-paragraphs of the Paris Agreement. This underscores the diffuse nature of due

[939] *Urgenda District Court (2015)* (n 759); *Urgenda Appellate Decision (2018)* (n 767); *Urgenda Supreme Court (2019)* (n 767); *Klimaatzaak (2021)* (n 767).
[940] *Thomson (2017)* (n 767).
[941] *Urgenda District Court (2015)* (n 759); *Urgenda Appellate Decision (2018)* (n 767); *Urgenda Supreme Court (2019)* (n 767); *Friends of the Irish Environment (2020)* (n 792); *Neubauer (2021)* (n 767).
[942] *Leghari (2015)* (n 766); *Klimaatzaak (2021)* (n 767).

diligence, and the lack of specific language speaks to the vagueness that was the subject of much of chapter 3.

The translation of these obligations to national courts provides additional challenges. The cases surveyed for this thesis met specific criteria outlined at the outset of this chapter and included the type of case (systemic litigation by civil society against a government's overall climate policy), a discussion of the ocean-related impacts of climate change, reference to the international climate regime by the national court, and consideration of states' due diligence obligations by the court. It is important to note again that none of the cases surveyed, and indeed no domestic systemic climate change litigation to date, relies on due diligence arguments as the primary grounds upon which the case is brought. Instead, these cases focus on rights-based grounds, tort law, or public law.[943] Courts are primarily tasked with determining whether the state meets the relevant standard of its duty of care and tend to make this determination along due diligence lines. This results in uneven application of the elements of due diligence obligations, which has been described as a 'perceived lack of standards against which to adjudicate whether a State is complying with the requirements of the applicable law in the context of climate mitigation.'[944] Given the increasing urgency of the most recent IPCC reports and the significant risk of devastating harms from continued anthropogenic GHG emissions, having a robust legal standard that can be applied in systemic climate change litigation is of particular importance in the context of ocean-related climate mitigation.

As states begin to improve their understanding (and inclusion) of the ocean-related aspects of unchecked climate change, the need for robust legal standards against which states' national climate mitigation measures can be assessed takes on increased significance. The international climate change regime, while it does include the elements of due diligence upon which courts can rely, remains a vague source of legal standards especially as it pertains to ocean-related harms. The question therefore becomes whether there are other sources of more robust legal standards. The next chapter considers whether the UN Convention on the Law of the Sea might be such a source.

[943] Maxwell, Mead and van Berkel (n 35) 4.
[944] ibid 5.

Chapter 5: Due Diligence in the UN Convention on the Law of the Sea and its Potential Use in National Climate Change Litigation

This chapter builds on the previous chapters of this thesis to answer the final part of the overall research question: to what extent can individuals invoke due diligence obligations under both the international climate change regime *and the United Nations Convention on the Law of the Sea to hold their governments accountable in national courts* for failing to adequately reduce GHG emissions, causing ocean-related climate harms.

This chapter follows a similar structure to that in chapter 4. In the first section, it outlines the historic development of due diligence within the law of the sea regime, considering how the six elements of due diligence are articulated within the regime. The second section relies on the same national systemic climate change cases relied on in chapter 4 and considers whether hypothetical reliance on due diligence obligations found in the law of the sea regime would have strengthened existing legal arguments and led to different outcomes. This chapter concludes with an analysis of the extent to which, to answer the research question of this thesis, individuals could invoke the due diligence obligations under UNCLOS to hold their governments accountable in national courts for failing to adequately reduce GHG emissions, causing ocean-related climate harm.

A note on terminology is warranted here. Throughout this chapter, I refer to UNCLOS, the law of the sea regime, and, broadly, to the law of the sea. The intention is not to confuse, but rather to include the full spectrum of legal instruments that make up the Law of the Sea. UNCLOS is the official treaty, the UN Convention on the Law of the Sea. The law of the sea regime includes both the Convention and its further developments. This includes judicial development, for example International Tribunal of the Law of the Sea (ITLOS) decisions, advisory opinions and other judicial development of the law of the sea. Broadly, the term "law of the sea" is used interchangeably with "law of the sea regime" throughout this chapter.

5.1 Due Diligence in the UN Convention on the Law of the Sea

In the first section of this chapter the development and articulation of due diligence in the law of the sea regime is investigated. Chapter 3 surfaced that UNCLOS and ITLOS, along with its Seabed Disputes Chamber, contributed significantly to the development of due diligence

in general international law.[945] This chapter first briefly outlines the history and development of the law of the sea regime, then goes into more detail within the regime to analyse how due diligence is articulated therein regime broadly and then delves into an exploration of each of the six elements of due diligence.

5.1.1 Historical overview of the law of the sea regime and due diligence

In chapter 4, frequent reference was made to the scarcity of inclusion of the ocean in the operative sections of the international climate change regime (with the exception of its utility as a sink for GHG emissions). The same is true here. There is no mention of climate change within UNCLOS, but the reason is relatively straightforward: climate change was not yet a significant topic of discussion or concern in international negotiations (although it was not unknown as a danger) when UNCLOS was being negotiated.[946] That is not to say environmental issues were not influential and instructive. The 1972 UN Conference on the Human Environment and its Stockholm Declaration[947] were significant in the development of Part XII of UNCLOS,[948] which is the most relevant for purposes of this thesis. The concern for the protection of the ocean and marine ecosystems from pollution, including from land-based sources, was directly based on the issues explored and elaborated in the Stockholm Declaration.[949]

Previously, the law of the sea had been focused primarily on protecting the interests of states in using and exploiting whatever resources the ocean provided rather than the protection and preservation of marine ecosystems. For centuries, states used the ocean as a means of transportation and a seemingly endless source of food and resources.[950] By the early 20th century, the customary rules governing the ocean were broadly recognised.[951] The stability of the law of the sea began to shift however, as coastal states began pushing and expanding their sovereign interests and ownership over the ocean further from their coastlines,

[945] Chapter 3, section 3.1.1 *3.1.1 What is Due Diligence and What are States' Due Diligence Obligations under* International Law?*.*
[946] Johansen (n 30) 2–3.
[947] *Declaration of the United Nations Conference on the Human Environment* (16 June 1972) UN Doc A/CONF 48/11/Rev 1 (1973) (Stockholm Declaration).
[948] H Corell, 'The United Nations: A Practitioner's Perspective' in Rothwell, Donald and others (eds), *The Oxford Handbook of the Law of the Sea* (Oxford University Press 2015) 355.
[949] ibid.
[950] Johansen (n 30) 8.
[951] T Treves, 'Historical Development of the Law of the Sea' in Donald Rothwell and others (eds), *The Oxford Handbook of the Law of the Sea* (Oxford University Press 2015) 7.

resulting in conflicts and legal claims.[952] This led to early attempts at developing a comprehensive law of the sea regime, which were primarily focused on protecting coastal states' interests.[953] Growing concern about the degradation and over-exploitation of the ocean later in the 20th century caused the protection and preservation of the ocean and its living resources to become a topic of international negotiations.[954] Pollution from shipping and dumping received the earliest attention after some localised incidents (including, e.g. high arsenic levels in the Baltic sea from dumping in the 1930's), but the assumption was still that such incidents remained within local or regional areas.[955] As recently as the 1970 Report of the Joint Group of Experts on the Scientific Aspects of Marine Pollution, the assumption remained that marine pollution had primarily local impacts.[956]

After the second world war, and in the general move toward codification of international law under the United Nations, the law of sea became the topic of renewed attempts to codify the law of the sea into one convention.[957] These attempts ultimately resulted in four separate conventions and an optional protocol being adopted at the 1958 Geneva Convention's Conference on the Law of the Sea.[958] Each of these conventions and the optional protocol eventually went into force, but the law of the sea had still not successfully been codified into one unified convention. After decades of failed attempts to negotiate and agree to one international framework convention governing the law of the sea, the 1982 UN Convention on the Law of the Sea became the first UN treaty to be agreed by consensus decision making.[959] It nonetheless took more than ten years to go into effect in November 1994

[952] ibid 17–22.
[953] ibid 13–15.
[954] Johansen (n 30) 8.
[955] EA Kirk, 'Science and the International Regulation of Marine Pollution' in Rothwell, Donald and others (eds), *The Oxford Handbook of the Law of the Sea* (Oxford University Press 2015) 519.
[956] Group of Experts on the Scientific Aspects of Marine Pollution, 'Report of the Second Session, GESAMP II/11 (1970)'.
[957] Treves, Tullio (n 951) 13.
[958] *Convention on the Territorial Sea and the Contiguous Zone*, 29 April 1958 (entered into Force 10 September 1964). United Nations Treaty Series, Vol. 516, p. 205 (1958); *Convention on the High Seas*, 29 April 1958 (entered into Force on 30 September 1962). United Nations Treaty Series Vol. 450, p. 11, p. 82 (1958); *Convention on Fishing and Conservation of the Living Resources of the High Seas*, 29 April 1958 (entered into Force 20 March 1966). United Nations Treaty Series, Vol. 559, p. 285 (1958); *Convention on the Continental Shelf*, 29 April 1958 (entered into Force 10 June 1964). United Nations Treaty Series, Vol. 499, p. 311 (1958); *Optional Protocol of Signature Concerning the Compulsory Settlement of Disputes*, 29 April 1958 (entered into Force on 30 September 1962). United Nations Treaty Series, Vol. 450, p. 169 (1958).
[959] RR Churchill, 'The 1982 United Nations Convention on the Law of the Sea' in Rothwell, Donald and others (eds), *The Oxford Handbook of the Law of the Sea* (Oxford University Press 2015) 26.

(incidentally the same year the 1992 UNFCCC came into force). [960] UNCLOS is often referred to as the "constitution for the ocean" because of its broad ambition and comprehensive coverage of all activities connected to the ocean.[961] The inclusion of significant protections of the health of the marine environment was a major objective in the negotiation of the Convention in the face of growing degradation of the marine environment as evidenced in the wide-ranging rules on this topic within UNCLOS.[962] Much like the UNFCCC, UNCLOS is a framework convention that is the basis for the normative regulation of the activities, uses, depletion and preservation of the ocean and its resources.[963] In its preamble, UNCLOS clearly spells out its intention to establish a legal order for the ocean that will 'promote the peaceful uses of the seas and oceans, the equitable and efficient utilization of their resources' and – crucially – 'the conservation of their living resources, and the study, protection and preservation of the marine environment.'[964]

As mentioned earlier, UNCLOS does not mention climate change, but it does include, in Part XII, wide-ranging obligations for states to preserve and protect the marine environment from pollution. Article 1 of UNCLOS defines "pollution of the marine environment" as:

> [T]he introduction by man, directly or indirectly, of substances or energy into the marine environment, including estuaries, which results or is likely to result in such deleterious effects as harm to living resources and marine life, hazards to human health, hindrance to marine activities, including fishing and other legitimate uses of the sea, impairment of quality for use of sea water and reduction of amenities.[965]

It is well settled[966] that greenhouse gas emissions and climate change fall within this definition of pollution. Emissions of GHGs and increased atmospheric temperature due to climate change introduce both substances and energy to the marine environment and, as was established in detail in chapter 2,[967] the results are indeed deleterious and harmful to

[960] *UNCLOS* (n 29).
[961] Johansen (n 28) 162.
[962] Center for Oceans Law and Policy, University of Virginia, *UN Convention on the Law of the Sea Commentary 1982* (Brill Nijhoff 2014) Part XII-Protection and Preservation of the Marine Environment, 3.
[963] Churchill (n 959) 30.
[964] *UNCLOS* (n 29) Preamble.
[965] ibid Article 1(1)(4).
[966] A Boyle, 'Law of the Sea Perspectives on Climate Change' (2012) 27 The International Journal of Marine and Coastal Law 831, 831–832; RK Craig, 'Mitigation and Adaptation' in Elise Johansen, Ingvild Ulrikke Jakobsen and Signe Veierud Busch (eds), *The Law of the Sea and Climate Change: Solutions and Constraints* (Cambridge University Press 2020) FN160; Boyle, 'Litigating Climate Change under Part XII of the LOSC' (n 30) 6.
[967] Chapter 2, section 2.2.2 *Ocean-related climate harms and their impacts*.

living resources and marine life, as well as hazardous to human health. The following sections of this chapter explore in more detail the sources of pollution and how UNCLOS treats each of them, including states' obligations pertaining to them. Suffice to say here that GHG emissions and climate change in general fit into the definition of UNCLOS as elaborated in Article 1.

Below, the specific features, rights and obligations of Part XII of UNCLOS are explored as they pertain specifically to the protection and preservation of the ocean, along with the primary due diligence obligations of the law of the sea regime. After that, each of the elements of due diligence are explored in detail, including how they are articulated within UNCLOS.

5.1.2 Due Diligence in the UN Convention on the Law of the Sea

Having briefly examined the history and context of UNCLOS, this sub-section looks in more detail at due diligence within the law of the sea regime. Focus will be on Part XII of UNCLOS, which is specifically concerned with the protection and preservation of the marine environment and is the most relevant section of UNCLOS for this thesis. Part XII of UNCLOS, titled 'Protection and Preservation of the Marine Environment' is intended to be a comprehensive approach to addressing *all* issues that pertain to the protection of the marine environment within the structure of a framework convention.[968] To this end, Part XII takes a sectoral approach by addressing individually, in distinct articles, the various sources of potential pollution, including from land-based sources,[969] seabed activities,[970] activities in the Area,[971] pollution by dumping,[972] from vessels[973] and from or through the atmosphere.[974] Part XII regulates enforcement of each of these sources of pollution in the same sectoral fashion.[975]

Due to its nature as a framework convention, however, UNCLOS, rather than providing detailed specificity regarding the protection and preservation of the marine environment for each sectoral source of pollution, invokes the novel device of incorporating by reference

[968] R Churchill, , 'The LOSC Regime for Protection of the Marine Environment - Fit for the Twenty-First Century?', *Research Handbook on International Marine Environmental Law* (Edward Elgar Publishing 2015) 4–5; Boyle, 'Protecting the Marine Environment from Climate Change' (n 30) 81–82.
[969] *UNCLOS* (n 29) Article 207.
[970] ibid Article 208.
[971] ibid Article 209.
[972] ibid Article 210.
[973] ibid Article 211.
[974] ibid Article 212.
[975] ibid Section 6. Enforcement, Articles 213-222.

external standards developed under other regimes or simply other instruments within the law of the sea regime.[976] The Parties deliberately drafted Part XII in this open-textured manner to allow for the evolution and further development of the obligations of due diligence in this Part of UNCLOS.[977] Part XII, which is explored in more detail below, is framed in due diligence language. As has been the theme throughout this thesis, the language is not explicit, but rather due diligence 'slang' that requires contextual interpretation to assess the full nature of states' obligations.[978] Indeed the Seabed Disputes Chamber, in its 2011 Advisory Opinion, noted that '[t]he content of "due diligence" obligations may not easily be described in precise terms."'[979]

Part XII begins with the general obligation that states must 'protect and preserve the marine environment.'[980] Because of its ambiguity, it has been argued that it is difficult to interpret or even apply this broad general obligation in isolation, making it not so much an obligation but a statement of principle.[981] The Tribunal in the *South China Sea* Arbitration, however, noted that '[a]lthough phrased in general terms, the Tribunal considers it well established that Article 192 does impose a duty on States Parties, the content of which is informed by the other provisions of Part XII.'[982] This obligation is unqualified and is therefore not limited to any subsection of the marine environment, but is a general, comprehensive duty to protect the entirety of the 'marine environment'[983] without sectoral, jurisdictional, spatial, biological, or geographic limit.[984]

Given its breadth and ambiguity, the general obligation to protect and preserve the marine environment in Article 192 must be read along with the subsequent Articles in Part XII,

[976] KN Scott, 'Ocean Acidification: A Due Diligence Obligation under the LOSC' (2020) 35 The International Journal of Marine and Coastal Law 382, 393.
[977] Boyle, 'Litigating Climate Change under Part XII of the LOSC' (n 30) 16.
[978] Papanicolopulu, Irini (n 38) 151.
[979] *Advisory Opinion* (n 39) para 117.
[980] *UNCLOS* (n 29) Article 192.
[981] J Harrison, *Saving the Oceans Through Law: The International Legal Framework for the Protection of the Marine Environment* (Oxford University Press 2017) 23.
[982] *South China Sea Arbitration* (n 293) para 941.
[983] The term "marine environment" is not defined within UNCLOS, but is meant to allow for the inclusion of the ever evolving understanding and knowledge related to the marine environment, including its preservation and protection. Center for Oceans Law and Policy, University of Virginia (n 962) Part I-Introduction, Article 1, para 1.23.
[984] Johansen (n 28) 162; N Oral, 'Implementing Part XII of the 1982 UN Law of the Sea Convention and the Role of International Courts' in Nerina Boschiero and others (eds), *International Courts and the Development of International Law: Essays in Honour of Tullio Treves* (T M C Asser Press 2013) 405.

particularly Article 194 which requires states to take all measures 'necessary to prevent, reduce and control pollution of the marine environment from any source'[985] and to 'minimize to the fullest possible extent the release of toxic, harmful or noxious substances, especially those which are persistent, from land-based sources, from or through the atmosphere or by dumping'.[986] Further, these measures must include 'those necessary to protect and preserve rare or fragile ecosystems as well as the habitat of depleted, threatened or endangered species and other forms of marine life.'[987] Considering these two articles together, the *South China Sea* Tribunal further found that

> Articles 192 and 194 set forth obligations not only in relation to activities directly taken by States and their organs, but also in relation to ensuring activities within their jurisdiction and control do not harm the marine environment.[988]

This is of particular importance for purposes of this thesis because it means that, under Articles 192 and 194 of UNCLOS, states are responsible for regulating any actions that take place within their jurisdictions to prevent the pollution of the marine environment.[989]

The *South China Sea* Tribunal drew on decisions of the International Court of Justice[990] and the Seabed Disputes Chamber of ITLOS[991] in finding that the obligations in Article 194 require states to employ due diligence in 'not only adopting appropriate rules and measures, but also a "certain level of vigilance in their enforcement and the exercise of administrative control."'[992] The Tribunal thus assigns a very high standard of due diligence in relation to the scope of the obligations pertaining to the protection and preservation of the marine environment.[993]

For purposes of this thesis, the most relevant sources of pollution are land-based sources and pollution from or through the atmosphere. UNCLOS provides in Article 207 that states must 'adopt laws and regulations to prevent, reduce and control pollution of the marine

[985] *UNCLOS* (n 29) Article 194(1).
[986] ibid Article 194(3)(a).
[987] ibid Article 194(5).
[988] *South China Sea Arbitration* (n 293) para 944.
[989] Boyle, 'Law of the Sea Perspectives on Climate Change' (n 966) 833–834.
[990] *Pulp Mills* (n 293).
[991] *Advisory Opinion* (n 39).
[992] *South China Sea Arbitration* (n 293) para 944.
[993] Johansen (n 28) 168–169; S Lee and L Bautista, 'Part XII of the United Nations Convention on the Law of the Sea and the Duty to Mitigate against Climate Change: Making out a Claim, Causation, and Related Issues Oceans and Climate Change Governance' (2018) 45 Ecology Law Quarterly 129, 137.

environment from land-based sources',[994] 'take other measures as may be necessary to prevent, reduce and control such pollution'[995] and that the laws, regulations, and measures thus taken 'shall include those designed to minimize, to the fullest extent possible, the release of toxic, harmful or noxious substances, especially those which are persistent, into the marine environment.'[996] 'Land-based sources' is not defined in UNCLOS but, considering the definition of "pollution" in Article 1 of UNCLOS discussed above, it is entirely logical that all land-based activities that generate GHG emissions with the potential of entering the marine environment (such as those from any fossil fuel burning activity, such as coal-fired power plants, fossil fuel based transport, etc.) would be included in Article 207.[997] Even if an argument could be made that airborne emissions from such land-based sources somehow did not fall under Article 207, Article 212 specifically addresses pollution from and through the atmosphere.[998] Similar to Article 207, Article 212 requires states to 'adopt laws and regulations to prevent, reduce and control pollution of the marine environment from or through the atmosphere'[999] and 'take other measures as may be necessary to prevent, reduce and control such pollution.'[1000] The entirety of the international climate change regime is based on the atmospheric concentrations of greenhouse gases that drive climate change, impact the global atmospheric temperature and also significantly impact the ocean.[1001] It can therefore not reasonably be argued that GHG emissions are excluded from Article 212.[1002]

In summary, the obligations to protect and preserve the marine environment found in Part XII of UNCLOS clearly pertain directly to activities that take place on land, cause emissions that travel through the atmosphere, are regulated by states and have the potential to cause harm to the marine environment. These obligations are grounded in familiar language that requires states to ensure the protection and preservation of the marine environment and are thus fundamentally obligations of due diligence.[1003] In the next subsection, these obligations are explored in more detail to determine how each element of due diligence is articulated

[994] *UNCLOS* (n 29) Article 207(1).
[995] ibid Article 207(2).
[996] ibid Article 207(5).
[997] Boyle, 'Protecting the Marine Environment from Climate Change' (n 30) 87.
[998] *UNCLOS* (n 29) Article 212.
[999] ibid Article 212(1).
[1000] ibid Article 212(2).
[1001] Chapter 2, section 2.2 *The Science*.
[1002] Boyle, 'Protecting the Marine Environment from Climate Change' (n 30) 87.
[1003] Boyle, 'Litigating Climate Change under Part XII of the LOSC' (n 30) 8.

within the law of the sea regime in order to analyse, in section 5.2, how the elements of due diligence under the law of the sea regime might be applied in national climate change litigation.

5.1.3 The elements of Due Diligence in the UN Convention on the Law of the Sea

Having established a general overview of the due diligence nature of Part XII of UNCLOS, this subsection explores how each of the six elements of due diligence are articulated within the law of the sea regime.

5.1.3.1 Due diligence, harm and risk

The first element of due diligence is the risk of harm and the related prevention of such harm. In chapter 3, it was established that due diligence requires the measures taken in the prevention of harm to be proportional to the severity of the risk of such harm.[1004] Given the risks of harm from climate change and GHG emissions that were detailed in chapter 2, including ocean acidification, warming and deoxygenation,[1005] the significance of this element remains. In chapter 4, under the international climate change regime, risk was established as well-expressed in the overall objective of that regime and in its long-term temperature goal.[1006] Here, the same is explored under the law of the sea regime.

UNCLOS was negotiated at a time when concern for the environment and the degradation of the ocean and its living resources were gaining increased attention at the global level.[1007] The inclusion of Part XII and the extensive definition of "pollution" in Article 1 are evidence of a stark contrast and shifting of priorities from the primary focus on the freedom of the seas, which had been the basis of ocean governance since the early seventeenth century,[1008] to an acknowledgement of the need to protect the ocean.[1009]

The definition of "pollution of the marine environment" found in Article 1 of UNCLOS clearly recognises the significant risks the ocean faces from anthropogenic actions and emissions by

[1004] Chapter 3, section 3.1.1.1 *Due diligence, harm and risk*.
[1005] See n 967.
[1006] Chapter 4, Section 4.1.2.1 *Due diligence, harm and risk*.
[1007] Churchill (n 968) 3.
[1008] Hugo Grotius wrote the commissioned work "*Mare Liberum"* in 1609 which established the principle of the freedom of the seas as the cornerstone of how use of the ocean was governed until the negotiation of the Law of the Sea Convention. Johansen (n 28) 8; H Grotius, *Mare Liberum - The Freedom of the High Seas: Or the Right Which Belongs to the Dutch to Take Part in the Indian Trade* (R Van Deman Magoffin tr, Oxford University Press 1916).
[1009] Johansen (n 28) 11.

expressly including 'the introduction by man, directly or indirectly, of substances or energy' which 'results or is likely to result in such deleterious effects as harm to living resources and marine life'.[1010] This definition of "pollution of the marine environment" includes GHG emissions, and particularly CO_2,[1011] as adding both anthropogenic substances (atmospheric GHGs captured by the ocean) and energy (increased temperature also introduced to the ocean through atmospheric warming), cause deleterious effects on the ocean, including changing its chemical make-up in the form of increasing acidification, warming and deoxygenation.[1012]

The prevention of the risk of harm to the ocean is articulated throughout Part XII, but particularly in the general obligation of Article 192 that states must 'protect and preserve the marine environment'.[1013] As was discussed above,[1014] this general obligation is supplemented by the subsequent articles in Part XII. Article 194 in particular requires states to take 'all measures ... that are necessary to prevent, reduce and control pollution of the marine environment'[1015] and obliges these measures to be 'designed to minimize to the fullest possible extent the release of toxic, harmful or noxious substances, especially those which are persistent, from land-based sources, from or through the atmosphere'.[1016] Article 194 goes further still in its requirements to prevent the risk of harm by clarifying that measures taken to prevent, reduce and control pollution must 'include those necessary to protect and preserve rare or fragile ecosystems as well as the habitat of depleted, threatened or endangered species and other forms of marine life.'[1017] The Tribunal in the *South China Sea Arbitration* confirmed the due diligence nature of these articles when it found that Article 192 imposes a due diligence obligation on states and that, failure to take measures that would accomplish this would be a breach of due diligence obligations under UNCLOS.[1018]

Further, the Seabed Disputes Chamber of ITLOS found that due diligence obligations include the requirement that states take measures within their legal systems such as adopting laws and regulations in order to enforce appropriate behaviours within their jurisdiction and

[1010] *UNCLOS* (n 29) Article 1(4).
[1011] Boyle, 'Law of the Sea Perspectives on Climate Change' (n 966) 832–833.
[1012] See n 967.
[1013] *UNCLOS* (n 29) Article 192.
[1014] See section 5.1.2 *Due Diligence in the UN Convention on the Law of the Sea*.
[1015] *UNCLOS* (n 29) Article 194(1).
[1016] ibid Article 194(3)(a).
[1017] ibid Article 194(5).
[1018] *South China Sea Arbitration* (n 293) paras 959–960.

control.[1019] This follows closely the obligations in Articles 207 and 212 of Part XII, which require states to 'adopt laws and regulations to prevent, reduce and control pollution of the marine environment'[1020] from land-based sources and from or through the atmosphere, respectively. Further, under Articles 204 and 206, Parties must evaluate, monitor and analyse risks of pollution to the marine environment[1021] and must assess and communicate any potential risk to the marine environment from activities within their jurisdiction or control.[1022] These monitoring and assessment articles are explored in more detail under the element of knowledge below.[1023]

In sum, the first element of due diligence, risk of harm and the prevention of such risk of harm, is well articulated within UNCLOS through the definition of "pollution of the marine environment" and the obligations in Part XII to protect and preserve the marine environment and to take the necessary measures to prevent, reduce and control pollution thereof from land-based sources and through the atmosphere.

Table 5.3.3.1 Risk

Element	Law of the Sea Regime	detail
risk	UNCLOS Article 1(4)	"pollution of the marine environment" means the introduction by man, directly or indirectly, of substances or energy into the marine environment . . . which results or is likely to result in such deleterious effects as harm to living resources and marine life, hazards to human health, hindrance to marine activities, including fishing and other legitimate uses of the sea, impairment of quality for use of sea water and reduction of amenities
	UNCLOS Article 192	States have the obligation to protect and preserve the marine environment
	UNCLOS Article 194(1)	States shall take . . . all measures . . . that are necessary to prevent, reduce and control pollution of the marine environment from any source
	UNCLOS Article 194(3)(a)	These measures shall include . . . those designed to minimize to the fullest possible extent the release of toxic, harmful or noxious substances, especially those which are persistent, from land-based sources, from or through the atmosphere
	UNCLOS Article 194(5)	The measures taken in accordance with this Part shall include those necessary to protect and preserve rare or fragile ecosystems as well as the habitat of depleted, threatened or endangered species and other forms of marine life.
	UNCLOS Article 207	(1) States shall adopt laws and regulations to prevent, reduce and control pollution of the marine environment from land-based sources. . . (2) States shall take other measures as may be necessary to prevent, reduce and control such pollution (5) Laws, regulations, measures . . . shall include those designed to minimize, to the fullest extent possible, the release of toxic, harmful or noxious substances, especially those which are persistent, into the marine environment.
	UNCLOS Article 212	(1) States shall adopt laws and regulations to prevent, reduce and control pollution of the marine environment from or through the atmosphere. . .

[1019] *Advisory Opinion* (n 39) paras 118, 242.3.A.
[1020] *UNCLOS* (n 29) Articles 207, 212.
[1021] ibid Article 204.
[1022] ibid Article 206.
[1023] See section 5.1.3.5 *Due diligence and knowledge*.

		(2) States shall take other measures as may be necessary to prevent, reduce and control such pollution.
	UNCLOS 204(1)	States shall endeavour to observe, measure, evaluate and analyse, by recognized scientific methods, the risks or effects of pollution of the marine environment.
	UNCLOS 206	When States have reasonable grounds for believing that planned activities under their jurisdiction or control may cause substantial pollution of or significant and harmful changes to the marine environment, they shall, as far as practicable, assess the potential effects of such activities on the marine environment and shall communicate reports of the results of such assessments in the manner provided in article 205.

5.1.3.2 Due diligence and flexibility

Building on risk of harm and its prevention, the second element that determines whether a state's actions are sufficiently diligent to meet its obligations is the context-specific, flexible nature of due diligence. In the exploration of the international climate change regime in chapter 4, this element was found to be well-expressed in terms of differentiation and discretion, providing states the flexibility to take national circumstances into consideration when addressing ocean-climate related harms.[1024] Here, this element is explored in the law of the sea regime.

In the discussion on the element of risk above, Article 207 (and similarly Article 212) was included as an articulation of the obligation of states to prevent pollution from land-based sources. Article 207 includes the obligation to 'adopt laws and regulations to prevent, reduce and control pollution of the marine environment from land-based sources ... taking into account internationally agreed rules, standards and recommended practices and procedures.'[1025] Article 212 includes identical language pertaining to pollution by or through the atmosphere.[1026] These two articles complete the obligations outlined in Article 194, particularly those pertaining to required measures to minimize to the fullest extent possible 'the release of toxic, harmful or noxious substances, especially those which are persistent, from land-based sources'[1027] of pollution of the marine environment.[1028] An early draft of Article 207 introduced by Norway in 1973 included the requirement that 'States shall exercise due diligence in the control of the types and quantities'[1029] of land-based sources of pollution of the marine environment. Ultimately, states agreed to the current language in Article 207 that both operationalises the obligations in Article 194 and establishes the relationship between national laws and international rules and standards as it pertains to pollution of the

[1024] Chapter 4, section 4.1.2.2 *Due diligence and flexibility*.
[1025] *UNCLOS* (n 29) Article 207(1).
[1026] ibid Article 212(1).
[1027] ibid Article 194(3)(a).
[1028] Center for Oceans Law and Policy, University of Virginia (n 962) Section 5. International Rules and National Legislation to Prevent, Reduce and Control Pollution of the Marine Environment, 127-128.
[1029] A/AC.138/SC.III/L.43 (1973, Mimeo.), Article VIII (Norway).

marine environment from land-based sources.[1030] The same is true for Article 212 pertaining to pollution from or through the atmosphere. While the explicit reference to due diligence that was suggested by Norway was ultimately not included, it does indicate the due diligence nature of the obligations, particularly given the *South China Sea* Tribunal's assessment of the due diligence nature of Part XII obligations.[1031]

In contrast to similar provisions in UNCLOS regarding pollution from dumping,[1032] from seabed activities[1033] or from vessels,[1034] the obligations to prevent pollution from land-based and atmospheric sources do not include precise language concerning the minimum standards that are allowed. The reason for this is that, during negotiations, states wanted to preserve the flexibility to design for themselves the level of protection of the marine environment from land-based and atmospheric sources as balanced against their own economic development.[1035] Articles 207 and 212 only include the obligation to 'take into account internationally agreed rules, standards and recommended practices and procedures'[1036] where pollution from dumping, vessels and seabed activities requires that states' national measures 'shall be no less effective than international rules, standards and recommended practices and procedures.'[1037] The increased flexibility within the provisions concerning pollution from land-based sources and from or through the atmosphere only requiring states to 'take into account' standards, rules and best practices has been described as weak compared to the more stringent requirements regarding pollution from other sources.[1038] The argument is that, in contrast to other sources of pollution, the language pertaining to land-based sources would allow states to ignore internationally agreed rules and standards, so long as they have been taken into account in some small way.[1039] However, in terms of due diligence obligations, the requirement to take internationally agreed rules and standards

[1030] Center for Oceans Law and Policy, University of Virginia (n 962) Section 5. International Rules and National Legislation to Prevent, Reduce and Control Pollution of the Marine Environment, 127.
[1031] *South China Sea Arbitration* (n 293) para 944.
[1032] *UNCLOS* (n 29) Article 210.
[1033] ibid Article 208.
[1034] ibid Article 211.
[1035] P Birnie, A Boyle and C Redgwell, 'International Regulation of Toxic Substances', *International Law & the Environment* (3rd edition, Oxford University Press 2009) 453–454.
[1036] *UNCLOS* (n 29) Articles 207(1), 212(1).
[1037] ibid Articles 208, 210, 211.
[1038] Churchill (n 968) 25; Boyle, 'Protecting the Marine Environment from Climate Change' (n 30) 30.
[1039] N Popattanachai and EA Kirk, 'Ocean Acidification and Multilateral Environmental Agreements' in VanderZwaag, David L, Oral, Nilüfer and Stephens, Tim (eds), *Research Handbook on Ocean Acidification Law and Policy* (Edward Elgar Publishing 2021) 39.

into account can be seen as an articulation of flexibility. If a state were to completely ignore internationally agreed rules and standards in the adoption of national rules to prevent pollution of the marine environment from land-based or atmospheric sources, it would be difficult to sustain an argument that their actions rise to an appropriate level of diligence. Rather, the flexibility afforded to states in the degree and manner in which national laws are based on internationally agreed rules and standards goes directly to the determination of the appropriate diligence of the state's actions. The further value of this language as another element of due diligence, that of an objective standard, is discussed in more detail in the next subsection.

Two additional articles within UNCLOS are relevant here. First, Article 237 provides that the provisions of Part XII 'are without prejudice to the specific obligations assumed by States' in agreements concluded 'in furtherance of the general principles set forth in this Convention.'[1040] The *South China Sea* Tribunal referred to Article 237 in its finding that the general obligation in Article 192 is expanded on by the 'subsequent provisions of Part XII, including Article 194, as well as by reference to special obligations set out in other international agreements, as envisaged in Article 237 of the Convention.'[1041] Second, Article 311 of UNCLOS governs the relationship between UNCLOS and other international agreements. It states that UNCLOS 'shall not alter the rights and obligations of states Parties which arise from other agreements compatible with this Convention and which do not affect … the performance of their obligations under this Convention.'[1042] Articles 237 and 311 of UNCLOS effectively build a bridge to the international climate change regime. The UNFCCC, and the Paris Agreement in particular, can be said to be agreements concluded 'in furtherance of the general principles' of UNCLOS in that the long-term temperature goal serves to limit the amount of anthropogenic GHG emissions and heat in the atmosphere, which would serve to protect and preserve the marine environment. Further, it cannot be said that the long-term temperature goal under the Paris Agreement alters rights or obligations of Parties under UNCLOS. Rather, the requirement to 'take into account internationally agreed rules [and] standards'[1043] in the adoption of national laws and regulations includes the Paris Agreement and its long-term temperature goal as one such

[1040] *UNCLOS* (n 29) Article 237(1).
[1041] *South China Sea Arbitration* (n 293) para 942.
[1042] *UNCLOS* (n 29) Article 311(2).
[1043] ibid Articles 207(1), 212(1).

internationally agreed rule or standard. Through Articles 237 and 311 of UNCLOS, it can be said that the two regimes work in concert to enhance each other.

Article 207(4) provides states with additional flexibility by allowing states to account for 'characteristic regional features, the economic capacity of developing States and their need for economic development' in the establishment of 'global and regional rules, standards and recommended practices and procedures to prevent, reduce and control pollution of the marine environment from land-based sources.'[1044] While states were negotiating UNCLOS, the need to balance pollution from land-based sources with economic development – often driven by the same sources of pollution – meant that flexibility and discretion were a high priority for developing countries.[1045] In the same vein, states kept for themselves the explicit sovereign right to exploit the natural resources within their own jurisdictions, but limited that flexibility by direct reference to 'their duty to protect and preserve the marine environment.'[1046]

States are also required to enforce the laws and regulations they are obligated to adopt under Articles 207 and 212 regarding pollution from land-based sources and from the atmosphere.[1047] UNCLOS itself does not further limit a state's discretion other than the requirement to enforce its own laws and regulations adopted under the relatively flexible Articles 207 and 212.[1048] While the express language of UNCLOS thus includes broad discretion on the level of enforcement of national laws and regulations, due diligence does require some additional vigilance. The Tribunal in the *South China Sea Arbitration*, relying on the ITLOS Seabed Disputes Chamber's 2011 *Advisory Opinion*, limits state discretion in the enforcement of its laws and regulations further by finding that due diligence requires a 'certain level of vigilance in their enforcement and the exercise of administrative control'.[1049] This means that mere perfunctory law-making on the part of states with regard to the prevention, reduction and control of pollution of the marine environment will not rise to the level of due diligence. Instead, states must demonstrate not only vigilance in law-making and enforcement but must also take appropriate action where non-compliance is found.[1050]

[1044] ibid Article 207(4).
[1045] Birnie, Boyle and Redgwell (n 1035) 454.
[1046] *UNCLOS* (n 29) Article 193.
[1047] ibid Articles 213, 222.
[1048] Churchill (n 968) 25.
[1049] *South China Sea Arbitration* (n 293) para 944.
[1050] ibid.

Another area where the element of flexibility is expressed within UNCLOS is within the expansive language of Article 194. As was mentioned above in the discussion on the element of risk, states are required to take all measures necessary to prevent, reduce and control pollution of the marine environment. However, this obligation is subject to states using 'the best practicable means at their disposal' and taking the required measures 'in accordance with their capabilities'.[1051] This language is reminiscent of the flexibility in the international climate change regime discussed in chapter 4 that provides for the consideration of the specific context within each state, its national circumstances and the extent of its capabilities.[1052]

In conclusion, the element of flexibility is also expressed clearly in the law of the sea regime through the allowance of discretion for states to balance the national measures taken to prevent, reduce and control pollution with actions intended for economic development. This discretion is, however, limited by the requirement to include a minimum level of vigilance in the enforcement of domestic measures taken to ensure the protection of the marine environment. Further, similar to the international climate change regime, states are afforded discretion to take into consideration the best practicable means available to them and to act within their national capabilities.

Table 5.1.3.2 Flexible

Element	Law of the Sea Regime	detail
flexible	UNCLOS 194(1)	States must take measures necessary to prevent, reduce and control pollution of the marine environment using the best practicable means at their disposal and in accordance with their capabilities.
	UNCLOS 207(1)	States must adopt laws and regulations to prevent, reduce and control pollution of the marine environment from land-based sources,. . . taking into account internationally agreed rules, standards and recommended practices and procedures.
	UNCLOS 212(1)	States must adopt laws and regulations to prevent, reduce and control pollution of the marine environment from or through the atmosphere, . . . taking into account internationally agreed rules, standards and recommended practices and procedures
	UNCLOS 207(4)	States shall endeavour to establish global and regional rules, standards and recommended practices and procedures to prevent, reduce and control pollution of the marine environment from land-based sources, taking into account characteristic regional features, the economic capacity of developing States and their need for economic development.

5.1.3.3 Due diligence as an objective standard of care

The third element of due diligence, after risk and flexibility, is that a state's conduct must be objectively appropriate to prevent the risk of harm, regardless of the actual outcome or result. In chapter 4 where this element was explored under the international climate change

[1051] *UNCLOS* (n 29) Article 194(1).
[1052] See n 1024.

regime,[1053] objective standards against which a state's due diligence could be measured included the long-term temperature goal which is the underlying basis that frames actions to be taken under the Paris Agreement. Other objective standards under the international climate change regime include common timeframes and the enhanced transparency framework, providing relatively robust objective measures for a party's due diligence. This subsection explores how the element of due diligence as an objective standard of care is articulated within the law of the sea regime.

Within UNCLOS, the first instance where this element is articulated is found in Article 194, which expands on the general obligation to protect and preserve the marine environment. Article 194(3) includes the obligation to take all necessary measures to prevent, reduce and control pollution of the marine environment, and that such measures must be designed to minimize 'to the fullest possible extent the release of toxic, harmful or noxious substances, especially those that are persistent'.[1054] The same language is repeated with regard to national laws adopted to prevent, reduce and control pollution from land-based sources.[1055] As was discussed earlier, the definition of "pollution of the marine environment" and the inclusion of substances that are toxic, harmful, noxious and especially those that are persistent certainly cover GHG emissions given their impacts on the marine environment. The language in Articles 194(3)(a) and 207(5) therefore arguably means that states are required to take significant measures to prevent the release of GHG emissions (and especially persistent CO_2) in order to be deemed objectively appropriate for purposes of meeting their due diligence obligations.[1056]

Further areas within UNCLOS that provide objective standards against which states can measure the sufficiency of the diligence of their actions pertain to the internationally agreed rules, standards and recommended practices and procedures of which they must take account in the adoption of national laws and regulations.[1057] Such internationally agreed rules and standards provide states with objective standards against which to measure the sufficiency of their diligence. As was argued above, a lack of inclusion by a state of such rules and standards within their national laws and regulations may technically follow the language

[1053] Chapter 4, section 4.1.2.3 *Due diligence as an objective standard of care*.
[1054] *UNCLOS* (n 29) Article 194(3)(a).
[1055] ibid Article 207(5).
[1056] Boyle, 'Protecting the Marine Environment from Climate Change' (n 30) 90.
[1057] *UNCLOS* (n 29) Article 207(1).

of the obligation.[1058] However, as mentioned, Articles 237 and 311 of UNCLOS build a bridge to the UNFCCC and a complete lack of consideration of, for example, the long-term temperature goal, would likely fall short of the state's due diligence obligation if the national laws adopted in accordance with Article 207 were counter to, or fell far short of, such rules and standards. Indeed, under Article 207(4), states are required themselves to participate in the development of such rules, standards and recommended practices and procedures.[1059] Since it was established earlier that GHG emissions fall within the definition of "pollution of the marine environment" in Article 1 of UNCLOS, the international rules and standards referred to in Articles 207 and 212 on pollution from land-based and atmospheric sources can be interpreted as including those found in the international climate change regime.[1060] For purposes of this thesis, the link between the law of the sea regime and the international climate change regime here is significant. Through the lens of due diligence obligations, the operative articles within UNCLOS that govern pollution of the marine environment by GHG emissions (from land-based sources and through the atmosphere) reference internationally agreed rules and standards such as those negotiated and agreed under the climate regime, serving as a direct link between the two regimes.

To sum up, the due diligence element of objectivity is articulated within the law of the sea regime in two ways. First, by the requirement to minimize pollution of the marine environment by land-based sources and through the atmosphere to the fullest possible extent. And second, through reference to internationally agreed rules and standards, which states must endeavour to establish and must take into account when adopting national laws to prevent pollution of the marine environment.

Table 5.1.3.3 Objective

Element	Law of the Sea Regime	detail
objective	UNCLOS 194(3)(a)	Measures to prevent, reduce and control pollution of the marine environment … shall include those designed to minimize to the fullest possible extent the release of toxic, harmful or noxious substances, especially those which are persistent, from land-based sources, from or through the atmosphere
	UNCLOS 207(1)	States shall adopt laws and regulations to prevent, reduce and control pollution of the marine environment from land-based sources . . . taking into account internationally agreed rules, standards and recommended practices and procedures.
	UNCLOS 212(1)	States shall adopt laws and regulations to prevent, reduce and control pollution of the marine environment from or through the atmosphere . . . taking into account internationally agreed rules, standards and recommended practices and procedures

[1058] See section 5.1.3.2 *Due diligence and flexibility*.
[1059] *UNCLOS* (n 29) Article 207(4).
[1060] E Harrould-Kolieb, 'Implications of the Paris Agreement for Action on Ocean Acidification within the UNFCCC' in VanderZwaag, David L, Oral, Nilüfer and Stephens, Tim (eds), *Research Handbook on Ocean Acidification Law and Policy* (Edward Elgar Publishing 2021) 394.

	UNCLOS 207(4)	States, acting especially through competent international organizations or diplomatic conferences, shall endeavour to establish global and regional rules, standards and recommended practices and procedures to prevent, reduce and control pollution of the marine environment from land-based sources
	UNCLOS 212(3)	States, acting especially through competent international organizations or diplomatic conferences, shall endeavour to establish global and regional rules, standards and recommended practices and procedures to prevent, reduce and control pollution [of the marine environment from or through the atmosphere]

5.1.3.4 Due diligence as a continuous obligation

The fourth element of due diligence, after risk, flexibility, and objective standard of conduct, is that due diligence obligations are of a continuous nature. Chapter 4 found that this element was articulated in the international climate change regime through obligations requiring progression over time, the long-term nature of the temperature goal, including the goal of holding the global atmospheric temperature at or below a certain level, and the ever-evolving nature of scientific knowledge.[1061] This subsection explores how this element is articulated within the law of the rea regime.

The general obligation in Article 192 that states must protect and preserve the marine environment was discussed above at some length.[1062] As it pertains to the continuous nature of due diligence, the Tribunal in the *South China Sea Arbitration* analysed this general obligation and found the following:

> Although phrased in general terms, the Tribunal considers it well established that Article 192 does impose a duty on States Parties, the content of which is informed by the other provisions of Part XII and other applicable rules of international law. This "general obligation" extends both to "protection" of the marine environment from future damage and "preservation" in the sense of maintaining or improving its present condition.[1063]

It is clear from the Tribunal's analysis that Article 192 and the other provisions of Part XII of UNCLOS include a continuous obligation to protect and preserve the marine environment over time, including from future damage. This is particularly important given the still largely unknown extent of the consequences current and future GHG emissions will have on the ocean and the entirety of the marine environment.[1064] The Tribunal further found that Article 192 'entails the positive obligation to take active measures to protect and preserve the marine environment, and by logical implication, entails the negative obligation not to degrade the marine environment.'[1065] Article 192 (and by extension the remaining provision

[1061] Chapter 4, section 4.1.2.4 *Due diligence as a continuous obligation*.
[1062] See section 5.1.2 *Due Diligence in the UN Convention on the Law of the Sea*.
[1063] *South China Sea Arbitration* (n 293) para 941.
[1064] Canadell and others (n 6) 769; Fox-Kemper and others (n 18) 1314; Dhakal and others (n 3) 82; Riahi and others (n 3) 116.
[1065] *South China Sea Arbitration* (n 293) para 941.

of Part XII that inform this general obligation) is therefore a clear articulation of the continuous nature of the due diligence obligation within the law of the sea regime.

Articles 207 and 212, as has been mentioned previously, require states to 'adopt national laws and regulations to prevent, reduce and control pollution of the marine environment'[1066] from land-based sources and through or from the atmosphere, respectively. The term 'prevent, reduce and control' implies a continuous duty much in the same way the duty to 'preserve' in Article 192 does. It would be counter to the notion of due diligence to read the term as a static, one-time duty rather than an obligation to maintain a level of vigilance in the long-term prevention and control of pollution in the marine environment.[1067] The continuous nature of the due diligence obligation articulated in Articles 207 and 212 is further detailed in Articles 213 and 222 requiring states to also enforce the national laws and regulations adopted under Articles 207 and 212.[1068] The obligations of enforcement and implementation as required by Articles 213 and 222 are by their very nature forward-looking and continuous.

Finally, the continuous nature of the due diligence obligations, particularly as GHG emissions are concerned, is explicitly articulated in the description of the nature of the substances that are targeted by the obligation to protect and preserve the marine environment. Article 194(3)(a) and Article 207(5) specifically require that the measures states take to preserve, protect and control pollution of the marine environment must include those designed to minimize to the fullest extent possible 'the release of toxic, harmful or noxious substances, *especially those which are persistent*'[1069] from land-based sources and from or through the atmosphere. The explicit highlighting of those substances that are persistent indicates the states' desire to address marine pollution in an ongoing manner and thus underscores the continuous nature of the due diligence obligation of states outlined in Part XII of UNCLOS. Along these same lines, under the monitoring and assessment requirements in Articles 204 and 206, states must assess the potential risk of future harm or damage to the marine

[1066] *UNCLOS* (n 29) Articles 207(1), 212(1).
[1067] Papanicolopulu (n 38) 162.
[1068] *UNCLOS* (n 29) Articles 213, 222.
[1069] ibid Articles 194(3)(a), 207(5) (*emphasis added)*.

environment from both current and future activities.[1070] These articles are explored in more detail under the element of knowledge below.[1071]

In summary, the continuous nature of the due diligence obligations under the Law of the Sea Regime is articulated in several ways. States have a positive obligation to protect the marine environment from current and future harm, to maintain or improve its current condition, to adopt and enforce national laws and regulations to prevent and control marine pollution long-term, and they must especially focus on substances that are persistent.

Table 5.1.3.4 Continuous

Element	Law of the Sea Regime	detail
continuous	UNCLOS 192/ South China Sea Tribunal	The general obligation in Article 192 to 'protect and preserve the marine environment' extends both to "protection" of the marine environment from future damage and "preservation" in the sense of maintaining or improving its present condition.
	UNCLOS 207(1)	States shall adopt laws and regulations to prevent, reduce and control pollution of the marine environment from land-based sources
	UNCLOS 212(1)	States shall adopt laws and regulations to prevent, reduce and control pollution of the marine environment from or through the atmosphere
	UNCLOS 213	States shall enforce their laws and regulations adopted in accordance with article 207
	UNCLOS 222	States shall enforce […] their laws and regulations adopted in accordance with article 212
	UNCNLOS 194(3)(a)	These measures shall include those designed to minimize to the fullest extent possible the release of toxic, harmful or noxious substances, especially those which are persistent, from land-based sources, from or through the atmosphere
	UNCLOS 207(5)	Laws, regulations, measures, rules, standards and recommended practices and procedures shall include those designed to minimize, to the fullest extent possible, the release of toxic, harmful or noxious substances, especially those which are persistent, into the marine environment.
	UNCLOS 204(1)	States shall endeavour to observe, measure, evaluate and analyse, by recognized scientific methods, the risks or effects of pollution of the marine environment.
	UNCLOS 206	When States have reasonable grounds for believing that planned activities under their jurisdiction or control may cause substantial pollution of or significant and harmful changes to the marine environment, they shall, as far as practicable, assess the potential effects of such activities on the marine environment and shall communicate reports of the results of such assessments in the manner provided in article 205.

5.1.3.5 Due diligence and knowledge

The fifth element of due diligence involves knowledge and includes both what a state actually knows and what a state, as a duly diligent actor, should know. Under the international climate change regime, as was explored in chapter 4, this element is primarily articulated in the long-term temperature goal, which is based on the scientific reporting underlying the entirety of the regime, and in the requirement to use best available science in the development of

[1070] ibid Articles 204, 206.
[1071] See section 5.1.3.5 *Due diligence and knowledge*.

national measures to address climate harms.[1072] Further, constructive knowledge is imputed to states through their reliance on the ever-evolving reports by both the IPCC and UNEP. Here, this element is explored within the law of the sea regime.

In terms of actual knowledge, states are required co-operate with each other, either directly or through international organisations, to develop and share knowledge about the pollution of the marine environment. To this end, they must endeavour to 'acquire knowledge for the assessment of the nature and extent of pollution, exposure to, and its pathways, risk and remedies'.[1073] Based on the knowledge acquired, appropriate scientific criteria are to be established to develop 'rules, standards and recommended practices for the prevention, reduction and control of pollution of the marine environment.'[1074] States regularly participate in various processes and committees through their membership in the United Nations, including the UN Open-ended Informal Consultative Process on Oceans and the Law of the Sea (ICP), in order to remain informed on the current state of ocean-climate science and the continuous need for its further development.[1075] As with the various processes and reporting in connection with the international climate change regime discussed in chapter 4,[1076] here there is also little, if any, room for an argument on a lack knowledge of the risk of harm related to climate change and the marine environment.

Both actual and constructive knowledge, or the need to acquire it, are articulated in a variety of ways within UNCLOS beginning with the definition of "pollution of the marine environment". Article 1(4) defines "pollution of the marine environment" as the anthropogenic introduction of energy or substances 'which results or *is likely to result*'[1077] in deleterious effects to the marine environment. The inclusion of the term 'likely to result' indicates the imputation of constructive knowledge on the part of states and arguably means states have a due diligence obligation to obtain the knowledge necessary to prevent the introduction of substances that are likely to result a risk of harm to the marine environment.

[1072] Chapter 4, section 4.1.2.5 *Due diligence and knowledge*.
[1073] *UNCLOS* (n 29) Article 200.
[1074] ibid Article 201.
[1075] UNGA ICP Report 72/95 "The Effects of Climate Change on the Oceans" (16 June 2017) UN Doc A/72/95; UNGA ICP Report 74/119 "Ocean Science and the United Nations Decade of Ocean Science for Sustainable Development" (21 June 2019) UN Doc A/74/119.
[1076] Chapter 4, section 4.1.1 *Historical overview of the international climate change regime and due diligence.*
[1077] *UNCLOS* (n 29) Article 1(4) *(emphasis added)*.

There are several obligations within Part XII of UNCLOS that require states to apply the precautionary approach, which imputes knowledge on states in advance of actual knowledge of harm.[1078] These include the requirement to minimize to the fullest extent possible the release of 'toxic, harmful, or noxious substances, especially those which are persistent'[1079] and the duty 'not to transfer, directly or indirectly, damage or hazards from one area to another or transform one type of pollution into another'.[1080] The prohibition against transferring damages and transforming types of pollution found in Article 195 is particularly relevant considering the impacts of CO_2 on the ocean and the marine environment, including ocean acidification and its risk multiplying effects.[1081] These obligations require a level of knowledge on the part of states if they are to adequately protect and preserve the marine environment.

The obligation to acquire knowledge and thus the imputation of constructive knowledge is further articulated in Part XII section 4 on Monitoring and Environmental Assessment. Under section 4 of Part XII, states must monitor the risks and effects of pollution on the marine environment,[1082] must publish and share reports of such monitoring[1083] and, most importantly, when states have reason to believe there is a risk of 'substantial pollution of or significant and harmful changes to the marine environment' from activities within their jurisdiction or control, they must assess and communicate the potential effects on the marine environment.[1084] This last obligation, found in Article 206 of UNCLOS, has been interpreted as potentially including the obligation of states to develop an understanding of their GHG emissions' impact on the ocean.[1085] Essentially, the obligations outlined in section 4 of Part XII of UNCLOS articulate the knowledge element of due diligence in a comprehensive manner, requiring states to obtain the knowledge necessary in order to adequately act to protect and preserve the marine environment.[1086]

[1078] Guilloux (n 267) 56.
[1079] *UNCLOS* (n 29) Articles 194(3)(a), 207(5).
[1080] ibid Article 195.
[1081] See n 967.
[1082] *UNCLOS* (n 29) Article 204.
[1083] ibid 205.
[1084] ibid Article 206.
[1085] Guilloux (n 267) 56.
[1086] J Harrison, 'Land-Based Sources of Marine Pollution', *Saving the Oceans Through Law: The International Legal Framework for the Protection of the Marine Environment* (Oxford University Press 2017) 67.

To summarize, the fifth element of due diligence, knowledge, is articulated within the law of the sea regime through the obligation to acquire scientific knowledge, and to develop rules and standards based on such knowledge. It is further articulated in the definition of pollution within UNCLOS, the obligations to monitor and report on potential harmful effects of activities within the state's jurisdiction and control, and finally in the obligation to assess the potential risk of significant harm or damage to the marine environment of future activities to be undertaken.

Table 5.1.3.5 Knowledge

Element	Law of the Sea Regime	detail
knowledge	UNGA, IPC, IPCC	Reporting and Resolutions regarding the climate/ocean nexus and scientific knowledge
	UNCLOS 1(4)	"pollution of the marine environment" means the introduction by man, directly or indirectly, of substances or energy into the marine environment which results or is likely to result in deleterious effects
	UNCLOS 194(3)(a)	minimize to the fullest extent possible, the release of toxic, harmful or noxious substances, especially those which are persistent
	UNCLOS 207(5)	minimize to the fullest extent possible, the release of toxic, harmful or noxious substances, especially those which are persistent
	UNCLOS 195	States shall act so as not to transfer, directly or indirectly, damage or hazards from one area to another or transform one type of pollution into another.
	UNCLOS 200	States shall co-operate, directly or through competent international organizations, for the purpose of promoting studies, undertaking programmes of scientific research and encouraging the exchange of information and data acquired about pollution of the marine environment. They shall endeavour to [...] acquire knowledge for the assessment of the nature and extent of pollution, exposure to it, and its pathways, risks and remedies.
	UNCLOS 201	In the light of the information and data acquired pursuant to article 200, States shall co-operate, directly or through competent international organizations, in establishing appropriate scientific criteria for the formulation and elaboration of rules, standards and recommended practices and procedures for the prevention, reduction and control of pollution of the marine environment.
	UNCLOS 204(1)	States shall endeavour to observe, measure, evaluate and analyse, by recognized scientific methods, the risks or effects of pollution of the marine environment.
	UNCLOS 204(2)	In particular, States shall keep under surveillance the effects of any activities which they permit or in which they engage in order to determine whether these activities are likely to pollute the marine environment.
	UNCLOS 205	States shall publish the reports of the results obtained pursuant to article 204
	UNCLOS 206	When States have reasonable grounds for believing that planned activities under their jurisdiction or control may cause substantial pollution of or significant and harmful changes to the marine environment, they shall, as far as practicable, assess the potential effects of such activities on the marine environment and shall communicate reports of the results of such assessments in the manner provided in article 205.

5.1.3.6 Due diligence and reasonableness

The sixth and final element of due diligence is that it is grounded in reasonableness. Any action taken by a state in meeting its due diligence obligations must be viewed through the lens of reasonableness, including each of the other elements (risk, flexibility, objective conduct, continuous and knowledge). In other words, reasonableness is the overarching standard by which states' actions are measured in determining whether they are duly diligent. In chapter 4, this element was broadly applied to test whether the national measures taken to reduce GHG emissions and mitigate climate change were appropriately diligent.[1087] This subsection explores how reasonableness is articulated within the law of the sea regime.

The vagueness of due diligence has been mentioned multiple times in the preceding chapters, and particularly in chapter 3 where due diligence was explored within general international law.[1088] The Seabed Disputes Chamber in its 2011 *Advisory Opinion* confirmed that '[t]he content of "due diligence" obligations may not easily be described in precise terms',[1089] but it went on to find that due diligence obligations require that the measures states take 'must be "reasonably appropriate".'[1090] In determining what is reasonable in a state's fulfilment of its due diligence obligations, the Tribunal in the *South China Sea* Arbitration later cited both the Seabed Disputes Chamber's 2011 *Advisory Opinion* and the ICJ's Judgment in *Pulp Mills*[1091] when it determined that due diligence obligations under UNCLOS require a 'certain level of vigilance'.[1092] While these terms do not take away the vagueness of due diligence obligations, they do add to the sense of reasonableness that is expected.

Broad formulations of expectations, such as those found in Part XII of UNCLOS, particularly as they pertain to pollution of the marine environment from land-based and atmospheric sources, do not offer precise or strict guidelines for states to follow. To the contrary, unlike for example strict liability, due diligence allows for states to apply broad discretion (see the

[1087] Chapter 4, section 4.1.2.6 *Due diligence and reasonableness*.
[1088] See n 945.
[1089] *Advisory Opinion* (n 39) para 117.
[1090] ibid 120.
[1091] *Pulp Mills* (n 293).
[1092] *South China Sea Arbitration* (n 293) para 944.

discussion on the element of flexibility above[1093]) in choosing the most appropriate measures to protect and preserve the marine environment. This means that, contrary to obligations that require a specific result to be achieved, due diligence obligations allow for the possibility that real and significant harm could still occur, and states will have met their due diligence obligations as long as the measures they have taken are appropriately reasonable.[1094] Still, as the Tribunal in *South China Sea* found in its detailed exploration and analysis of the general obligation in Article 192, and the rest of Part XII, the standard of due diligence as it pertains to the protection and preservation of the marine environment is indeed very high.[1095]

To summarize, the general due diligence obligation to protect and preserve the marine environment found in Article 192 is essentially a framework provision that is expanded and developed further by the subsequent provisions within Part XII of UNCLOS and also through a continued interpretation in light of developing context and scientific knowledge, along with other policy and legal instruments.[1096] It follows that the element of reasonableness therefore dictates that a state's failure to adequately meet any of the obligations stemming from Article 192, i.e. the remainder of Part XII (here particularly those articles governing to pollution from land-based sources and from or through the atmosphere), would be considered unreasonable.[1097]

Table 5.1.3.6 Reasonable

Element	Law of the Sea Regime	detail
reasonable	UNCLOS 192 (+ Part XII generally)	States have the obligation to protect and preserve the marine environment

As can be seen throughout this section, each of the six elements of due diligence obligations are articulated within the law of the sea regime and are elaborate and extensive. Hence it can be maintained that UNCLOS contains due diligence obligations. As was established in

[1093] Section 5.1.3.2 *Due diligence and flexibility*.
[1094] J Harrison, 'The United Nations Convention on the Law of the Sea and the Protection and Preservation of the Marine Environment', *Saving the Oceans Through Law: The International Legal Framework for the Protection of the Marine Environment* (Oxford University Press 2017) 28.
[1095] *South China Sea Arbitration* (n 293) para 944; Johansen (n 28) 168–169; Lee and Bautista (n 993) 137.
[1096] Lee and Bautista (n 993) 140.
[1097] ibid 146–147.

chapter 4, this is also true within the international climate change regime,[1098] but here states' due diligence obligations as they pertain to the protection and preservation of the marine environment are contained within one distinct Part of UNCLOS, with the notable exception and addition of the definition of "pollution of the marine environment" which is found in the opening article of the Convention. Having established each of the elements of due diligence obligations within the law of the sea regime, the next section turns to the exploration of how these elements might be used within domestic systemic climate change cases against governments for failing to adequately reduce GHG emissions on a national level, leading specifically to ocean-climate related harms.

[1098] Chapter 4, section 4.1.2 *The Elements of Due Diligence in the International Climate Change Regime*.

Table 5.4 The six elements of due diligence in the law of the sea regime

Element	Law of the Sea Regime	detail
risk	UNCLOS Article 1(4)	"pollution of the marine environment" means the introduction by man, directly or indirectly, of substances or energy into the marine environment . . . which results or is likely to result in such deleterious effects as harm to living resources and marine life, hazards to human health, hindrance to marine activities, including fishing and other legitimate uses of the sea, impairment of quality for use of sea water and reduction of amenities
	UNCLOS Article 192	States have the obligation to protect and preserve the marine environment
	UNCLOS Article 194(1)	States shall take . . . all measures . . . that are necessary to prevent, reduce and control pollution of the marine environment from any source
	UNCLOS Article 194(3)(a)	These measures shall include . . . those designed to minimize to the fullest possible extent the release of toxic, harmful or noxious substances, especially those which are persistent, from land-based sources, from or through the atmosphere
	UNCLOS Article 194(5)	The measures taken in accordance with this Part shall include those necessary to protect and preserve rare or fragile ecosystems as well as the habitat of depleted, threatened or endangered species and other forms of marine life.
	UNCLOS Article 207	(3) States shall adopt laws and regulations to prevent, reduce and control pollution of the marine environment from land-based sources. . . (4) States shall take other measures as may be necessary to prevent, reduce and control such pollution (5) Laws, regulations, measures . . . shall include those designed to minimize, to the fullest extent possible, the release of toxic, harmful or noxious substances, especially those which are persistent, into the marine environment.
	UNCLOS Article 212	(3) States shall adopt laws and regulations to prevent, reduce and control pollution of the marine environment from or through the atmosphere. . . (4) States shall take other measures as may be necessary to prevent, reduce and control such pollution.
	UNCLOS 204(1)	States shall endeavour to observe, measure, evaluate and analyse, by recognized scientific methods, the risks or effects of pollution of the marine environment.
	UNCLOS 206	When States have reasonable grounds for believing that planned activities under their jurisdiction or control may cause substantial pollution of or significant and harmful changes to the marine environment, they shall, as far as practicable, assess the potential effects of such activities on the marine environment and shall communicate reports of the results of such assessments in the manner provided in article 205.
flexible	UNCLOS 194(1)	States must take measures necessary to prevent, reduce and control pollution of the marine environment using the best practicable means at their disposal and in accordance with their capabilities.
	UNCLOS 207(1)	States must adopt laws and regulations to prevent, reduce and control pollution of the marine environment from land-based sources,. . . taking into account internationally agreed rules, standards and recommended practices and procedures.
	UNCLOS 212(1)	States must adopt laws and regulations to prevent, reduce and control pollution of the marine environment from or through the atmosphere, . . . taking into account internationally agreed rules, standards and recommended practices and procedures
	UNCLOS 207(4)	States shall endeavour to establish global and regional rules, standards and recommended practices and procedures to prevent, reduce and control pollution of the marine environment from land-based sources, taking into account characteristic regional features, the economic capacity of developing States and their need for economic development.
objective	UNCLOS 194(3)(a)	Measures to prevent, reduce and control pollution of the marine environment … shall include those designed to minimize to the fullest possible extent the release of toxic, harmful or noxious substances, especially those which are persistent, from land-based sources, from or through the atmosphere
	UNCLOS 207(1)	States shall adopt laws and regulations to prevent, reduce and control pollution of the marine environment from land-based sources . . . taking into account internationally agreed rules, standards and recommended practices and procedures.
	UNCLOS 212(1)	States shall adopt laws and regulations to prevent, reduce and control pollution of the marine environment from or through the atmosphere . . . taking into account internationally agreed rules, standards and recommended practices and procedures
	UNCLOS 207(4)	States, acting especially through competent international organizations or diplomatic conferences, shall endeavour to establish global and regional rules, standards and recommended practices and procedures to prevent, reduce and control pollution of the marine environment from land-based sources
	UNCLOS 212(3)	States, acting especially through competent international organizations or diplomatic conferences, shall endeavour to establish global and regional rules, standards and recommended practices and procedures to prevent, reduce and control pollution [of the marine environment from or through the atmosphere]

continuous	UNCLOS 192/ South China Sea Tribunal	The general obligation in Article 192 to 'protect and preserve the marine environment' extends both to "protection" of the marine environment from future damage and "preservation" in the sense of maintaining or improving its present condition.
	UNCLOS 207(1)	States shall adopt laws and regulations to prevent, reduce and control pollution of the marine environment from land-based sources
	UNCLOS 212(1)	States shall adopt laws and regulations to prevent, reduce and control pollution of the marine environment from or through the atmosphere
	UNCLOS 213	States shall enforce their laws and regulations adopted in accordance with article 207
	UNCLOS 222	States shall enforce […] their laws and regulations adopted in accordance with article 212
	UNCNLOS 194(3)(a)	These measures shall include those designed to minimize to the fullest extent possible the release of toxic, harmful or noxious substances, especially those which are persistent, from land-based sources, from or through the atmosphere
	UNCLOS 207(5)	Laws, regulations, measures, rules, standards and recommended practices and procedures shall include those designed to minimize, to the fullest extent possible, the release of toxic, harmful or noxious substances, especially those which are persistent, into the marine environment.
	UNCLOS 204(1)	States shall endeavour to observe, measure, evaluate and analyse, by recognized scientific methods, the risks or effects of pollution of the marine environment.
	UNCLOS 206	When States have reasonable grounds for believing that planned activities under their jurisdiction or control may cause substantial pollution of or significant and harmful changes to the marine environment, they shall, as far as practicable, assess the potential effects of such activities on the marine environment and shall communicate reports of the results of such assessments in the manner provided in article 205.
knowledge	UNGA, IPC, IPCC	Reports and Resolutions regarding the climate/ocean nexus and scientific knowledge
	UNCLOS 1(4)	"pollution of the marine environment" means the introduction by man, directly or indirectly, of substances or energy into the marine environment which results or is likely to result in deleterious effects
	UNCLOS 194(3)(a)	minimize to the fullest extent possible, the release of toxic, harmful or noxious substances, especially those which are persistent
	UNCLOS 207(5)	minimize to the fullest extent possible, the release of toxic, harmful or noxious substances, especially those which are persistent
	UNCLOS 195	States shall act so as not to transfer, directly or indirectly, damage or hazards from one area to another or transform one type of pollution into another.
	UNCLOS 200	States shall co-operate, directly or through competent international organizations, for the purpose of promoting studies, undertaking programmes of scientific research and encouraging the exchange of information and data acquired about pollution of the marine environment. They shall endeavour to […] acquire knowledge for the assessment of the nature and extent of pollution, exposure to it, and its pathways, risks and remedies.
	UNCLOS 201	In the light of the information and data acquired pursuant to article 200, States shall co-operate, directly or through competent international organizations, in establishing appropriate scientific criteria for the formulation and elaboration of rules, standards and recommended practices and procedures for the prevention, reduction and control of pollution of the marine environment.
	UNCLOS 204(1)	States shall endeavour to observe, measure, evaluate and analyse, by recognized scientific methods, the risks or effects of pollution of the marine environment.
	UNCLOS 204(2)	In particular, States shall keep under surveillance the effects of any activities which they permit or in which they engage in order to determine whether these activities are likely to pollute the marine environment.
	UNCLOS 205	States shall publish the reports of the results obtained pursuant to article 204
	UNCLOS 206	When States have reasonable grounds for believing that planned activities under their jurisdiction or control may cause substantial pollution of or significant and harmful changes to the marine environment, they shall, as far as practicable, assess the potential effects of such activities on the marine environment and shall communicate reports of the results of such assessments in the manner provided in article 205.
reasonable	UNCLOS 192 (+ Part XII generally)	States have the obligation to protect and preserve the marine environment

5.2 The Potential Use of Due Diligence obligations within UNCLOS in National Climate Change Litigation

The previous section outlines the way in which due diligence obligations are articulated in the law of the sea regime. Building on chapters 3 and 4 where due diligence obligations were explored in general international law and in the international climate regime, respectively, this chapter adds another layer to states' due diligence obligations, specifically focused on protecting and preserving the ocean and the marine environment. This section follows a similar structure to section 4.2 in the previous chapter,[1099] considering first the historic application (if any) of ocean-related due diligence obligations under the law of the sea regime in national climate change litigation. It then goes on to explore, again through the lens of the six elements of due diligence, whether due diligence obligations under the law of the sea regime could have (hypothetically) impacted the outcome of the domestic climate cases that were analysed in the previous chapter. This section is necessarily of a speculative nature, as these cases do not include UNCLOS-related arguments.

5.2.1 National Courts in Practice – Existing Precedent for the Use of UNCLOS in Domestic Climate Litigation?

Building on the previous analysis in this chapter, the exploration now turns to whether there is any precedent for using the law of the sea regime in domestic climate change cases. As a reminder, the climate cases this thesis analyses are what are referred to as "systemic" climate litigation because they challenge the overall climate policy of a government for being insufficient to adequately reduce GHG emissions to levels that will prevent the risk of serious harms related to climate change. The previous chapter explored the question of how domestic courts apply international law in national legal questions of this nature. In section 4.2.1 of the previous chapter, it was settled that national courts regularly reference international climate law, IPCC reports and the like, regardless of their status within the domestic legal order.[1100] National courts recognize that international climate law and principles determine to a great extent the sufficiency of a state's diligence in preventing ocean-related climate harms.[1101] This was based on an exploration of the existing domestic

[1099] Chapter 4, section 4.2 *International Climate Change Regime Due Diligence Obligations in National Courts*.
[1100] Chapter 4, section 4.2.1 *National Courts in Practice – International Climate Change Regime Due Diligence in Domestic Climate Litigation*.
[1101] ibid.

climate change litigation. The question here is whether there is the same precedent for a reliance on the international law of the sea in domestic climate change litigation. As a reminder, the systemic climate cases that were chosen for the analysis in this thesis meet the criteria that the court mentions ocean-related harms, such as sea level rise, ocean acidification, increased storm events, more severe weather, and saltwater intrusion.[1102]

It is not entirely unusual for climate-related cases to have an "ocean connection" given the inextricable relationship between the climate and the ocean.[1103] Aside from the connection mentioned in the domestic systemic climate change cases analysed in this thesis, the ocean connection has been raised in several cases in the human rights system, particularly the Inter-American Commission on Human Rights, which has seen petitions brought by Indigenous Peoples, whose claims against national governments hinged on the causal link between the government's failure to adequately reduce GHG emissions and the destruction of marine ecosystems, along with snow and ice-covered environments on which plaintiffs' subsistence and lives depend.[1104] There have been several cases, particularly in the U.S., in which municipalities have brought suits against fossil fuel companies, specifically citing the dangers of rising sea levels connected to the burning of fossil fuels.[1105] A recent case in Norway sought to challenge the issuance of oil and gas extraction licenses for sites situated within the Barents Sea on the grounds that the licenses violated the Norwegian constitution and were counter to Norway's domestic and international climate change commitments.[1106] Each of these cases is an example of a climate change case that specifically highlights the ocean-climate nexus, each has a clear connection to the subject matter governed directly by the law

[1102] Chapter 1, section 1.4 *Methodology.*
[1103] Johansen (n 28) 147.
[1104] *Petition to the Inter-American Commission on Human Rights Seeking Relief from Violations Resulting from Global Warming Caused by Acts and Omissions of the United States (2005)* (Submitted by Sheila Watt-Cloutier); *Petition to the Inter-American Commission on Human Rights Seeking Relief from Violation of the Rights of Arctic Athabaskan Peoples Resulting from Rapid Arctic Warming and Melting Caused by Emissions of Black Carbon by Canada (2013)* (Submitted by the Arctic Athabaskan Council).
[1105] *The People of the State of California (City of Oakland) v BP PLC and others* [2017] Superior Court of the State of California RG17875889; *The People of the State of California (San Francisco) v BP PLC and others* [2018] United States District Court Northern District of California 3:17-cv-06012-EMC; *The City of New York v Exxon Mobil Corporation and others* [2021] United States District Court Southern District of New York 21-CV-4807 (VEC).
[1106] *Greenpeace Nordic Association v Ministry of Petroleum and Energy* [2020] Supreme Court of Norway HR-2020-2472-P (case no. 20-050052SIV-HRET). The Norwegian case is closest to the type of cases explored in this thesis but is a project-based domestic case challenging the approval of oil exploration permits, rather than a systemic case challenging the government's overall climate policy and is thus not included in the analysis.

of the sea (protection and preservation of the marine environment), several of them are brought in international judicial fora. Still, none of them include legal arguments based on the law of the sea. Indeed, there is a complete lack of reference to UNCLOS or the law of the sea regime broadly in every one of these cases.[1107]

The focus of this thesis is on domestic climate litigation and individuals (or civil society at large) as plaintiffs, but even considering international legal disputes, there have to date been no climate change cases brought before any of the various international fora, including ITLOS, that include any law of the sea legal grounds or arguments. In November 2021, during COP26 in Glasgow, the Prime Ministers of Antigua and Barbuda and Tuvalu announced the establishment of a Commission of Small Island Developing States that will have the authority to request an advisory opinion from ITLOS on matters concerning the connection between climate change and the marine environment.[1108] No such request has been filed yet. There are thus no examples of either domestic or international climate change cases that include the use of, reliance on, or even reference to, UNCLOS or other instruments within the law of the sea regime, and there is thus no precedent for the use of UNCLOS in domestic climate change litigation.

The logical reason for this lack of precedent could be that only states are Parties to UNCLOS, making law of the sea regime-related legal arguments unlikely in domestic climate litigation where the plaintiffs are individuals and civil society. However, as was mentioned above, domestic courts routinely look to international law for guidance in domestic litigation, particularly in climate change litigation.[1109] Why should the same not also be true for UNCLOS, particularly when domestic courts are tasked with determining the scope of a state's due diligence obligations as they pertain to the harms associated with the climate-ocean nexus in domestic climate litigation? Given that there is no precedent for this, however, the following section of this chapter explores the hypothetical outcome of an inclusion of the law of the sea regime in domestic courts' decisions on the adequacy of the diligence employed by states in response to the risk of ocean-climate related harms.

[1107] Johansen (n 28) 151.
[1108] 'Antigua & Barbuda, Tuvalu Press Conference UNFCCC - COP26' (1 November 2021) <https://unfccc-cop26.streamworld.de/webcast/antigua-barbuda-tuvalu> accessed 25 April 2022.
[1109] See n 1100.

5.2.2 The Elements of Due Diligence of UNCLOS in Domestic Litigation

The case law that is relied on in this thesis for purposes of the analysis of due diligence obligations within domestic climate change litigation was selected based on the criteria outlined in chapter 1,[1110] that includes mention by the court of climate change and GHG emissions' impacts on the ocean, such as sea level rise, ocean acidification, more extreme weather and storm events, etc. The reference to ocean-related harms was included in the selection criteria because the same list of cases will be analysed again here in order to answer the final portion of the research question of this thesis: to what extent can individuals *invoke due diligence obligations under UNCLOS* (in addition to those under the UNFCCC) *to hold their governments accountable in national court cases* for failing to adequately reduce GHG emissions, causing ocean climate related harm. This section therefore now turns to an analysis of whether each of the six elements of due diligence under UNCLOS, when applied in domestic systemic climate change litigation, would have an impact on the outcome of the cases.

5.2.2.1 Due diligence, harm and risk

The first element of risk was established in the previous chapter to be relatively uncontroversial in national courts.[1111] In the case law surveyed in this thesis, the significant risk of harm from unchecked climate change is not in dispute but provides the context for the underlying legal questions before the courts. This section considers whether an inclusion of due diligence obligations under the law of the sea would impact this element in domestic courts' decision-making.

Given that this element is not in dispute in the surveyed case law, the addition of UNCLOS as an underlying legal regime on which a domestic court might rely in its decision-making does not on its face seem to be of great legal value. Rather than adding to the legal disputes at issue, the benefit of including UNCLOS in domestic climate litigation from a risk perspective would be to sharpen the focus of the dispute. As has been mentioned several times throughout the previous chapters in this thesis, the international climate change regime primarily views the ocean through the perspective of its value as a carbon sink.[1112] While the courts surveyed here do not explicitly discuss the ocean in terms of being a sink, they do all

[1110] See n 1102.
[1111] Chapter 4, section 4.2.2.1 *Due diligence, harm and risk*.
[1112] *UNFCCC* (n 14) Articles 3.3, 4.1(d); *Paris Agreement* (n 1) Article 5.1.

make mention of the consequences of GHG emissions and increased global atmospheric temperature on the ocean in the form of sea level rise, increased storms, ice melt, and the like.[1113] Beyond these consequences, the surveyed courts do not include the ocean in their broader decision-making. Given that the risks of harm from climate change are not in dispute in these cases, an inclusion of UNCLOS in systemic climate change litigation could serve to narrow the scope of what courts deem permissible as it pertains to GHG emissions.

Each of the courts surveyed devotes significant time to the historic development of the international climate regime and the agreed reports of scientific knowledge of the risks of harm from climate change – including to the ocean. Some even reference the IPCC Special Report on Oceans and the Cryosphere.[1114] But when discussing the permissible levels of GHG emissions, courts tend to only focus on the impact of GHG emissions on the atmosphere. The *Urgenda* Supreme Court, for example, summarises the extensive discussions by the lower courts of climate science as the earth warming due to an ever-increasing volume of GHG emissions which retain heat radiated by earth.[1115] Likewise, the Irish Supreme Court in *Friends of the Irish Environment* focused its discussion of the scientific basis of climate change solely on the increase in GHG emissions causing increased atmospheric temperature.[1116] The Court in *Notre Affairs* does discuss the impact of GHG emissions on the ocean in the form of ocean acidification, the severity of storms and damage to ecosystems,[1117] but then focuses the remainder of its discussion on atmospheric temperature rise. It makes sense, of course, that the courts surveyed here focus their attention on the rising temperatures caused by anthropogenic GHG emissions since that is the focus of the international climate change regime. However, if these courts were also faced with determining whether states behaved with due diligence regarding their obligation to prevent pollution of the marine environment from GHG emissions, the discussion on the risks associated with climate change might shift focus.

Just as the risk of devastating harms from climate change and unmitigated GHG emissions provide the underlying context to the legal disputes at issue in the case law surveyed in this thesis, the framing of the legal issues through an ocean lens would provide important context

[1113] Chapter 4, section 4.2.2 *The Elements of Due Diligence of the International Climate Change Regime in Domestic Litigation*.
[1114] Pörtner and others (n 4).
[1115] *Urgenda Supreme Court (2019)* (n 767) para 4.1-4.8.
[1116] *Friends of the Irish Environment (2020)* (n 792) para 3.1-3.8.
[1117] *Notre Affaire à Tous (2021)* (n 789) para 16.

for the courts to decide on the legality of the states' actions. In a court's decision-making on whether the state has taken sufficiently diligent actions to meet its duty of care, the inclusion of UNCLOS could provide a potentially higher level of scrutiny: UNCLOS includes more stringent obligations as it pertains to the protection and preservation of the marine environment than the international climate change regime does, particularly when analysed under the remaining elements of due diligence, further explored below.

The addition of UNCLOS to a domestic systemic climate case would therefore not change the outcome of a court's decision under the element of risk, as these would remain undisputed. The courts surveyed for this thesis all discuss the ocean-related harms as a context for the underlying legal dispute. Rather, the benefit of UNCLOS for this element would be to shift a court's focus for the analysis of the remaining elements of due diligence obligations. This would serve to position the marine environment in the centre of the legal dispute, thereby framing the state's actions in relation to the due diligence obligations as articulated in UNCLOS in addition to those found in the international climate change regime. Thus, courts would have to consider the legal questions through the lens of both the increase in temperature and the pollution of the marine environment.

In conclusion, under the element of risk, the addition of UNCLOS could be relevant in national systemic climate change litigation in two main ways. First, it would serve to centre the ocean as the frame for decision-making based on the undisputed underlying facts of the risk of harm from GHG emissions within these cases. Second, it could serve to focus the decision-making under the remaining elements of due diligence on the higher level of scrutiny included in the obligations to protect and preserve the marine environment than those found in the international climate change regime. The latter is the subject of the analysis below.

5.2.2.2 Due diligence and flexibility

The second element of due diligence, that of flexibility, was found in chapter 4 to result in a range of outcomes in domestic climate change litigation.[1118] The way this element translates to domestic climate litigation is in the form of discretion. Courts in the surveyed case law consistently recognise that states are afforded broad discretion in determining the specific measures to be taken to meet their overall climate goals, and therefore to meet their due diligence obligations. While domestic courts maintain their oversight role on the legality of

[1118] Chapter 4, section 4.2.2.2 *Due diligence and flexibility*.

measures taken by the state in meeting its obligations, the flexible nature of due diligence – in the form of discretion – seems to limit the scope of the level of accountability courts retain. This section considers whether the due diligence obligations under UNCLOS could impact courts' scope for holding states accountable in climate litigation for ocean-related harms.

As was developed above,[1119] one way in which flexibility is articulated in the law of the sea regime is to allow states to balance domestic measures to prevent, reduce and control pollution with their economic interests. Article 194(1) includes the requirement to take necessary measures to prevent, reduce and control pollution of the marine environment 'using for this purpose the best practicable means at their disposal and in accordance with their capabilities'.[1120] The phrase 'in accordance with their capabilities' was first included in draft articles that were submitted by Kenya in 1974[1121] and was intended to ensure that the obligation to prevent, reduce and control pollution of the marine environment would not place undue burden, especially on developing countries.[1122] This expression of economic consideration, particularly for developing states is repeated again in Article 207(4) where states are again expected to take account of 'the economic capacity of developing States and their need for economic development'.[1123] This language is reminiscent of the flexibility in the international climate change regime discussed in chapter 4 that provides for the consideration of the specific context within each state, its national circumstances and the extent of its capabilities.[1124]

Several court decisions surveyed for this thesis balance economic considerations with the need to act to protect against climate change (even though they are not developing countries). The *Thomson* Court, in its discussion on the State's discretion, for example, recognises that the State's decision-making on the level of GHG emissions reductions indicated in its NDC include a concern about 'burdensome costs on the economy especially when there was no "easy" solution to lowering our emissions'.[1125] The Court goes on to find that, even though the State's NDC was likely an insufficient response to climate risks, it was not 'outside the proper bounds of the Minister's power'.[1126] The Court found that, while a

[1119] See section 5.1.3.2 *Due diligence and flexibility*.
[1120] *UNCLOS* (n 29) Article 194(1).
[1121] A/CONF.62/C.3/L.2 (1974), Articles 4,5 and 7, Paragraph (a), III Off. Rec. 245-46 (Kenya).
[1122] Center for Oceans Law and Policy, University of Virginia (n 962) pt XIII (Article 194), 64.
[1123] *UNCLOS* (n 29) Article 207(a).
[1124] See (n 11188).
[1125] *Thomson (2017)* (n 767) para 160.
[1126] ibid.

'differently constituted Government may have balanced the competing factors differently and made different choices about how to lower [GHG] emissions',[1127] this balancing exercise is properly within the State's discretion.[1128] If the focus of the State's due diligence obligations were to include the obligations articulated within UNCLOS Article 194(1), would the Court have found stricter balancing was necessary? The discretion to balance the economic impact of measures taken is articulated only as a qualifier to the obligation that 'States shall take ... all measures ... that are necessary to prevent, reduce and control pollution of the marine environment from any source, using for this purpose the best practicable means at their disposal'.[1129]

In its determination that the State acted within its discretion, the *Thomson* Court found that there is 'no requirement for countries to adopt a target that if adopted by all would achieve warming well below 2°C, nor to alter its NDC because the combined INCDs were insufficient to meet the target.'[1130] This indicates that the Court reads the State's obligations under the international climate change regime as being broadly permissive, allowing the Court to find broad discretion to the benefit of the State. If the more restrictive language of Article 194(1) of UNCLOS were included in the Court's decision-making, it likely would have still found broad discretion under the international climate regime. However, it is feasible that, while finding broad discretion to balance measures taken to meet the long-term temperature goal, the *Thomson* Court would have found that 'an insufficient response to the dangerous climate change risks' was indeed 'outside the proper bounds of the Minister's power' given its obligation under UNCLOS to take all measures 'necessary to prevent, reduce and control pollution of the marine environment from any source, using for this purpose the best practicable means at their disposal'.[1131]

Similarly, the Belgian Court in *Klimaatzaak* found that within the confines of arguments based on the international climate regime, the State had discretion to determine the level of GHG emissions reductions on its own, as international law does not require a reduction by any specific percentage, merely that the State must 'seek to achieve a global cap on greenhouse gas emissions'[1132] in order to achieve net zero by mid-century. The Court found that the

[1127] ibid.
[1128] ibid 168.
[1129] *UNCLOS* (n 29) Article 194(1).
[1130] *Thomson (2017)* (n 767) para 159.
[1131] *UNCLOS* (n 29) Article 194(1).
[1132] *Klimaatzaak (2021)* (n 767) 80, Section 2.3.2.

international climate regime was thus 'limited to setting a common objective', namely keeping the global temperature below a certain level in the long term.[1133] In finding the State had broad discretion under the climate change regime to set the relevant emissions reduction targets, the Court dismissed the Plaintiff's request for an injunction to require stricter targets.[1134] Had the Court also considered the State's obligation to prevent, reduce and control pollution of the marine environment, it is feasible that the Court in *Klimaatzaak* would have found a requirement for stricter emissions reductions permissible on the basis of the State's due diligence obligations under UNCLOS.

Another important articulation of flexibility in the law of the sea regime is the obligation to take into account internationally agreed rules, standards and recommended practices.[1135] While much of the academic literature categorises this as a relatively weak obligation, especially when compared to other sources of pollution,[1136] it is where an important connection can be made between oceans and climate change. Articles 207 and 212 of UNCLOS oblige states to adopt laws and regulations 'to prevent, reduce and control pollution from the marine environment'[1137] from land-based sources and by and through the atmosphere, respectively. Both of these obligations include that states must 'take into account internationally agreed rules, standards and recommended practices and procedures' in the adoption of their national laws and regulations.[1138] The intention of the negotiators in including this reference to international rules and standard was to indicate the relationship between national laws and international rules.[1139] While this is considered to be the weakest of the interactions between national laws and international rules, it provides a direct connection between the obligations under UNCLOS to prevent, reduce and control pollution of the marine environment and the long-term temperature goal articulated in the international climate change regime. In domestic climate change litigation, this could prove important when courts are deciding on the adequacy of states' measures to reduce GHG

[1133] ibid 81, Section 2.3.2.
[1134] ibid 83, Section 2.3.2.
[1135] *UNCLOS* (n 29) Articles 207(1), 212(1).
[1136] Churchill (n 968) 25; Boyle, 'Protecting the Marine Environment from Climate Change' (n 30) 30; Popattanachai and Kirk (n 1039) 39.
[1137] *UNCLOS* (n 29) Articles 207(1), 212(1).
[1138] ibid.
[1139] Center for Oceans Law and Policy, University of Virginia (n 962) Section 5. International Rules and National Legislation to Prevent, Reduce and Control Pollution of the Marine Environment, 127.

emissions as linked to their due diligence obligations under UNCLOS to prevent pollution of the marine environment.

In other words, Articles 207 and 212 include a seemingly weak connection to international rules regarding pollution of the marine environment from land-based sources and by and through the atmosphere. They also serve as further articulation of the importance of national sovereignty with respect to international rules, and therefore state discretion.[1140] They might, however, also serve as significant indicators of whether a state's national laws and regulations (including NDCs) intended to reduce GHG emissions – and prevent, reduce and control pollution of the marine environment – are sufficiently diligent.

In conclusion, the element of flexibility, where courts feel the most constrained in the scope of their authority by state discretion, could prove to benefit from the inclusion of UNCLOS. As it pertains to the element of flexibility, including due diligence obligations under UNCLOS in a court's decision-making feasibly lends itself to empower courts to further limit the broad flexibility states currently have in setting specific GHG emission reductions targets. It would be unreasonable to expect that the inclusion of due diligence obligations under UNCLOS would give courts unlimited power to prescribe specific reduction targets, of course, but it could give courts broader scope to place limits on what is currently near-limitless flexibility and could potentially shift the outcome of this type of climate litigation.

5.2.2.3 Due diligence as an objective standard of care

The third element of due diligence is that it is an objective standard of care. This element is articulated within the law of the sea regime in two ways. The first is the requirement that states minimize pollution of the marine environment by land-based and atmospheric sources to the fullest possible extent. The second is through reference to internationally agreed rules and standards, which states must endeavour to establish and must take into account when adopting national laws to prevent pollution of the marine environment. In the analysis of this element in chapter 4, the cases surveyed demonstrated the tendency for this element to turn on the sufficiency and specificity of the measures a state has put in place in order to meet the long-term temperature goal within the international climate change regime.[1141] The

[1140] ibid Section 5. International Rules and National Legislation to Prevent, Reduce and Control Pollution of the Marine Environment, 132.
[1141] Chapter 4, section 4.2.2.3 *Due diligence as an objective standard of care*.

question to be answered here is whether the addition of the due diligence obligations found in the law of the sea regime would impact a court's decision-making on this element.

A significant question in several of the climate cases surveyed for this thesis is whether the state relied on appropriate, objective standards and guidelines when determining which measures to take to protect its citizens from the risk of the dangerous impacts of climate change. The *Urgenda* Supreme Court found that, in order to determine whether a state has met its duty of care, courts must examine 'whether there are sufficiently objective grounds from which a concrete standard can be derived'.[1142] In the hypothetical addition of UNCLOS to these decisions, it is important to keep in mind that the ocean-related harms would be an important underlying factor via the first element of risk. Courts would be required, therefore, to consider whether the measures taken by the state include objectively appropriate measures to specifically prevent ocean-related harms. Articles 207(1) and 212(1) require states to take into account internationally agreed rules and standards when adopting the obligatory laws and regulations to prevent, reduce and control pollution of the marine environment from land-based sources and by and through the atmosphere, respectively.[1143] Articles 207(4) and 212(3) go on to require states to endeavour to establish, by acting through competent international organizations or diplomatic conferences, global or regional rules and standards to prevent, reduce and control pollution of the marine environment.[1144]

Here is where the link between UNCLOS and the international climate change regime could be made explicitly by national courts when determining whether appropriate rules and standards were applied by states in deciding which measures to take to prevent the risk of dangerous ocean-related harm from GHG emissions. Every case surveyed includes direct reference to the IPCC and its many reports. The *Thomson* Court goes so far as to say that '[t]he IPCC reports provide a factual basis on which decisions can be made.'[1145] Several of the courts surveyed undertook very detailed exploration and analysis of the states' remaining carbon budget as a starting point for their emissions reduction plans.[1146] These analyses and calculations are all based on the IPCC's articulation of various pathways to reaching the long-

[1142] *Urgenda Supreme Court (2019)* (n 767) para 6.4.
[1143] *UNCLOS* (n 29) Articles 207(1), 212(1).
[1144] ibid Articles 207(4), 212(3).
[1145] *Thomson (2017)* (n 767) para 133.
[1146] *Neubauer (2021)* (n 767) paras 214–229; *Notre Affaire à Tous (2021)* (n 789) paras 29–31; *Urgenda District Court (2015)* (n 759) para 4.20-4.30; *Urgenda Appellate Decision (2018)* (n 767) paras 46–53; *Urgenda Supreme Court (2019)* (n 767) para 7.1-7.6.2.

term temperature goal and the complex calculations of the remaining global carbon budget. The detailed exploration of the remaining global and national carbon budgets in these cases serve as the underlying objective standard against which the state's emissions reductions plans are measured.

The *Neubauer* Court for example[1147] underwent a very detailed analysis, along with a clear articulation of how the remaining national carbon budget can be calculated, its remaining uncertainties, and potential for inaccuracies 'in both directions'.[1148] The Court went to great pains to establish the danger of exceeding the remaining carbon budget and how easily that could occur if the State failed to proceed with great caution.[1149] The Court noted, based on the IPCC's estimated pathways to meeting the range of temperature goals (1.5°C and 2°C), that a calculation of the remaining national carbon budget was indeed possible, although it did still include some uncertainty given the complexity of the climate system, the possibility of reaching tipping points, and the exclusion of the aviation and shipping sectors, among other factors.[1150] Based on this, the *Neubauer* Court found that, given the irreversible nature of the harms involved and the severity of the danger from climate change-related impacts, states have a heightened obligation of due diligence when determining appropriate measures to address climate change.[1151] In its analysis, the Court found that the State's 2030 emissions reduction plan was technically achievable, but was likely insufficient to leave an adequate remaining carbon budget past 2030.[1152] Nonetheless, the Court found that the State had not technically acted unlawfully and had therefore not breached its due diligence obligation.[1153]

Would the addition of the due diligence obligations under UNCLOS have caused the German Federal Constitutional Court to come to a different conclusion? Initially, the prevailing perspective that the obligation merely to 'take into account' international rules and standards represents a relatively weak obligation[1154] would indicate that the inclusion of

[1147] The courts in *Klimaatzaak*, all three *Urgenda* decisions, and *Notre Affaire* each undertook similar analyses of remaining carbon budgets, appropriate levels of emissions reductions, and due diligence.
[1148] *Neubauer (2021)* (n 767) para 222.
[1149] ibid 215–239.
[1150] ibid.
[1151] ibid 229.
[1152] ibid 230–234.
[1153] ibid 237.
[1154] Center for Oceans Law and Policy, University of Virginia (n 962) Section 5. International Rules and National Legislation to Prevent, Reduce and Control Pollution of the Marine Environment, 132.

UNCLOS would have no significant impact here. However, the elements of due diligence do not exist in isolation. If, under the element of risk, the ocean-related harms and the obligations flowing from the general obligation to protect and preserve the marine environment under UNCLOS were included, the weight of the evaluation would likely shift. The addition of the obligations to prevent, reduce and control pollution of the marine environment, the requirement to minimize to the fullest extent possible the release of harmful substances into the marine environment, and to take into account international rules and standards could serve to strengthen the court's analysis. This shift in focus feasibly could require the court's analysis to include the determination of whether the state's emissions reduction measures are sufficient to minimize to the fullest extent possible the release of harmful substances into the marine environment to prevent, reduce and control pollution of the marine environment. If the *Neubauer* Court had undergone this analysis with such a shifted focus, it may have found that the internationally agreed rules and standards the State took into account in adopting laws and regulations to prevent, reduce and control pollution of the marine environment from GHG emissions, in fact call for more stringent measures in order to meet its due diligence obligations. If that was the case, the Court may have been able to find the State's actions to no longer be technically lawful.[1155]

In sum, under UNCLOS the objective standard of conduct that is expected from states in meeting their due diligence obligations points to internationally agreed rules and standards rather than clear objective guardrails within the regime. This element can therefore serve as a connecting thread between the law of the sea and the international climate change regime due diligence obligations. Courts may not find a technically heightened obligation on this element within UNCLOS. However, if the ocean and states' obligations under UNCLOS relating to protecting and preserving the marine environment are factors in a court's decision-making, the objective standards under the international climate regime could still be enhanced by them. This could translate to more scope for courts to restrict the broad discretion discussed under the previous element of flexibility.

5.3.3.4 Due diligence as a continuous obligation

The fourth element of due diligence obligations is that they are continuous in nature. This is articulated in the law of the sea regime as the positive obligation to protect and preserve the marine environment from current and future harm by maintaining or improving its condition.

[1155] *Neubauer (2021)* (n 767) para 237.

States have obligations to not only adopt national laws and regulations to prevent and control pollution of the marine environment, but also to enforce those laws and regulations with a particular focus on substances that are persistent, such as GHG emissions, and especially CO_2. In chapter 4, it was determined that national courts consider the duty to ensure the national measures taken by states to prevent climate-related harms are forward-looking, and that courts rely on the continuous nature of states' due diligence obligations in their decision-making.[1156] This section considers whether the inclusion of UNCLOS in domestic climate change litigation would impact courts' decision-making on this element.

The very nature of climate change litigation is forward-looking. All of the courts surveyed for this thesis discuss the long-term future impacts of past and current GHG emissions and therefore the need to reduce those emissions in order to meet long-term temperature goals to prevent the worst of the risks coming to pass.[1157] As is discussed under the elements of risk and knowledge in both this chapter and in chapter 4,[1158] courts consistently engage in lengthy discussions of the impacts of climate change. Each of the national policies or approaches explored in the surveyed case law take long-term, gradual approaches to reducing GHG emissions in order to meet the long-term temperature goal of the international climate change regime. The international climate change regime, with its focus on progression and ambition, specifically expects this type of approach which may or may not include immediate, near-term action and instead focuses primarily on the long-term goals.[1159]

The long-term temperature goal of the international climate change regime allows for significant flexibility in approaches (as evidenced by the various approaches analysed in the case law) to meet the long-term goal of holding the global temperature increase at 1.5°C and reaching net zero by mid-century. In contrast, the due diligence obligations under the law of the sea regime envision immediate action with the obligation to maintain the measures taken in a continuous manner. As was established in detail in chapter 2,[1160] the ocean is already showing signs of slowing its uptake of atmospheric CO_2 and the consequences of GHG

[1156] Chapter 4, section 4.2.2.4 *Due diligence as a continuous obligation*.
[1157] ibid.
[1158] See section 5.2.2.1 *Due diligence, harm and risk*; section 5.2.2.5 *Due diligence and knowledge*; Chapter 4, section 4.2.2.1 *Due diligence, harm and risk*; Chapter 4, section 4.2.2.5 *Due diligence and knowledge*.
[1159] See (n 1156).
[1160] See (n 1001).

emissions are present now, albeit of a continuous nature. Further, the obligations under UNCLOS, while also continuous in nature, are not amenable to approaches based solely on future progression that rely on significant GHG emissions reduction only in the future. Instead, the due diligence obligations under UNCLOS flow from the general positive obligation in Article 192 to protect and preserve the marine environment which includes the negative obligation not to degrade the marine environment.[1161] The due diligence obligations under UNCLOS therefore include the requirement to address both current and future impacts.

How then would domestic courts treat the inclusion of UNCLOS due diligence obligations, specifically regarding the continuous nature of due diligence? An important area of discussion for several of the surveyed courts involved the consequences of postponing action to reduce GHG emissions. The *Urgenda* Supreme Court acknowledged, for example, that the need for GHG emissions is ever more urgent and that postponement of emissions reductions translates to far more stringent, costly and risky efforts needed in the future.[1162] It acknowledged the Appellate Court's finding that particularly today's youngest generations will face significant adverse impacts from climate change if states do not act with sufficient adequacy in the near-term.[1163] The German Federal Constitutional Court in *Neubauer* found that, because postponement of emissions reductions would likely negatively impact future rights and freedoms, the State is required to begin as soon as possible the development of necessary legal and practical structures to enable appropriate emissions reductions, particularly for the timeframe after 2030.[1164] The *Neubauer* Court ultimately found that the State's emissions reductions plans for the post-2030 timeframe lacked sufficient specificity for the Court to determine the adequacy of the State's planned measures to reach net zero by mid-century, and were therefore unlawful.[1165] The Irish Supreme Court in *Friends of the Irish Environment*, similarly found that the State's plan lacked specificity, particularly post-2030, to allow the Court to determine the adequacy of the State's measures to achieve net zero by mid-century.[1166]

[1161] *South China Sea Arbitration* (n 293) para 941.
[1162] *Urgenda Supreme Court (2019)* (n 767) para 4.6, 7.4.3.
[1163] ibid 4.7, citing *Urgenda Appellate Decision (2018)* (n 767) para 37.
[1164] *Neubauer (2021)* (n 767) paras 248–249.
[1165] ibid 257.
[1166] *Friends of the Irish Environment (2020)* (n 792) para 6.45, 9.2.

Each of these courts found their state's long-term plans to reach net carbon neutrality by mid-century to be insufficient. However, each of them maintained their focus on the adequacy of the states' measures to achieve the long-term temperature goal of the international climate change regime (post-2030), finding that, in the short-term, a significant level of emissions was still allowable.[1167] The *Neubauer* Court and the Court in *Friends of the Irish Environment* found their respective States' long-term measures lacked specificity, not ambition.[1168] If these courts had included UNCLOS in the analysis of their respective states' emissions reductions plans, it is possible that the short-term (pre-2030) emissions reductions would have undergone more scrutiny. Particularly in light of the obligation under Article 194(3)(a) that measures taken by states to protect and preserve the marine environment must include those designed to minimize to the fullest extent possible the release of persistent substances that are harmful.[1169] The Dutch Supreme Court in *Urgenda* even made reference to the persistent nature of GHG emissions and especially CO_2 in its description of climate change and its consequences.[1170] So too did the Irish Supreme Court[1171] and the German Federal Constitutional Court.[1172] Given the shift in focus, discussed in the previous elements of this section, that the addition of UNCLOS would offer, it is not implausible to assume that these courts would have further scrutinised the near-term (pre-2030) emissions reductions with a view to the obligations under Article 194(3)(a). This is underscored by the consistent reference by these courts to the use of best available science in the form of their reliance on successive IPCC reports to establish the continuous nature of due diligence obligations.[1173]

The *Thomson* Court, which allowed the State's emissions reduction plan to stand even given its probable insufficiency, based its decision in part on the future progression of the State's planned measures.[1174] The Court acknowledged that the consequences of delaying significant emissions reductions until after 2030 included the future need for far more stringent reductions with long-term economic impacts and a reliance on yet-to-be developed carbon

[1167] Even the *Urgenda* Courts, which required the State to implement more ambitious emissions reductions in the short-term, maintained their focus on the long-term goals.
[1168] *Neubauer (2021)* (n 767) para 257; *Friends of the Irish Environment (2020)* (n 792) para 9.2-9.3.
[1169] *UNCLOS* (n 29) Article 194(3)(a).
[1170] *Urgenda Supreme Court (2019)* (n 767) para 2.1.
[1171] *Friends of the Irish Environment (2020)* (n 792) para 3.1-3.2.
[1172] *Neubauer (2021)* (n 767) paras 17–19.
[1173] Chapter 4, section 4.2.2.4 *Due diligence as a continuous obligation*.
[1174] *Thomson (2017)* (n 767) para 169.

removal technology.[1175] The Court nevertheless found that because the State's pre-2030 plan was not 'set in stone' and appropriate reviews were to be undertaken, it could stand.[1176] The *Thomson* Court ultimately found that, while New Zealand's plan for near-term emissions reductions likely fell short of the ambition required to achieve the long-term temperature goals, the possibility of future review and progression in ambition envisaged by the international climate change regime meant that the State acted within the bounds of the regime.[1177] While this finding embraces the long-term, continuous nature of the State's obligations under the international climate change regime (ambition and progression toward the long-term goal), it ignores the pressing need for immediate measures that have a long-term continuing effect, which could be required under the UNCLOS obligations to prevent harmful substances from being released into the marine environment. Had the *Thomson* Court also considered UNCLOS in its decision-making, it may have found the obligations to minimize to the fullest extent possible the release of harmful substances into the marine environment to be incompatible with the State's inadequate short-term ambition, meaning that the State failed in its due diligence obligation under this element. A finding that the State's emissions reductions in the lead-up to 2030 were insufficient to adequately protect the marine environment would have included the finding that the State must not only enact appropriate laws to protect and preserve the marine environment in this way, but also to enforce those laws.[1178]

In sum, the distinction between the way the continuous nature of due diligence obligations is articulated in the international climate change regime and in the law of the sea regime could result in more scrutiny if UNCLOS were included in domestic climate cases. The international climate change regime's continuous due diligence obligations are focused on the long-term temperature goal (including the goal of becoming carbon neutral by mid-century), allowing for potentially significant GHG emissions to continue for quite some time. The continuous nature of the due diligence obligations under UNCLOS, however, would require immediate action (to minimize to the fullest extent possible the pollution of the marine environment) with a long-term, continuous effect (in the form of enforcement of laws and regulations). Under this element of due diligence, therefore, it is plausible that the

[1175] ibid.
[1176] ibid.
[1177] ibid 176, 179.
[1178] *UNCLOS* (n 29) Article 207(1), 212(1), 213, 222.

inclusion of UNCLOS in domestic systemic climate change litigation would bring results that include court-mandated higher emissions reductions in the near-term.

5.2.2.5 Due diligence and knowledge

The fifth element of due diligence is knowledge. In the law of the sea regime, this is articulated through obligations to acquire scientific knowledge and develop rules and standards based on such knowledge. UNCLOS also requires monitoring and reporting of harmful effects of activities within states' jurisdiction and control and the assessment of potential risks of significant harm or damage to the marine environment of future activities to be undertaken. It was established in chapter 4 that domestic courts in systemic climate change litigation devote significant attention to elaborating the most up-to-date scientific understanding of climate change and its impacts, primarily based on successive IPCC reports, and impute knowledge to the states on this basis.[1179] This section explores whether the inclusion of UNCLOS due diligence obligations would impact domestic courts' decision-making on the knowledge element of due diligence.

The knowledge element of due diligence obligations closely relates to the element of risk, and the courts surveyed here engage in lengthy discussions about the current state of scientific understanding of the drivers and impacts of climate change, including ocean-related harms. However, as was highlighted in the discussion of the element of risk above,[1180] the inclusion of the law of the sea regime would serve to further expand the court's attention on ocean-related harms, not just as a consequence of GHG emissions, but as an integral and vital component of the climate system with immediate and significant impacts from and on the climate.[1181] The purpose of this would be, as discussed under risk above, to shift the courts' focus to include the marine environment in their decision-making in addition to the impact of the GHG emissions on global atmospheric temperature. As was discussed in detail in chapter 4,[1182] each of the courts surveyed here explains in detail that, as Party to the international climate change regime and a responsible member of the global community, the state acknowledges and accepts the underlying scientific basis of the regime.[1183]

[1179] Chapter 4, section 4.2.2.5 *Due diligence and knowledge*.
[1180] See section 5.2.2.1 *Due diligence, harm and risk*.
[1181] See n 1001.
[1182] See n 1179.
[1183] *Urgenda District Court (2015)* (n 759) para 4.14-4.89; *Urgenda Appellate Decision (2018)* (n 767) para 43; *Neubauer (2021)* (n 767) paras 4–9, 159–163, 208–210; *Leghari (2015)* (n 766) para 5.4, 7;

While a discussion of the current state of science as underlying the law of the sea regime may not be performed by courts in the same way, a focus on the ocean-related harms from both GHG emissions and rising atmospheric temperatures would serve to crystallise the need for the measures taken by states to include those specifically designed to protect the marine environment from anthropogenic pollution. As a reminder, UNCLOS defines "pollution of the marine environment" as the introduction by man, whether direct or indirect, of substances or energy (including GHG emissions and heat), which result or are likely to result in deleterious effects.[1184] The inclusion within this definition of 'results or is likely to result'[1185] indicates both current and constructive knowledge. As was discussed above in section 5.1, Part XII of UNCLOS focuses on the protection of the ocean and preventing pollution of the marine environment from all sources, but for purposes of this thesis, particularly from land-based sources and by and through the atmosphere. This is in contrast to the international climate change regime, which could be said to focus on the gradual reduction of this type of pollution rather than the outright prevention of or protection from such pollution. On the basis of the knowledge that states are imputed by the courts to have, particularly as it pertains to GHG emissions and their impacts on the ocean, including ocean acidification, it cannot be said that the measures states take under the international climate change regime that are focused solely on long-term atmospheric temperature rise would be sufficient to meet the due diligence obligations under UNCLOS.[1186]

The inclusion of UNCLOS in systemic climate change litigation could also serve to bolster domestic courts' reasoning regarding the application of best available science to measure the adequacy of state action to address climate change-related harms. Domestic courts routinely rely on the need for best available science in making decisions regarding the appropriateness of measures to combat climate change. As was established in chapter 4, domestic courts frequently require states' plans to evolve alongside the evolution of the scientific knowledge.[1187] The *Neubauer* Court made reference to this when it held that if, based on newly available science, the Paris goals were to change, the State's ambition would also be required to change.[1188] The *Urgenda* Appellate Court, again referencing IPCC reports,

Thomson (2017) (n 767) paras 7–69; *Friends of the Irish Environment (2020)* (n 792) para 3.1, 4.1; *Notre Affaire à Tous (2021)* (n 789) paras 27–30; *Klimaatzaak (2021)* (n 767) paras 6–42.

[1184] *UNCLOS* (n 29) Article 1(4).

[1185] ibid.

[1186] Scott (n 976) 407.

[1187] See n 1179.

[1188] *Neubauer (2021)* (n 767) paras 16–20.

expressed this requirement specifically within the context of the State's duty of due care, requiring the government to appropriately update plans based on what they 'knew or ought to have known.'[1189] The Court in *Friends of the Irish Environment* looked toward future scientific knowledge in its discussion of the State's obligation to update its rolling five-year plans towards reaching net zero by 2050.[1190] The Belgian Court in *Klimaatzaak* found that the State's positive obligation to prevent climate harms must be based on the best available science and must stay abreast of ever-evolving climate science.[1191] Even the *Thomson* Court found that the publication of new IPCC reports triggers an obligation for the State to consider whether its targets require updating based on the newly available science.[1192]

The due diligence obligations under UNCLOS include obligations to endeavour to acquire knowledge in order to assess the nature and extent of pollution of the marine environment, as well as the risks and remedies involved in marine pollution.[1193] States must also stay informed regarding the effects of any polluting activities[1194] and take action based on such surveillance, again with the goal of protecting and preserving the marine environment.[1195] As has been discussed at length, courts already focus in large part on the knowledge component of states' due diligence obligations and the accompanying requirement to keep abreast of evolving science. The inclusion of UNCLOS would therefore likely only serve to include the ocean and marine environment more explicitly in courts' reasoning on the extent of the knowledge states are expected to gain and act upon to meet their due diligence obligations.

In sum, through the lens of knowledge, the inclusion of due diligence obligations under the law of the sea regime could serve to elevate the impact of GHG emissions on the marine environment. This elevation may result in findings that measures taken by states that fail to include specific consideration of ocean-related impacts such as acidification fall short of adequate diligence. On the other hand, from the perspective of courts requiring states to maintain the requisite level of knowledge regarding evolving climate science, including UNCLOS in climate litigation would merely have a focus-shifting purpose, similar to that under the element of risk.

[1189] *Urgenda Appellate Decision (2018)* (n 767) para 42.
[1190] *Friends of the Irish Environment (2020)* (n 792) para 6.20.
[1191] *Klimaatzaak (2021)* (n 767) paras 59–60.
[1192] *Thomson (2017)* (n 767) para 94.
[1193] *UNCLOS* (n 29) Article 200.
[1194] ibid Article 204(2).
[1195] ibid Articles 201, 205, 206.

5.2.2.6 Due diligence and reasonableness

The final element of due diligence obligations is that the measures taken by states to prevent the risk of harm must be reasonable. Reasonableness serves as an overarching lens through which courts can measure a state's due diligence. It was established above and in previous chapters that the overall due diligence obligation and each of the elements contained therein (risk, flexibility, objective standard of care, the continuous nature of the obligation and knowledge) must all be viewed through the lens of reasonableness.[1196] In the law of the sea regime this is articulated through the general due diligence obligation to protect and preserve the marine environment in Article 192 and the following articles contained in Part XII. As chapter 4 demonstrated, domestic courts place high value on states acting reasonably with regard to the measures they implement to prevent the significant risk of dangerous climate change harms.[1197] This section explores whether the inclusion of UNCLOS in domestic climate change litigation would impact a court's reasoning and decision-making when considering whether a state has acted with sufficient diligence.

Reasonableness was found in chapter 4 to be applied by national courts in climate change litigation in a variety of ways, including the balancing between near- and long-term measures taken to reduce GHG emissions.[1198] The *Urgenda* and *Neubauer* Courts found it unreasonable to exchange minimal near-term measures for future measures that will have to be far more stringent, costly and risky.[1199] However, the Courts in *Neubauer* and *Friends of the Irish Environment* both focused on the long term goals toward meeting net zero by 2050 in finding that they were unreasonable and based their findings on a lack of specificity, not ambition.[1200] In other words, these Courts found that the long-term plans lacked enough detail to be able to determine whether the future emission reduction measures were reasonable given the balance of benefits and likely significant future burdens. On the immediate, near-term plans leading up to 2030, the *Neubauer* Court reluctantly found that there was no evidence the State acted outside of the bounds of reasonableness within the confines of the international climate change regime.[1201] The State therefore did not appear

[1196] See section
5.1.3.6 Due diligence and reasonableness.
[1197] Chapter 4, section 4.2.2.6 *Due diligence and reasonableness.*
[1198] ibid.
[1199] *Urgenda District Court (2015)* (n 759) para 4.89; *Urgenda Appellate Decision (2018)* (n 767) paras 52–53; *Neubauer (2021)* (n 767) para 258.
[1200] *Neubauer (2021)* (n 767) para 257; *Friends of the Irish Environment (2020)* (n 792) para 9.2-9.3.
[1201] *Neubauer (2021)* (n 767) paras 236–237.

to breach its due diligence obligations pertaining to the long-term temperature goal.[1202] The Court's reluctance is evidenced by its repeated remarks that, while not strictly impossible, it was neither certain nor realistic that the State's near-term emissions reductions were sufficient to leave an adequate carbon budget for post-2030 reductions that will not unconstitutionally infringe on future rights.[1203] Had the Court applied the due diligence obligations pertaining to the protection and preservation of the marine environment under UNCLOS, it is entirely possible that it would have found the near-term plans to be unreasonable as well. Given the Court's reluctance to find that the State's near-term measures met its due diligence obligations under the international climate regime, the inclusion of obligations to minimize to the fullest extent, the pollution of the marine environment through GHG emissions, might have given the Court the reasoning it needed to require the State to increase its immediate and near-term reductions.

Is it possible that the inclusion of UNCLOS in its reasoning and decision-making would have also led the *Thomson* Court to a different conclusion? The *Thomson* Court engaged in an extensive analysis of case law from other jurisdictions to test the reasonableness of the State's measures to meet its obligations under the international climate change regime.[1204] After this lengthy exercise in transjudicialism, the Court found that, despite the likely insufficiency of the State's current emissions reduction plan, the State had not acted unreasonably within its obligations under the international climate change regime to implement measures to reach the long-term temperature goal.[1205] The reasons for this included that, in the Court's view, there was still time to increase ambition and, under the international climate change regime, such progression in ambition was permitted – and indeed expected – on the path to the long-term goal, and was therefore reasonable.[1206] Given the Court's careful and expansive analysis of not only domestic and international obligations, but also the lengthy analysis of similar climate change case law in other jurisdictions, it is feasible that the Court would have also engaged in a careful and considered analysis of UNCLOS had it been included in this case. Further, the *Thomson* Court did find that the State's current plan was likely insufficient to meet the long-term temperature goal but based its finding that the State nonetheless acted reasonably primarily on future review and

[1202] ibid.
[1203] ibid 168–172.
[1204] *Thomson (2017)* (n 767) paras 105–132.
[1205] ibid 179.
[1206] ibid 169.

progression in ambition of the State's plans.[1207] The obligations under UNCLOS, beginning with the general obligation to protect and preserve the marine environment,[1208] those pertaining to prevention of pollution of the marine environment[1209] and minimizing to the fullest extent possible the release of harmful substances from land-based sources and through the atmosphere,[1210] likely could have led the *Thomson* Court to find that the near-term plans were indeed unreasonable. Again, here UNCLOS could have served to shift the goal posts to require more immediate and more ambitious action rather than relying on the future tightening of currently insufficient measures.

In sum, under the element of reasonableness, which also considers the totality of the other elements of due diligence, the due diligence obligations under the law of the sea regime could serve to bolster the obligations under the international climate change regime. It is entirely feasible that the inclusion of UNCLOS in national systemic climate change litigation would cause a court to find that a state's actions are simply not reasonable if the emissions reduction plans solely focus on meeting the long-term temperature goal and ignore the need for more immediate protection of the marine environment. UNCLOS defines "pollution of the marine environment" as the introduction of substances by man to the marine environment that have deleterious effects.[1211] Coupled with the general obligation of states to protect and preserve the marine environment, elaborated and expanded in Part XII of UNCLOS, the inclusion of due diligence obligations under the law of the sea regime might indeed be used by individuals to hold their governments accountable for failing to adequately reduce GHG emissions in national courts.

Having considered each of the elements of due diligence obligations under the law of the sea regime and their potential impacts on national climate change litigation, the next section explores the implications of such hypothetical reliance on UNCLOS within domestic systemic climate change litigation.

5.3 Conclusions

This chapter seeks to explore the extent to which individuals can invoke due diligence obligations under UNCLOS in addition to those under the international climate change regime

[1207] ibid 179.
[1208] *UNCLOS* (n 29) Article 192.
[1209] ibid Articles 194(1), 207, 212, 213, 222.
[1210] ibid Articles 194(3)(a), 207(5).
[1211] ibid Article 1.

in order to hold their government accountable in national courts for failing to adequately reduce GHG emissions, causing ocean-climate related harm. Building on the previous chapter which explored and analysed the due diligence obligations under the international climate change regime, this chapter first briefly explored the history of due diligence within the law of the sea regime. It then applied each element of due diligence as articulated within UNCLOS to the domestic systemic climate change cases that were the subject of the same analysis in chapter 4. This final section serves to bring together each of the distinct sections of this chapter and explore the implications of such hypothetical reliance on the due diligence obligations under UNCLOS in domestic climate change litigation.

It is clear that the ocean is gaining more visibility in the international climate change regime. This is evidenced not only by events during COP meetings, but by the first express inclusion of the ocean (beyond serving as a carbon sink) within the regime in the preamble of the Paris Agreement, and the consistent mention of ocean-related harms within systemic climate change litigation. The ocean is, however, still seen within the international climate change regime's focus on atmospheric temperature primarily through its function as a carbon sink, which could prove dangerous.[1212] This singular focus runs the risk of excluding the significant danger involved with the change in not just ocean temperatures, but the chemical make-up of the ocean as well. The inclusion in domestic climate litigation of due diligence obligations under UNCLOS alongside those under the international climate change regime, can serve the important function of shifting the courts' focus and bringing the ocean front and centre for purposes of mitigating against the most severe harms caused by anthropogenic GHG emissions. Indeed, if the ocean's importance as an integral part of the climate system – and as the source of the majority of the oxygen humans breathe and the vital lifeblood of communities and food systems – are not adequately protected from the consequences of GHG emissions, the ocean will eventually become so saturated that it will cease to function as a carbon sink.[1213]

The courts surveyed in this thesis consistently find that GHG emissions at significant levels are still allowable in the near-term under the international climate change regime, as long as the states' long-term plans toward meeting net carbon neutrality by 2050 can be deemed reasonable. In order to determine whether states have taken duly diligent measures to meet

[1212] Harrould-Kolieb (n 1060) 43.
[1213] Scott (n 976) 387.

the long-term temperature goal, courts consider economic burdens and future rights infringements, along with the risks involved in unchecked climate change. Courts do not allow unlimited emissions in the short-term and several courts require states to meet at least some minimum level of reductions, even before 2030.[1214] Indeed, as the *Urgenda* Appellate and Supreme Courts found, in order to exceed a court-mandated minimum level of emissions reductions, states must sufficiently demonstrate that such a lower reduction plan would be either 'an impossible or disproportionate burden'.[1215] However, as was discussed in detail in section 5.2 above, many of the courts that found their state to have failed in its due diligence obligations under the international climate change regime, based their reasoning on a lack of specificity in long-term plans[1216] rather than a sufficiency of emissions reductions to protect against ocean-climate related harms.

All of the courts surveyed here focused their decision-making on the long-term temperature goal articulated within the international climate change regime, including reaching net carbon neutrality by 2050. All of the courts surveyed also acknowledged the impact of GHG emissions and climate change on the ocean.[1217] However, none of the courts surveyed connected the emissions reductions plans (near- or long-term) to the direct impacts on the marine environment in such a way that would require states to take the protection of the marine environment from pollution by GHG emissions and heat into consideration. As was mentioned at the conclusion of the previous chapter, the international climate change regime includes all of the elements of due diligence and courts do rely on them, however vague they may be.[1218] Would the inclusion of due diligence obligations under UNCLOS make a significant difference in providing courts with a more robust legal standard in order to find that more significant emission reductions are required in the immediate and near-term?

Nothing within the analysis in this chapter points toward such an inclusion being a silver bullet or offering a guaranteed solution to a court's inability to find a failure by the state to act diligently enough in the near-term. However, as has been mentioned throughout the above analysis, the minimum impact of inclusion of UNCLOS due diligence obligations in

[1214] *Urgenda District Court (2015)* (n 759); *Urgenda Appellate Decision (2018)* (n 767); *Urgenda Supreme Court (2019)* (n 767); *Neubauer (2021)* (n 767); *Klimaatzaak (2021)* (n 767); *Notre Affaire à Tous (2021)* (n 789).
[1215] *Urgenda Supreme Court (2019)* (n 767) para 7.5.3.
[1216] *Neubauer (2021)* (n 763); *Friends of the Irish Environment (2020)* (n 792).
[1217] As a reminder, this falls within the selection criteria for the case law included within this thesis.
[1218] Chapter 4, section 4.3 *Conclusions*.

systemic climate change litigation would be to shift the focus of the court's decisions to include the ocean in a more prominent and vital way. Aside from the potential further strengthening of the scope of courts' decision-making on state discretion and the objective standard of care, the mere shifting of focus may itself serve to change the outcome of court decisions, particularly as it pertains to shorter-term, pre-2030 emissions reductions. Particularly regarding ocean acidification, the addition of UNCLOS due diligence obligations could prove important, as ocean acidification – a direct consequence of GHG emissions rather than increased atmospheric temperature or climate change itself – arguably falls outside the reach of the international climate change regime but has increasingly dangerous consequences.[1219]

The impact on courts' decision-making will of course depend on a variety of factors, including the legal questions at issue, the particular jurisdiction, the national court's willingness to consider international law within its decision-making, just to name a few. The following chapter addresses some of these issues. Broadly, however, the analysis in this chapter indicates that invoking UNCLOS due diligence obligations alongside those in the UNFCCC could serve to strengthen the legal arguments employed in cases by individuals to hold their state accountable in national courts for failing to adequately reduce GHG emissions, causing ocean-climate related harms.

[1219] Harrould-Kolieb (n 1060) 24–25.

Chapter 6 Conclusions

In this concluding chapter, each of the several chapters of this thesis are briefly summarized in order to bring all of the information together in one place. Following the flow of the thesis, this chapter then draws conclusions, outlines the contributions to the academic literature and establishes remaining gaps and the need for future research.

6.1 Thesis overview

The overall research question this thesis seeks to answer is as follows: to what extent can individuals invoke due diligence obligations under both the UNFCCC and UNCLOS to hold their governments accountable in national courts for failing to adequately reduce GHG emissions, causing ocean-climate related harms? Each chapter addressed a different portion of the research question in order to fully explore the potential of the question.

As was outlined in the introductory chapter, this thesis considers domestic climate change litigation as a potential driver of more ambitious climate action by states in order to address the urgent need to close the remaining gap between what is needed and what states are currently doing to prevent the worst of climate change harms from coming to pass. It is well documented in academic literature, IPCC reports, court actions, and mainstream global media, that the collective action by states must be focused on keeping the global temperature increase to 1.5°C. The way to do this, and the path chosen by most states throughout the world, is to dramatically reduce GHG emissions in the near-, medium- and long-term in order to reach net carbon neutrality by 2050. As was described in the previous chapters and as will be summarized below, long-term GHG emissions reduction plans allow for current emissions to continue – and in many cases to increase – with a focus on keeping the temperature stable in the long-term. What gets lost in this long-term focus is the immediate and short-term danger of continued emissions at significant levels. Most of the immediate and near-term dangers are due to the ocean's historic uptake of both excess atmospheric temperature and significant amounts of atmospheric CO_2.

The international climate change regime, the source of the 1.5°C temperature goal, describes its overall purpose thus:

> The ultimate objective of this Convention and any related legal instruments that the Conference of the Parties may adopt is to achieve, in accordance with the relevant provisions of the Convention, stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system. Such a level

> should be achieved within a time-frame sufficient to allow ecosystems to adapt naturally to climate change, to ensure that food production is not threatened and to enable economic development to proceed in a sustainable manner.[1220]

It defines "climate system" as 'the totality of the atmosphere, hydrosphere, biosphere and geosphere and their interactions.'[1221] Thus, while there is a recognition from the beginning of the international climate change regime that the climate system includes the ocean and that the atmosphere and the ocean are inextricably linked, the totality of the international climate change regime focuses on atmospheric concentrations of GHG and treats the ocean primarily as a carbon sink. The ocean and activities pertaining to it are not regulated by the international climate change regime but rather by UNCLOS, itself a framework convention governing all activities in, on, or pertaining to the ocean. Part XII of UNCLOS explicitly governs the protection and preservation of the marine environment, including the prevention, reduction and control of pollution of the marine environment. UNCLOS defines "pollution of the marine environment" as follows:

> "pollution of the marine environment" means the introduction by man, directly or indirectly, of substances or energy into the marine environment, including estuaries, which results or is likely to result in such deleterious effects as harm to living resources and marine life, hazards to human health, hindrance to marine activities, including fishing and other legitimate uses of the sea, impairment of quality for use of sea water and reductions of amenities[1222]

It is well established that GHG emissions fall within the definition of "pollution of the marine environment" for purposes of UNCLOS.[1223] It is precisely the ocean's uptake of atmospheric GHG emissions, and CO_2 in particular, that leads the international climate change regime to categorize the ocean as a carbon sink with tremendous benefit. A sink, as defined in the international climate regime 'means any process, activity or mechanism which removes a greenhouse gas, an aerosol or a precursor of a greenhouse gas from the atmosphere'.[1224] This means that under the international climate change regime, the introduction of GHG emissions into the marine environment is treated as a benefit because it means the concentrations of atmospheric GHGs is reduced by the drawdown of those emissions by, and

[1220] *UNFCCC* (n 14) Article 2.
[1221] ibid Article 1.3.
[1222] *UNCLOS* (n 29) Article 1.1(4).
[1223] Boyle, 'Law of the Sea Perspectives on Climate Change' (n 966) 27; Craig (n 968) FN160; Boyle, 'Litigating Climate Change under Part XII of the LOSC' (n 30) 6.
[1224] *UNCLOS* (n 29) Article 1.8.

into, the ocean. While this process of drawdown by the ocean of atmospheric GHG is not expressly acknowledged by states in their GHG emissions reduction plans, it is inherent within their calculations of remaining atmospheric carbon budget, and thus within what is considered an allowable amount of continued emissions. States' emissions reduction plans are precisely the subject of national systemic climate change litigation, where individuals – or civil society at large – challenge states' overall GHG emissions reduction plans and national climate policy as inadequate to protect against the worst of climate change related impacts, including ocean-related harms.

What is missing from these domestic climate cases and from the singular focus on meeting the long-term temperature goal is that, while the ocean is indeed our planet's largest and most prolific carbon sink, it is also suffering extreme damage due to its continued pollution by anthropogenic GHG emissions.[1225] As was the topic of chapter 2 and will be summarized below, the ocean-related harms attributable to GHG emissions and climate change at large are so significant and intertwined with the subject matter of such litigation that it is impossible to separate one from the other. Domestic systemic climate litigation has been a rapidly growing and expanding phenomenon, especially since the entry into force of the Paris Agreement and has become an important contributor to the manner in which states approach their overall climate policy.[1226] This thesis therefore seeks to determine whether the inclusion of the law of the sea regime (which governs the protection of the ocean from pollution caused by GHG emissions) in these systemic climate cases would serve to drive increased ambition to reduce GHG emissions more rapidly and drastically. The focus on due diligence obligations is based on the finding that, regardless of which legal grounds underly domestic systemic climate litigation (human rights, constitutional questions, tort law, e.g.), courts in these cases are tasked with determining whether the state has met its duty of care to protect its citizens.[1227] The duty of care to protect citizens from the risk of harm from climate change is determined based on whether the measures the state has taken in developing its climate policy, along with its emissions reduction plans, are sufficiently diligent.[1228] Courts routinely look to the international climate change regime to guide them in determining states' due diligence obligations within the context of systemic climate change

[1225] Chapter 2, section 2.2 *The Science*.
[1226] IPCC, 2022, *IPCC AR6* (n 73) ch 13, section 13.4.2, 29–32.
[1227] Maxwell, Mead and van Berkel (n 35).
[1228] ibid 27.

litigation and there appears to be a new, more specific due diligence standard developing in domestic climate change litigation.

Beginning with chapter 2, this thesis first laid out the current scientific understanding of the ocean-climate nexus, focusing on the three most significant causes of harm: ocean acidification, warming and deoxygenation. Chapter 3 detailed the development of due diligence obligations in general international law and explored how national courts treat international law. Chapter 4 focused the analysis on the due diligence obligations found in the international climate change regime and how national courts treat such obligations in systemic climate change litigation. Finally, Chapter 5 focused the analysis on the due diligence obligations found in UNCLOS, and on how the hypothetical application of UNCLOS might have impacted the decision-making of national courts in the same domestic climate cases. Each of these chapters is summarized below in section 2. After summarising each chapter, section 3 turns to expanding on the conclusions made through the analysis in each chapter and then surfaces this thesis' contribution to legal scholarship. The final section of this chapter details outstanding gaps and the scope for future ongoing research in this area.

6.2 Summary of Analysis

In this section, each of the substantive chapters of this thesis are briefly summarized in order to remind the reader of the most significant information developed in each chapter toward answering the overall research question of this thesis.

Each chapter serves to answer a different portion of the overall research question of this thesis. The following table outlines which sub-questions are answered in each chapter.

Research Question	To what extent can individuals invoke due diligence obligations under both the UNFCCC and UNCLOS to hold their governments accountable in national courts for failing to adequately reduce GHG emissions, causing ocean-related climate harms?	
Chapter	**Title**	**Sub-question answered**
Chapter 2	Threats to the Ocean from Climate-Change and their Effects on Humans	To what extent can individuals invoke due diligence obligations under both the UNFCCC and UNCLOS to hold their governments accountable in national courts for **failing to adequately reduce GHG emissions, causing ocean-related climate harms**?
Chapter 3	Due Diligence and the Role of International Law in National Courts	To what extent can individuals invoke **due diligence obligations** under both the UNFCCC and UNCLOS to **hold their governments accountable in national courts** for failing to adequately reduce GHG emissions, causing ocean-related climate harms?
Chapter 4	Due Diligence in the International Climate	To what extent can individuals invoke **due diligence obligations under both the UNFCCC** and UNCLOS to **hold**

	Change Regime and Domestic Climate Change Litigation	**their governments accountable in national courts** for failing to adequately reduce GHG emissions, causing ocean-related climate harms?
Chapter 5	Due Diligence in the UN Convention on the Law of the Sea and its Potential Use in National Climate Change Litigation	To what extent can individuals invoke **due diligence obligations under** both the UNFCCC and **UNCLOS to hold their governments accountable in national courts** for failing to adequately reduce GHG emissions, causing ocean-related climate harms?

6.2.1 Problem Development – the Science

To establish the context within which the research question of this thesis resides, in chapter 2, the interconnection between the climate and the ocean that is alluded to in the UNFCCC's definition of "climate system" is explored in detail. Covering approximately 71% of the earth's surface,[1229] the importance of the ocean for human life can be measured in the goods and services we use (nearly 80% of the world's trade travels via the ocean)[1230] and the livelihoods it provides (millions of people rely on the ocean for their livelihoods and protection). [1231] The ocean is also vital for human life in that approximately 70% of the oxygen we breathe is produced by the marine environment,[1232] roughly three billion people worldwide rely on the ocean to provide their primary sources of protein,[1233] and it provides habitats for as many as 80% of earth's organisms.[1234] The ocean is therefore extraordinarily vital to human existence.

For purposes of this thesis, chapter 2 specifically explores the direct impact the ocean has on the world's climate, including that the ocean has absorbed over 90% of the excess energy (heat)[1235] and roughly a quarter of atmospheric CO_2 produced by humans burning fossil fuels.[1236] This absorption of heat and CO_2 protects us from the high levels that would have otherwise remained in the atmosphere, acting as a buffer against far more extreme climate change,[1237] but the cost of this absorption is high. The increased temperature and carbon content of the ocean translates into significant changes in the chemical, biological and

[1229] Pörtner and others (n 4) SMP-3.
[1230] Turley and Gattuso (n 106) 281.
[1231] ibid 218.
[1232] Sekerci and Petrovskii (n 105) 2347.
[1233] United Nations Report (n 104).
[1234] Turley and Gattuso (n 106) 218.
[1235] V Eyring and others, 'IPCC 2021: Human Influence on the Climate System' in V Masson-Delmotte and others (eds), *Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change* (Cambridge University Press 2021) 476.
[1236] Canadell and others (n 6) 714.
[1237] Galland, Harrould-Kolieb and Herr (n 114) 765; Baird, Simons and Stephens (n 116) 460.

physical make-up of the ocean, which impact virtually every area of the marine ecosystem.[1238] It also means that, while the ocean continues to absorb heat and carbon at roughly the same percentages as in the past, it is becoming saturated and its ability to continue to draw excess energy and CO_2 out of the atmosphere is declining.[1239] The three most significant impacts of the excess energy (heat) and carbon absorption by the ocean are discussed below and each has important and dangerous consequences for human life. These include impacts on global food systems, livelihoods, trade, and coastal protection but also potentially severe and unpredictable changes to the entire planetary climate system.[1240] Preventing the risk of these extreme dangers is crucial to human survival and is the underlying reason for the need for urgent action to curb GHG emissions as soon as possible.

The three most significant impacts of the ocean's historic and continued uptake of excess heat and CO_2 are ocean acidification, warming, and deoxygenation. Ocean acidification is the direct consequence of the ocean's absorption of anthropogenic CO_2 which dissolves in seawater and forms carbonic acid which ultimately means the ocean is becoming more acidic, depriving marine life of vital carbonate which is crucial to their existence.[1241] The effects of ocean acidification impact the entire marine ecosystem from the smallest microorganisms at the bottom of the food chain[1242] to impacts on internal organs, neurotransmission and sensory functions of large marine animals.[1243] Importantly, ocean acidification is not a consequence of increased global warming and climate change broadly, but a direct consequence of anthropogenic GHG emissions, specifically CO_2. This is a vital distinction for purposes of this thesis, as it has been argued that ocean acidification – not a consequence of higher atmospheric temperature or climate change itself – falls outside the scope of the international climate change regime which has as its purpose to regulate atmospheric temperature increase.[1244] It would, however, fall within the scope of UNCLOS and its definition of "pollution of the marine environment" as explained above.

[1238] Pörtner and others (n 4).
[1239] Canadell and others (n 6) 677; Cooley and others (n 114) 3; Oral (n 114) 10.
[1240] Brierley and Kingsford (n 123); Katz (n 124).
[1241] Canadell and others (n 6) 714–722.
[1242] Brierley and Kingsford (n 123) R606; Pörtner and others (n 4) SPM-8, APM-13; Canadell and others (n 6) 716–720.
[1243] Baird, Simons and Stephens (n 116) 462; Turley and Gattuso (n 106) 281.
[1244] Harrould-Kolieb (n 1060) 24–25.

Ocean warming is a direct consequence of the uptake of excess energy in the form of atmospheric heat from anthropogenic global warming.[1245] Temperature has a major impact on biochemical and physiological processes,[1246] including that increased temperature means organisms require increased oxygen,[1247] but the ocean's ability to hold oxygen also decreases with higher temperatures.[1248] As the ocean warms, it also expands because it loses density, causing an increase in volume (this is called 'thermal expansion'),[1249] resulting in sea level rise. Warming also contributes to sea level rise through increased ice melt (and subsequently slower regrowth of ice),[1250] which further contributes to changes in density and salinity of the ocean.[1251] Changes in density and salinity further add to the disruption of the ocean's ability to mix layers of water (increased stratification),[1252] ultimately slowing ocean circulation with potential impacts on the entire marine ecosystem.[1253] These processes further decrease the ocean's ability to absorb CO_2 from the atmosphere, further compounding climate change.[1254]

The third significant consequence of anthropogenic climate change, global warming and the release of GHGs into the atmosphere is ocean deoxygenation, or a loss of oxygen. As was mentioned above, warming impacts the ocean's ability to store oxygen and acidification impacts its ability to create oxygen by impacting the ecosystem's ability to function properly. The scientific understanding of each of these processes and their impacts is constantly evolving and deoxygenation is a relatively new focus, but what is known is that loss of oxygen impacts changes in physiology and behaviours within marine ecosystems including habitat depletion, predator/prey relationships, feeding, reproduction, and shifts in species, ultimately impacting entire ecosystems.[1255]

Having established the most wide-reaching and significant impacts of anthropogenic climate change, GHG emissions and global warming on the ocean and the interconnectedness of the ocean and the global climate system, chapter 2 concludes with an examination of the

[1245] Eyring and others (n 1235) 473–485.
[1246] Gruber (n 121) 1986; Hoegh-Guldberg and others (n 665) 1680.
[1247] Gruber (n 121) 1991.
[1248] ibid 1983.
[1249] Fox-Kemper and others (n 18) 1220.
[1250] Gruber (n 121) 1984; Brierley and Kingsford (n 123) R609.
[1251] Fox-Kemper and others (n 18) 1247–1273.
[1252] Wheeler (n 185).
[1253] Hoegh-Guldberg and others (n 665) 1672–1677; Pörtner and others (n 4) SPM-9-11.
[1254] Fox-Kemper and others (n 18) 1314.
[1255] Canadell and others (n 6) 714–722; Brierley and Kingsford (n 123) R607; Gruber (n 121) 1983–1989; Hoegh-Guldberg and others (n 665) 1678.

adequacy of state action to address the established harms. Given the severity of the risks of ocean-climate related dangers, the remaining emissions gap begs the question of how states can be influenced to do more to address and prevent these risks of harm. Chapter 2 thus develops the first important sub-part of the research question, whether and to what extent governments' failure to reduce GHG emissions causes ocean-related climate harms.

The subsequent chapters address the remaining components of the overall research question, beginning with chapter 3, which explores due diligence obligations in general international law and considers whether – and if so, how – national courts treat international law before moving to an investigation of regime-specific due diligence in systemic climate change litigation in chapters 4 and 5.

6.2.2 Due Diligence and the use of international law in national courts

Having established the context of the ocean-climate interlinkages and how anthropogenic GHG emissions contribute to the dangers surfaced in chapter 2, chapter 3 addresses two important components of the overall research question, including the content of due diligence obligations and whether international law can be invoked by national courts. Through an investigation of the history of due diligence obligations in general international law, chapter 3 developed six elements of due diligence that serve as a framework for the remainder of the thesis. These elements are that 1) due diligence is about risk of harm and the prevention of said harm; 2) it is context- specific and therefore requires flexibility; 3) it requires an objective standard of conduct; 4) it entails continuous obligations; 5) it assumes both actual and constructive knowledge on the part of the state regarding the risk of harm to be prevented; and 6) due diligence is grounded firmly in reasonableness.[1256]

In order to determine how national courts treat international law, the chapter includes a detailed exploration of national legal systems (monist, dualist, hybrid-systems) in theory and the implications thereof on the practice of national courts. This resulted in the determination that, in practice, national courts routinely turn to international law both in its binding application when appropriate, and as guidance to aid decision-making, particularly when courts are faced with questions of law whose roots are in international law, whether binding in the national legal system or not. This analysis therefore clarified that international law can indeed be invoked in domestic legal settings, thus beginning to flesh out the next sub-part of

[1256] Chapter 3, section 3.1.1 *3.1.1 What is Due Diligence and What are States' Due Diligence Obligations under International Law?*.

the research question on the extent to which individuals can invoke *international due diligence obligations to hold their governments accountable in national court*s.

The subsequent two chapters analysed the six elements of due diligence established under general international law within the international climate change regime and the law of the sea regime, respectively. Each of the chapters also took forward the generalized understanding that national courts can – and do – look to international law. First, under the international climate change regime, chapter 4 explored how the selected case law treats the international climate change regime in domestic systemic climate change litigation on the basis of the six due diligence elements. The purpose of chapter 4 is to engage in a deep exploration of how individuals already invoke states' due diligence obligations under the international climate change regime in national courts, in order to answer the next portion of the research question.

This analysis demonstrated that each of the six elements of due diligence (risk, flexibility, objective standard of care, continuous, knowledge, and reasonableness) is well articulated within the international climate change regime. However, as with due diligence obligations in general international law, the due diligence obligations (and the elements within them) are not articulated in a straight-forward or simple manner in the international climate change regime. Instead, they are found across multiple articles and sections of the regime, often overlapping or building on each other, resulting in a complex and diffuse climate regime that relies heavily on due diligence as its driving force. The international climate change regime, and the Paris Agreement in particular, focuses on the achievement of the long-term temperature goal – holding the global temperature increase as close to 1.5°C as possible by reaching net carbon neutrality by mid-century – which is dependent on states' ambition and progression toward this goal, all important components of the elements of due diligence within the regime.[1257]

Once it was established that each of the elements of due diligence is indeed well defined, albeit in a diffuse rather than straight-forward manner, the analysis turned to how the national courts in the selected case law apply the elements of due diligence to systemic climate change litigation in their decision-making. The case law was selected based on the

[1257] Chapter 4, section 4.1.2 *The Elements of Due Diligence in the International Climate Change Regime*.

following four criteria. First, the cases selected were all systemic climate cases with at least one court decision, meaning they were cases where civil society brought a case against their own government challenging the overall climate policy as being insufficient to adequately protect against the risk of harm from climate change. Second, each case had to include mention by the court of the ocean-related impacts of climate change and GHG emissions, such as sea level rise, ocean acidification, or the like. The reason for this criterion is that the same list of cases is used throughout this and the next chapter considering due diligence obligations under the law of the sea regime. Third, the court had to include in its decision-making the consideration of whether the state had met its obligations under the international climate change regime, bringing international law into the domestic legal arena (regardless of its bindingness in the jurisdiction). Finally, the court had to base its decision-making regarding the sufficiency of the measures taken by the state toward meeting its duty of care on due diligence.

The analysis of the selected case law through the lens of the six elements of due diligence revealed that domestic courts do look to a state's due diligence in determining whether the state acted appropriately to protect its citizens from the risk of harm of climate change. The results of the courts' analyses differ along some elements more so than others. There is no disagreement about the risk of harm and the state's knowledge of such risks, for example. The element of flexibility provides the most constraint on courts' ability to find a state has acted outside the bounds of its discretion. Here courts consistently find that, even if the state's overall climate policy falls short of sufficiency to meet the long-term temperature goal, as long as states have acted to address climate change and reduce GHG emissions, they have likely acted within their discretion. While courts' application of the objective standard of care element varies, there is consistency in their reference to the long-term temperature goal articulated in the Paris Agreement being the appropriate goal to strive towards. Similarly, the continuous nature of due diligence obligations showed consistent application by courts, albeit with some mixed results. Some courts found a lack of due diligence on the part of the state along these lines (mostly for lack of specificity in long-term plans toward meeting net-zero by 2050). On the final element of reasonableness, only one court among the surveyed cases, the *Thomson* Court in New Zealand, found that the State had acted reasonably within the confines of the international climate change regime despite the overall climate policy likely being insufficient to meet the long-term temperature goal.

Ultimately, this chapter found a robust understanding by national courts of ocean-related dangers of GHG emissions and climate change. This chapter surfaced the diffuse nature of due diligence obligations within the international climate change regime and found that, while courts do rely on and refer to them, the international climate change regime remains a relatively vague source of legal standards as it pertains to due diligence obligations to protect specifically against the ocean-related impacts of GHG emissions. Chapter 4 thus addressed the next sub-part of the research question: the extent to which individuals can *invoke due diligence obligations under the UNFCCC to hold their governments accountable in national courts* for failing to adequately reduce GHG emissions, causing ocean-climate related harm.

The final substantive chapter, chapter 5, follows the same structure as the previous one, first investigating how each of the six elements of due diligence obligations (risk, flexibility, objective standard of care, continuous, knowledge and reasonableness) is articulated within the law of the sea regime. Not surprisingly, given the law of the sea regime's influence in developing due diligence obligations in general international law, each of the six elements is well articulated within UNCLOS. In contrast to the international climate change regime, the due diligence obligations in question are all articulated in one section of the law of the sea regime. Part XII of UNCLOS, which governs the protection and preservation of the marine environment is the source of each of the six elements of due diligence obligations as it pertains to climate change and anthropogenic GHG emissions, which fall within the definition of "pollution of the marine environment".

Having established each of the six elements of due diligence within UNCLOS, chapter 5 turns to an analysis of the selected national climate change case law in order to answer the final sub-part of the overall research question. Chapter 5 found that the inclusion of due diligence obligations under UNCLOS alongside those under the international climate change regime, could serve an important function within national climate change litigation to bring the ocean into central focus for purposes of mitigating against the risk of the most severe harms caused by anthropogenic GHG emissions. The previous chapter found that even the most stringent national courts still allow for significant levels of GHG emissions in the near- and medium-term as states progress toward achieving the long-term temperature goal and net carbon neutrality by mid-century. This fails to consider the already significant dire impacts on the marine environment that historic and continued GHG emissions, even in the short-term,

have. Therefore, it appears that the addition of UNCLOS to domestic systemic climate change litigation could significantly shift courts' focus, giving them a more robust legal standard to require more stringent emissions reductions in the near-term.[1258]

Overall, the analysis in chapter 5, building on the previous chapters, surfaced that the inclusion of UNCLOS in domestic systemic climate change litigation would, at a minimum, serve a focus-shifting function to bring the ocean into a more prominent position in the court's decision-making. The further potential to strengthen the scope of courts' decision-making, particularly as it pertains to curbing otherwise vast state discretion, may have an impact, especially on the shorter-term plans leading up to 2030, rather than the long-term focus under the international climate change regime. This could prove important in relation to ocean acidification, as this seems to be an area that falls outside the atmospheric temperature focus of the international climate change regime. The remaining portion of the research question is therefore addressed through this analysis, resulting in a finding that, were individuals to *invoke a state's due diligence obligations under* the UNFCCC and *UNCLOS in national court cases against their own government* for failing to adequately reduce GHG emissions, their legal arguments could be strengthened.

The brief summary of the substantive chapters of this thesis serves to surface that each chapter considers a sub-part of the overall research question. The following sections of this concluding chapter detail the findings of this thesis, establish the contribution of this thesis to the legal scholarship on this topic, along with addressing some outstanding questions before outlining the remaining gaps and open questions for future research.

6.3 Summary of Findings

Given the growing and ever-more-sophisticated scientific understanding of the inherent interconnectedness of the ocean and the earth's climate system, much of which provides the factual context underlying the international climate change regime, the urgent need for ambitious action is without question. States are best positioned to enact and regulate the measures needed to adequately address the impending significant risks associated with anthropogenic GHG emissions and resulting climate change but have so far failed to collectively meet this challenge.[1259] It is well established that civil society can, and does, bring

[1258]Chapter 5, section 5.3 .
[1259] UNEP (n 8); Lecocq and others (n 9).

climate change litigation against their own government for the failure to adequately reduce GHG emissions, as evidenced by the rapid growth in the number of cases seen around the world in the recent past.[1260] Even the IPCC has acknowledged in its most recent report, AR6, that climate change litigation is beginning to have an impact on state behaviours.[1261]

Systemic climate change litigation, while a relatively new phenomenon, is not altogether unique. For this thesis, many such cases were surveyed and there are enough domestic systemic climate change cases across the globe to enable this thesis to focus specifically on cases that meet the selection criteria outlined above. What is new, or rather non-existent at this point in time, is the addition of law of the sea-based arguments in this type of case. Further, it has been determined that, regardless of the underlying grounds relied on by the plaintiffs in national systemic climate change litigation, domestic courts tend to apply a due diligence lens to their determinations on the sufficiency of states' measures toward meeting the requisite duty of care.[1262] Cases have mixed results along the lines of whether courts require states to take more stringent emissions measures with some requiring minimum reductions in the near-term[1263] and others requiring more specificity on how long-term goals are to be met.[1264] Each of the systemic climate change cases surveyed for this thesis included in the courts' decision a discussion of – and reliance on – the state's international due diligence obligations under the international climate change regime.

The main question of this thesis is therefore to what extent civil society can invoke states' due diligence obligations under the law of the sea regime, in addition to the international climate change regime, in order to hold states accountable for inadequate GHG emissions reductions causing ocean-climate related harms. As the analysis in chapter 5 demonstrated, it is feasible that the addition of UNCLOS to national systemic climate change litigation may provide for more stringent outcomes in the form of courts requiring more ambitious GHG emissions reductions in the near-term. The primary result of the analysis in chapter 5 was that, at a minimum, the inclusion of UNCLOS in this type of litigation would serve to shift the

[1260] J Setzer and M Bangalore, 'Regulating Climate Change in the Courts', *Trends in Climate Change Legislation* (Edward Elgar Publishing, Incorporated 2017); Setzer and Vanhala (n 24); K Bouwer and J Setzer, 'New Trends in Climate Litigation: What Works?', *New Trends in International Climate and Environmental Advocacy Workshop* (2020); Savaresi and Setzer (n 21); Setzer and Higham (n 13).
[1261] Dubash and others (n 10) 13-29-13–32.
[1262] Maxwell, Mead and van Berkel (n 35).
[1263] See for example *Urgenda District Court (2015)* (n 759); *Urgenda Appellate Decision (2018)* (n 767); *Urgenda Supreme Court (2019)* (n 767); *Klimaatzaak (2021)* (n 767).
[1264] See for example *Neubauer (2021)* (n 767); *Friends of the Irish Environment (2020)* (n 792).

court's decision-making to focus more pointedly on the ocean-related harms from historic and continued GHG emissions.

Each of the cases included in the analysis in this thesis had as a selection criterion that the court at least mentioned the ocean-related harms from GHG emissions and climate change. However, while each court mentioned these dangers, none of the courts focused their decision-making on them. Instead, the focus of the courts' decision-making was solely on the atmospheric temperature goals articulated within the international climate change regime and the resulting remaining carbon budget. In other words, ocean-related harms, including particularly ocean acidification, warming and deoxygenation, were consistently mentioned in the (undisputed) context-setting underlying facts of climate change and GHG emissions, but did not figure into the courts' legal determination whether the state had acted with due diligence in developing its GHG reduction measures. The addition of UNCLOS in systemic climate change cases would likely serve, at a minimum, to push consideration of the ocean-related dangers into the courts' discussion of whether states meet due diligence obligations. At best, courts could feasibly rely on the stronger harm prevention language in UNCLOS to require states to be far more ambitious in the near-term, pre-2030 plans to reduce GHG emissions. The result of this would be a far higher likelihood of closing the emissions gap that continues to plague global progress toward mitigating against the worst of climate change, and a greater likelihood of preventing dangerous tipping points and irreversible climate change.

In other words, invoking due diligence obligations under both the UNFCCC and UNCLOS could strengthen individuals' legal arguments in national court cases against governments for inadequately reducing GHG emissions, thereby causing ocean-climate harms.

Having answered the overall research question of this thesis, the following section outlines the contribution this thesis makes to the legal scholarship on climate change litigation and the ocean-climate nexus of GHG emissions that are the subject of domestic systemic climate change litigation.

6.4 Contribution to Legal Scholarship

Having detailed the findings of this thesis and outlined the overall answer to the research question, it remains to highlight the contribution of this thesis to the legal scholarship on this topic. The legal scholarship on systemic climate change litigation continues to grow as rapidly

as this field of law. Finding ways to contribute meaningfully to this legal scholarship is becoming more nuanced, as is this area of legal expertise.

Legal practitioners Maxwell, Mead and van Berkel recently surveyed a wide range of systemic climate change litigation and found that, despite domestic judges' lamenting the lack of a consistent legal standard, there appears to be a new, more specific standard emerging from the climate jurisprudence.[1265] This exploration and analysis of national systemic climate litigation surfaced that, regardless of the underlying legal grounds of the case (constitutional law, human rights, tort claims), courts were focused on the question of state duty of care. Each of the court decision that were surveyed for this thesis made duty of care decisions along due diligence lines of reasoning. The first contribution of this thesis to the scholarship, therefore, is the development of the specific, nuanced framework of six elements of due diligence that can be applied in these cases. Due diligence is notoriously vague and frequently described not in specific terms, but in due diligence slang as was explored in detail in chapter 3 (and subsequently in chapters 4 and 5) of this thesis.

The development of the six elements of due diligence (risk, flexibility, objective standard of care, continuous, knowledge and reasonableness) provides a guide that can be applied to the vague and highly context-specific principle of due diligence to both pinpoint the due diligence obligations within a legal regime such as the UNFCCC or UNCLOS, and to measure the adequacy of state measures to meet the requisite duty of due care. While the principle of due diligence is by no means new, the framework of the six elements teases out from the murky vagueness of due diligence slang a scaffolding upon which legal reasoning can be built when national courts are faced with determining the adequacy of state action in systemic climate change litigation.

The second, and likely more significant, contribution this thesis makes to the legal scholarship on climate change litigation is the addition of UNCLOS to domestic climate change litigation. The majority of the academic literature in this field considers the possibility of climate change-related claims being made under UNCLOS, and focuses on international judicial fora.[1266] There has been at least one exploration[1267] of how the ocean-connection can be

[1265] Maxwell, Mead and van Berkel (n 35).
[1266] See, for example, Boyle, 'Litigating Climate Change under Part XII of the LOSC' (n 30); Klein (n 30); M Doelle, 'Climate Change and the Use of the Dispute Settlement Regime of the Law of the Sea Convention' (2006) 37 Ocean Development and International Law 319.
[1267] Johansen (n 28).

highlighted within a climate case, which focuses on a case brought against the Norwegian government challenging the approval of new permits for oil exploration in the Barents Sea.[1268] In her article, Johansen surfaces that many climate change cases within both national and international judicial fora have an ocean-connection and focuses on the hypothetical areas within the Norwegian case where UNCLOS may have relevance.[1269] She stops short, however, of exploring how national courts might apply the law of the sea in their decision-making. Instead, she lays out as the main argument for excluding UNCLOS-related arguments in climate litigation that its provisions are vague and ambiguous.[1270]

This thesis therefore provides a significant contribution to the climate change litigation scholarship by taking the ocean-connection Johansen describes as an 'untapped resource' in climate change litigation[1271] and follows the legal reasoning to its next logical conclusion. The addition of due diligence obligations under UNCLOS as guiding principles would allow a court to look to UNCLOS regardless of its status as binding or not within the legal jurisdiction. Rather than requiring a national court to base its findings on legal arguments grounded in international law, this thesis demonstrates that including due diligence obligations as the overarching lens of the legal reasoning allows courts to look to international law purely as guidance rather than as binding precedent. The vagueness and ambiguities of the UNCLOS provisions that Johansen refers to are brought into focus through the six elements of due diligence established in chapter 3 of this thesis, allowing courts to apply robust objective standards to their reasoning.

Johansen points out in her analysis that one of the several reasons why the law of the sea has never found its way into domestic climate change litigation is that only states are parties to UNCLOS, and therefore it cannot be relied on as legal grounds in a national court against a state.[1272] Focusing on the due diligence obligations within UNCLOS, however, allows plaintiffs and courts to bring international law into domestic settings as guidance, just as the international climate change regime has been applied in domestic systemic litigation we have seen at least since the famous first *Urgenda* decision.[1273] In other words, this thesis provides

[1268] *Greenpeace Nordic Association v Ministry of Petroleum and Energy* (n 1106).
[1269] Johansen (n 28) 152–156.
[1270] ibid 168.
[1271] ibid 169.
[1272] ibid 151. There may be exceptions to this in cases involving individuals who are crew members on board a ship in a dispute regarding an UNCLOS-governed measures or cases involving piracy, but these fall outside the scope of this discussion.
[1273] *Urgenda District Court (2015)* (n 759).

a potential pathway to including the law of the sea in domestic climate change litigation where this has previously been lacking.

As this potential pathway is wholly predicated on a speculative analysis of the hypothetical inclusion of UNCLOS in past existing climate change litigation, there are remaining gaps in the analysis and significant opportunities for further research. These are explored in the following section.

6.5 Further research opportunities

While this thesis makes important contributions to the legal scholarship, further gaps and the need for future research remain. These include the diversity of jurisdictional specificity and whether the state in question would have to be a Party to UNCLOS for a court to rely on its provisions – even as guidance – in a domestic climate case. Other issues pertain to the international climate change regime's perspective on oceans purely as carbon sinks and the question of the practical application of the hypothetical inclusion of UNCLOS in domestic systemic climate change litigation. This section outlines these remaining gaps and opportunities for further research.

Beginning with the jurisdictional diversity, there is of course a wide range of national variation in how domestic legal systems incorporate international law, as was explored in detail in chapter 3,[1274] which might impact the application of UNCLOS within domestic climate change litigation.[1275] However, as the analysis in chapter 3 and subsequently in chapter 4 revealed, courts routinely look to international law regardless of its status within the national legal system. The *Urgenda* District Court referred to this as a "reflex effect", finding that the Court could look to the international law underlying the domestic legal questions at issue, especially when the national law and the state's corresponding obligations are directly based on that international law.[1276] Beyond this, however, it is necessary to consider whether the international law in question – here, UNCLOS – is directly relevant to the state. This issue has not been raised in systemic climate change litigation as it pertains to the international climate change regime because that regime, and especially the Paris Agreement, has near-universal membership among the world's governments.[1277] The law of the sea regime has fewer

[1274] Chapter 3, section 3.2 *3.2 International Due Diligence Obligations in National* Courts.
[1275] Johansen (n 28) 151.
[1276] *Urgenda District Court (2015)* (n 759).
[1277] 'United Nations Treaty Collection: Status of Treaty Ratification (UNFCCC)' <https://treaties.un.org/doc/Publication/MTDSG/Volume%20II/Chapter%20XXVII/XXVII-7.en.pdf>;

member states (although a significant majority of states are members, there are some notable exceptions),[1278] so it is worth considering how a court might address a challenge to its applicability where the state is not a Party. UNCLOS has the benefit of being widely regarded as customary law, even prior to its entry into force, and, through its treatment as customary by international judicial fora as well as non-Parties, the customary character likely extends to Part XII of UNCLOS.[1279] The *South China Sea* Tribunal appears to have relied in its analysis of UNCLOS obligations on the premise that customary international law informs at least Article 192.[1280] The comprehensive nature of Part XII points to its customary law status as well, as it relates to the protection and preservation of the entirety of the marine environment, regardless of sector, maritime zone, national jurisdiction or source of pollution.[1281] The contribution of Part XII to the understanding of due diligence obligations in general international law further demonstrates its customary status.[1282]

Whether Part XII of UNCLOS is or is not considered customary international law, and whether the state in question is or is not a Party to UNCLOS may not be of significant weight, however. While this would, of course, underscore the legitimacy of courts' (and plaintiffs') reference to UNCLOS, it does not impact the ability of courts to rely on UNCLOS as general guidance to assist in the determination of the diligence of state measures to protect against ocean-related harms in the context of anthropogenic GHG emissions.[1283] Governments are likely to argue that UNCLOS is inadmissible for a variety of reasons (for example, only states are Parties, international law cannot be relied on in national court, they may not be a Party, etc.) and these may be found by the court to be valid arguments. This would, however, not preclude a court from nonetheless considering UNCLOS as general guidance in the same way courts employ transjudicialism and consideration of other sources of (international) law that are not binding precedent but can inform and guide the court in its decision-making. It still

'United Nations Treaty Collection: Status of Treaty Ratification (Paris Agreement)' <https://treaties.un.org/doc/Publication/MTDSG/Volume%20II/Chapter%20XXVII/XXVII-7-d.en.pdf> accessed 2 June 2022.

[1278] 'United Nations Treaty Collection: Status of Treaty Ratification (UNCLOS)' <https://treaties.un.org/doc/Publication/MTDSG/Volume%20II/Chapter%20XXI/XXI-6.en.pdf>.

[1279] Doelle (n 1266) 327; Boyle, 'Protecting the Marine Environment from Climate Change' (n 30) 81–82; Guilloux (n 267) 54.

[1280] *South China Sea Arbitration* (n 293) para 942; Klein (n 30) n 57.

[1281] Center for Oceans Law and Policy, University of Virginia (n 962) Part XII Protection and Preservation of the Marine Environment, XII.20, 18.

[1282] See n 11566.

[1283] Harrison, *Saving the Oceans Through Law: The International Legal Framework for the Protection of the Marine Environment* (n 981) 35.

remains that every jurisdiction, every court and every case is unique, dependent on the specific underlying circumstances and legal questions at issue, which leads to the further research needed as discussed blow.

Returning to the issue that the international climate change regime views oceans as carbon sinks, this has been mentioned throughout this thesis as a challenge because of the consequent lack of consideration of the ocean within that regime. This singular treatment by the international climate regime of oceans as a carbon sink with the ability to aid in mitigating atmospheric carbon concentrations has been described as a danger because it excludes the consideration of the ocean as an environment harmed by anthropogenic emissions.[1284] The argument here is that the continued treatment by the international climate regime of oceans solely as a climate mitigator ignores the ocean's potential to significantly impact and speed the risk of dangerous consequences of anthropogenic GHG emissions and climate change more broadly, including the passing of tipping points.[1285] This focus, however, provides an important argument for the need to include UNCLOS in this type of climate litigation. While it is not a focus of domestic courts in systemic climate change litigation, the UNFCCC does include that states 'should take action to conserve and enhance' such sinks.[1286] While this is not a binding obligation ('should' rather than 'shall'), it could provide courts with another basis on which to base reference to and reliance on Part XII of UNCLOS as guidance on the level of diligence required by states in mitigating against the risk of harm from GHG emissions.

Each of these remaining gaps lead to the opportunity for further research. Specifically, further empirical research that includes perspectives from legal practitioners and domestic judges who consider systemic climate change litigation in practice is needed. Such research must include the question of how, in practical terms, plaintiffs could include UNCLOS within their pleadings and arguments. It must also include the question of how, regardless of pleadings, domestic courts could – and would – reference, rely on, and apply UNCLOS to the legal questions raised in domestic systemic climate change litigation. Could the combination of legal arguments and states' due diligence obligations under UNFCCC and UNCLOS be the basis for a court requiring a state to update its near-term emissions reductions plans as was suggested in chapter 5? These open questions provide ample opportunity for further

[1284] Popattanachai and Kirk (n 1039) 43.
[1285] Guilloux (n 267) 64–65.
[1286] *UNFCCC* (n 14) Article 5(1).

research that could serve to bridge the divide between academic research and practical application of the law in order to address one of the world's most pressing issues.

Bibliography

Primary Sources

Cases, arbitral decisions and other judicial orders

Alabama Claims Arbitration (United States of America v Great Britain) [1872] 29 Rep Int Arbitr Awards RIAA 125

Asian Agricultural Products Ltd v Republic of Sri Lanka (Final Award) [1990] Case No ARB873 (International Centre for the Settlement of Investment Disputes [ICSID])

Baker v Canada (Minister of Citizenship and Immigration) [1999] 2 SCR 817 (Supreme Court of Canada)

Canadian Council for Refugees v Canada, 2007 Fed CC LEXIS 1550

Case concerning application of the Convention on the Prevention and Punishment of the Crime of genocide (Bosnia and Herzegovina v Serbia and Montenegro): Judgment of 26 February 2007 (International Court of Justice (ICJ))

Certain Activities Carried Out by Nicaragua in the Border Area (Costa Rica v Nicaragua), and Construction of a Road in Costa Rica Along the San Juan River (Nicaragua v Costa Rica), Judgment, ICJ Reports 2015, p 665

Corfu Channel Case (Merits) [1949] ICJ Rep 1949

Frederick Wipperman v. United States of Venezuala (10 July 1890) United States and Venezuela Commission, [1899] Opinions Delivered by the Commissioners in the Principle Cases

Friends of the Irish Environment CLG v The Government of Ireland, Ireland and the Attorney General [2020] The Supreme Court Appeal No: 205/19

Greenpeace Nordic Association v Ministry of Petroleum and Energy [2020] Supreme Court of Norway HR-2020-2472-P (case no. 20-050052SIV-HRET)

Grootboom v Oostenberg Municipality [2000] 3 BCLR 277 (High Court of South Africa)

HCJ 7957/04 Mara' be v Prime Minister of Israel, [2006] 45 ILM 202

In the Matter of the South China Sea Arbitration (The Republic of Philippines v The People's Republic of China), Award [2016] Permanent Court of Arbitration 2013-19

Legality of the Use by a State of Nuclear Weapons in Armed Conflict, Advisory Opinion ICJ Rep 1996

Leghari v Federation of Pakistan [2015] WP No 25501 (Lahore High Court Green Bench Pakistan)

Minister of State for Immigration and Ethnic Affairs v Ah Hin Teoh [1995] 128 ALR 353 (High Court of Australia)

Neubauer and Others v Germany [2021] German Federal Constitutional Court 1 BvR 2656/18, 1 BvR 96/20, 1 BvR 78/20, 1 BvR 288/20, 1 BvR 96/20, 1 BvR 78/20

Notre Affaire à Tous v The Republic of France [2021] Paris Administrative Court N° 1904967, 1904968, 1904972 1904976/4-1, 44-008 60-04-02-02 54-07–03 R

Petition to the Inter-American Commission on Human Rights Seeking Relief from Violation of the Rights of Arctic Athabaskan Peoples Resulting from Rapid Arctic Warming and Melting Caused by Emissions of Black Carbon by Canada [2013] (Submitted by the Arctic Athabaskan Council)

Petition to the Inter-American Commission on Human Rights Seeking Relief from Violations Resulting from Global Warming Caused by Acts and Omissions of the United States (2005) (Submitted by Sheila Watt-Cloutier)

Pulp Mills on the River Uruguay (Argentina v Uruguay) [2010] ICJ Rep 14

Re Jaballah, [2006] FCJ No 1706 (Canadian Federal Court, Toronto, Ontario)

Responsibilities and Obligations of States Sponsoring Persons and Entities with Respect to Activities in the Area (Advisory Opinion) [2011] ITLOS Rep 2011 Case No 17 (Seabed Disputes Chamber of the International Tribunal for the Law of the Sea)

State of the Netherlands (Ministry of Infrastructure and the Environment) v Urgenda Foundation [2018] The Hague Court of Appeal C/09/456689/ HA ZA 13-1396, ECLINLRBDHA20157196 Off Engl Transl

State of the Netherlands v Stichting Urgenda [2019] Supreme Court of The Netherlands 19/00135, ECLINLHR20192007 Off Engl Transl

The City of New York v Exxon Mobil Corporation and others [2021] United States District Court Southern District of New York 21-CV-4807 (VEC)

The People of the State of California (City of Oakland) v BP PLC and others [2017] Superior Court of the State of California RG17875889

The People of the State of California (San Francisco) v BP PLC and others [2018] United States District Court Northern District of California 3:17-cv-06012-EMC

Thomson v Minister for Climate Change Issues [2017] HC, New Zealand CIV 2015-485-919, 2017 NZHC 733

Trail Smelter [1941] 3 RIAA 1938

United States v Arjona, [1887] 120 US 479

Urgenda Foundation v The State of the Netherlands (Ministry of Infrastructure and Environment) [2015] C/09/456689/HA ZA 13-1396 (English Translation) (District Court, The Hague)

Vishaka v State of Rajasthan [1997] 1997 AIR 3011 (Supreme Court of India)

VZW Klimaatzaak v Kingdom of Belgium and Others [2021] French-speaking Court of First Instance of Brussels 2015/4585/A, 2021 JUG-JGC N° 167

Zaoui v Attorney-General (No 2), [2006] 1 NZLR 289 (Supreme Court of New Zealand)

Conventions, Treaties, Protocols, Agreements and related Decisions

Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal (22 March 1989) 1637 U.N.T.S. 57

Convention on Fishing and Conservation of the Living Resources of the High Seas (1958), entered into force 20 March 1966. United Nations Treaty Series, Vol. 559

Convention on the Continental Shelf (1958), entered into force 10 June 1964. United Nations Treaty Series, Vol. 499

Convention on the High Seas (1958), entered into force on 30 September 1962. United Nations Treaty Series Vol. 450

Convention on the Law of Non-Navigational Uses of International Watercourses (1997), entered into force on 17 August 2014. United Nations Treaty Series Vol. 2999

Convention on the Prevention of Marine Pollution by Dumping Wastes and Other Matter (1972), entered into force on 30 August 1975. United Nations Treaty Series Vol. 1046

Convention on the Protection and Use of Transboundary Watercourses and International Lakes (1992), entered into force on 6 October 1996. United Nations Treaty Service Vol. 1936

Convention on the Regulation of Antarctic Mineral Resource Activities (2 June 1988, not yet in effect) SATCM IV-12-10

Convention on the Territorial Sea and the Contiguous Zone (1958), entered into force 10 September 1964. United Nations Treaty Series, Vol. 516

Decision 1/CP21, Adoption of the Paris Agreement (2015) UN Doc FCCC/CP/2015/10/Add1

Decision 6/CMA.1 Common Time Frames for Nationally Determined Contributions Referred to in Article 4, Paragraph 10, of the Paris Agreement, UN Doc FCCC/PA/CMA/2018/3/Add.1 (Advance Version)

Decision 18/CMA.1 Modalities, Procedures and Guidelines for the Transparency Framework for Action and Support Referred to in Article 13 of the Paris Agreement, UN Doc FCCC/PA/CMA/2018/3/Add.2

Decision -/CMA.3 Common Time Frames for Nationally Determined Contributions Referred to in Article 4, Paragraph 10, of the Paris Agreement, Advance Unedited Version

Doha Amendment to the Kyoto Protocol, UN Doc. FCCC/KP/CMP/2021/13/Add. 1, Decision 1/CMP.8, 8 December 2012 (Entered into Force 31 December 2020)

Glasgow Climate Pact - Draft Decision -/CP26, UN Doc FCCC/CP/2021/L13 (13 November 2021)

Kyoto Protocol to the United Nations Framework Convention on Climate Change (adopted 11 December 1997), entered into force 16 February 2005, 2303 UNTS 162

OHCHR | Protocol II Additional to the Geneva Conventions of 12 August 1949, and Relating to the Protection of Victims of Non-International Armed Conflict (Protocol II) (1977), entered into force 7 December 1978

'Optional Protocol of Signature Concerning the Compulsory Settlement of Disputes' (1958), entered into Force on 30 September 1962. United Nations Treaty Series, Vol. 450

Paris Agreement, adopted by UNFCCC Decision 1/CP21, Adoption of the Paris Agreement, UN Doc FCCC/CP/2015/10/Add1, (12 December 2015), entered into force 4 November 2016

United Nations Convention on the Law of the Sea (Montego Bay, 10 Dec 1982) 1833 UNTS 3, 21 ILM 1261 (1982), entered into force 16 Nov 1994 (UNCLOS)

United Nations Framework Convention on Climate Change (UNFCCC) (New York, 9 May 1992) 1771 UNTS 107, 31 ILM 849 (1992), entered into force 21 March 1994

Vienna Convention for the Protection of the Ozone Layer (22 March 1985) 1513 U.N.T.S. 293

Vienna Convention on the Law of Treaties (adopted 23 May 1969, entered into force 27 January 1980) 1155 UNTS 331

Reports and Resolutions

IPCC, Canadell JG and others, 'IPCC 2021: Global Carbon and Other Biogeochemical Cycles and Feedbacks' in V Masson-Delmotte and others (eds), Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change (Cambridge University Press 2021)

——, Chen D and others, 'IPCC 2021: Framing, Context, and Methods' in V Masson-Delmotte and others (eds), Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change (Cambridge University Press 2021)

——, 'Climate Change 2007: Synthesis Report. Contribution of Working Groups I, II and III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change'

——, Cooley S and others, 'IPCC 2022: Ocean and Coastal Ecosystems and Their Services' in HO Pörtner and others (eds), Climate Change 2022: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change (Cambridge University Press 2022)

——, Dhakal S and others, 'IPCC 2022: Emissions Trends and Drivers' in PR Shukla and others (eds), Climate Change 2022: Mitigation of Climate Change. Contribution of Working Group III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change (Cambridge University Press 2022)

——, Dubash N and others, 'IPCC 2022: National and Sub-National Policies and Institutions' in PR Shukla and others (eds), Climate Change 2022: Mitigation of Climate Change, Working Group III contribution to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change (Cambridge University Press 2022)

——, Eyring V and others, ‘IPCC 2021: Human Influence on the Climate System’ in V Masson-Delmotte and others (eds), Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change (Cambridge University Press 2021)

——, Fox-Kemper B and others, ‘IPCC 2021: Ocean, Cryosphere and Sea Level Change’ in V Masson-Delmotte and others (eds), Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change (Cambridge University Press 2021)

——, Glavovic B and others, ‘IPCC 2022: Cross-Chapter Paper 2: Cities and Settlements by the Sea’ in HO Pörtner and others (eds), Climate Change 2022: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change (Cambridge University Press 2021)

——, Gulev SK and others, ‘IPCC 2021: Changing State of the Climate System’ in V Masson-Delmotte and others (eds), Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change (Cambridge University Press 2021)

——, Hoegh-Guldberg O and others, ‘Special Report: Global Warming of 1.5°C - Chapter 3: Impacts of 1.5°C of Global Warming on Natural and Human Systems’, IPCC 2018: Global Warming of 1.5°C (Cambridge University Press 2018)

——, Hoegh-Guldberg O and others, ‘The Ocean’ in VR Barros and others (eds), Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part B: Regional Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change (Cambridge University Press 2014)

——, Lecocq F and others, ‘IPCC 2022: Mitigation and Development Pathways in the Near- to Mid-Term’ in PR Shukla and others (eds) (Cambridge University Press 2022)

——, Lee J-Y and others, ‘IPCC 2021: Future Global Climate: Scenario-Based Projections and NearTerm Information’ in V Masson-Delmotte and others (eds), Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change (Cambridge University Press 2021)

——, Masson-Delmotte V and others (eds) ‘IPCC 2018: Global Warming of 1.5°C. An IPCC Special Report on the Impacts of Global Warming of 1.5°C above Pre-Industrial Levels and Related Global Greenhouse Gas Emission Pathways, in the Context of Strengthening the Global Response to the Threat of Climate Change, Sustainable Development, and Efforts to Eradicate Poverty’ (Cambridge University Press 2018)

——, Masson-Delmotte V and others (eds), ‘IPCC, 2018: Summary for Policymakers. In: Global Warming of 1.5°C. An IPCC Special Report on the Impacts of Global Warming of 1.5°C above Pre-Industrial Levels and Related Global Greenhouse Gas Emission Pathways, in the Context of Strengthening the Global Response to the Threat of Climate Change, Sustainable Development, and Efforts to Eradicate Poverty’

——, Masson-Delmotte V and others (eds) ‘Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change’ (Cambridge University Press 2021)

——, Masson-Delmotte V and others (eds), IPCC, 2021: Summary for Policymakers. In: Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change (Cambridge University Press 2021)

——, Patt A and others, ‘IPCC 2022: International Cooperation’ in PR Shukla and others (eds), Climate Change 2022: Mitigation of Climate Change. Contribution of Working Group III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change (Cambridge University Press 2022)

——, Pörtner HO and others (eds) ‘Climate Change 2022: Impacts, Adaptation, and Vulnerability. Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change’ (Cambridge University Press 2022)

——, Pörtner H-O and others (eds), ‘IPCC Special Report on the Ocean and Cryosphere in a Changing Climate: Summary for Policymakers’ (Cambridge University Press 2019)

——, Riahi K and others, ‘IPCC 2022: Mitigation Pathways Compatible with Long-Term Goals’ in PR Shukla and others (eds), Climate Change 2022: Mitigation of Climate Change. Contribution of Working Group III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change (Cambridge University Press 2022)

——, Shukla PR and others (eds), ‘Climate Change 2022: Mitigation of Climate Change. Contribution of Working Group III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change’ (Cambridge University Press 2022)

Report of the Subsidiary Body for Scientific and Technological Advice on the Structured Expert Dialogue on the 2013-2015 Review, UN Doc. FCCC/SB/2015/INF.1

Rio Declaration on Environment and Development (1992) UN Doc A/CONF151/26

Stockholm Declaration of the United Nations Conference on the Human Environment (1972) UN Doc A/CONF 48/11/Rev 1

United Nations Environment Programme, ‘UNEP, The Emissions Gap Report 2017. United Nations Environment Programme (UNEP) (2017)’ (2017)

——, ‘UNEP, The Emissions Gap Report 2018. United Nations Environment Programme (UNEP) (2018)’ (UNEP 2019)

——, ‘UNEP, The Emissions Gap Report 2019. United Nations Environment Programme (UNEP) (2019)’ (UNEP 2019)

——, ‘UNEP, The Emissions Gap Report 2020. United Nations Environment Programme (UNEP) (2020)’ (2020)

——, ‘UNEP, Global Climate Litigation Report, 2020 Status Review’ (UNEP, Columbia Law School, Sabin Center for Climate Change Law 2020)

——, ‘The Emissions Gap Report 2021. United Nations Environment Programme (UNEP) (2021)’ (2021)

UNFCCC, ‘Report to the Conference of the Parties on its 25th Session’ UN Doc. FCCC/CP/2019/13/Add.1 Decision 1/CP.25

UN General Assembly, UNGA ICP Report 72/95 “The Effects of Climate Change on the Oceans” (16 June 2017) UN Doc A/72/95

——, UNGA ICP Report 74/119 “Ocean Science and the United Nations Decade of Ocean Science for Sustainable Development” (21 June 2019) UN Doc A/74/119

——, UNGA Res 43/53, UN Doc A/RES/43/53 (6 December 1988)

Miscellaneous

Committee on the Peaceful Uses of the Seabed and the Ocean Floor beyond National Jurisdiction, Submission by Norway (1973, Mimeo.) A/AC.138/SC.III/L.43

——, Official Recommendation by Kenya (1974) A/CONF.62/C.3/L.2

Group of Experts on the Scientific Aspects of Marine Pollution, ‘Report of the Second Session, GESAMP II/11 (1970)’

ILC, ‘Draft Articles on Responsibility of States for Internationally Wrongful Acts - with Commentaries’

International Law Association (ILA), ‘Due Diligence in International Law, Mandate’

——, ‘Study Group on Due Diligence in International Law, First Report’ (2014)

——, ‘Study Group on Due Diligence in International Law, Second Report’ (2016)

IPCC, ‘WMO/UNEP Intergovernmental Panel on Climate Change: Report of the First Session of the IPCC Bureau, WCP TD-No. 294’ (1989)

Memorandum of Agreement between the United Nations Environment Programme (UNEP) and the World Meteorological Organization (WMO), FP/4102-89-01-2001

‘Papers Relating to the Foreign Relations of the United States, Transmitted to Congress with the Annual Message of the President, December 2, 1872, Part II, Volume I - Office of the Historian’

United Nations Framework Convention on Climate Change Handbook (UNFCCC 2006)

Secondary Sources

Journal Articles

Agrawala S, ‘Structural and Process History of the Intergovernmental Panel on Climate Change’ (1998) 39 Climatic Change; Dordrecht 621

Alter KJ, ‘The Promise and Perils of Theorizing International Regime Complexity in an Evolving World’ (2022) 17 The Review of International Organizations 375

Alter KJ and Raustiala K, 'The Rise of International Regime Complexity' (2018) 14 Annual Review of Law and Social Sciences 329

Bahdi R, 'Globalization of Judgment: Transjudicialism and the Five Faces of International Law in Domestic Courts' (2002) 34 George Washington International Law Review 555

Baird R, Simons M and Stephens T, 'Ocean Acidification: A Litmus Test for International Law Thematic Focus: Climate Change and the Law of the Sea' [2009] Carbon & Climate Law Review 459

Benvenisti E, 'Reclaiming Democracy: The Strategic Uses of Foreign and International Law by National Courts' (2008) 102 American Journal of International Law 241

Berg M and Lidskog R, 'Pathways to Deliberative Capacity: The Role of the IPCC' (2018) 148 Climatic Change 11

Bingham T, 'The Alabama Claims Arbitration' (2005) 54 The International and Comparative Law Quarterly 1

Bodansky D, 'The United Nations Framework Convention on Climate Change: A Commentary' (1993) 18 Yale Journal of International Law 451

——, 'The Legal Character of the Paris Agreement' (2016) 25 Review of European, Comparative & International Environmental Law 142

Bonnitcha J and McCorquodale R, 'The Concept of "Due Diligence" in the UN Guiding Principles on Business and Human Rights' (2017) 28 European Journal of International Law 899

Boyle A, 'Law of the Sea Perspective on Climate Change The 1982 Law of the Sea Convention at 30: Successes, Challenges and New Agendas' (2012) International Journal of Marine and Coastal Law 831

——, 'Litigating Climate Change under Part XII of the LOSC' (2019) 1 The International Journal of Marine and Coastal Law 1

Brierley A and Kingsford MJ, 'Impacts of Climate Change on Marine Organisms and Ecosystems' (2009) 19 Current Biology R602

Clapham A, 'The Role of the Individual in International Law' (2010) 21 European Journal of International Law 25

Colombo E, 'Enforcing International Climate Change Law in Domestic Courts: A New Trend of Cases for Boosting Principle 10 of the Rio Declaration Student Comments' (2017) 35 UCLA Journal of Environmental Law and Policy 98

Cooley SR and others, 'Overlooked Ocean Strategies to Address Climate Change' (2019) 59 Global Environmental Change 101968

Corten O, 'The Notion of "Reasonable" in International Law: Legal Discourse, Reason and Contradictions' (1999) 48 The International and Comparative Law Quarterly 613

Doelle M, ‘Climate Change and the Use of the Dispute Settlement Regime of the Law of the Sea Convention’ (2006) 37 Ocean Development and International Law 319

Eddebbar YA, Gallo ND and Linsmayer LB, ‘The Oceans and the UN Framework Convention on Climate Change’ (2015) 24 Limnology and Oceanography Bulletin 69

Fabry VJ and others, ‘Impacts of Ocean Acidification on Marine Fauna and Ecosystem Processes’ (2008) 65 ICES Journal of Marine Science 414

Galland G, Harrould-Kolieb E and Herr D, ‘The Ocean and Climate Change Policy’ (2012) 12 Climate Policy 764

Gruber N, ‘Warming up, Turning Sour, Losing Breath: Ocean Biogeochemistry under Global Change’ (2011) 369 Philosophical Transactions of the Royal Society A: Mathematical, Physical and Engineering Sciences 1980

Guilloux BG, ‘Ocean and Climate Regime Interactions’ (2020) 34 Ocean Yearbook Online 43

Harrould-Kolieb ER and Herr D, ‘Ocean Acidification and Climate Change: Synergies and Challenges of Addressing Both under the UNFCCC’ (2012) 12 Climate Policy 378

Hessbruegge JA, ‘The Historical Development of the Doctrines of Attribution and Due Diligence in International Law’ (2003) 36 New York University Journal of International Law and Politics 265

Hulme M and Mahony M, ‘Climate Change: What Do We Know about the IPCC?’ (2010) 34 Progress in Physical Geography: Earth and Environment 705

Johansen E, ‘The Role of the Law of the Sea in Climate Change Litigation’ (2020) 11 The Yearbook of Polar Law Online 141

Klein N, ‘Expansions and Restrictions in the UNCLOS Dispute Settlement Regime: Lessons from Recent Decisions’ (2016) 15 Chinese Journal of International Law 403

Knop K, ‘Here and There: International Law in Domestic Courts Millennium Issue: Shaping the Parameters of International Law in the New Millennium’ (1999) 32 New York University Journal of International Law and Politics 501

Koh HH, ‘Why Do Nations Obey International Law Review Essay’ (1996) 106 Yale Law Journal 2599

Lee S and Bautista L, ‘Part XII of the United Nations Convention on the Law of the Sea and the Duty to Mitigate against Climate Change: Making out a Claim, Causation, and Related Issues Oceans and Climate Change Governance’ (2018) 45 Ecology Law Quarterly 129

Lubchenco J and Gaines SD, ‘A New Narrative for the Ocean’ (2019) 364 Science 911

Malaihollo M, ‘Due Diligence in International Environmental Law and International Human Rights Law: A Comparative Legal Study of the Nationally Determined Contributions under the Paris Agreement and Positive Obligations under the European Convention on Human Rights’ (2021) 68 Netherlands International Law Review 121

Markell D and Ruhl JB, ‘An Empirical Assessment of Climate Change in the Courts: A New Jurisprudence or Business as Usual Climate Change Special Issue’ (2012) 64 Florida Law Review 15

Maxwell L, Mead S and van Berkel D, ‘Standards for Adjudicating the Next Generation of Urgenda-Style Climate Cases’ (2021) Special Issue ’Climate Litigation and Human Rights: Stocktaking and a Look at the Future’ Journal of Human Rights and the Environment 35

Mayer B, ‘Obligations of Conduct in the International Law on Climate Change: A Defence’ (2018) 27 Review of European, Comparative & International Environmental Law 130

May JR and Daly E, ‘Global Climate Constitutionalism and Justice in the Courts’ [2019] Research Handbook on Global Climate Constitutionalism 235

McDonald N, ‘The Role of Due Diligence in International Law’ (2019) 68 International & Comparative Law Quarterly 1041

Mehling M, ‘The Comparative Law of Climate Change: A Research Agenda’ (2015) 24 Review of European, Comparative & International Environmental Law 341

Moore SK and others, ‘Impacts of Climate Variability and Future Climate Change on Harmful Algal Blooms and Human Health’ (2008) 7 Environmental Health S4

Moore TJ and others, ‘Exploring Ship Traffic Variability off California’ (2018) 163 Ocean & Coastal Management 515

Obergassel W and others, ‘Turning Point Glasgow? An Assessment of the Climate Conference COP26’ (2021) 15 Carbon & Climate Law Review (CCLR) 271

Onuf NG, ‘Civitas Maxima: Wolff, Vattel and the Fate of Republicanism’ (1994) 88 American Journal of International Law 280

Oral N, ‘Ocean Acidification: Falling between the Legal Cracks of UNCLOS and the UNFCCC Oceans and Climate Change Governance’ (2018) 45 Ecology Law Quarterly 9

Ourbak T and Magnan AK, ‘The Paris Agreement and Climate Change Negotiations: Small Islands, Big Players’ (2018) 18 Regional Environmental Change 2201

Pahuja S, ‘Methodology: Writing about How We Do Research’ [2021] Research Methods in International Law 60

Pain N and Rheinberger B, ‘The Due Diligence Principle from International to Domestic Law: Applying the Principle in Practice Special Volume: Selected Papers Presented at the ILA 78th Biennial Conference Sydney, 19-24 August 2018’ (2018) 25 Australian International Law Journal 81

Peel J and Osofsky HM, ‘A Rights Turn in Climate Change Litigation?’ (2018) 7 Transnational Environmental Law 37

Pisillo-Mazzeschi R, ‘The Due Diligence Rule and the Nature of the International Responsibility of States’ (1992) 35 German Yearbook of International Law 9

Rajamani L, ‘The 2015 Paris Agreement: Interplay Between Hard, Soft and Non-Obligations’ (2016) 28 Journal of Environmental Law 337

Redgwell C, ‘UNCLOS and Climate Change’ (2012) 106 Proceedings of the Annual Meeting-American Society of International Law 406

——, ‘Treaty Evolution, Adaptation and Change: Is the LOSC “Enough” to Address Climate Change Impacts on the Marine Environment?’ (2019) 1 The International Journal of Marine and Coastal Law 1

Sabine CL and others, ‘The Oceanic Sink for Anthropogenic C[O.Sub.2]’ (2004) 305 Science

Saiger A-J, ‘Domestic Courts and the Paris Agreement’s Climate Goals: The Need for a Comparative Approach’ (2020) 9 Transnational Environmental Law 37

Sarewitz D, ‘Does Climate Change Knowledge Really Matter?’ (2011) 2 WIREs Climate Change 475

Scott KN, ‘Ocean Acidification: A Due Diligence Obligation under the LOSC’ (2020) 35 The International Journal of Marine and Coastal Law 382

Sekerci Y and Petrovskii S, ‘Mathematical Modelling of Plankton–Oxygen Dynamics Under the Climate Change’ (2015) 77 Bulletin of Mathematical Biology 2325

Setzer J and Higham C, ‘Global Trends in Climate Change Litigation: 2022 Snapshot’ (Grantham Research Institute on Climate Change and the Environment and Centre for Climate Change Economics and Policy, London School of Economics and Political Science 2022)

Setzer J and Vanhala LC, ‘Climate Change Litigation: A Review of Research on Courts and Litigants in Climate Governance’ (2019) 10 WIREs Climate Change

Shany Y, ‘National Courts as International Actors: Jurisdictional Implications’ (2008) Hebrew University International Law Research Paper No. 22-08

Sigman DM, ‘The Biological Productivity of the Ocean’ (2012) 3 Nature Education 10

Sloss D, ‘When Do Treaties Create Individually Enforceable Rights - The Supreme Court Ducks the Issue in Hamdan and Sanchez-Llamas’ (2006) 45 Columbia Journal of Transnational Law 20

Tully K and others, ‘The Invisible Flood: The Chemistry, Ecology, and Social Implications of Coastal Saltwater Intrusion’ (2019) 69 BioScience 368

Turley C and Gattuso J-P, ‘Future Biological and Ecosystem Impacts of Ocean Acidification and Their Socioeconomic-Policy Implications’ (2012) 4 Current Opinion in Environmental Sustainability 278

Tzanakopoulos A and Tams CJ, ‘Introduction: Domestic Courts as Agents of Development of International Law International Law and Practice: Symposium on Domestic Courts as Agents of Development of International Law’ (2013) 26 Leiden Journal of International Law 531

Verdier P-H and Versteeg M, ‘International Law in National Legal Systems: An Empirical Investigation Exploring Comparative International Law’ (2015) 109 American Journal of International Law 514

Voigt C, ‘The Paris Agreement: What Is the Standard of Conduct for Parties?’ (2016) 26 QIL QDI 17

Warner R, ‘Preserving a Balanced Ocean: Regulating Climate Change Mitigation Activities in Marine Areas beyond National Jurisdiction’ (2007) 14 Australian International Law Journal 99

Wartelle S, ‘Oh the Tides They Are a Changin’: Climate Change Due Diligence, and How the Standard of Care Should Change to Reflect the Current Technologies in Flood Mapping Comments’ (2022) 10 LSU Journal of Energy Law and Resources 275

Wittich S, ‘Domestic Courts and the Content and Implementation of State Responsibility International Law and Practice: Symposium on Domestic Courts as Agents of Development of International Law’ (2013) 26 Leiden Journal of International Law 643

Zipursky BC, ‘Reasonableness in and out of Negligence Law’ (2014) 163 University of Pennsylvania Law Review 2131

Books and book chapters

Baade B, ‘Due Diligence and the Duty to Protect Human Rights’ in Krieger, Heike, Peters, Anne and Kreuzer, Leonhard (eds), Due Diligence in the International Legal Order (Oxford University Press 2020)

Bartolini G, ‘The Historical Roots of the Due Diligence Standard’ in Krieger, Heike, Peters, Anne and Kreuzer, Leonhard (eds), Due Diligence in the International Legal Order (Oxford University Press 2020)

Birnie P, Boyle A and Redgwell C, International Law & the Environment (Third Edition, Oxford University Press 2009)

——, ‘International Regulation of Toxic Substances’, International Law & the Environment (3rd edition, Oxford University Press 2009)

——,, ‘Rights and Obligations of States Concerning Protection of the Environment’ in Patricia Birnie, Alan Boyle and Catherine Redgwell (eds), International Law and the Environment (3rd edition, Oxford University Press 2009)

Bodansky D, Brunnée J and Rajamani L, International Climate Change Law (Oxford University Press 2017)

Boyle A, ‘Protecting the Marine Environment from Climate Change: The LOSC Part XII Regime’ in Elise Johansen, Ingvild Ulrikke Jakobsen and Signe Veierud Busch (eds), The Law of the Sea and Climate Change: Solutions and Constraints (Cambridge University Press 2020)

Boyle A and Chinkin C, The Making of International Law (Oxford University Press 2007)

Chayes A and Handler Chayes A, The New Sovereignty: Compliance with International Regulatory Agreements (Harvard University Press 1995)

Churchill R, 'The LOSC Regime for Protection of the Marine Environment - Fit for the Twenty-First Century?', in Rosemary Rayfuse (ed), Research Handbook on International Marine Environmental Law (Edward Elgar Publishing 2015)

——, 'The 1982 United Nations Convention on the Law of the Sea' in Rothwell, Donald and others (eds), The Oxford Handbook of the Law of the Sea (Oxford University Press 2015)

Corell H, 'The United Nations: A Practitioner's Perspective' in Rothwell, Donald and others (eds), The Oxford Handbook of the Law of the Sea (Oxford University Press 2015)

Craig RK, 'Mitigation and Adaptation' in Elise Johansen, Ingvild Ulrikke Jakobsen and Signe Veierud Busch (eds), The Law of the Sea and Climate Change: Solutions and Constraints (Cambridge University Press 2020)

Crawford J, 'Consequences of an Internationally Wrongful Act', Brownlie's Principles of Public International Law (9th edn, Oxford University Press 2019)

——, 'International Human Rights', Brownlie's Principles of Public International Law (9th edn, Oxford University Press 2019)

——, 'Introduction', Brownlie's Principles of Public International Law (9th edn, Oxford University Press 2019)

——, 'Subjects of International Law', Brownlie's Principles of Public International Law (9th edn, Oxford University Press 2019)

——, 'The Claims Process', Brownlie's Principles of Public International Law (9th edn, Oxford University Press 2019)

——, 'The Relations of International and National Law', Brownlie's Principles of Public International Law (9th edn, Oxford University Press 2019)

Depledge J, 'Foundations for the Paris Agreement - A. The Legal and Policy Framework of the United Nations Climate Change Regime' in Daniel Klein and others (eds), The Paris Agreement on Climate Change - Analysis and Commentary (Oxford University Press 2017)

Doelle M, 'Assessment of Strengths and Weaknesses' in Daniel Klein and others (eds), The Paris Agreement on Climate Change: Analysis and Commentary (Oxford University Press 2017)

Fisher, R, 'Use of Domestic Courts and Procedures Part II: Second-Order Compliance Coping with Apparent Noncompliance - Chapter IX' in Improving Compliance with International Law (University Press of Virginia 1981)

French D and Pontin B, 'The Science of Climate Change: A Legal Perspective on the IPCC' in Michael Faure (ed), Elgar Encyclopedia of Environmental Law (Edward Elgar Publishing Limited 2016)

Gehring T and Oberthür S, ‘Exploring Regime Interaction’ in Arild Underdal and Oran R Young (eds), Regime Consequences: Methodological Challenges and Research Strategies (Springer Netherlands 2004)

Grotius H, Mare Liberum - The Freedom of the High Seas: Or the Right Which Belongs to the Dutch to Take Part in the Indian Trade (R Van Deman Magoffin tr, Oxford University Press 1916)

Hall WE, ‘Sovereignty in Relation to the Territory of the State Part II: The Law Governing States in Their Normal Relations: Chapter IV’, *Treatise on International Law* (3rd edn, Clarendon Press 1890)

Harrison J, ‘Addressing the Marine Environmental Impacts of Climate Change and Ocean Acidification’, Saving the Oceans Through Law: The International Legal Framework for the Protection of the Marine Environment (Oxford University Press 2017)

——, ‘Introduction’, Saving the Oceans Through Law: The International Legal Framework for the Protection of the Marine Environment (Oxford University Press 2017)

——, ‘Land-Based Sources of Marine Pollution’, Saving the Oceans Through Law: The International Legal Framework for the Protection of the Marine Environment (Oxford University Press 2017)

——, Saving the Oceans Through Law: The International Legal Framework for the Protection of the Marine Environment (Oxford University Press 2017)

——, ‘The Role of International Law in Saving the Oceans and Future Challenges for the Legal Framework’, Saving the Oceans Through Law: The International Legal Framework for the Protection of the Marine Environment (Oxford University Press 2017)

——, ‘The United Nations Convention on the Law of the Sea and the Protection and Preservation of the Marine Environment’, Saving the Oceans Through Law: The International Legal Framework for the Protection of the Marine Environment (Oxford University Press 2017)

Harrould-Kolieb E, ‘Implications of the Paris Agreement for Action on Ocean Acidification within the UNFCCC’ in VanderZwaag, David L, Oral, Nilüfer and Stephens, Tim (eds), Research Handbook on Ocean Acidification Law and Policy (Edward Elgar Publishing 2021)

Hernández ÁJR, ‘Due Diligence Obligations as a Tool to Manage Radical Vulnerability from Climate Change’ in Mar Campins Eritja and Rahma Bentirou Mathlouthi (eds), Understanding Vulnerability in the Context of Climate Change (Atelier 2022)

Johansen E, ‘The Role of the Oceans in Regulating the Earth’s Climate: Legal Perspectives’ in Elise Johansen, Ingvild Ulrikke Jakobsen and Signe Veierud Busch (eds), The Law of the Sea and Climate Change: Solutions and Constraints (Cambridge University Press 2020)

Kirk EA, ‘Science and the International Regulation of Marine Pollution’ in Rothwell, Donald and others (eds), The Oxford Handbook of the Law of the Sea (Oxford University Press 2015)

Klein N, ‘Adapting UNCLOS Dispute Settlement to Address Climate Change’ in Jan McDonald, Jeffrey McGee and Richard Barnes (eds), Research Handbook on Climate Change, Oceans and Coasts (Edward Elgar Publishing Limited 2020)

Krieger H and Peters A, ‘Due Diligence and Structural Change in the International Legal Order’ in Krieger, Heike, Anne Peters and Kreuzer, Leonhard (eds), Due Diligence in the International Legal Order (Oxford University Press 2020)

Kulesza J, *Due Diligence in International Law* (Brill Nijhoff 2016)

——, ‘Introduction’, *Due Diligence in International Law* (Brill Nijhoff 2016);

——, ‘The Principle of Due Diligence in International Law’, *Due Diligence in International Law* (Brill Nijhoff 2016)

Lauterpacht H, International Law and Human Rights (Shoe String Press Inc 1950)

Longobardo M, ‘Due Diligence in International Humanitarian Law’ in Krieger, Heike, Peters, Anne and Kreuzer, Leonhard (eds), Due Diligence in the International Legal Order (Oxford University Press 2020)

Lowe V, ‘Introduction and Overview: The Ambit of International Law’, International Law (Oxford University Press 2007)

——,, ‘The Principles of the International Legal System’, International Law (Oxford University Press 2007)

Murphy SD, ‘Does International Law Obligate States to Open Their National Courts to Persons for the Invocation of Treaty Norms That Protect or Benefit Persons?’ in David Sloss (ed), The Role of Domestic Courts in Treaty Enforcement: A Comparative Study (Cambridge University Press 2009)

Oral N, ‘Implementing Part XII of the 1982 UN Law of the Sea Convention and the Role of International Courts’ in Nerina Boschiero and others (eds), International Courts and the Development of International Law: Essays in Honour of Tullio Treves (T M C Asser Press 2013)

Papanicolopulu I, ‘Due Diligence in the Law of the Sea’ in Krieger, Heike, Peters, Anne and Kreuzer, Leonhard (eds), Due Diligence in the International Legal Order (Oxford University Press 2020)

Peel J and Osofsky HM, Climate Change Litigation: Regulatory Pathways to Cleaner Energy (Cambridge University Press 2015)

Peters A, Krieger H and Kreuzer L, ‘Due Diligence in the International Legal Order: Dissecting the Leitmotif of Current Accountability Debates’ in Krieger, Heike, Peters, Anne and Leonhard Kreuzer (eds), Due Diligence in the International Legal Order (Oxford University Press 2020)

Popattanachai N and Kirk, EA, 'Ocean Acidification and Multilateral Environmental Agreements' in VanderZwaag, David L, Oral, Nilüfer and Stephens, Tim (eds), Research Handbook on Ocean Acidification Law and Policy (Edward Elgar Publishing 2021)

Rajamani L, 'Due Diligence in Climate Change Law' in Krieger, Heike, Peters, Anne and Kreuzer, Leonhard (eds), Due Diligence in the International Legal Order (Oxford University Press 2020)

Rajamani L and Guérin E, 'Central Concepts in the Paris Agreement and How They Evolved' in Daniel Klein and others (eds), The Paris Agreement on Climate Change: Analysis and Commentary (Oxford University Press 2017)

Sands P and Peel J, Principles of International Environmental Law (3rd edn, Cambridge University Press 2012)

Schabas WA, Genocide in International Law: The Crime of Crimes (2nd edn, Cambridge University Press 2009)

Setzer J and Bangalore M, 'Regulating Climate Change in the Courts', Trends in Climate Change Legislation (Edward Elgar Publishing 2017)

Sharma A (ed), Guide to the Paris Agreement (Oxford Climate Policy 2020)

Sindico F and Mbengue MM (eds), Comparative Climate Change Litigation: Beyond the Usual Suspects (Springer Nature Switzerland 2021)

Sloss D (ed), The Role of Domestic Courts in Treaty Enforcement: A Comparative Study (Cambridge University Press 2009)

Talbot F and Wilkinson C, 'Coral Reefs, Mangroves and Seagrasses: A Sourcebook for Managers' (Australian Institute of Marine Sciences 2001)

Treves T, 'Historical Development of the Law of the Sea' in Donald Rothwell and others (eds), The Oxford Handbook of the Law of the Sea (Oxford University Press 2015)

Van Alstine MP, 'The Role of Domestic Courts in Treaty Enforcement - Summary and Conclusions' in David Sloss (ed), The Role of Domestic Courts in Treaty Enforcement: A Comparative Study (Cambridge University Press 2009)

van den Herik L and Irving E, 'Due Diligence and the Obligation to Prevent Genocide and Crimes Against Humanity' in Krieger, Heike, Peters, Anne and Kreuzer, Leonhard (eds), Due Diligence in the International Legal Order (Oxford University Press 2020)

Viñuales JE, 'Due Diligence in International Environmental Law: A Fine-Grained Cartography' in Krieger, Heike, Peters, Anne and Kreuzer, Leonhard (eds), Due Diligence in the International Legal Order (Oxford University Press 2020)

Violi F, 'The Function of the Triad "Territory", "Jurisdiction", and "Control" in Due Diligence Obligations' in Krieger, Heike, Peters, Anne and Kreuzer, Leonhard (eds), Due Diligence in the International Legal Order (Oxford University Press 2020)

Online Sources, including webpages

Antigua & Barbuda, Tuvalu Press Conference UNFCCC - COP26 (1 November 2021) <https://unfccc-cop26.streamworld.de/webcast/antigua-barbuda-tuvalu> accessed 25 April 2022

Bassett H, Stote A and Allison E, 'Ocean Deoxygenation: Impacts on Ecosystem Services and People' <https://portals.iucn.org/library/node/48892> accessed 13 January 2020

C2LI, 'Climate Change Litigation Initiative' (C2LI) <https://www.c2li.org/>

'Christiana Figueres: The Case for Stubborn Optimism on Climate' | TED Talk <https://www.ted.com/talks/christiana_figueres_the_case_for_stubborn_optimism_on_climate?language=en> accessed 29 June 2022

'Impact for Our Oceans: The Road to Lisbon' (UNEP, 3 June 2022) <http://www.unep.org/news-and-stories/speech/impact-our-oceans-road-lisbon> accessed 19 June 2022

IPCC, 'Principles Governing IPCC Work' <https://www.ipcc.ch/site/assets/uploads/2018/09/ipcc-principles.pdf> accessed 20 June 2020

——, 'Principles Governing IPCC Work, Appendix A' <https://www.ipcc.ch/site/assets/uploads/2018/09/ipcc-principles-appendix-a-final.pdf> accessed 26 February 2020

——, 'List of IPCC Member Countries' <https://www.ipcc.ch/site/assets/uploads/2019/02/ipcc_members.pdf> accessed 20 June 2022

——, 'IPCC Factsheet: How Does the IPCC Approve Reports?' (IPCC About) <https://www.ipcc.ch/about/> accessed 26 February 2020

——, 'IPCC Factsheet: How Does the IPCC Review Process Work?' (IPCC About) <https://www.ipcc.ch/about/> accessed 26 February 2020

——, 'IPCC Factsheet: How Does the IPCC Select Its Authors?' (IPCC About) <https://www.ipcc.ch/about/> accessed 26 February 2020

——, 'IPCC Factsheet: What Is the IPCC?' (IPCC About) <https://www.ipcc.ch/site/assets/uploads/2021/07/AR6_FS_What_is_IPCC.pdf> accessed 20 June 2022

——, 'IPCC Factsheet: What Literature Does the IPCC Assess?' (IPCC About) <https://www.ipcc.ch/site/assets/uploads/2021/07/AR6_FS_assess_literature.pdf> accessed 20 June 2022

——, 'IPCC - Intergovernmental Panel on Climate Change' <http://www.ipcc.ch/news_and_events/docs/factsheets/FS_what_ipcc.pdf> accessed 19 August 2018

IUCN, ‘Executive Summary - Ocean Deoxygenation: Everyone’s Problem’ <portal.iucn.org/library/sites/files/documents/2019-048-En.pdf> accessed 13 January 2020

Keith K, ‘ICJ Judge Keith the Role of International Law in National Law (Part I)’ (United Nations Web TV, 9 July 2009) <http://webtv.un.org/watch/icj-judge-keith-the-role-of-international-law-in-national-law-part-i/2591635948001/?term=> accessed 25 August 2020

‘Ocean for Climate’ (Because the Ocean 2019) <https://www.becausetheocean.org/wp-content/uploads/2019/10/Ocean_for_Climate_Because_the_Ocean.pdf> accessed 16 October 2019

‘OHCHR | Prevention and Punishment of the Crime of Genocide’ <https://www.ohchr.org/en/professionalinterest/pages/crimeofgenocide.aspx> accessed 12 February 2021

‘Press Release: AOSIS Ministers Lay Out Priorities Ahead of Week Two’ (AOSIS, 7 December 2015) <https://www.aosis.org/press-release-aosis-ministers-lay-out-priorities-ahead-of-week-two/> accessed 9 February 2022

Savaresi A and Setzer J, ‘Mapping the Whole of the Moon: An Analysis of the Role of Human Rights in Climate Litigation’ [2021] SSRN Electronic Journal <https://papers.ssrn.com/abstract=3787963>

‘Science in the Negotiations | UNFCCC’ <https://unfccc.int/topics/science/the-big-picture/science-in-the-negotiations> accessed 26 February 2020

‘The Socioeconomic Costs of Ocean Acidification’ (https://www.whoi.edu/) <https://www.whoi.edu/oceanus/feature/the-socioeconomic-costs-of-ocean-acidification/> accessed 3 December 2019

United Nations Report, ‘Report on the Role of Seafood in Global Food Security. Open-Ended Informal Consultative Process on Oceans and the Law of the Sea’ <http://www.un.org/depts/los/consultative_process/documents/adv_uned_mat.pdf> accessed 2 November 2020

‘United Nations Treaty Collection: Status of Treaty Ratification (Paris Agreement)’ <https://treaties.un.org/doc/Publication/MTDSG/Volume%20II/Chapter%20XXVII/XXVII-7-d.en.pdf> accessed 2 June 2022

‘United Nations Treaty Collection: Status of Treaty Ratification (UNCLOS)’ <https://treaties.un.org/doc/Publication/MTDSG/Volume%20II/Chapter%20XXI/XXI-6.en.pdf>

‘United Nations Treaty Collection: Status of Treaty Ratification (UNFCCC)’ <https://treaties.un.org/doc/Publication/MTDSG/Volume%20II/Chapter%20XXVII/XXVII-7.en.pdf>

Wheeler CBMAPA, Biological Oceanography (Wiley-Blackwell) <https://www.dawsonera.com/abstract/9781118223178> accessed 18 February 2020

Miscellaneous

Bouwer K and Setzer J, 'New Trends in Climate Litigation: What Works?', New Trends in International Climate and Environmental Advocacy Workshop (2020)

Brunnée J, 'Procedure and Substance in International Environmental Law (Volume 405)' (2019) Collected Courses of the Hague Academy of International Law

Center for Oceans Law and Policy, University of Virginia, UN Convention on the Law of the Sea Commentary 1982 (Brill Nijhoff 2014)

de Lapradelle A, Recueil Des Arbitrages Internationaux, Tome II: 1856-1872 (Perdone 1923)

Katz C, 'Why Is an Ocean Current Critical to World Weather Losing Steam? Scientists Search the Arctic for Answers' (2019) National Geographic Magazine

WWF, 'Living Planet Report - 2018: Aiming Higher' (WWF 2018)