MARPOL 73/78: The Challenges of Regulating Vessel-Source Oil Pollution

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Abstract

Merchant shipping is the major method of international transportation for all types of goods, including oil. Shipping has been a major cause of degradation to the marine environment due to operational and accidental discharge of oil which accounted for an estimated 2 million tons of oil entering the world's oceans in the 1980s. To put this into perspective, the grounding of Exxon Valdez in 1989 resulted in a discharge of 35,000 tons of crude oil which is estimated to have killed 250,000 sea birds, 2800 otters, 300 seals and 13 orca whales. It also required over $3.5 billion in clean-up costs.

MARPOL is the international convention that has been brought into effect to protect the oceans of the world. Annex I was specifically created to prevent and reduce oceanic oil discharges.

This article examines the challenges that are faced by such an ambitious international regulation that combines International, Environmental and Maritime Law. Many of these challenges are connected to unique jurisdictional gaps and overlaps. In most cases there is more than one jurisdiction which may take action in response to a suspected violation. However, in many cases, states tend to defer responsibility for reasons such as the costs involved in taking action.

The overall success of MARPOL will be measured by the impact it has had in achieving its objective. The conclusion will be reached that MARPOL is a legitimate international regime that has made significant progress in achieving its objectives, but still has some way to go.

I. Introduction

International trade would be impossible without the marine shipping industry. Merchant ships around the world transport the majority of the products considered essential to international trade as well as everyday life. Those products include manufactured goods, food products, raw materials

and the principle source of global energy, oil.[1] Shipping as the major method of transportation of goods around the world has had a costly impact on the environment but it is only in the last 50 years that this impact has been acknowledged.[2] The significant sources of degradation have been identified as both operational and accidental vessel-source oil pollution from the continually increasing international merchant fleets.

Prior to the Second World War, the accepted practice for managing shipboard waste was to, as it were, 'throw it into Davy Jones' locker'.[3] This practice and lack of concern for the ocean environments encouraged the pollution of the sea. It is the realization of damage being done to the oceans that has led to the development and implementation of international law to eliminate marine pollution. The focus of this article is on a significant aspect of marine pollution, that being, vessel-source oil pollution.

The International Convention for the Prevention of Pollution from Ships 1973 as amended by the Protocol of 1978, which is more commonly known as MARPOL 73/78, is the most ambitious attempt on a global level to prevent marine pollution from operational activities and accidents.[4] Every vessel at sea, regardless of size or purpose generates oily waste. This waste is generated by the operation of the vessel, and additionally through the transportation of oil. MARPOL was created as an organic regulation with an expectation that it would expand over time and include additional environmental aspects. This expansion has occurred: at present there are six annexes, each dealing with a different type of pollution from ships. It is MARPOL

1 Patricia Birnie, Alan Boyle, Catherine Redgwell, *International Law and the Environment* (3rd Edition, OUP 2009) 398.

2 Nickie Butt, 'The Impact of Cruise Ship Generated Waste on Home Ports and Ports of Call: A Study of Southampton' (2007) 31 Marine Policy 591.

3 ibid.

4 Manfred Nauke, Geoffrey L Holland, 'The Role and Development of Global Marine Conventions: Two Case Histories' (1992) 25 Marine Pollution Bulletin 74.

Annex I that deals with the significant issue of oil pollution, and for this reason this article will focus on Annex I.[5]

In the late 1980s, when MARPOL had only recently come into effect, it was estimated that vessels released 2 million tons of oil into the sea.[6] By 2007, it was estimated that this figure had been reduced to 450,000 tons of oil entering the marine environment annually.[7] This decline indicates a significant decrease in a major cause of marine degradation and the position that this should be credited to MARPOL will be demonstrated. MARPOL is not intended to totally eliminate all oil discharges into the sea, however, the point has not been reached where those discharges have reached a level that has no more of an impact on the environment than that of naturally occurring oil releases.

The location and concentration of vessel related discharges can have a catastrophic impact on the marine and coastal environment. This impact is demonstrated by the fact that a single discharge of 35,000 tons of crude oil, a result of the grounding of the *Exxon Valdez* in 1989[8], is estimated to have killed 250,000 sea birds, 2800 sea otters, 300 harbour seals, and 13 orca whales, as well as shutting down the commercial Alaskan salmon fishery and requiring over $3.5 Billion USD in clean-up costs.[9] Without the MARPOL Annex I discharge standards, tanker vessels would be discharging up to 2500 tons of crude oil for each voyage they make; which could possibly amount up to 10 million tons per year.[10]

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5 Butt (n 2) 594.

6 Andrew Griffin, 'MARPOL 73/78 and Vessel Pollution: A Glass Half Full or Half Empty?' (1994) 2 Indiana J Global L Studies 489.

7 Birnie (n 1) 381.

8 Ronald B Mitchell, *Intentional Oil Pollution at Sea: Environmental Policy and Treaty Compliance* (The MIT Press 1994) 82.

9 John M Weber, Robert E Crew, 'Deterrence Theory and Marine Oil Spills: Do Coast Guard civil Penalties Deter Pollution?' (2000) 58 J Environmental Management 161.

10 Mitchell (n 8).

In exploring the issues of vessel-source oil pollution, there will be an examination of the international regulations which have brought about the significant reduction in vessel-source oil discharge. Additionally, attention will be drawn to the difficulties faced in further achieving the mandate of Annex I. One cause of these difficulties is due to MARPOL being a hybrid of international, environmental and maritime law. This unique composition produces significant challenges, specifically those associated with jurisdictional and operational success.

The opening section of this article will outline the historical context which led to the adoption of MARPOL. This is the starting point for evaluating the success of the convention in achieving its ambitious goals. The subsequent sections will focus on the jurisdictional challenges encountered in enforcing MARPOL, as well as the issues connected to the operation of key requirements within the regulation. The conclusion will be made that supports the position that MARPOL should be viewed as a legitimate international regime. It is worth briefly noting at this point that a 'flag state' is the state to which a ship is flagged and registered, a 'coastal state' is a state which has territorial waters due to its location bordering an ocean or sea and a 'port state' is the state where a ship calls into port for any purpose.

II. Development Of Maritime Pollution Regulations

A. Early Developments in Vessel-Source Pollution Regulation

Development of international law with the aim of regulating vessel-source pollution beyond the territorial three nautical mile limit occurred in the early 20th century. This development took place as a result of significant political pressure from both the United Kingdom and the United

States.[11] This pressure led the two draft conventions: namely, the 1926 Washington Draft Convention and the League of Nations Draft Convention.

Although they were drafted, the conventions were never adopted formally. The outbreak of the Second World War resulted in the suspension of any action in relation to vessel-source pollution control.[12] In the post-war period, and on account of the rapid growth of the global economy and the enhanced demand for energy resources, attention returned once again to protection of the marine environment from shipping-related pollution. In 1948, the United Nations took the first post-war steps to address the issue of vessel-source pollution of the marine environment by holding an international maritime conference in Geneva.

This ultimately led to the establishment of the Inter-Governmental Maritime Consultative Organization (IMCO). This organization would eventually come to be known as the International Maritime Organization (IMO) and this transformation took place through the process of amendments to the conventions of the IMCO in 1982.[13] The progression of the new IMCO from establishment to becoming operational was protracted, as the IMCO did not become operational until 1958.[14]

During the development stages of the IMCO between 1948- 1958, the UK began to acknowledge the need for immediate action in the area of vessel-source marine pollution. This was the result of growing public concern with regard to oil discharges from ships, and the impact it had on

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11 Alan Khee-Jin Tan, *Vessel Source Marine Pollution: The Law and Politics of International Regulation* (Cambridge University Press 2006) 107.

12 ibid 109.

13 International Maritime Organization, *MARPOL 73/78 Consolidated Edition, 2002* (IMO 2002).

14 Rebecca Becker, 'MARPOL 73/78: An Overview in International Environmental Enforcement' (1997) 10 Georgetown Int Environmental L Rev 626.

the marine environment.[15] The UK's dedication to taking action in this area was demonstrated by the creation of the Committee on the Prevention of Pollution of the Sea by Oil, which was chaired by Lord Faulkner, to explore potential global measures to harmonize regulatory action regarding oil discharges.[16]

Following the report of the Faulkner Committee in 1953, a diplomatic conference was called in London in May 1954 with the intention of negotiating an international convention on this subject.[17] The London Conference is held to have been a success, as it was the birthplace of the first multilateral agreement on oil pollution control. This agreement became known as the International Convention for the Prevention of Pollution of the Sea by Oil (OILPOL), which came into force on the 26th of July 1958.

B. OILPOL: The Birth of Multilateral Marine Pollution Agreements

Essentially, OILPOL prohibited the release of oily waste into the sea within a 50 nautical-mile coastal zone. The prohibition predominately targeted oil tankers, whilst non-tanker commercial vessels were largely unaffected. In truth, the restriction on tankers was limited. When operating outside of the coastal zones, within the majority of the world's oceans, tanker crews were generally free to discharge oily waste.[18]

In addition to being limited in scope[19], OILPOL lacked sufficient enforcement controls for coastal and port

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15 Ronald B Mitchell, 'Regime Design Matters: Intentional Oil Pollution and Treaty Compliance' (1994) 48 International Organization Foundation 431.

16 R Michael M'Gonigle, Mark W Zacher, *Pollution, Politics and International Law: Tankers at Sea* (University of California Press 1979) 84.

17 Tan (n 11) 110.

18 ibid 111.

19 The lack of significant prohibition regulating oil discharges was due to the active dispute among nations at the 1954 conference as to whether there were harmful impacts on the marine environment from oil discharges (Mitchell 1994: 84).

states. Responsibility was passed to a vessel's flag state once it had been informed of an alleged violation. The flag state was to investigate the matter, and if it determined there was sufficient evidence to initiate proceedings it could elect to do so.[20] Due to the limited ability of coastal and port states to monitor oily discharge, and a general reluctance by flag states to prosecute alleged offending vessels, OILPOL was not as effective in dealing with oil pollution as had been the intention of the UK as the leading party to the London Conference.[21]

The events surrounding the *Torrey Canyon,* which in on March 1967 ran aground near the Isles of Scilly and released its cargo of 120,000 tons of crude oil, probably had the largest impact on changing marine pollution regulations. Being the largest oil spill ever recorded up to that time,[22] it drew attention to the fact that vessel-source oil pollution was a serious problem that needed to be addressed. Although accidental pollution, such as the *Torrey Canyon,* was often more visible to the public, it was actually operational pollution that resulted in a much more consistent and significant source of oily discharge.[23]

In an effort to reduce the amount of operational discharge at sea and to pre-empt regulation, oil companies led by Shell Oil established the practice known as Load On Top[24] (LOT).[25] LOT reduced oily discharge, however,

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20 International Convention for the Prevention of Pollution of the Sea by Oil, 1954 Article X.

21 M'Gonigle and Zacher (n 16) 89.

22 Tan (n 11) 120.

23 International Maritime Organization, 'Brief History of IMO' <http://www.imo.org/about/historyofimo/Pages/Default.aspx> Accessed 1 May 2012.

24 Jeff B Curtis, 'Vessel-Source Oil Pollution and MARPOL 73/78: An International Success Story?' (1984) 15 Environmental L 689.

25 LOT allowed for ballast water to be taken on after oil had been offloaded in port, during the return journey separation would occur and oily sludge would settle on top of the water which could be discharged without the significant release of oil. A new cargo of oil would be loaded on top of the remaining oil without the need to discharge oily sludge into the sea (ibid 690).

there still remained significant technical shortcomings within LOT and operational pollution continued to occur.[26] The official requirement for LOT and a modification of discharge standards were brought into effect through a 1969 amendment to OILPOL. This amendment did not make any adjustments to the compliance and enforcement measures of the convention.[27] When the 1969 amendment was in the process of being brought into force, the maritime nations which had initially supported OILPOL came to the agreement that it was no longer adequately suited to fulfil its mandate.[28] Thus, the shortcomings of OILPOL were the catalyst that brought MARPOL into existence.

C. From OILPOL to MARPOL 73

Following the *Torrey Canyon* disaster, the United States was forced to respond to public pressure, and it did so in a drastic manner. The response by the United States President Nixon's administration was to create the Environmental Protection Agency (EPA) in 1970. The mandate of the newly established EPA was to protect the natural environment of the US.[29] The US objected to the poor state of international regulation on vessel-source pollution, and lobbied for improvements.

As a result of US influence, and with the support of a number of other maritime states, reform began to take shape in a manner that would significantly impact the issue of vessel-source pollution.[30] The 1973 International Conference on Marine Pollution in London was attended by 71 states representing both the developed and developing world. It was the International Conference on Marine Pollution that was the birthplace of the International

26M'Gonigle (n 16) 102.
27 Tan (n 11) 121.
28 IMO (n 23).
29 M'Gonigle (n 16) 107.
30 ibid 109.

Convention for the Prevention of Pollution from Ships (MARPOL 73).[31]

MARPOL 73 was adopted by the International Conference on Marine Pollution. This conference was convened by the IMCO largely as a result of US determination to drive change. Although MARPOL 73 was adopted, it was unable to meet the double ratification requirements [32] for several years after it had been negotiated.[33]

Due to the inability to ratify, combined with recognition that MARPOL 73 was necessary, the Convention was modified by the Protocol of 1978. The result of this modification was the creation of the regulation known as MARPOL 73/78. [34] MARPOL 73/78 (MARPOL) successfully met the double ratification threshold and came into effect in October 1983, with the mandate of eliminating international pollution of the marine environment. [35] MARPOL superseded OILPOL, which had been the previous regulation relevant to dealing internationally with marine pollution from oil[36].

D. International Regulation and the Position of the IMO

Marine pollution is a concept which crosses national boundaries, and is governed by International, Regional and Domestic Laws. This has resulted in overlaps of applicable

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31 ibid 112.

32 The requirement of ratification contains a double threshold which must be achieved. The double threshold being at minimum 15 State that account for at least 50% of the gross tonnages of the international merchant shipping fleet (IMO 2002: Article 15(1)).

33 Elizabeth R DeSombre, Global Environmental Institutions (Routledge 2006) 74.

34 IMO (n 13) iii.

35 John McEldowney, Sharron McEldowney, *Environmental Law* (Pearson Education Limited 2010) 35.

36 MARPOL also applies to any technical aspects of pollution from all types of ships, something that was far beyond the mandate of OILPOL (Tan 2006: 129).

laws and regulations as well as jurisdictions. The United Nations has played an important role in codifying the various treaties and conventions regulating marine pollution. This challenging process commenced with the adoption of the United Nations Convention on the Law of the Sea 1982 (UNCLOS). The ultimate objective of UNCLOS was to create a single consolidated legal instrument that eliminated contradictions and overlap, and to ensure that all gaps in international law were filled.[37]

UNCLOS commenced the process of creating a climate of clarity in relation to governance, and establishing where authority lies in connection to different aspects of the law of the sea. The most significant contribution in this area is in relation to the enhancement of jurisdictional zones for coastal states.[38] UNCLOS reinforces the role of the IMO and the regulations which were created by it. This is done via the designation of certain specific functions to the "competent international organization", a reference that has been accepted to mean the IMO.[39] UNCLOS has accepted and endorsed the IMO regulations through references to the "generally accepted international rules", those being interpreted as MARPOL and SOLAS (Safety of Life at Sea).[40]

The IMO is the international body responsible for setting maritime vessel safety regulations and marine pollution standards. The IMO is a body of the United Nations and is composed of members from over 150 nations.[41] All states which are members of the UN may join the IMO. Any state that is not a member of the UN has the ability to join the IMO provided that the candidate state

37 DeSombre (n 33) 80.

38 ibid.

39 ibid 83.

40 ibid.

41 Claudia Copeland, *Cruise Ship Pollution: Background, Laws and Regulation, and Key Issues* (Congressional Research Service Report for Congress, 2008) CRS-7.

receives endorsement from at least two-thirds of the existing members of the IMO.[42]

The structure of the IMO in relation to decision-making is straightforward. The IMO Assembly, composed of all member states, is the primary decision making body and is mandated to meet every second year. The IMO Council is the body which coordinates the business of the IMO when the Assembly is not in session. The Council is a more manageable group made up of 32 of the member states and the members of Council are elected by the Assembly to serve a two year term and during this term Council must meet at least twice per year.

The Council is not empowered to make recommendations on behalf of the IMO to national governments in areas related to maritime safety and prevention of pollution, as this function is restricted to that of the Assembly.[43] The IMO contains two significant committees which are open to all IMO members, as well as non-members who are parties to the SOLAS and MARPOL conventions. These committees are the Maritime Safety Committee (MSC), which deals with all matters related to maritime safety, and the Marine Environment Protection Committee (MEPC), which deals with all matters related to prevention and control of pollution from ships, and specifically the adoption and enforcement of conventions and regulations related to pollution.[44]

E. The International Convention for the Prevention of Pollution from Ships

The MARPOL convention, as noted, contains six annexes which provide the technical substance on the

42 This requirement is contained in Articles 6 and 8 of the Convention of the IMCO.

43 International Maritime Organization, 'Structure of IMO' <http://www.imo.org/About/Pages/Structure.aspx> Accessed 1 May 2012.

44 ibid.

international standards for protection of the environment from discharge of waste by ships.

For the MARPOL convention to be held as binding, ratification must occur by member states. The requirement is that the number of states which ratify each annex must represent at minimum 50% of global shipping gross tonnage, and be at least 15 states in total. This is known as the double threshold and has not been modified since the adoption of the original MARPOL regulation.[45] All six of the annexes have been ratified as of 2005. Once a state has become a signatory to MARPOL it is that state's responsibility to create and enact domestic legislation which will implement the convention rules. This includes the compulsory annexes (Annex I and II) and the voluntary annexes (Annexes III to VI) to which the country has agreed. The domestic legislation must recognize the related legislation of other MARPOL signatory states and agree to comply with that legislation.[46] Ships that are flagged under a state which is a signatory to MARPOL are subject to the convention regardless of where they sail or operate. It is the duty of the flag state to be responsible for the vessels which are registered under their flag.[47]

There is a very high level of acceptance of IMO negotiated agreements; this is likely due to the fact that the majority of the major shipping states participated in the conventions where the agreements were created, and states are more likely to accept an agreement if they took part in the process of creating them. This level of acceptance is demonstrated by the fact that the states to which 98% of the world's merchant tonnage is registered to, have accepted and become parties to MARPOL.[48]

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45 Copeland (n 41) CRS-8.
46 ibid CRS-8.
47 ibid CRS-7.
48 DeSombre (n 33) 74.

An overview of the significant components of MARPOL is necessary in order to understand the manner in which the convention is meant to operate. Once this overview has been completed, it is possible to examine the issues that are faced in achieving the MARPOL objectives.

F. MARPOL Overview

The International Convention for the Prevention of Pollution from Ships is laid out in a manner which allows for amendments and additions to take place within the Annexes, and not require a major overhaul of the entire convention. MARPOL 1973 is organized into 20 Articles. It is these articles that lay out what the convention parties have agreed upon. Preceding the articles is the preamble which recognizes that there is a need to preserve the marine environment, and that deliberate, negligent and accidental release of oil from ships is a major source of pollution which results in damage to the environment.

With recognition of the key issues taking place, the intention of MARPOL 73 is stated to be the complete elimination of intentional and accidental pollution of the marine environment from oil and all other harmful substances. Finally, it is held that the best method of achieving this is through the establishment of rules.[49] The 20 articles are laid out over 13 pages and provide a framework for MARPOL 73. These articles include: the general obligations under the convention (Art 1), seven key definitions for clarification purposes (Art 2), application (Art 3), violation (Art 4), certificates and special rules on inspecting ships (Art 5), detection of violations and enforcement of the convention (Art 6), undue delay to ships (Art 7), reports on incidents involving harmful substances (Art 8), other treaties and interpretation (Art 9), settlement of disputes (Art 10), communication of information (Art 11), casualties to ships (Art 12), signature, ratification, acceptance,

49 IMO (n 13) 3.

approval and accession (Art 13), optional annexes (Art 14), entry into force (Art 15), amendments (Art 16), promotion of technical co-operation (Art 17), denunciation (Art 18), deposit and registration (Art 19), and languages (Art 20).

Following MARPOL 73 is the Protocol of 1978. In the preamble to this protocol there is an outline of the reasons for its addition. It is recognized that the International Convention for the Prevention of Pollution from Ships can make a significant contribution to the protection of the marine environment, and there is the need to implement the regulations contained within Annex I in order to achieve the prevention of pollution by oil. However, there was a need to defer the implementation of Annex II due to a number of technical problems.

The Protocol of 1978 is very brief and laid out over five pages and nine articles. The main objective of the protocol as set out in Article I is to give effect to MARPOL 73, including Annex I. Article II contains the main structural amendment to MARPOL 73, that being the delay of the implementation of Annex II for a period of 3 years. This period may be extended by approval of two-thirds of the parties to MARPOL 73 who are members of the MEPC. Article III provides an amendment to 11(1)(b) in regards to communication of MARPOL 73. Article IV provides a revised procedure for: signature, ratification, acceptance, approval and accession. Article V provides the ratification requirements and holds that once ratified the protocol will come into force 12 months from the date of ratification. This, in essence, provides an extra year to the three year delay of the implementation of Annex II. Articles VI-IX set out respectively the procedure for amendments, denunciation, the depository and languages, and their relation to MARPOL 73.

The Protocol of 1978 relating to the International Convention for the Prevention of Pollution from Ships 1973, once ratified, would establish the International Convention for the Prevention of Pollution from Ships 73/78 (MARPOL). There also exist two additional protocols,

Protocol I 'Provisions concerning reports on incidents involving harmful substances' and Protocol II 'Arbitration'. These protocols supplement Articles 8 and 10 of the MARPOL convention by providing additional details and requirements.

With the historical development of MARPOL having been examined, as well as an explanation of the structure of the regulation, it is possible to now focus on the challenges faced by MARPOL as an international law regulating marine pollution.

III. MARPOL and Jurisdiction

This section will initially focus on the impact of having multiple jurisdictions associated with the regulation of vessel-source oil pollution. There are overlaps between the jurisdiction of flag, port and coastal states, and due consideration will be given to the challenges that result from this overlap and how MARPOL and UNCLOS operate in practice in this area.

A. The Issue of Jurisdiction

A ship is viewed as quite a unique subject of the law, due to its ability to be subject to more than one system of law; international, national and customary maritime systems of law may all apply simultaneously.[50] It is this unique nature which creates numerous legal discussions, one of which focuses on the question of where jurisdiction over ships rests in relation to MARPOL.

A significant weakness of MARPOL is that the regulation is one that is voluntarily accepted by shipping states. States are responsible for implementing domestic legislation which gives effect to the rules agreed upon in the regulation; and this is also the case with enforcement. Although the IMO exists as the body responsible for

50 Daniel Patrick O'Connell, *The International Law of the Sea: Volume II* (Clarendon Press 1984) 747.

MARPOL, there are no powers vested within the IMO for implementation and enforcement of MARPOL. It is the flag, port, and coastal states, which are the relevant parties in the context of implementation and enforcement of MARPOL. Based on the categorization of the state, their jurisdiction and powers are regulated by customary maritime law as well as UNCLOS, which is a codification of customary international maritime law, currently ratified by 162 nations[51].

B. Development of Jurisdiction to enforce MARPOL

The nationality of a ship is the starting point for determining where jurisdiction lies in relation to that ship and its crew. Historically, there were four connecting factors which were held to be relevant in identifying the nationality of a ship: the nationality of the ship-owning country, the state to which the ship was registered, the nationality of crew members, and finally the nationality of the master of the vessel. [52] The modern position has simplified the determination and provides that the nationality of the vessel is that of the state whose flag it flies under.[53]

Under the customary law of the sea, and affirmed by the Permanent Court of International Justice in the *Lotus Case* 1927, the flag state is the only one which has jurisdiction to enforce any regulations over ships while on the high (international) seas. Only once a ship voluntarily enters a port, may states other than the flag state attempt to enforce a regulation.[54] It is with the flag state that the majority of obligation lies.

A main source of criticism is flag states having the jurisdiction and the responsibility for enforcement over ships

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51 United Nations, 'Oceans and Law of the Sea' <http://www.un.org/Depts/los/reference_files/chronological_lists_of_ratifications.htm> Accessed 1 May 2012.

52 O'Connell (n 50) 752.

53 ibid.

54 Birnie (n 1) 401.

flagged to the state as this causes a reduction in the efficiency of MARPOL.[55] The underlying reason for this is the lack of incentive for flag states to impose and enforce the pollution control rules diligently. UNCLOS Article 217(1) requires that the flag state ensures that the ships registered under its flag comply with all international rules and standards. Yet there does not exist, in any capacity, a means of review of flag state enforcement.

In addition, there are no penalties for flag states who fail to fulfil their MARPOL obligations.[56] While it may be a port or coastal state which detects a violation of MARPOL outside of their own territorial waters, those states are obligated to report the violation to the flag state who is then responsible for bringing proceedings against the offending ship.[57] Flag states tend to be averse to fulfilling the responsibility of prosecuting ships, and this dereliction of responsibility is owed largely to the advent of the flag of convenience.

C. Flag States

The flag of convenience (FoC) is a practice which provides a significant impediment on the achievement of the MARPOL Annex I objectives. It is suggested that flag states lack incentive to enforce and are not subject to penalties for not doing so, which is the main cause for their failure to fulfil MARPOL responsibilities.[58]

The advent of the FoC has allowed the majority of the world's shipping tonnage to be registered with nations that ships would otherwise have no connection to, and

55 IMO (n 11) 203.

56 ibid.

57 Rebecca Becker, 'MARPOL 73/78: An Overview in International Environmental Enforcement' (1997) 10 Georgetown Int Environmental L Rev 631.

58 Richard J Payne, 'Flags of Convenience and Oil Pollution: A Threat to National Security?' (1980) 3 Houston J Int L 72.

possibly never even visit their ports.[59] Ship owners do not even have to visit the flag state to complete registration.[60] The Geneva Convention on the High Seas; Article 5: Section 1 proclaims that 'it is for each state to set the requirements for the granting of ships to fly its flag'.

The flag under which a ship is registered has a significant impact upon the operational costs of that ship. It is for this reason that shipping companies favour the FoC in the same way that multinational corporations base their manufacturing in developing nations, as it allows costs to be reduced and profits to be increased.[61] If a shipping company were interested in registering their vessel, for example, under the flag of the United States, that ship must be constructed in the US.[62] Labour costs, for example, under a Liberian FoC are estimated to be about 25% of that under the US flag. In addition, regulations for taxes and working hours are strictly enforced under a US flag.[63] The most important factor in relation to MARPOL is that the FoC state has in most cases, little power or interest to fulfil their commitments under international law. This allows shipping companies to operate pretty much as they wish on the high seas.[64]

In the majority of cases, port and coastal states detect MARPOL discharge violations. The standard procedure upon detection, as noted above, is to inform the flag state of the violation. Once reported by the port or coastal state, responsibility for prosecuting the vessel shifts to the flag state, which in the majority of cases is reluctant to prosecute.[65] In a study conducted by a Dutch environmental organization, related to violations within the North Sea, it was found that of

59 Mongolia for example, which is landlocked, allows ships to register under its flag.

60 Payne (n 58) 70.

61 ibid 69.

62 In most cases doubling the cost of construction.

63 Payne (n 58) 71.

64 ibid 72.

65 Becker (n 57) 631.

the violations reported to flag states,[66] only in 17% of the cases did the flag state investigate the matter via the process prescribed by the IMO and the MEPC. Only 6% of the total reported violations actually resulted in convictions and fines. Although fines were levied, they were generally held to be insignificant and unlikely to impact future conduct.[67] This aspect will be discussed further in more detail later.

Ultimately, it is the object of FoC states to benefit from the revenue generated by registering ships under their flag. This means that relying on the flag state to enforce MARPOL and take significant action in many instances will prove to be fruitless due to this arrangement.

D. Port States

The jurisdiction of port states has improved since the introduction of MARPOL and was significantly improved further with the adoption of UNCLOS. Historically, port states only had jurisdiction to deal with violations which occurred within their territorial sea[68] or internal waters. If violations occurred outside of this area, then the port state could only inspect the ships documentation once it voluntarily entered into its port. If evidence of a violation was found, this had to be reported to the flag state.[69]

Since the adoption of UNCLOS III, the jurisdiction of port states has been enhanced under Article 218. Port states are able to prosecute foreign flagged ships for violations of internationally accepted regulations[70] that have occurred in international waters. If the violation has occurred within the jurisdiction of another state's coastal or Exclusive Economic Zone (EEZ) waters, the port state is only able to

66 Violations were a mix of FoC and non-FoC.

67 Ton Ijlstra, 'Enforcement of MARPOL: Deficient or Impossible?' (1989) Volume 20 Marine Pollution Bulletin 596.

68 The Territorial Sea extends 12 nautical miles from the baseline.

69 Tan (n 11) 217.

70 MARPOL is considered to be an internationally accepted regulation within Article 218 UNCLOS.

take action upon request by that state or the flag state (UNCLOS Article 218(2)).

Article 218 is tempered by Article 228 which provides flag states with the power of pre-emption in relation to violations that have occurred outside the territorial sea of the prosecuting state, and this must occur within 6 months of the start of proceedings. This pre-emption allows flag states to take action, yet it does not require a judgement against the alleged violator (UNCLOS III, Article 228). MARPOL Article 5(2) provides port states with the power to prevent unseaworthy ships from sailing until repairs have been made. This enhanced position of port state jurisdiction is an important improvement in achieving a greater level of compliance with MARPOL.

It must also be noted, that there remain a number of limitations in relation to the jurisdiction of port states. The port state is not obligated to take action and prosecute when informed of a violation by a coastal state. Once informed of a suspected violation, the port state is able to then report the violation to the flag state and avoid the cost involved in bringing proceedings against the violator, since the state prosecuting an alleged violation bears the cost of the legal proceedings.[71] Due to the significant financial costs involved in legal actions against alleged violators, it is common practice for a port state to choose to exercise the option of reporting to the flag state, rather than initiating proceedings under its enhanced powers.[72]

In an extensive study conducted by another Dutch environmental organization, it was found that in a period of seven years where 1335 violations were reported by port states to the IMO, 1077 were referred to the flag states for action, with only 238 being dealt with by the port state.[73] The existence of the enhanced port state jurisdiction only

71 Becker (n 57) 633.

72 ibid 632.

73 ibid.

resulted in slightly over 17% of cases reported by port states to the IMO to have resulted in judicial action by the port states within the study period. The violations reported to the IMO and referred to flag states resulted in only 5% of the alleged violations having any type of hearing or trial and just under 0.1% resulted in disciplinary action.[74]

It is evident that although there has been an enhancement in the jurisdiction of port states, the application of this increased optional power is not significant. In addition, there is no mandatory requirement for the port state to take any action. It is suggested that the reluctance of port states to act may be based on having to incur the cost of action against violators, as well as the impact it may have on the commerce of its ports if it gains a reputation for taking strict action against violators.[75]

Additionally, there are logistical challenges in high traffic ports that deal with thousands of vessels per year.[76] Port states are empowered to inspect ships to ensure that the flag state has issued an International Oil Pollution Prevention Certificate (IOPP). If a ship is in possession of an IOPP, then the port state, under MARPOL, must treat the certificate as if it had been issued by the inspecting port state (Annex I, Article V). The port state may only disregard the IOPP where there is clear evidence that the condition of the ship or its equipment does not correspond with that of the IOPP, and intervention is warranted.[77] The standard intervention is that the port state will not allow the ship to sail until repairs have taken place. It is important for a port state to have a clear understanding of what is significant enough to warrant intervention through the prevention of departure from a port, as opposed to being overzealous and causing

74 ibid 633.

75 Tan (n 11) 220.

76 ibid.

77 Andrew Griffin, 'MARPOL 73/78 and Vessel Pollution: A Glass Half Full or Half Empty?' (1994) 2 Indiana Journal of Global Legal Studies 501.

undue delay, which could result in the port state being liable to the ship owner.[78]

E. Coastal States

The coastal state has traditionally been viewed as the innocent bystander who, through no fault of its own but by virtue of its geographical location, was significantly impacted by all types of oil discharges due to shipping.[79] The *Torrey Canyon* disaster was the event which focused attention on the deficiency of the customary maritime laws to address the impact of events which take place outside the territorial sea of a coastal state, yet still having a significant impact on that state.[80]

The central point of this issue has been the customary right of unimpeded free usage of the high seas, under Article 2 of the High Seas Convention 1958. Only within the 12 nautical mile territorial sea of a coastal state and within the internal waters, was there freedom to enforce national legislation (UNCLOS III Article 2). This legislation, the High Seas Convention may be more stringent than that of the commonly accepted international regulation, due to the right of national sovereignty.[81]

There are however, limitations within UNCLOS on this matter, one of which is that the coastal state cannot interfere with the right of innocent passage or international navigation. Coastal state jurisdiction is also excluded from matters related to the construction and infrastructure of vessels, areas where supremacy is given to MARPOL and SOLAS (UNCLOS III, Article 21(2); 211(4), Articles 17-19; 24-25).

Through the French and British reaction to *Torrey Canyon*, came the UNCLOS adoption of the rights of coastal

78 Birnie (n 1) 406.
79 M'Gonigle (n 16) 143.
80 ibid 146.
81 Birnie (n 1) 414.

states to the EEZ under Article 56. This is an area which extends beyond that of the territorial sea to a distance of 200 nautical miles from the baseline. The coastal states are given jurisdiction in relation to protection of the marine environment in this area (UNCLOS III, Article 56).

Birnie highlights that the EEZ is not an automatic jurisdiction but instead the coastal state must claim the jurisdiction in order to have it. To assume jurisdiction over matters of pollution, the accepted practice is to legislate on the matter domestically, and at that point jurisdiction will be assumed over the EEZ.[82] UNCLOS Article 211(5) only permits the enactment of laws over the EEZ that are in conformity with internationally accepted regulations, which in this case is MARPOL. This is stricter compared to UNCLOS Article 2, which applies only to territorial waters. There is one exception to Article 211 (5) and that is in application to the arctic and ice covered areas within the EEZ, which has been exercised by Canada.[83]

UNCLOS has extended the jurisdiction of coastal states to allow them to bring proceedings against ships which have violated MARPOL outside their territorial sea, provided that it is within the EEZ and only after they have entered that state's port (UNCLOS Article 220(1)). If a substantial violation which causes a significant threat of pollution has taken place within the EEZ, the coastal state is permitted to make a physical inspection of the vessel if it has refused to give required information or if the information provided is unreliable (UNCLOS Article 220(5)).

It is only in the situation described within Article 220(5) that the coastal state may arrest and detain a vessel that has entered into its territorial waters (UNCLOS Article 220(6)). If the violation is not deemed serious enough to warrant the above actions or entry into the territorial waters does not occur, then the coastal state must present the

82 Birnie (n 1) 418.
83 ibid 419.

evidence to either a port state visited by the vessel or to the flag state in the hope that the evidence will be sufficient for a prosecution to take place.

The difficulty with coastal state jurisdiction is that the state is limited to act only on significant violations occurring within their territorial waters, or upon those which have occurred in the EEZ where the offending vessel enters territorial waters. This is not a significant enforcement power due to its limitations, and if the coastal state is not also a port state, it is powerless to take judicial action directly against offenders.

Instead, it is required to rely on port or flag state prosecutions, something that has a minuscule chance of being successful. Although the EEZ is available, there are only a limited number of states who have legislated on EEZ pollution enforcement, and those who have legislated have done so in general terms or have not conformed with the requirements of UNCLOS.[84]

IV. MARPOL And The Operational Challenges

The focus in this section is on the operational challenges faced in putting MARPOL regulations into practice. These challenges are largely dictated by financial complications. Foremost is the question of whether punitive fines have a deterrent impact on discharge violations. Consideration will also be given to the additional issues of the costs of enforcement by coastal states, as well as implementation by port states of reception facilities for oily waste from vessels.

A. Operational Issues in Executing MARPOL

Discharge standards under the auspices of OILPOL failed to have an impact on operational oil discharges due generally to the lack of reliable monitoring equipment and

84 Tan (n 11) 214.

surveillance capability.[85] Compliance thus relied on the good faith and honesty of a ship's crew.[86]

The equipment requirements under MARPOL in the construction of new vessels and the retrofitting of older ones are suggested to have ensured more effective compliance with the regulations by ship owners than the discharge standards.[87] These equipment standards are able to be enforced by developed port states, as they have the resources, incentives and authority to ensure compliance.

Tan suggests that detention of vessels or denial of entry into ports for a blatant equipment or construction violation has a much greater deterrence on ship owners than does the possibility of a judicial fine for discharge violations.[88] This view on the effectiveness of the deterrence is based on the significant financial impact that detention or denial of entry will have immediately on ship owners.

B. Challenges of Enforcement and Deterrence: US Example

The impact of financial penalties as a method of deterrence of illegal oil discharge from ships has been studied in the US. This study should be viewed as a realistic evaluation of the impact of these penalties, due to the level of enforcement exercised on behalf of the US. The United States Coast Guard (USCG) is responsible for prevention of damage to the marine environment through operational and accidental discharges and the USCG enforces the domestic legislation that implements MARPOL requirements in US territorial waters.[89]

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85 M'Gonigle (n 16) 262.

86 ibid.

87 Tan (n 11) 237.

88 ibid 238.

89 Kishore Gawande, Alok K Bohara, 'Agency Problems in Law Enforcement: Theory and Application to the US Coast Guard' (2005) 51 Management Science 1595.

With approximately 30% of the annual operating budget dedicated to the Marine Inspections Program, the USCG is provided with approximately $3 Billion USD to fulfil this objective.[90] It is due to this substantial allocation of resources that the USCG should be considered a strong example of MARPOL enforcement and will be examined below.

Research conducted by analysing a number of studies beginning in the early 1980s through the late 1990s has found that the use of fines as deterrence in the US has only impacted operational discharges on a small scale. This is due to the fact that when issuing fines of $10,000 USD and under, only a limited amount of resources are required by the USCG and these cases can be disposed of rather quickly.[91]

In cases of larger discharges, it is suggested that there is a pattern of under penalization. This is due to the significant resources required for the USCG to issue fines in excess of $10,000 USD, or for these cases to be heard as a judicial civil penalty case. A case will be heard as a judicial civil penalty case where aggravating factors may be considered in order to assess a greater penalty than listed as standard for the discharge, but within the statutory maximum. In addition, the Oil Pollution Act 1990 imposes limits on the liability courts may impose on violators.[92]

In the period leading up to 2000, it was found that cases involving oil discharges regularly took more than a year to settle, and that the average penalty imposed by the USCG once a case had been settled was $3.96 USD per litre of oil discharged.[93] Additionally, there is reluctance on the part of the US to detain vessels for discharge violations that are

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90 ibid.

91 ibid 1601.

92 ibid.

93 John M Weber, Robert E Crew, 'Deterrence Theory and Marine Oil Spills: Do Coast Guard civil Penalties Deter Pollution?' (2000) 58 Journal of Environmental Management 165.

considered minor (those below 5000 gallons). This lack of detention results in difficulty in the collection of fines for minor violations, especially if the ship does not return to a US port.[94]

The US example demonstrates how MARPOL enforcement even in a developed state with significant resources, legislation and motivation to enforce, is unable to overcome the fundamental difficulties connected to using financial penalties to deter illegal discharges.

C. Technological Difficulties of Monitoring Discharges and Collecting Reliable Evidence

An early factor identified as a probable challenge for MARPOL was that of monitoring discharges from older ships which have not been the subject of strict construction requirements. The US National Academy of Sciences highlighted a lack of efficient monitoring as a deficiency in MARPOL. This shortcoming is viewed as a primary contributor to the difficulty in identifying the sources of oil discharges.[95] Tests conducted by the EEC demonstrated that discharges which fall within both the MARPOL special area and standard regulations were not detectable by the standard remote sensing equipment in use for the first decade of MARPOL.

It was concluded from those tests that discharges which were detectable were always above that of the standard limit, and observation by this method should be clear evidence of a violation of MARPOL.[96] Although it is possible to identify the existence of a discharge above that which is permitted, without the ability to take a sample it is near impossible to demonstrate to a court the exact discharge amount and it is thus unlikely for monitoring equipment

94 Mitchell (n 15) 451.
95 Nauke (n 4) 77.
96 Ijlstra (n 67) 597.

alone to provide sufficient evidence to court of a specific measurable violation.[97]

The difficulty of detecting discharge violations and the high cost involved in the collection of evidence through aerial surveillance, as well as the need to develop new technologies that are able to provide sufficient evidence which meets the evidentiary standards required by the judiciary are a significant factor which results in many nations being unwilling or unable to implement.[98]

The suggestion of Tan that equipment standards are the more reliable method of compliance is one which carries weight. Detention and barring from ports carries a very significant and immediate impact on ship owners. Total avoidance of compliance would result in a vessel being unable to trade in the majority of ports and thus significantly reduce its economic worth.[99] The ability for states to detain vessels creates significant and immediate financial penalties on ship owners due to "the cost of delays and lost trade.

There is no direct cost to the port state detaining a vessel. Detention can take place without the need for the drawn out process involving judicial hearings, which take place when taking action due to discharge violations. The evidentiary problems faced in dealing with discharge violations will also not arise.[100]

Although only a handful of MARPOL states have detained vessels by exercising this power, it does not mean that the equipment regime is not successful. The low number of detentions is considered evidence of a high degree of compliance. [101] Although compliance of equipment standards does not impose a cost on port states in relation to enforcement as the ship owners absorb

97 Becker (n 57) 637.
98 Mitchell (n 15) 454 .
99 ibid 451.
100 ibid 452.
101 ibid.

compliance costs, port states as members of MARPOL are required to have discharge reception facilities. This aspect of reception facilities as part of the equipment regime demonstrates yet another operational difficulty in putting MARPOL into practice.

D. Reception Facilities: An Unfulfilled Obligation

It is stipulated by MARPOL that there should be reception facilities available in ports for wastes that cannot be discharged while at sea (Annex I, Regulation 12). The regulation placed the requirement for reception facilities to be available and operational one year from the entry into force of MARPOL Annex I. However, ten years on from the ratified deadline, many states still had not constructed reception facilities due to the cost involved as well as the fact that there is a lack of repercussions for non-compliance.[102]

In developing countries where the level of compliance with is lowest, the estimated cost to construct a reception facility starts at $500 million USD. This would require a level of investment which is impossible for these states to justify.[103] A survey assembled by the MEPC in 1990 based on reported findings from MARPOL member states to the IMO, found that of the 993 ports which were surveyed there were 104 which did not have any receptions facilities.[104]

Within the MARPOL special areas, where discharges are not permitted at all, and there is an increased need for receptions facilities, the survey found that 5.9% of the ports reported did not have the reception facilities required.[105] This has resulted in flag states electing not to enforce discharge standards for their ships operating in special area waters where the nations whose ports they called

102 Griffin (n 77) 505.
103 Tan (n 11) 267.
104 Mitchell (n 8) 196.
105 ibid 203.

upon had not complied with the reception facility requirement.[106]

The European Union, whose member states have all adopted MARPOL, has taken significant action in ensuring that reception facilities required within the convention are in place. This has occurred through EU Directive 2000/59/EC and due to the supremacy of EU law on the member states, they are obligated to comply with the directive and establish the necessary port reception facilities for the types of ships regularly calling at their ports.[107] Olson has noted that refinery terminals where vessels take on their cargo of oil are generally equipped with the necessary equipment to process oily water on a large scale.[108]

The presence of these facilities does not guarantee that they will be used, and this is due to the fact that some ports charge exorbitant reception fees or that the use of the facilities would cause a significant delay.[109] For these reasons, ships may be willing to take the risk of dumping oily water or waste into the sea due to the fact that even if they are caught there is a low chance of sanction, and in the limited case that a sanction is imposed it would be unlikely to have a major effect on the operation of the ship or its owner.[110]

It is evident that there is a circular relationship between the different operational aspects within MARPOL. This is demonstrated by the fact that it is necessary for the shipping industry to comply with construction and equipment requirements in order to operate in a manner where it is not necessary to discharge oil into the sea. There is a need for the MARPOL port states to ensure that reception facilities are in place and that they are operated in a manner which is not prohibitive financially in relation to the cost of use and

106 ibid 204.

107 Butt (n 2) 592.

108 Philip Olson, 'Handling of Waste in Ports' (1994) Volume 29 Marine Pollution Bulletin 289.

109 Tan (n 11) 256.

110 ibid 263.

the efficiency of that use. There must also be incentive to use the facilities, and significant deterrence to ensure that crews do not view the option of illegal discharge as more favourable due to insufficient enforcement and punishment. Thus the operational challenges are interconnected. As such, there is no single solution and it is not possible to point to a single shortcoming as the reason for unsatisfactory compliance with MARPOL.

The lack of available sufficient financial resources tends to be an underlying theme for unsatisfactory compliance with MARPOL. This is true for port, flag and coastal states, and a potential solution would be based on providing subsidization to the financially challenged states which would assist in providing the resources that result in improved compliance.

This potential solution creates its own issues, such as where would the funding come from, who would provide it, how would a state qualify, and is it possible to ensure the funding is spent on MARPOL related expenditures? Funding could also be provided to states as a reward for compliance, however once again the question arises as to how the states would find the financial resources necessary for compliance in the first place.

As these two simple examinations of possible solutions show, there is no single solution that can be applied without creating a host of new issues. This finding also supports the position that there is not a single shortcoming that can be addressed and result in total MARPOL Annex I compliance.

V. Conclusion – Final Thoughts

There are a number of different factors that can be judged in determining whether MARPOL has been able to successfully achieve its Annex I objectives. Evidence presented here has proven that since the adoption of MARPOL discharge, construction and equipment regulations, there has been a decline in the amount of oil entering the sea from ships.

What remains to be seen is whether the reduction in vessel-source oil pollution is a direct result of MARPOL as an international regime driving change through compliance and behavioural changes. Breitmeier suggests that international regimes are established as a method of dealing with urgent transnational problems that occur in both the social and natural world.[111] In the case of vessel source oil pollution, the problems occur in one and affect the other. The success of MARPOL as an international regime thus can be judged on the questions of whether it is able to cause the individuals, companies and states involved to act positively towards alleviating the issue of vessel-source oil pollution.[112]

Action and compliance should not be driven by forced obligation but instead through improved knowledge and education about the issues and the problems that arise because of it. This knowledge will result in a willingness to be part of the solution rather than part of the problem.[113] The design of MARPOL as an international regime voluntarily adopted by maritime states suggests that a driving force behind acceptance should be viewed as improved understanding of the issue of vessel-source oil pollution, and the impact of discharges on coastal states.

The issues identified in the above sections, and related to compliance difficulties should be viewed not as an unwillingness of signatories to comply with MARPOL, but as the obstacles to compliance.

The most significant obstacle for states is that of financial resource availability. This is demonstrated, as discussed previously, through the difficulties faced by states in monitoring discharge violations at sea, the inability of flag states to take judicial action against offenders, as well as the reporting by coastal and port states back to flag states of alleged violations. In the USCG example considered above,

111 Helmut Breitmeier, *The Legitimacy of International Regimes* (Ashgate Publishing Limited 2008) 19.

112 Mitchell (n 15) 425.

113 Breitmeier (n 111).

it was found that actions taken are dictated by the cost of the resources required. Additionally, the underlying issue connected to the lack of total compliance with regard to reception facilities is driven by financial resources of both states and shipping companies.

It is significant to note that although financial factors impact compliance, the shipping companies have complied with equipment and construction standards more so than they have done with discharge standards, even though they are the far more expensive aspect with which to comply. The compliance of shipping companies with the construction and equipment standards allows for the prevention of violations by removing the possibility of them occurring, rather than working within a system of deterrence.[114]

Ultimately, there is no single solution to the challenges that exist in relation to the elimination of discharge violations. Discharge violations are not a black and white issue like that of construction and equipment, where either you are in compliance or you are not. Discharge violations follow more closely to the adversarial criminal law process, where there are many steps to get from the act at issue taking place, all the way to it being proven and then a punishment being imposed.

It is argued that international rules reflect the interests of the most powerful states. In shipping however, the most powerful states are those who have a significant number of vessels flagged to it, as well as the coastal states that export the majority of the world's crude oil, rather than the powerful western states who have been the victims of oil pollution.[115]

MARPOL, therefore, represents a legitimate international regime and though it has faced compliance challenges, there does appear to be the intention of the signatories to comply with MARPOL and to do their part to

114 Mitchell (n 15) 428.
115 ibid.

protect the marine environment from vessel-source oil pollution. MARPOL has not yet fully achieved this objective, yet it should be viewed as a successful international regime, for the reasons above, which has made a significant difference by empowering states to protect the marine environment and by putting in place a framework by which both global shipping and the marine environment can prosper without one suffering for the benefit of the other.

BIBLIOGRAPHY

Books

Birnie P, Boyle A and Redgwell C, *International Law and the Environment* (3rd Edition, OUP 2009)

Breitmeier H, *The Legitimacy of International Regimes* (Ashgate Publishing Limited 2008)

DeSombre ER, *Global Environmental Institutions* (Routledge 2006)

McEldowney J and McEldowney S, *Environmental Law* (Pearson Education Limited 2010)

—, *Environmental Law & Regulation* (Blackstone Press 2001)

International Maritime Organization, *MARPOL 73/78 Consolidated Edition, 2002* (IMO 2002)

M'Gonigle RM and Zacher MW, *Pollution, Politics and International Law: Tankers at Sea* (University of California Press 1979)

Mitchell RB, *Intentional Oil Pollution at Sea: Environmental Policy and Treaty Compliance* (The MIT Press 1994)

O'Connell DP, *The International Law of the Sea: Volume II* (Clarendon Press 1984)

Tan AK, *Vessel Source Marine Pollution: The Law and Politics of International Regulation* (Cambridge University Press 2006)

Academic Journals

Ayorinde AA, 'Inconsistencies Between OPA '90 and MARPOL 73'78: What is the Effect on Legal Rights and Obligations of the United States and Other Parties to MARPOL 73/78?' (1994) 25 Journal of Maritime Law and Commerce 55

Becker R, 'MARPOL 73/78: An Overview in International Environmental Enforcement' (1997) 10 Georgetown International Environmental Law Review 625

Butt N, 'The Impact of Cruise Ship Generated Waste on Home Ports and Ports of Call: A Study of Southampton' (2007) 31 Marine Policy 591

Copeland C, *Cruise Ship Pollution: Background, Laws and Regulation, and Key Issues* (Congressional Research Service Report for Congress, 2008)

Curtis JB, 'Vessel-Source Oil Pollution and MARPOL 73/78: An International Success Story?' (1984) 15 Environmental Law 679

Dzidzornu DM, Tsamenyi BM, 'Enhancing International Control of Vessel-Source Oil Pollution Under the Law of the Sea Convention, 1982: A Reassessment' (1990) 10 University of Tasmania Law Review 269

Gawande K and Bohara AK, 'Agency Problems in Law Enforcement: Theory and Application to the US Coast Guard' (2005) 51 Management Science 1593

Griffin A, 'MARPOL 73/78 and Vessel Pollution: A Glass Half Full or Half Empty?' (1994) 2 Indiana Journal of Global Legal Studies 489

Ijlstra T, 'Enforcement of MARPOL: Deficient or Impossible?' (1989) Volume 20Marine Pollution Bulletin 596

Karim MS, 'Implementation of the MARPOL Convention in Developing Countries' (2010) 79 Nordic Journal of International Law 303

Kullenberg G, 'Approaches to Addressing the Problems of Pollution of the Marine Environment: An Overview' (1999) 42 Ocean and Coastal Management 999

Mitchell RB, 'Regime Design Matters: Intentional Oil Pollution and Treaty Compliance' (1994) 48 International Organization Foundation 425

Nauke M and Holland GL, 'The Role and Development of Global Marine Conventions: Two Case Histories' (1992) Volume 25 Marine Pollution Bulletin 74

Olson PH, 'Handling of Waste in Ports' (1994) Volume 29 Marine Pollution Bulletin 284

Payne RJ, 'Flags of Convenience and Oil Pollution: A Threat to National Security?' (1980) 3 Houston Journal of International Law 67

Peet G, 'The MARPOL Convention: Implementation and Effectiveness' (1992) 7 International Journal of Estuarine & Coastal Law 277

Weber JM, Crew RE, 'Deterrence Theory and Marine Oil Spills: Do Coast Guard civil Penalties Deter Pollution?' (2000) 58 Journal of Environmental Management 161

Wiswall FL, 'The Nature and Future of Maritime Law' (2004) 1 WMU Journal of Maritime Affairs 1

Xu J, 'Theoretical Framework of Economic Analysis of Law Governing Marine Pollution' (2006) 5 WMU Journal of Maritime Affairs 75

Legislation

European Union Directive 2000/59/EC

Geneva Convention on the High Seas 1958

International Convention for the Prevention of Pollution of the Sea by Oil, 1954

International Convention for the Prevention of Pollution by Ships 1973 As Amended by the Protocol of 1978

United Nations Convention on the Law of the Sea III 1982