3

POLLUTION FROM DUMPING

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3.1 Introduction

Dumping at sea is a major cause of marine pollution that accounts for about 10 per cent of marine environment pollution.[1] Ocean dumping was once considered a necessary means of disposing industrial and even radioactive waste, due to the cost and impacts of waste disposal on land. It is now regarded, however, as a serious interference with the marine environment, its biodiversity, and with the earth's ecosystem. The disposal of waste at sea by individual countries arguably imposes pollution risks on other countries and future generations, and creates major environmental and security problems.[2] Since the 1950s and, most manifestly, since 1972, the issue of dumping waste at sea has been an agenda of international law. It is now the subject of a specific global framework and is regulated by a number of significant international and regional treaties. This chapter reviews and analyses the international legal regime of pollution from dumping at sea.

The origins of the present day international regime can be found in the international community's focus on the disposal at sea of radioactive waste.[3] This chapter considers the international legal regime that applies today to the dumping of waste, including the dumping of radioactive waste at sea. It focuses, in particular, on the specific international legal framework that regulates sea dumping established by the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter 1972[4] (London Convention) and the London

[1] P Sands and J Peel, *Principles of International Environmental Law* (3rd edn, Cambridge University Press, 2012) 365.

[2] S Boehmer-Christiansen, 'An end to radioactive disposal "at sea"?' (1986) 10 *Marine Policy* 119, 131.

[3] O Schram Stokke, 'Beyond Dumping? The effectiveness of the London Convention' (1989/99) *Yearbook of International Cooperation and Development* 39, 39.

[4] Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter (London, 29 December 1972, entered into force 30 August 1975) 1046 UNTS 120.

Convention's 1996 Protocol. The chapter also examines the regional treaties and arrangements that apply to pollution from dumping at sea. Further, this chapter also explores recent responses of the international sea dumping regime to climate change and the extent to which it currently regulates the dumping at sea of radioactive waste: the issue that was its genesis.

3.2 Convention on the Law of the Sea 1982

The UN Convention on the Law of the Sea 1982 (UNCLOS)[5] does not prohibit dumping: it regulates dumping. Under UNCLOS Article 1(5)(a) dumping is defined as 'any deliberate disposal of waste or other matter from vessels, aircrafts, platforms or other man-made structures at sea'. Included in this definition is the deliberate disposal of vessels and other sea installations (Art. 1(5)(a)(ii)). The same article excludes from the definition the disposal of wastes and other matter that are incidental to the normal operations of vessels and other offshore installations (Art. 1(5)(b)(i)). The definition provided by the UNCLOS is similar to the definition of dumping in the London Convention,[6] which is noted below, and to the definition contained in a number of other international and regional treaties.[7]

The provisions of the UNCLOS that regulate dumping at sea can be found in Articles 210 and 216. Under Article 210(1) coastal states are obliged to adopt national laws in order to prevent, reduce, and control the amount of pollution by dumping in the marine environment. A State's national laws and regulations must not be less effective than the global rules in place that prevent and control marine pollution by dumping (Art. 210(6)). Article 210, while not banning dumping completely, regulates it and provides that dumping within the territorial sea, the exclusive economic zone (EEZ) and the continental shelf shall only be carried out with the permission of the coastal state (Art. 210(5)).

The existing global rules and standards in relation to dumping and which give content to the obligations under the UNCLOS are now based on the provisions of a large number of international instruments, notably the 1996 London Protocol, and several regional instruments, such as the 1992 Convention for the Protection

[5] UN Convention on the Law of the Sea (Montego Bay, 10 December 1982, entered into force 16 November 1994) 1833 UNTS 3.

[6] The London Convention, Art. 3(1).

[7] See also The Convention on the Protection of the Marine Environment of the Baltic Sea Area (Helsinki, 9 April 1992, entered into force 17 January 2000) 1507 UNTS 167 (The Helsinki Convention) BNA35: 0401 Art. 2(4), and The Convention for the Protection of the Mediterranean Sea Against Pollution (Barcelona, 16 February 1976, entered into force 12 February 1978) 1102 UNTS 27 (Barcelona Convention); revised and renamed as the Convention for the Protection of the Marine Environment and the Coastal Region of the Mediterranean and The Protocol for the Prevention of Pollution in the Mediterranean Sea by Dumping from Ships and Aircraft (The Barcelona Protocol) (Barcelona, 16 February 1976) as revised, Art. 3.

of the marine Environment of the North-East Atlantic (OSPAR Convention). The general provisions in relation to dumping of waste at sea in the UNCLOS are significant, as the large number of states that are party to the UNCLOS has meant that many provisions of the UNCLOS may now be considered customary international law.

3.3 The London Convention Regime

The London Convention is a major global convention which establishes a global legal framework to protect the marine environment from human activities and has been in force since 1975. It currently has eighty-seven States Parties.[8] A review of the London Convention took place in the mid-1990s. The result of those negotiations was the 1996 Protocol. Both of these instruments are examined in detail below.

Article 2 of the London Convention requires the Contracting Parties to 'take effective measures individually, according to their scientific, technical and economic capabilities, and collectively, to prevent marine pollution caused by dumping and shall harmonise their policies in this regard'. Article 2 of the London Protocol is framed in similar terms.

The London Convention does not prohibit ocean dumping, and indeed, with the exception of certain limited wastes, almost any material can be dumped at sea under certain circumstances and with the requirement for it to be authorized through the grant of permits being issued by national authorities of the contracting parties. Dumping is defined in Article 3 as 'any deliberate disposal at sea of wastes or other matter from vessels, aircraft, platforms or other man-made structures at sea' and 'any deliberate disposal at sea of vessels, aircraft, platforms or other man-made structures at sea'. The London Convention expressly excludes from the definition of dumping disposal at sea of matter that is incidental to, or derived from, the normal operations of vessels, aircraft, platforms, or other man-made structures at sea and their equipment. Similarly, matter that is placed in the sea other than merely for disposal is excluded from the definition of dumping (Art. 3).

The London Convention regulates three categories of wastes: (1) highly hazardous substances, (2) grey list wastes, and (3) all other wastes. The first category, listed in Annex I of the London Convention, includes crude oil and its wastes, refined petroleum products, petroleum, radioactive wastes or matters, biological and chemical warfare materials, industrial wastes, persistent plastics, organohalogen

[8] International Maritime Organization, 'London Convention and Protocol' <http://www.imo.org/OurWork/Environment/LCLP/Pages/default.aspx> accessed 1 February 2014.

compounds, mercury and mercury compounds, and incineration at sea of industrial waste and sewage sludge. Dumping of waste listed in Annex 1 is prohibited pursuant to Article IV(1)(a) of the London Convention.

The hazardous list in Annex II of the London Convention contains substances and materials that require special care. These materials can only be dumped with a prior special permit, pursuant to Article IV(1)(b). Annex II includes: wastes containing significant amounts of, for example, arsenic, zinc, copper, and lead; and containers, scrap metal, and other bulky wastes liable to sink to the sea bottom and present a serious obstacle to fishing or navigation.

The dumping of all other wastes or matter requires a prior general permit pursuant to Article IV(1)(c). A prior general permit may only be issued after careful consideration of all the factors set forth in Annex III. These factors include the characteristics and composition of the matter and the characteristics of the dumping site and method. The issue of a special and general permit for the dumping of wastes, except the hazardous and grey list, is within the power and discretion of national authorities of each state.[9] However, a special permit by parties to the Convention may only be issued in certain circumstances, including in emergencies that pose unacceptable risks relating to human health and admit no other feasible solution.[10] Further, the contracting parties must advise and consult in advance other countries that may be affected, as well as the International Maritime Organization (IMO).[11] In practice, not all parties follow the requirement of reporting to other countries and the IMO when they prescribe the dumping of special wastes at sea.[12]

The London Convention requires the contracting parties to promote support for training of scientific and technical personnel, the supply of equipment and facilities for research, and the methods for the disposal and treatment of waste and other measures to prevent or mitigate pollution caused by dumping (Art. IX). Article X requires the contracting parties to develop, in accordance with the principles of international law relating to State responsibility, procedures for the assessment of liability and the settlement of disputes regarding dumping of waste at sea.

The contracting parties have designed a mechanism for Consultative Meetings of the Parties, which are held at the International Maritime Organization Headquarters in London. These meetings occur at least once every two years. The Consultative Meetings review, administer, and implement the Convention, and may

[9] London Convention 1972, Art. VI(1).
[10] London Convention, Art. V(2).
[11] London Convention, Art. V(2).
[12] See eg 'Status of Compliance with the Notification and Reporting Requirements under Article VI(4) of the London Convention 1972', IMO Doc LC 27/INF.2, 25th July 2005, cited in Sands and Peel (n. 1) 367–8.

adopt amendments to the Convention and its annexes based on scientific or technical considerations.[13] The Consultative Meetings have established a number of subsidiary groups. At its Fourteenth Meeting the Scientific Group of the London Convention was established. The Scientific Group meets regularly and addresses issues relating to various scientific aspects of ocean dumping. The 36th Meeting of the Scientific Group, held in Buenos Aires in May 2013, addressed a number of issues, including a Review of the CO2 Sequestration Guidelines.[14]

3.4 The 1996 London Protocol

As noted above, the outcome of the review of the London Convention in the 1990s was the 1996 London Protocol,[15] which currently has forty-four Contracting Parties.[16] The London Protocol is a more modern and comprehensive waste management regime that places greater emphasis on marine protection than the London Convention does. It is a more restrictive scheme than that of the London Convention: Article 4 of the London Protocol prohibits all forms of dumping, except for certain listed substances which are contained on the 'safe list' in Annex I. These wastes include dredged material, sewage sludge, fish waste, vessels, and platforms or other man-made structures, inorganic geological materials, organic materials of natural origin; bulky items primary comprising of iron, steel, and concrete, and other similarly harmless materials for which concern is their physical impact.[17] The dumping of Annex I substances requires a permit. This effectively reverses the mechanism of the London Convention and reflects the precautionary approach which is expressly contemplated in Article 3 of the London Protocol which states:

> In implementing this Protocol, Contracting Parties shall apply a precautionary approach to environmental protection from dumping of wastes or other matter whereby appropriate preventative measures are taken when there is reason to believe that wastes or other matter introduced into the marine environment are likely to cause harm even when there is no conclusive evidence to prove a causal relation between inputs and their effects.

[13] London Convention 1972, Arts XIV, XV(2).

[14] The 36th meeting of the Scientific Group of the London Convention and 7th meeting of the Scientific Group of the London Protocol (LC-SG36/LP-SG7) were held concurrently from 27–31 May in Buenos Aires, Republic of Argentina. See 'Convention and Protocol News', International Maritime Organization, 29 January 2013, <http://www.imo.org/OurWork/Environment/SpecialProgrammesAndInitiatives/Pages/London-Convention-and-Protocol.aspx> accessed 19 August 2013.

[15] The Protocol to the Convention on the Prevention of Marine Pollution by Dumping of Wastes and other Matter (The London Protocol) (7 November 1996) (1997) 36 *ILM* 1.

[16] International Maritime Organization 'London Convention and Protocol' <http://www.imo.org/OurWork/Environment/LCLP/Pages/default.aspx> accessed 1 February 2014.

[17] London Protocol, Annex 1.

The London Protocol entered into force in March 2006. It supersedes the London Convention as between the parties to the Protocol.[18] The London Protocol is designed ultimately to replace the London Convention entirely. For the present time, however, both agreements are in force and parties may join the Convention without joining the Protocol.[19]

The London Convention and the Protocol create parallel regimes which represent an innovative and unique approach in administration of international treaties.[20] Regular annual meetings of the Parties to both instruments, the production of some very important up-to-date and detailed regulations for dumping at sea of waste and materials, and the gradual increase in the number of states joining both treaties, indicate that the global legal regime provided by these treaties is working effectively. It has, thus, rightly been said that the London Convention, in practice, has been largely successful in establishing an international legal framework for action in relation to dumping.[21]

3.5 Responding to Climate Change

In 2006, the London Protocol was amended to allow sequestration of carbon dioxide under the seabed to facilitate climate change mitigation measures. Annex 1 was amended to include carbon dioxide streams from carbon dioxide capture processes for sequestration on the 'safe list' of waste that can be dumped at sea. Clause 4 was also added to Annex 1 to provide that 'carbon dioxide streams may be considered for dumping if the disposal is into a sub-seabed geological formation and they consist overwhelmingly of CO2 and no wastes or other matters are added for the purpose of disposing of those wastes or other matters'. These amendments entered into force on 10 February 2007.

For similar reasons at the Fourth Meeting of the Contracting Parties to the London Protocol, held in October 2009, Article 6 of the London Protocol which prohibits contracting parties from allowing the export of wastes or other matter to other countries for dumping or incineration at sea was amended to enable transboundary exports of CO2. This was necessary as the term 'export' has been interpreted to include any movement of CO2 from one country to another for the purpose of dumping at sea.[22] There was no exception for transferring CO2 in

[18] International Maritime Organization 'London Convention and Protocol' <http://www.imo.org/OurWork/Environment/LCLP/Pages/default.aspx> accessed 1 February 2014.

[19] Sands and Peel (n. 1) 366.

[20] Sands and Peel (n. 1) 366, and P Verlaan, 'Current Legal Development: London Convention and London Protocol' (2011) 26 *The International Journal of Marine and Coastal Law* 185, 185.

[21] P Birnie, A Boyle, and C Redgwell, *International Law & the Environment* (3rd edn, Oxford University Press, 2009) 472.

[22] International Maritime Organization (2008), *Report of the 1st Meeting of the Legal and Technical Working Group on Transboundary CO2 Sequestration Issues*, LP/CO2 1/8 [3.9] cited in

order to store it under the seabed.[23] Accordingly Article 6 has been amended to provide an exception for the export of carbon dioxide streams for disposal provided that the countries concerned have entered into an agreement or arrangement that includes:

1) confirmation and allocation of permitting responsibilities between the exporting and receiving countries, consistent with the provisions of this Protocol and other applicable international law; and
2) in the case of export to non-contracting parties, provisions at a minimum equivalent to those contained in this Protocol, including those relating to the issuance of permits and permit conditions for complying with the provisions of Annex 2, to ensure that the agreement or arrangement does not derogate from the obligations of contracting parties under this Protocol to protect and preserve the marine environment.

The requirement contained in Article 21 that amendments such as the amendment to Article 6 will enter into force after two-thirds of the Contracting Parties to the London Protocol have ratified it mean that it has not yet come into force. It is unlikely to enter into force in the near future.[24]

In another response to climate change mitigation efforts, the Contracting Parties responded to proposals for ocean fertilization, or the process of sowing 'large areas of the sea with nutrients to assess their effects, if any, on phytoplankton and carbon sequestration'[25] by deciding that this activity fell within the scope of the London Convention and London Protocol and required regulation.[26] In a non-binding resolution in 2007, the Contracting parties defined the activity of ocean fertilization and prohibited forms of it that were not related to scientific research.[27]

By the time the 2013 London Convention and London Protocol Consultative Meetings took place, a formal amendment to the London Protocol had been prepared. In due course the Contracting Parties adopted, by consensus, a resolution to amend to the London Protocol that defines and regulates this activity referred to as marine geo-engineering.[28] The entry into force of these amendments is also

International Energy Agency, *Carbon Capture and Storage and the London Protocol: Options for Enabling Transboundary CO2 Transfer* (Working Paper 2011) 11.

[23] International Maritime Organization (2008), *Report of the 1st Meeting of the Legal and Technical Working Group on Transboundary CO2 Sequestration Issues*, LP/CO2 1/8 [3.9]. See also International Maritime Organization (2008), *Report of the Thirtieth Consultative Meeting and the Third Meeting of Contracting Parties*, LC 30/16 [5.24].

[24] International Energy Agency, *Carbon Capture and Storage and the London Protocol: Options for Enabling Transboundary CO2 Transfer* (Working Paper 2011) 12.

[25] P Verlan, 'Current Legal Developments: London Convention and London Protocol' (2013) 28 *The International Journal of Marine and Coastal Law* 729, 729.

[26] Verlan (n. 25) 729.

[27] Resolution LC-LP.1 (2008) on the Regulation of Ocean Fertilization (adopted on 31 October 2008) Res. LC-LP.1 (2008), < http://www.imo.org/blast/blastDataHelper.asp?data_id=24337&filename=LC-LP1(30).pdf > accessed 11 February 2014.

[28] Verlan (n. 25) 730.

governed by Article 21 of the London Protocol. The amendments will enter into force after two-thirds of the Contracting Parties to the London Protocol have ratified.

Marine geo-engineering is defined by a paragraph added to Article 5 as:

> A deliberate intervention in the marine environment to manipulate natural processes, including to counteract anthropogenic climate change and/or its impacts, and that has the potential to result in deleterious effects, especially where those effects may be widespread, long-lasting or severe.

The amendments contain a new Annex 4. The effect of these amendments is to prohibit all ocean fertilization unless it is assessed as constituting legitimate scientific research. In such cases the activity may be authorized under a permit. The amendments also contain a new Annex 5 which contains relevant guidelines for assessment of permissible marine geo-engineering activities, with reference to the Assessment Framework for Scientific Research Involving Ocean Fertilisation that was adopted in 2010.[29]

The work of the contracting parties to develop a 'sound, practical and predictable mechanism' for dealing with marine geo-engineering in a manner that highlights consistent application of both the London Convention, the London Protocol and the UNCLOS 1982 has been lauded as 'timely, environmentally responsible [and] "pioneering"'.[30]

3.6 Regional Sea Dumping Arrangements

The features of certain marine environments mean that specific regional measures to control dumping at sea have been adopted. Both the London Convention and the 1982 UNCLOS specifically contemplate that specific regional arrangements may be adopted in such circumstances. In this regard, Article 8 of the London Convention provides that contracting parties 'with common interests to protect in the marine environment in a given geographical area' may enter into regional arrangements concerning the prevention of pollution, especially by dumping. These regional arrangements, which are analysed below, must be consistent with the London Convention.

3.7 1992 OSPAR Convention

The Convention[31] (OSPAR Convention) was the result of the unification of the 1972 Oslo Dumping Convention and the 1974 Paris Convention. The 1972 Oslo

[29] Res LC-LP.2 (2010) as cited in Verlan (n. 25) 730.
[30] Verlan (n. 25) 736.
[31] The Convention for the Protection of the Marine Environment of the North-East Atlantic (Paris, 22 September 1992, in force 25 March 1998) 2354 UNTS 67, 32 *ILM* 1069 (1993).

Convention applied to the North East Atlantic, the North Sea, and the adjoining parts of the Arctic Ocean area. The Oslo Convention concerned the dumping of materials into the sea by, or from, ships or aircraft.[32] The 1974 Paris Convention was concluded to prevent marine pollution from land-based sources from watercourses, the coast, artificial structures, and atmospheric emissions. This Convention, similar to the London Convention, followed a 'list' approach in relation to the disposal of wastes at sea. It classified waste materials into 'blacklist' and 'greylist' substances.[33]

The OSPAR Convention, a significant regional convention, regulates activities at sea in the North-East Atlantic in various maritime areas of the sea, including territorial waters, the Exclusive Economic Zones, and the high seas.[34] It defines 'dumping' as any deliberate disposal in the maritime area wastes or other matters from vessels, aircraft, and offshore installations.[35] Dumping also includes the deliberate disposal of vessels, aircraft, and offshore installations themselves.[36] The OSPAR Convention has established a Commission, made up of the representatives of all the contracting parties to supervise the implementation of the Convention, as well as to adopt binding decisions and recommendations.[37]

While the Convention prohibits dumping from offshore installations, it permits the leaving in place, wholly or partly, a disused offshore installation, or a disused offshore pipeline, provided that such operation takes place in accordance with relevant provisions of the Convention and international law.[38] However, in 1998 the OSPAR Ministerial Meeting adopted OSPAR Decision 98-3 on the Disposal of Disused Offshore Installations, which made the leaving of offshore installations at sea subject to new regulations. The decision recognized that 'the reuse, recycling or final disposal on land will generally be the preferred option for the decommissioning of offshore installations in the maritime area'.[39] Further, the decision prohibited the leaving in place, wholly or partly, of disused offshore installations within the maritime area, except if the competent authority of the relevant contracting party is satisfied that there are significant reasons to prefer a disposal option at sea over recycling or final disposal on land.[40] This means that the competent authority of the relevant State Party may prescribe to be left at sea all or part of the footing of

[32] Convention for the Prevention of Marine Pollution by Dumping from Ships and Aircraft (15 February 1972, Oslo) 932 UNTS 3, Art. 19(1).

[33] The Convention for the Prevention of Marine Pollution from Land-Based Sources (Paris, 4 June, 1974, entered into force 6 May 1978) 1546 UNTS 119, 13 *ILM* 352 (1974 Paris Convention) Annex A, Part I (1-5), Part II (1–3).

[34] OSPAR Convention, Art. 1 (a).

[35] OSPAR Convention, Art. 1(f)(i).

[36] OSPAR Convention, Art. 1 (f)(ii).

[37] OSPAR Convention, Arts 10, 13.

[38] OSPAR Convention, Art. 1 (g)(iii).

[39] OSPAR 98/14/1-E Annex 33, preamble.

[40] OSPAR 98/14/1-E Annex 33, paras 2, 3.

a steel installation, placed offshore before 9 February 1999, or an installation consisting of a concrete anchor base. Any other disused offshore installation can be dumped or left in place under exceptional and unforeseen circumstances, resulting from structural damage or deterioration.[41]

The contracting parties to the OSPAR Convention adopted a strategy on hazardous substances in 1998, which was subsequently revised in 2003. The strategy's ultimate aim is to reduce the amount of hazardous substances in the marine environment and to achieve concentrations in the marine environment of close to zero for man-made synthetic substances. OSPAR's work focuses on the objective of reducing discharges, emissions and losses of hazardous substances to these levels by 2020.[42] Further, the OSPAR Commission adopted the North-East Atlantic Environment Strategy (2010–2020), which recognized that while a number of objectives in the previous strategy (2003 OSPAR Strategies) had been achieved, many had still not been reached and require further efforts.[43] The North-East Atlantic Environment Strategy directs the OSPAR Commission to take the Ecosystem Approach, which is:[44]

> the comprehensive integrated management of human activities based on the best available scientific knowledge about the ecosystem and its dynamics, in order to identify and take action on influences which are critical to the health of the marine ecosystems, thereby achieving sustainable use of ecosystem goods and services and maintenance of ecosystem integrity.

The Ecosystem Approach covers the protection of biodiversity, eutrophication, hazardous substances, offshore hydrocarbon activities, ionizing radiation, and radioactive substances in the OSPAR maritime areas.[45]

3.8 Dumping in the Antarctic Region

The specific arrangements that regulate dumping in the Antarctic Region are an example of specific provisions adapted to the specific features of that region, however, as noted below these arrangements are not parts of the London Convention system. Instead, dumping in the Antarctic region is prohibited under the regime established under the 1959 Antarctic Treaty.[46] The Antarctic Treaty was designed to freeze territorial claims to sovereignty over the Antarctic continent and was thus not intended primarily as a vehicle for the protection of the Antarctic

[41] OSPAR 98/14/1-E Annex 33, para. 3.

[42] 'OSPAR Strategy with Regard to Hazardous Substances' OSPAR Ministerial Meeting, Sintra, 22–23 July 1998, 21, 23. Available at: <http://www.ospar.org/documents?v=6877> (accessed 27 November 2015).

[43] 'The North-East Atlantic Environment Strategy'.

[44] 'The North-East Atlantic Environment Strategy' Part I, p 2.

[45] 'The North-East Atlantic Environment Strategy' Part I, p 4, para 2.2.

[46] Antarctic Treaty (Washington, 1 December 1972, entered into force 11 March 1978) 402 UNTS 71.

environment. Nevertheless, the scheme has developed a number of features that protect the region's environment. As noted below, some of them have developed into a regime that constitutes 'the most comprehensive and stringent regime of environmental protection rules ever established under the rules of public international law anywhere in the world'.[47]

The Antarctic Treaty applies to the polar region below 60⁰ south latitude.[48] Article I provides that Antarctica is to be used 'for peaceful purposes only'[49] and it forbids the use of Antarctica for military purposes. Article II permits the continued use of Antarctica for 'scientific investigation' and cooperation.[50] Article V prohibits both nuclear explosions and the disposal of nuclear waste in Antarctica.

The meetings of the consultative parties led to the first specific environment protection measures with the adoption, in 1964, of the Brussels Agreed Measures for the Conservation of Antarctic Fauna and Flora.[51] This agreement was followed by agreements aimed at protecting other aspects of the Antarctic environment: the 1972 Antarctic Seals Convention;[52] the 1980 Convention on the Conservation of Antarctic Marine Living Resources,[53] the 1988 Convention on the Regulation of Antarctic Mineral Resource Activities[54] and the 1991 Protocol on Environmental Protection to the Antarctic Treaty (The Madrid Protocol).[55] These specific agreements, together with the 1982 UNCLOS, the 1989 Basel Convention[56] and the 1997 IAEA Joint Safety Convention[57] provide considerable protection of the Antarctic environment and mean that there is now a large body of environmental regulation that applies to the Antarctic.

3.9 The Madrid Protocol and its Annexes III and IV

The Madrid Protocol was negotiated following the refusal of Australia and France to ratify the 1988 Convention on the Regulation of Antarctic Mineral Resource

47 Sands and Peel (n. 1) 586.
48 Antarctic Treaty, Art. VI.
49 Antarctic Treaty, Art. I.
50 Antarctic Treaty, Art. II.
51 Recommendation ATCM III-VIII (Brussels, 13 June 1964) 1964 17 UST 992, TIAS 6058.
52 Convention for the Conservation of Antarctic Seals (London, 1 June 1972, entered into force 11 March 1978) 11 *ILM* 251 (1972).
53 The Convention on the Conservation of Antarctic Marine Living Resources (Canberra, 20 May 1980, entered into force 7 April 1982) 1329 UNTS 48, 19 *ILM* 841 (1980).
54 The Convention on the Regulation of Antarctic Mineral Resource Activities1988 (Wellington, 2 June 1988) 27 *ILM* 868 (1988).
55 The Protocol on Environmental Protection to the Antarctic Treaty (The Madrid Protocol) (Madrid, 4 October 1991) 30 *ILM* 1461 (1991).
56 Convention on the Control of Transboundary Movement of Hazardous Wastes and Their Disposal (Basel, 22 March 1989, entered into force 5 May 1992) 1673 UNTS 126, 28 *ILM* 657 (1989) (The Basel Convention).
57 Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management (Vienna, 5 September 1997) 36 *ILM* 1431 (1997).

Activities because they argued that it failed to protect the Antarctic environment adequately.[58] Article 4 of the Madrid Protocol expressly provides that it is additional to and does not derogate from the Antarctic Treaty. Pursuant to Article 2 the parties:

> commit themselves to the comprehensive protection of the Antarctic environment and dependent and associated ecosystems and hereby designate Antarctica as a natural reserve, devoted to peace and science.

The Preamble to the Madrid Protocol indicates that the States Parties were motivated to take the action set out in the document by the conviction that to do so was 'in the interest of mankind as a whole'. Article 7 of the Madrid Protocol prohibits '[a]ny activity relating to mineral resources, other than scientific research' while Article 3 establishes principles to guide the planning and conduct of non-mineral resources activities. Article 3(2)(a) requires activities in the Antarctic Treaty area to be 'planned and conducted so as to limit adverse impacts on the Antarctic environment and dependent and associated ecosystems', and Article 3(2)(b) seeks specifically to ensure that activities are planned and conducted so as to avoid:

(i) adverse effects on climate or weather patterns;
(ii) significant adverse effects on air or water quality;
(iii) significant changes in the atmospheric, terrestrial (including aquatic), glacial or marine environments;
(iv) detrimental changes in the distribution, abundance or productivity of species or populations of species of fauna and flora;
(v) further jeopardy to endangered or threatened species or populations of such species; or
(vi) degradation of, or substantial risk to, areas of biological, scientific, historic, aesthetic or wilderness significance . . .

The Madrid Protocol is supplemented by six annexes that detail measures and procedures specific to certain activities. Annexes III and IV relate to sea dumping.

Annex III on Waste Disposal and Waste Management sets out general obligations to reduce, as far as practicable, the amount of waste produced and disposed of in the Antarctic Treaty area and to minimize interference with the natural values of Antarctica, scientific research and the other uses consistent with the Antarctic Treaty (Art. 1(1)). Article 1(2) places prime importance on questions of waste storage, waste disposal and removal of waste in the planning and conduct of activities in the Antarctic Treaty area. Article 1(3) provides that to the maximum extent possible, waste removed from the Antarctic Treaty area should be returned to the country responsible for the activities that generated it or to another country where other international agreements contemplate it.

[58] Sands and Peel (n. 1) 586.

Annex IV on Prevention of Marine Pollution regulates and, in some cases, prohibits the discharge of substances from ships. It is largely consistent with the International Convention for the Prevention of Pollution from Ships 1973[59] (MARPOL), as amended by the 1978 Protocol. Article 3(1) for examples prohibits any discharge (defined to mean any release howsoever caused from a ship and includes any escape, disposal, spilling, leaking, pumping, emitting, or emptying) into the sea of oil or oily mixture, except in the cases permitted under Annex I of MARPOL, as amended by the 1978 Protocol. Except in certain stated cases of damage to a ship, Article 3 also requires that when operating in the Antarctic Treaty area all ships are to retain on board and must not discharge to the sea sludge, dirty ballast, tank washing waters, and other oily residues.

Article 4 of Annex IV expressly prohibits the discharge to the sea of any noxious liquid substance, and any other chemical or other substances, in quantities or concentrations that are harmful to the marine environment. In addition Article 5(1) prohibits the disposal of all plastics, including synthetic ropes, synthetic fishing nets and plastic garbage bags. Article 5(2) extends this prohibition to 'all other garbage, including paper products, rags, glass, metal, bottles, crockery, incineration ash, dunnage, lining and packing materials'. Article 5(3) applies to food wastes. It permits disposal of food wastes into the sea in certain limited circumstances. This includes a requirement that they have been passed through a comminuter or grinder and are disposed of as far as practical from land and ice shelves and no less than twelve nautical miles from the nearest land or ice shelf.

Article 6 provides a limited mechanism for the discharge at sea of untreated sewage (as defined in the International Convention for the Prevention of Pollution from Ships 1973, as amended by the 1978 Protocol). Article 6(1)(a) prohibits its discharge within twelve nautical miles of land or ice shelves. Beyond that distance Article 6(1)(a) requires that it be disposed of from a holding tank at a moderate rate and, where practicable, while the ship is travelling at a speed of no less than four knots.

Article 7 provides an exemption from Articles 3, 4, 5, and 6 in cases of emergency relating to the safety of a ship and those on board or to the saving of life at sea.

Consistent with the attention that the Madrid Protocol gives to planning Article 9 of Annex IV extends obligations upon each state party to ensure that all ships flying its flag are fitted with sufficient tank capacity to retain all sludge, dirty ballast, tank washing waters, and other oily residues, garbage, and noxious liquid substances. Article 9 also requires each state party to ensure that such ships have arrangements in place for the discharge of oily residues and garbage at a reception facility once the ship has left the Antarctic Treaty area. The focus on planning is

[59] International Convention for the Prevention of Pollution from Ships (London, 2 November 1973, entered into force 12 October 1983) 1340 UNTS 184 (MARPOL).

extended by Article 10 of Annex IV which requires each state party to take into account the objectives of Annex IV in the design, construction, manning and equipment of ships engaged in supporting its Antarctic operations.

3.10 United Nations Environment Programme Regional Protocols

Regional arrangements have also been developed for the following specific marine environments: the Mediterranean,[60] the Black Sea,[61] the South Pacific,[62] and the Baltic Sea.[63] These agreements provide for licensing, enforcement, and supervision arrangements that are similar to those of the London Convention.[64] They provide a further institutional mechanism for achieving compliance. Birnie, Boyle, and Redgwell have noted that the additional level of regional institutional supervision afforded by these arrangements contributes to the enforceability and effectiveness of the sea dumping regime.[65] This is due to the fact that these regional standards are articulated 'within a clear global framework of minimum standards' that are reinforced in the wider forum of the Consultative Meeting of the parties to the London Convention.[66]

3.11 Dumping of Radioactive Waste

It is possible to dispose of radioactive waste and materials at sea or on land. Disposal of radioactive waste into the sea by dumping started in the late 1940s.[67] The first sea dumping operation took place in 1946 in the North East Pacific Ocean, approximately 80 kilometres off the coast of California in the United States.[68] For many years, disposal of radioactive waste at sea was the standard practice of several nuclear states, such as the United States, the United Kingdom, and Japan. The

[60] Protocol for the Prevention of Pollution in the Mediterranean Sea by Dumping from Ships and Aircraft (The Barcelona Protocol) (16 February 1976 Barcelona) amended and recorded as Protocol for the Prevention and Elimination of Pollution in the Mediterranean Sea by Dumping from Ships and Aircraft or Incineration at Sea (10 June 1995 Barcelona).

[61] Convention on the Protection of the Black Sea Against Pollution (and protocols) (The Black Sea Convention) (21 April 1992 Bucharest) 32 *ILM* 1101 (1992).

[62] Protocol for the Prevention of Pollution of the South Pacific Region by Dumping (25 November 1986 Noumea) (The Noumea Dumping Protocol) IELMT 986:87A.

[63] Convention on the Protection of the Marine Environment of the Baltic Sea Area (The Helsinki Convention) (Helsinki 9 April 1992) BNA35: 0401.

[64] Birnie et al (n. 21) 471.

[65] Birnie et al (n. 21) 471.

[66] Birnie et al (n. 21) 471.

[67] S Boehmer-Christiansen, 'Dumping nuclear waste into the sea, International control and the role of science and law' (1983) 7 *Marine Policy* 25, 25.

[68] D Calmet, 'Ocean disposal of radioactive waste: Status report' IAEA Bulletin, 4/1989.

issue became an international matter when the Second United Nations Conference on the Law of the Sea (UNCLOS II) in 1958 addressed the issue of prevention of pollution of the sea from the dumping of radioactive waste. The Conference did not suggest the prohibition of the dumping of radioactive waste at sea; however, it did make this practice subject to any standards and regulations that were provided by the competent international organizations,[69] notably the International Atomic Energy Agency (IAEA).

The IAEA published the 'Safety Series No. 5, Radioactive Waste Disposal into the Sea' in 1961, which provided general guidance and recommendations for the disposal of radioactive waste in the sea.[70] This publication has been followed by many subsequent guidelines, requirements and standards.[71]

The 1972 London Convention categorized radioactive waste and matter within its 'blacklist' (Annex I to the Convention) and prohibited its disposal at sea, except in very low quantities and subject to the IAEA guidelines.[72] The IAEA Standards have been criticized by some states for being significantly low.[73] Several regional environmental treaties have banned radioactive dumping at sea.[74] Radioactive dumping is not prohibited by the 1996 London Protocol.[75]

3.12 Precautionary Principles and Dumping of Waste at Sea

The precautionary principle which was developed to avoid gaps in the international protection of the environment based on scientific uncertainty is now a well-established approach in international law and a norm of customary international law.[76] The principle requires states and policy makers to adopt approaches in

[69] Convention on the High Seas (Geneva, 29 April 1958, entered into force 30 September 1962) 450 UNTS 82 348, Art. 25(1).

[70] International Atomic Energy Agency, *Safety Series No. 5, Radioactive Waste Disposal into the Sea.* <http://gnssn.iaea.org/Superseded%20Safety%20Standards/Safety_Series_005_1961.pdf>, accessed 21 February 2014.

[71] For further information on the current status of the safety guidelines and requirements of radioactive waste disposal, see International Atomic Energy Agency, <http://www-ns.iaea.org/standards/documents/default.asp?s=11&l=90&sub=40>.

[72] London Convention Annex I, para 6; Annex II para d. See also IAEA, Code of Conduct on the Safety and Security of Radioactive Sources, (January 2004) <http://www-pub.iaea.org/MTCD/publications/PDF/Code-2004_web.pdf>; and IAEA, *Inventory of Radioactive Waste Disposals at Sea* (August 1999) <http://www-pub.iaea.org/MTCD/publications/PDF/te_1105_prn.pdf/>.

[73] Birnie et al (n. 21) 468.

[74] 1992 Helsinki Convention, Art. 11; 1986 Noumea Convention, Art. 10; 1989 Protocol for the protection of the South-East Pacific Against Radioactive pollution; 1992 Black Sea Protocol, Art. 2 and Annex I; 1992 OSPAR Convention, Annex II, Art. 3(3); 1995 Barcelona Protocol for the Prevention of Pollution by Dumping, Annex I.

[75] London Protocol, Annex I, Para 3.

[76] See generally, O McIntyre and T Mosedale, 'The Precautionary Principle As A Norm of Customary International Law' (1997) 9 *Journal of Environmental Law* 221; J Cameron and J Abouchar,

international law which '[ensure] that errors are made on the side of excess environmental protection and that it may require preventative action before scientific proof of harm has been submitted'.[77] The Precautionary Principle has particularly received consistent approval in international instruments relating to marine pollution. An example is the way in which it has been adopted in the 1992 OSPAR Convention. Article 2 requires states parties to apply the precautionary principle. This is explained as a requirement that:

> preventive measures are to be taken when there are reasonable grounds for concern that substances or energy introduced, directly or indirectly, into the marine environment may bring about hazards to human health, harm living resources and marine ecosystems, damage amenities or interfere with other legitimate uses of the sea, even when there is no conclusive evidence of a causal relationship between the inputs and the effects. [78]

3.13 Conclusion

The issue of dumping at sea has been a concern of international law for many decades and has become increasingly more important in recent years. There is an international legal framework regulating dumping in various areas of the sea by individual countries. The principal international instruments are the 1972 London Convention and its 1996 Protocol. There are also further regulations in a number of other international environmental law treaties as well as principles of customary international law.

While the 1982 UNCLOS provides only general principles and provisions in relation to dumping of waste at sea the 1972 London Convention provides a global legal framework with detailed provisions in relation to dumping of materials at sea. The London Convention, similarly to the UNCLOS Convention, does not prohibit ocean dumping but regulates different categories of the dumping of waste at sea. The London Convention and its 1996 Protocol have created a global legal regime for action in relation to dumping which is relatively effective and successful.

Besides the global legal regime established by the UNCLOS and the London Convention and its Protocol, there have been regional instruments relating to dumping activities at sea, notably the 1992 OSPAR Convention and the 1959 Antarctic Treaty. The latter prohibits dumping of waste materials in the Antarctic region.

'The Precautionary Principle: A Fundamental Principle of Law and Policy for the Protection of the Global Environment' (1991) 14 *Boston College International and Comparative Law Review* 1.

[77] D Freestone, 'The Road to Rio: International Environmental Law after the Earth Summit' (1994) 6 *Journal of Environmental Law* 193, 211.

[78] 1992 OSPAR Convention, Art. 2(2)(a).

One important area is the disposal of radioactive waste at sea. Generally international law does not prohibit disposal of radioactive waste at sea but regulates the activities by a number of legal principles, guidelines, and recommendations. The relevant principal legal international legal instruments are the 1972 London Convention and the IAEA guidelines and provisions in relation to the disposal of radioactive waste at sea.

Although there is a relatively effective international legal regime concerning the disposal of waste at sea, given the significance of the ocean for the protection of the global environment, a more rigorous international law regime relating to dumping may be required in the near future. The fact that the London Protocol will eventually supersede the London Convention would be an important step in this direction.