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Ocean Dumping

JOHN WARREN KINDT*

Man is both creature and molder of his environment, which gives him physical sustenance and affords him the opportunity for intellectual, moral, social and spiritual growth. In the long and tortuous evolution of the human race on this planet a stage has been reached when, through the rapid acceleration of science and technology, man has acquired the power to transform his environment in countless ways and on an unprecedented scale. Both aspects of man's environment, the natural and the man-made, are essential to his well-being and to the enjoyment of basic human rights—even the right to life itself.

Declaration of the U.N. Conference on the Human Environment (1972).[1]

I. INTRODUCTION

The oceans are the earth's greatest single natural resource. Covering 71 percent of the earth's surface, they are crucial to maintaining the balance of the global ecosystem. "The importance of the oceans needs little emphasis as this planet's last great economic frontier, the potential source for enormous food supplies, the final buffer against ecological catastrophe, and a recreational outlet for restoration of body and spirit of man."[2]

As important as the oceans are to mankind, it seems irrational that human enterprise would abuse them.[3] Man's dumping of wastes into the ocean has always occurred. However, due to accelerating industrial development and population growth, the quantities and concentrations of wastes dumped have begun to tax the assimilative capacity of the oceans.[4]

The reasons for the growing use of the ocean as a dump site are readily observable because mankind tends to "regard the oceans as a convenient, limitless receptacle for wastes."[5] "But as problems of waste disposal on land multiply, pressures to use the oceans as a dumping ground become stronger."[6] Ocean dumping often provides the least expensive

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1. *Report of the United Nations Conference on the Human Environment*, art. I, proclamation 1, U.N. Doc. A/CONF.48/14/Rev.1, 3 (rev. ed. 1972) [hereinafter cited as *Stockholm Report*]. For a copy of the unrevised edition of the *Stockholm Report*, see UNITED NATIONS CONFERENCE ON THE HUMAN ENVIRONMENT, THE RESULTS FROM STOCKHOLM 1, 70 (E. Verlag ed. 1973).

2. Waldichuk, *Control of Marine Pollution: An Essay Review*, 4 OCEAN DEV. & INT'L L. 269, 291 (1977) [hereinafter cited as Waldichuk].

3. *Id.* at 282.

4. Lumsdaine, *Ocean Dumping Regulation: An Overview*, 5 ECOLOGY L.Q. 753, 753 (1976) [hereinafter cited as Lumsdaine].

5. COUNCIL ON ENVTL. QUALITY, ENVTL. QUALITY—1980 15 (1980) [hereinafter cited as CEQ 1980 REPORT].

6. *Id.*

method of disposal. Since the sites are far removed from land, the adverse effects are less noticeable and therefore less objectionable.[7] However, experience and research have revealed that despite its vastness, the ocean's natural ability to accept, decompose, and recycle wastes is limited.[8] Once saturation levels of waste assimilation develop, irreversible consequences may result, for the "deep sea has a turnover rate measured in thousands of years."[9]

Of the pollutants entering the world's oceans, approximately 10 percent are due to direct ocean dumping.[10] In 1970 the U.S. Council on Environmental Quality (CEQ) identified seven sources of ocean dumping.[11] The seven categories and their definitions are as follows:

> a. "*Dredge spoils*—the solid materials removed from the bottom of water bodies generally for the purpose of improving navigation: sand, silt, clay, rock, and pollutants that have been deposited from municipal and industrial discharges."[12]
>
> b. "*Industrial wastes*—acids; refinery, pesticides, and paper mill wastes; and assorted liquid wastes."[13]
>
> c. "*Sewage sludge*—the solid material remaining after municipal waste treatment: residual human wastes and other organic and inorganic wastes."[14]
>
> d. "*Construction and demolition debris*—masonry, tile, stone, plastic, wiring, piping, shingles, glass, cinderblock, tar, tarpaper, plaster, vegetation, and excavation dirt."[15]
>
> e. "*Solid waste*—more commonly called refuse, garbage, or trash—the material generated by residences; commercial, agricultural, and industrial establishments; hospitals and other institutions; and municipal operations: chiefly paper, food wastes, garden wastes, steel and glass containers, and other miscellaneous materials."[16]
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> f. *Explosives and chemical munitions*—no official definition but includes "[u]nserviceable or obsolete shells, mines, solid rocket fuels, and chemical warfare agents."[17]
>
> g. "*Radioactive wastes*—the liquid and solid wastes that result from processing of irradiated fuel elements, nuclear reactor opera-

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7. Lumsdaine, *supra* note 4, at 754.
8. CEQ 1980 REPORT, *supra* note 5, at 15.
9. Waldichuk *supra* note 2, at 282.
10. Note, *The Ocean Dumping Dilemma*, 10 LAW. AM. 868, 877 (1978) [hereinafter cited as *Dumping Dilemma*].
11. COUNCIL ON ENVTL. QUALITY, OCEAN DUMPING 18 (Report to the President, 1970) [hereinafter cited as OCEAN DUMPING REPORT]. These seven categories remain unchanged in the CEQ 1980 REPORT, *supra* note 5, at 17.
12. OCEAN DUMPING REPORT, *supra* note 11, at iv.
13. *Id.*
14. *Id.*
15. *Id.*
16. *Id.*
17. *Id.* at 6.

> tions, medical use of radioactive isotopes, and research activities and from equipment and containment vessels which become radioactive by induction."[18]

These sources are listed in decreasing order of their deleterious impact on the marine environment.[19] Of the 10 percent of ocean dumped materials, dredged spoils constitute 80 percent of this total.[20] Approximately 1 to 10 percent of the dredged sediment taken from waterways and harbors has been contaminated to potentially unacceptable levels because of industrial, urban, and agricultural activities.[21] Even non-toxic dredged spoils can physically damage marine organisms in ways ranging from inhibiting the penetration of light (due to suspended sediments) to smothering organisms on the ocean floor when large quantities are dumped.[22]

The dumping of dredged material, sewage sludge, and other wastes has had a measurable impact on ecosystems, such as the New York Bight, and has led to cadmium and PCB concentrations that have approached intolerable levels.[23] Toxic pollutants dumped into the ocean, either industrial wastes or municipal sewage sludge, enter into the tissue of marine organisms. As larger forms feed on contaminated organisms, toxic substances accumulate and reach concentrations where immediate physical harm can occur to marine mammals, birds, and man.[24] For example, biomagnification[25] of PCB's in marine food chains has been reported, and levels involving birds and mammals have been magnified "by a factor on the order of 10 to 100 at each step."[26]

Pollutants may be highly biodegradable and have only a locally adverse effect, whereas less or non-biodegradable pollutants may have long-term effects on both local and global marine environments. Pollutants can be classified into several scientific categories: (1) hydrocarbons (basically oil and gas); (2) hydrocarbon compounds utilized as organic contaminants, inhibitors, and poisons; (3) heavy metals; (4) radioactive wastes;

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18. *Id.* at iv.

19. *Id.* at 1-8. *Contra Dumping Dilemma, supra* note 10, at 869-79 n.1.

20. OCEAN DUMPING REPORT, *supra* note 11, at 3.

21. *Ocean Dumping: Hearings on H.R. 6112, H.R. 6113, and H.R. 6324 Before the Subcomm. On Oceanography and the Subcomm. On Fisheries And Wildlife Conservation And The Environment of the House Comm. On Merchant Marine and Fisheries*, 97th Cong., 2d Sess. 126 (1982) (statement of Brig. Gen. Forrest T. Gay III) [hereinafter cited as *1982 Ocean Dumping Hearings*].

22. Lumsdaine, *supra* note 4, at 755.

23. COUNCIL ENVTL. QUALITY, ENVTL. QUALITY 1982 1, 46 (1982) [hereinafter cited as CEQ 1982 REPORT].

24. Lumsdaine, *supra* note 4, at 755-56.

25. "Biomagnification refers to the increase in toxicant concentration which occurs in successively higher trophic level organisms in an ecosystem." *Dredge Spoil Disposal And PCB Contamination: Hearings Before the House Comm. On Merchant Marine And Fisheries*, 96th Cong., 2d Sess. 512 (1980) (statement of Frank G. Wilkes) [hereinafter cited as *1980 Dredge Spoil Hearings*].

26. *Id.*

and (5) solid wastes (including particulate pollution). Of these, heavy metals, poisons, and radioactive wastes are especially hazardous because they tend to bioaccumulate[27] in marine organisms.[28]

The adverse effects of these hazardous wastes are numerous. High levels of pollutants which bioaccumulate have led to "bioconcentration" that kills marine organisms or anything which feeds on them. This phenomenon has killed marine stocks and made surviving stocks inedible, thus causing severe economic loss to the fishing industry.[29]

More serious is the long-range impact of pollutants on the marine environment. First, pollutants affect some species more than others. The resulting diminution of species variety is known to upset the ecobalance. Secondly, organic wastes, particularly sewage sludge, require oxygen for decomposition. When organic wastes are dumped, they deplete the oxygen in adjacent waters to the extent that some organisms cannot survive. The cycle is accelerated when deceased organisms decompose and further deplete oxygen concentrations in that process. A vicious cycle of death, decay and depletion ensues which threatens the hardiest marine organisms.[30] The oxygen deficiency may continue for years—long after the dumping has ceased.[31]

Due to the volume and types of wastes dumped annually, particularly toxic materials and radioactive wastes, the need to understand the impact of these wastes and to expand international environmental cooperation must receive priority.[32]

II. AN ANALYSIS OF OCEAN DUMPING

A. *Delimitation of the Problem*

There are three traditional problem areas involved in analyzing international ocean dumping and its ramifications. These problems, whether dealt with either as international concerns or as national problems, are eventually faced by the entire international community.[33] The first area of concern deals with determining what constitutes pollution. The most widely invoked definition of marine pollution is that agreed upon in 1970

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27. "Bioaccumulation refers to those processes by means of which organisms take up chemicals from the physico-chemical environment and incorporate them into some or all of their tissues." *1982 Ocean Dumping Hearings*, *supra* note 21, at 449 (submission of the International Association of Ports and Harbors).

28. Waldichuk, *supra* note 2, at 280.

29. Lumsdaine, *supra* note 4, at 756.

30. *See* Comment, *Ocean Dumping: Progress Toward A Rational Policy of Dredged Waste Disposal*, 12 ENVTL. L. 745, 751 nn.37-42 (1982) [hereinafter cited as *Ocean Dumping Progress*].

31. Lumsdaine, *supra* note 4, at 757.

32. CEQ 1980 REPORT, *supra* note 5, at 15.

33. As noted by Captain Cousteau, "[e]ach one of the cells of our bodies is a miniature ocean. Poisoning the sea will inevitably poison us." *1982 Ocean Dumping Hearings*, *supra* note 21, at 188 (statement of Jacques-Yves Cousteau).

by the United Nations Joint Group of Experts on the Scientific Aspects of Marine Pollution (GESAMP):

> Introduction by man, directly or indirectly, of substances or energy into the marine environment (including estuaries) resulting in such deleterious effects as harm to living resources, hazard to human health, hindrance to marine activities including fishing, impairment of quality for use of sea water, and reduction of amenities.[34]

The Convention on the Law of the Sea (LOS Convention)[35] enumerates the preferred definition in article 1, paragraph 1(4), which incorporates the GESAMP wording.

> (4) "pollution of the marine environment" means the introduction by man, directly or indirectly, of substances or energy into the marine environment, including estuaries, which results or is likely to result in such deleterious effects as harm to living resources and marine life, hazards to human health, hindrance to marine activities, including fishing and other legitimate uses of the sea, impairment of quality for use of sea water and reduction of amenities; . . . .[36]

Similarly, in article 1, paragraph 1(5), the LOS Convention enumerates the best definition for ocean dumping.

> 5. (a) "[D]umping" means:
>
> (i) any deliberate disposal of wastes or other matter from vessels, aircraft, platforms or other man-made structures at sea;
> (ii) any deliberate disposal of vessels, aircraft, platforms or other man-made structures at sea;
>
> (b) "[D]umping" does not include:
> (i) the disposal of wastes or other matter incidental to, or derived from the normal operations of vessels, aircraft, platforms or other man-made structures at sea and their equipment, other than wastes or other matter transported by or to vessels, aircraft, platforms or other man-made structures at sea, operating for the purpose of disposal of such matter or derived from the treatment of such wastes or other matter on such vessels, aircraft, platforms or structures;
> (ii) placement of matter for a purpose other than the mere disposal thereof, provided that such placement is not contrary to the aims of this Convention.[37]

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34. *See* Kutner, *The Control and Prevention of Transnational Pollution: A Case for World Habeas Ecologicus*, 9 LAW. AM. 257, 260 (1977) [hereinafter cited as Kutner].

35. *Done* Dec. 10, 1982, *reprinted in* 21 I.L.M. 1261, U.N. Doc. A/CONF.62/122 (1982) [hereinafter cited as LOS Convention].

36. *Id.* art. 1, para. 1(4). This version of paragraph 4 is reprinted pursuant to the copy of the LOS Convention in 21 I.L.M. 1261. The LOS Convention as reproduced by the U.S. State Department has the words "(including estuaries)" in parentheses instead of being offset by commas.

37. LOS Convention, *supra* note 35, art. 1, para. 1(5). The margins in paragraph 5 differ between the version of the LOS Convention reproduced by the U.S. State Department and the version *reprinted in* 21 I.L.M. 1261.

Thus, the test of whether the disposal of unwanted materials constitutes "ocean dumping" focuses on "intent" (*i.e.*, deliberate disposal).

Any definition of ocean dumping necessarily involves many of the problems inherent in defining "pollution." Five categories have been suggested for approaching definitional problems. Pollution can be viewed as:

a. any alteration of the existing environment,

b. the right of the territorial sovereign,

c. damage per se,

d. interference with other uses of the environment, and

e. any excess beyond the assimilation capacity of the environment.[38]

The first two approaches define the boundaries or limits of pollution, and therefore, they are not viewed as realistic alternatives. When referring to pollution as just "damage" per se, two factors must be determined. First, determinations must be made of which injured countries, individuals, and properties may seek redress. The standards must be set for those damages which are compensable. For example, the question arises as to whether damages must be tangible injuries which can be recompensed monetarily or can intangible injuries also demand compensation? In addition, the level and magnitude of damages must also be delimited by reference to a high or low threshold.[39] In other words, does injury take place when a serious, proven action endangers the health or property of another, or is it possible that the injury has occurred when the action causes substantial inconvenience or discomfort? The major fault with this definitional approach is that a high threshold approach is generally adopted, ignoring gradual yet constant impairments.

Pollution as "interference" with other uses of the environment has an anti-ecological basis, and it is the result of international agreements regulating busy waterways and ocean areas. "The environment is important only to the degree that it is useful to man's immediate interests and environmental alteration is something to be halted only if the benefits of so doing . . . outweigh the costs."[40]

Pollution as "exceeding the assimilative capacity of the environment" is generally considered to be the best approach. Due to the growing realization of the frailty and interdependence of the components of the biosphere, it has been recognized that certain pollution, either in quantity or kind, cannot be decomposed or rendered harmless by natural processes—thus exceeding the ocean's assimilative capacity.[41] Although theoretically sound, this approach fails to resolve certain practical issues. First, it is difficult to determine the assimilative limits of a given environ-

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38. Springer, *Towards a Meaningful Concept of Pollution in International Law*, 26 INT'L & COMP. L.Q. 531, 533 (1977).

39. *Id.* at 538.

40. *Id.* at 544.

41. *Id.* at 548.

ment. It is equally difficult to ascertain when actual damage has been done to the integrity of natural cycles. Second, there is a problem with delimiting the point at which the quantity of the pollution exceeds the "assimilative capacity" of the environment.[42] Research has led the scientific community to conclude that marine systems can be safely used for waste disposal if such disposal is carefully managed.[43] Furthermore, eliminating the oceans as an alternative disposal site would transfer all waste management problems to land and air media.[44] For wastes which are biodegradable and nonaccumulative in marine organisms, the ocean would be a reasonable disposal site.[45] Assimilative capacity models, which incorporate a number of factors considered by the Environmental Protection Agency (EPA) in establishing and revising ocean dumping criteria, suffer from numerous weaknesses.[46] One of the most important limitations is the absence of empirical data which has impeded efforts to estimate the endpoints of contaminants for particular ocean areas.[47]

Previously undiscovered dangers of PCB's and DDT in dredge spoils and sewage sludge, for example, highlight the lack of scientific evidence with respect to ocean dumping.[48] Short-term environmental analysis has further compounded the problem situation and led to dangerously flawed decisions for waste disposal via ocean dumping. Due to the lack of knowledge regarding the ocean's assimilative capacity, the tendency has been to proceed with rapacious ocean dumping.[49]

There are numerous international conventions which impact upon

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42. For a brief discussion of materials which the ocean can safely assimilate, see *Waste Dumping: Hearings Before the Subcomm. On Fisheries and Wildlife Conservation And The Environment of the House Comm. On Merchant Marine and Fisheries*, 97th Cong., 1st Sess. 83-85 (1981) (statement of Kenneth S. Kamlet) [hereinafter cited as *1981 Waste Dumping Hearings*].

43. Swanson & Devine, *Ocean Dumping Policy*, ENV'T, June 1982, at 14, 16 [hereinafter cited as Swanson & Devine]. "[W]aste disposal policies are changing to allow the cautious and studied use of the oceans as a waste disposal medium." *1982 Ocean Dumping Hearings, supra* note 21, at 295 (statement of NACOA). Research results indicate that some wastes can reasonably be dumped in the oceans, but research and monitoring measures must be undertaken to protect the ocean. *Id.*

44. *See Ocean Dumping Progress, supra* note 30, at 748.

45. *Id.*

46. Note, *Ocean Dumping of Sewage Sludge: The Tide Turns From Protection to Management*. 6 HARV. ENVTL. L. REV. 395, 429-30 (1982) [hereinafter cited as *Dumping Sludge*].

47. *Id.* at 430.

48. "[T]he complex toxicological interactions of PCB's with other contaminants such as petroleum hydrocarbons, pesticides, and heavy metals" are not fully understood. *1980 Dredge Spoil Hearings, supra* note 25, at 142 (statement of Lynn A. Greenwalt).

> It is known, however, that these materials do not act alone and that most, if not all, test methods used do not adequately predict latent and chronic toxic effects of individual contaminants, let alone the mixtures of materials that are known to be present in some dredge materials.

Id.

49. *1982 Ocean Dumping Hearings, supra* note 21, at 189 (statement of Rep. Norman E. D'Amours).

the problems of ocean dumping, but these conventions should generally be categorized as dealing with vessel-source pollution or land-based pollution. The most comprehensive international convention is the 1972 Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter (Ocean Dumping Convention).[50] Prior to this Convention, the United States enacted narrowly tailored legislation to control specific pollutants or categories of pollutants that impacted upon ocean dumping. Ocean dumping per se, however, was not regulated until the Marine Protection, Research, and Sanctuaries Act of 1972 (MPRSA).[51] Although the MPRSA was enacted on October 23, 1972,[52] its primary purpose was to implement the Ocean Dumping Convention, which entered into force for the United States on August 30, 1975.[53] In fact, the MPRSA is frequently referred to as the "Ocean Dumping Act,"[54] but since it also encompasses important issues involving ocean research and marine sanctuaries, "MPRSA" is probably a more appropriate short form.

Both the Ocean Dumping Convention, and the MPRSA prohibit the dumping of dangerous wastes and license the dumping of other wastes,[55] and both specify that some consideration must be given with regard to the environmental effects of land disposal alternatives during the reviewing process for applications for ocean dumping permits.[56] Each system allowed an exception for trace amounts of contaminants from the prohibited lists. In dealing with the problem of how much is too much, the Ocean Dumping Convention provided that parties shall prohibit dumping of those wastes listed in Annex I (the "blacklist").[57] Annex I listed organ-

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50. *Done* Dec. 29, 1972, [1975] 2 U.S.T. 2403, T.I.A.S. No. 8165 (entered into force Aug. 30, 1975) [hereinafter cited as Ocean Dumping Convention]. While this Convention is commonly termed the "London Convention," the "London Dumping Convention," or the "London Ocean Dumping Convention," it is less confusing to use the terminology "Ocean Dumping Convention" because there have been and probably will be more "London Conventions" (particularly since IMCO is largely based in London). Accordingly, this Convention should be referred to as the "Ocean Dumping Convention."

51. 33 U.S.C. §§ 1401-1444 (1976 & Supp. V 1981).

52. *See* Letter from Secretary of State William P. Rogers to President Richard M. Nixon (Feb. 13, 1973), *reprinted in* G.P.O., CONVENTION ON THE PREVENTION OF MARINE POLLUTION, 93D CONG., 1ST SESS., v (Doc. No. 83-118).

53. *Id. See also* Amendments to the Marine Protection, Research, and Sanctuaries Act of 1972, in order to implement the provisions of the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter, Pub. L. No. 93-254, 88 Stat. 50 (codified at 33 U.S.C. § 1401-1444 (1976)), *reprinted in* 13 I.L.M. 611 (1974).

54. *See, e.g.*, Kuersteiner & Herbach, *In Pursuit of Clean Oceans— A Review Of The Marine Protection, Research, and Sanctuaries Act*, 18 SANTA CLARA L. REV. 157, 159 (1978) [hereinafter cited as Kuersteiner]; *Dumping Dilemma, supra* note 10, at 879.

55. *See Dumping Dilemma, supra* note 10, at 904.

56. *Dumping Sludge, supra* note 46, at 424.

57. Ocean Dumping Convention, *supra* note 50, art. 4; *Dumping Dilemma, supra* note 10, at 896-97. The lists of substances contained in Annexes I and II are not exhaustive. Any country is free to prohibit the dumping of wastes and other materials not mentioned in either Annex. *Dumping Dilemma, supra* note 10, at 897.

ohalogens, mercury, cadmium, persistent materials (plastics), oil, high-level radioactive wastes, and chemical and biological warfare (CBW) materials, among other pollutants.[58] Annex I, however, permitted disposal of the proscribed materials which are:

> "rapidly rendered harmless by physical, chemical or biological processes in the sea provided they do not:
>
> (i) make edible marine organisms unpalatable, or
>
> (ii) endanger human health or that of domestic animals."[59]

In addition, the incineration at sea of organohalogen compounds, crude oil and petroleum products was exempted by amendment in October of 1978.[60] The prohibitions of Annex I did not apply to wastes or other materials (*e.g.*, sewage sludges and dredged spoils) containing the aforementioned pollutants as "trace contaminants."[61]

Marine scientists have generally agreed that a "trace" constitutes concentrations which are commensurate with levels normally found in the ocean (*e.g.*, natural levels). However, the problem of definition has become complicated when directed toward certain organohalogens (such as PCB's and DDT) which are man-made contaminants yet present in dumped waste.[62] Neither the MPRSA nor the Ocean Dumping Convention could define trace contaminants numerically.[63]

Sewage sludge and dredged spoils, generally taken from commercial harbors, contain concentrations of "blacklisted materials" which are far in excess of those which naturally occur.[64] In spite of this fact, ocean dumping of hazardous sludge and spoils is allowed (in limited quantities) due to the nature of these waters.[65] This seems contrary to the spirit of Annex I.

A related problem in this area deals with the economics of waste disposal and the degree to which alternative methods are available. Three

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58. Ocean Dumping Convention, *supra* note 50, Annex. I.

59. *Id.*; *see Dumping Dilemma, supra* note 10, at 896.

60. Ocean Dumping Convention, *supra* note 50, Annex I (10). Incineration of these wastes requires a special permit prior to disposal.

61. *Id.* Annex I. "Such wastes shall be subject to the provisions of Annexes II and III as appropriate." *Id.*

62. Rogers, *Ocean Dumping*, 7 ENVTL. L. 1, 13 (1976) [hereinafter cited as Rogers].

63. Schenke, *The Marine Protection, Research, and Sanctuaries Act: The Conflict Between Marine Protection and Oil and Gas Development*, 18 HOUS. L. REV. 987, 1001 (1981) [hereinafter cited as Schenke].

64. Rogers, *supra* note 62, at 13; *see 1982 Ocean Dumping Hearings, supra* note 21, at 173 (statement of EPA); *see also 1980 Dredge Spoil Hearings, supra* note 25, at 331 (statement of Kenneth S. Kamlet). "[M]uch of the spoil material dredged from the New York Harbor area is severely contaminated with highly toxic, persistent, and often carcinogenic chemicals, many of which are subject to biological uptake (from water and sediments) at levels which may have serious implications for health and the environment." *Id.*

65. Schenke, *supra* note 63, at 999. Dredged spoils received special consideration under Annex I. Hazardous toxic materials found in dredge waters were automatically defined as "trace" contaminants. *Id.*

major land-based alternatives to the ocean disposal of sludge, for example, have become commercially feasible: (1) landfilling, (2) landspreading, and (3) incineration.[66] Although these three alternative methods have been used safely and effectively, each poses potential risks to human health and the environment.[67] Landfilling and landspreading of sludge containing high concentrations of heavy metals and soluble materials contaminate groundwater.[68] Sludge spread on agricultural fields threatens human food supplies when crops absorb certain toxic contaminants.[69] Incineration of sewage sludge, considered the most effective mode of disposal, presents environmental problems created by gaseous and particulate emissions.[70] In addition, disposal of ash residue produced through incineration endangers the environment because high concentrations of heavy metals found in sludge become residues in the ash.[71]

Incineration of wastes at sea, in specially designed tankers, offers perhaps the best means of disposing of certain ultra-hazardous chemical wastes.[72] However, the high-temperature, high-efficiency, combustion

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66. *Dumping Sludge, supra* note 46, at 411.

> Landfilling involves placing the waste in landfills or impounding it in storage lagoons or basins; it is the most common sludge disposal technique in the United States, accounting for approximately forty-four percent of the sludge generated. Landspreading involves using the waste as fertilizer or as soil conditioner and accounts for about twenty-four percent of the sludge. Approximately twenty-two percent of the sludge is incinerated.

Id. For a more detailed discussion of the various sludge management alternatives, *see 1981 Waste Dumping Hearings, supra* note 42, at 467-70 (statement of Christopher J. Capper).

67. *Dumping Sludge, supra* note 46, at 411.

68. *Id.*

69. *Id.* at 411-12.

70. *See id.* at 412.

71. *Dumping Sludge, supra* note 46, at 412.

72. Farrington, Capuzzo, Leschine, & Champ, *Ocean Dumping,* 25 OCEANUS 39, 45 (1982-83) [hereinafter cited as Farrington].

> The Environmental Protection Agency (EPA) has allowed several test burnings of chlorinated organic chemical wastes at sea where the basic chemical nature of seawater rapidly neutralizes the hydrochloric acid that is the main combustion product of concern. Burning such wastes on land requires difficult and potentially expensive controls on the release of this acid to prevent adverse effects on nearby structures, plants, animals, and people.

Id. Incineration of toxic wastes at sea has been used for more than a decade by European countries, which are generally more willing to experiment than the U.S. in the utilization of alternate disposal methods. EPA permission for the operation of the *Vulcanus II,* a commercial incineration vessel, has not come easily. In October of 1983, EPA tentatively approved a three-year permit for the *Vulcanus II* to burn hazardous wastes in U.S. waters. Critics of the incineration process contended that the ship was not adequately tested. Lancaster, *Waste Management Still Hits Snags In Bid To Operate Incinerator Ship,* Wall St. J., Nov. 17, 1983, Sec. 2, at 35, Cols. 4-6. In addition, land-based operators are required to install costly pollution-cleansing scrubbers which are not mandated for sea operated incinerators. The installation of these devices on incinerator ships would reduce considerably the ships' expected cost edge. *See id.* Failure to install such pollution-control equipment, however, may merely transform the ocean dumping pollution problem into a degradation of the atmosphere.

technology of incineration entails several adverse characteristics including:

> a. the difficulty of ensuring continued high efficiency of operations;
> b. the risk of accidental spills of material during collection, storage, loading, and transit at sea; and
> c. the high cost of the fuel necessary to achieve and maintain the required temperatures.[73]

Pollution controls seldom reveal tangible benefits. The social utility of a pollution-free environment is often quite difficult to ascertain.[74] Economic and political factors dominate the final decision on the methods utilized to dispose of unwanted materials.[75] Dumping pollutants into the oceans is frequently the mode which is the most economically and politically expedient.[76] Environmental regulations, increased energy costs, and the dwindling availability of land have dramatically increased the cost differential of non-ocean disposal methods.[77] The estimated costs of land-based alternatives may be 10 to 100 times greater than the costs of ocean disposal.[78] For example, composting sewage sludge generated by New York City would entail a capital cost of $250 million and require an annual operating budget of $45 million.[79] In contrast, the total expense of ocean disposal of the same sludge over the same period would cost approximately $3 million.[80]

Users of the ocean as a resource for waste disposal generate costs external to themselves that are borne by others.[81] These costs, called externalities or external diseconomics, are absorbed elsewhere by society.[82] "[B]ecause ocean dumpers do not have to pay for ocean dumping and disposal property, and because the ocean has no nearby constituency, ocean dumping is economically and politically expedient."[83] If policymakers consider the full costs of ocean dumping and the impact of marine pollution on the quality of human life, the cost differential of alternative disposal media may prove less troublesome and ocean disposal less attractive. "[T]hose who would use the ocean to subsidize their enterprises

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73. Farrington, *supra* note 72, at 45.
74. Waldichuk, *supra* note 2, at 283.
75. *Id.* at 277.
76. *Dumping Sludge, supra* note 46, at 415.
77. *Id.* "As sites for landfilling or landspreading become less available, the costs of transporting the sewage sludge become significant." *Id.* at 415-16. "Large energy requirements have always made incineration a relatively expensive disposal technique, but the energy demands of air pollution control technology have recently increased these expenses." *Id.* at 416.
78. Bleicher, *The Battle Over Ocean Dumping*, 12 ENVTL. L. REP. 15,032, 15,033 (1982) [hereinafter cited as *Dumping Battle*].
79. *Dumping Sludge, supra* note 46, at 416.
80. *Id.*
81. Waldichuk, *supra* note 2, at 276.
82. *Id.*
83. *Dumping Sludge, supra* note 46, at 425.

ought to bear the burden of proof that no irreversible damage will result now, or in the future."[84]

Thus, the problem is that "[o]ften, the economics of a particular disposal operation, rather than its ecological impact, will determine the final disposal practice."[85] This situation is illustrated by the former practice in the United States of disposing of low-level radioactive wastes by dumping them into the coastal waters of California. From 1946 to 1970, these wastes were dumped by the United States under regulations established by the Atomic Energy Commission (AEC), which were set prior to the international controls on low-level waste disposal.[86] Due to stricter dumping policies adopted by the AEC and due to the attractiveness of shallow burial of wastes on land, U.S. ocean disposal of low-level radioactive wastes declined in importance and was eventually terminated in 1970.[87] Thereafter, as a result of the high cost of sea disposal, these wastes were buried inland at a lower cost. Although the termination of this ocean dumping was a long-term benefit to life in coastal U.S. waters, the fact remains that economics, rather than ecological impact, was the determining factor.[88]

Due to a shortage of inexpensive land disposal sites, the pendulum may swing toward greater use of ocean dumping for radioactive wastes. Despite the dumping moratorium adopted by Congress, effective through January 6, 1985,[89] the U.S. Department of Energy (DOE) has conducted feasibility research on using the seabed for disposal of high-level radioactive wastes.[90] In addition, the DOE has advanced a proposal to dump

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84. *1982 Ocean Dumping Hearings, supra* note 21, at 188 (statement of Jacques-Yves Cousteau).

85. Waldichuk, *supra* note 2, at 277.

86. Finn, *Ocean Disposal of Radioactive Wastes: The Obligation of International Cooperation to Protect the Marine Environment*, 21 VA. J. INT'L L. 621, 632 (1981) [hereinafter cited as Finn]. Following passage of the MPRSA, jurisdiction over radioactive waste disposal by the United States shifted to the EPA. *Id.* at 633. Internationally, the Ocean Dumping Convention vested regulatory authority over "rad-waste" dumping with IMCO and technical oversight with the International Atomic Energy Agency (IAEA). *See id.* A thorough analysis of radioactive waste dumping is beyond the scope of this article. For a comprehensive examination of radioactive waste disposal issues, *see id.* at 621-90; *1981 Waste Dumping Hearings, supra* note 42, at 381-464.

87. Finn, *supra* note 86, at 632-33.

88. Waldichuk, *supra* note 2, at 277.

89. Surface Transportation Assistance Act of 1982, Pub. L. No. 97-424, § 424(a), 96 Stat. 2165 (1983) (to be codified at 33 U.S.C. §§ 1401, 1414).

90. CEQ 1982 REPORT, *supra* note 23, at 97. The ocean disposal option is favored for several reasons: (1) "developing marine technology may provide the means to design, implement, and monitor a disposal system": (2) deep-seabed sediments, "which would tend to trap released radionuclides from high level waste, constitute one of the most geologically stable environments in the world"; (3) the ocean provides "a medium of dilution for any wastes released from a repository"; (4) ocean sites would provide "resistance to future human intrusion"; and (5) ocean repositories would reduce domestic political pressures associated with selecting land-based sites. Finn, *supra* note 86, at 640-41. On the other hand, ocean disposal of radiological wastes involves several troubling risks:

thousands of cubic yards of radioactive soil generated by the 1950's Manhattan Project and other contaminated materials created in similar energy programs.[91] Similarly, the U.S. Navy has explored the possibility of dumping irradiated decommissioned nuclear submarines at sea after defueling their reactors.[92] These evolving U.S. interests in ocean dumping indicate that the trend in balancing economic costs and ecological effect will extend the pollution hazards of radiological wastes to the marine environment.[93]

Other industrialized countries have also dumped low-level radioactive wastes into the ocean.[94] Pursuant to the Ocean Dumping Convention, Western European disposal operations have dumped much larger amounts of these wastes than the previous amounts dumped by the United States.[95] During the period between 1967 and 1979, dumping by European countries exceeded one-half million curies of radioactive waste, whereas total U.S. dumping between 1946 and 1970 approximated 94,630

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(1) Wastes are irretrievable once they have been placed in the ocean. What may appear to be acceptable today may prove unacceptable tomorrow. It is necessary to maintain the option of future remedial action because we do not have a full understanding of the ecological consequences of ocean disposal of radioactive materials.

(2) The bioaccumulation of radionuclides is poorly understood. Radioactive materials may pose serious health threats to future generations.

(3) There has been no clear demonstration of the need or advantages of ocean dumping of radioactive materials other than political or financial considerations.

(4) Opening the ocean as a dumping ground for radioactive wastes encourages the proliferation of such wastes, and discourages the minimization of waste generation. . . .

1982 Ocean Dumping Hearings, supra note 21, at 551-52 (statement of Edmund G. Brown, Jr.).

91. *Disposal of Decommissioned Nuclear Submarines: Hearing Before the House Comm. on Merchant Marine and Fisheries*, 97th Cong., 2d Sess. 125 (1982) (statement of Clifton E. Curtis) [hereinafter cited as *1982 Submarine Hearing*].

92. *Id.* at 2. The United States Navy has not identified a preferred alternative, and no immediate plans have been made to dispose of nuclear powered vessels. No deep-ocean sites have been selected. However, deep ocean disposal is being examined because it might produce negligible environmental harms at lower costs than land burial alternatives. *Id.* at 4 (testimony of Carl H. Schmitt).

93. *Cf.* U.S. ENVTL. PROTECTION AGENCY, ANN. REP. TO CONGRESS JAN.-DEC. 1980, 18 (1981) [hereinafter cited as EPA 1980 REPORT] (based on environmental impact survey results, the EPA has concluded that past ocean dumping of radioactive wastes by the United States has not caused harm to either man or the marine ecosystem).

94. Finn, *supra* note 86, at 633. However, these activities may be reversed following passage of a Spanish resolution calling for the suspension of sea dumping of radioactive waste. The resolution, enacted at a 1983 meeting of the parties to the Ocean Dumping Convention in London, would suspend dumping until 1985, while the IAEA assessed the environmental safety of ocean disposal. The resolution, as such, is non-binding but serves as moral persuasion against ocean dumping. *See* Cruickshank, *Disposing of intermediate and low level waste in Britain*, NUCLEAR ENGINEERING INT'L, Aug. 1983, at 33, 35.

95. Finn, *supra* note 86, at 635.

curies.[96] The vast magnitude of the European operations, when coupled with the possibility of future dumping by the United States, highlights the need for transnational cooperation.[97] Without an internationally enforceable policy on radioactive waste dumping, "a mad dash toward using the oceans as a less expensive, quick fix for waste disposal will occur without due consideration of the relative risks and benefits of all options for waste management."[98]

The MPRSA authorized the EPA to deny ocean disposal of wastes containing any of several types of "prohibited materials" (organohalogens, mercury, cadmium, oil, and others) unless present only as trace contaminants, in which case an application must be made for a special or interim permit. The definitional problem with trace contaminants has been previously discussed.[99]

Interim permits require their holders to take effective action to develop alternatives to ocean dumping. However, sewage sludge, the waste substance most often dumped under interim permits, was not originally subject to this type of implementation plan.[100] Certain sludge wastes cannot be sufficiently modified to eliminate the accumulation of all hazardous substances.[101] Even so, it has been proven that there are economically feasible recycling alternatives for sewage sludge, particularly when external costs are considered.[102] Inclusion of sewage sludge in the implementation plan requirement has pressured municipalities to find recycling alternatives.[103] In addition, holders of "special permits," who were not required to formulate implementation plans, were encouraged to search for alternatives.

Another problem area deals with international uniformity and the method of regulation. Under one international legal interpretation, the ocean is *res communes, i.e.*, the common possession of mankind.[104] According to the concept known as the "tragedy of the commons," property which is the common heritage of humanity belongs to no one in particular and therefore, gets no special attention for preservation.[105] Accordingly, each country is motivated to maximize its short-term benefits in using common property resources—in this instance, the utilization of the

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96. *Id.* at 632-33.

97. *Id.* at 633.

98. Farrington, *supra* note 72, at 50.

99. See footnotes 62-63 *supra* and accompanying text.

100. Lumsdaine, *supra* note 4, at 775-76.

101. *See 1982 Ocean Dumping Hearings, supra* note 21, at 297 (statement of Dr. John A. Knauss).

102. Lumsdaine, *supra* note 4, at 776.

103. *Id.*

104. *Dumping Sludge, supra* note 46, at 424-25. The other international legal interpretation is that the ocean is *res nullius; i.e.*, the property of no one. It should be noted that *res communes* is frequently misspelled *res communis*.

105. *Ocean Dumping Progress, supra* note 30, at 748; *see* Hardin, *The Tragedy of the Commons, in* THE ENVIRONMENTAL HANDBOOK (G. DeBell ed. 1970).

oceans for dumping.[106] Since each country is a sovereign, each can theoretically despoil the environment in any manner it desires.[107] The dumping of materials in deeper ocean waters, legally accessible to any country, may be especially damaging because the site chosen may fall below the "thermocline," where conditions on the ocean floor are generally unvarying and marine organisms are highly sensitive to change.[108]

Most ocean disposal takes place within the territorial waters or contiguous zone of a country due to considerations of convenience and due to high transportation costs. It has been suggested that "90 percent or more of the particles originating in rivers or discharged to the oceans settle out at the discharge site or never leave the coastal zone."[109] However, if the settling rate is slow, a pollutant may be carried by currents from the coast of one country to another. In either case, fish feeding in coastal zones can be caught in international zones—possibly transferring one country's pollutants to the people of another. Waters washing ashore on the Antarctic continent have already showed signs of pollution originating from other parts of the world.[110] This problem illustrates the internationality and commonality of the marine pollution dilemma. Wastes discharged into the oceans do not respect political boundaries.[111] Therefore, a need exists for uniformity of standards for effluent discharges and water quality from one country to another. "Both use and abuse of the seas are of consequence to all peoples; a *GLOBAL OCEAN POLICY* thus must be established to define a common set of principles and rules for activities of individual nations and 'a fortiori' for states and cities."[112]

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106. *See* Waldichuk, *supra* note 2, at 276.

107. *Dumping Dilemma, supra* note 10, at 870 n.4. As noted by one commentator:

> Developing nations are unimpressed by the dilatory environmental chivalry of developed nations which while themselves industrializing polluted with impunity. These nations are not easily swayed by arguments favoring strong environmental protection measures, believing that if such stringent standards are applied to them their development will be considerably more difficult, expensive, and inconvenient. England only recently began ocean dumping its sewage sludge and is disturbed by the U.S. example of strictly controlling such dumping.

Id.

108. Lumsdaine, *supra* note 4, at 755 n.13.

109. Rogers, *supra* note 62, at 21 n.86.

110. *1982 Ocean Dumping Hearings, supra* note 21, at 188 (statement of Jacques-Yves Cousteau).

111. Farrington, *supra* note 72, at 49.

112. *1982 Ocean Dumping Hearings, supra* note 21, at 188 (statement of Jacques-Yves Cousteau) (emphasis original).

> The Pilatus syndrome—that is, dump it and wash your hands—is no longer an expediency. It has now developed into an entirely new, fundamental moral issue. What we dump "out of sight" in the sea will not remain for long "out of mind." The anonymous crime of conventional poison dumping is aimed at no one in particular, but it may bring about agonies around the world. The ultimate conceivable escalation consists in threatening not just other nations who are endangered by our recklessness, but whole generations to come.

Id.

B. *Goals*

Both the Ocean Dumping Convention and the MPRSA clearly delineate which pollutants are prohibited from being dumped into the oceans. However, if these contaminants are present as traces in dredged spoils or sewage sludge, they may be readily dumped—often in very high concentrations. This dumping violates the spirit of both the Ocean Dumping Convention and the MPRSA. In pure form, these contaminants are prohibited because they are dangerous, regardless of the particular type of waste in which they are found.

An international organization, such as the Intergovernmental Maritime Consultative Organization (IMCO),[113] should establish standards which resolve certain questions. For example, this international body should resolve: (1) whether "trace" really means concentrations normally found in the ocean (*i.e.*, natural levels), (2) whether the phrase means only that each nation should dump as little of the blacklisted substances as possible, or (3) whether whole categories of common wastes such as dredge spoil and sewage sludge are to be exempt from Annex I.[114]

The permissible concentrations of toxic materials in ocean dumped wastes has received a good deal of discussion, but little attention has been given to "the more difficult environmental and legal question of how much *total* waste should be allowed to be dumped."[115] IMCO should determine the overall levels of waste mentioned herein and investigate their potential ramifications. This gap in ecological understanding highlights the vast need for further marine scientific investigation, and therefore, a maximum amount of freedom of research should be encouraged[116] to protect the "common heritage of mankind." The *sine qua non* of protecting the marine environment is freedom of scientific research.[117]

Another major goal should be to encourage harmony between international and national laws. In the United States, "[t]he EPA ocean dumping program [as defined by the MPRSA] is one of the few national environmental regulatory programs significantly affected by international law."[118] The Ocean Dumping Convention establishes international rules

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113. In 1982, IMCO changed its official name to the International Maritime Organization, but it is still commonly referred to as IMCO. For a brief discussion on the formation of IMCO, *see* Kindt, *Special Claims Impacting Upon Marine Pollution Issues At The Third U.N. Conference On The Law Of The Sea*, 10 CAL. W. INT'L L.J. 397, 432 (1980) [hereinafter cited as *Special Claims*].

114. Rogers, *supra* note 62, at 20-21.

115. *Id.* at 21 (emphasis added).

116. *See e.g., 1982 Submarine Hearing, supra* note 91, at 123 (statement of Clifton E. Curtis).

117. Kindt, *The Effects of Claims by Developing Countries on LOS International Marine Pollution Negotiations*, 20 VA. J. INT'L L. 313, 339 (1980) [hereinafter cited as *Effects of Claims*].

118. Rogers, *supra* note 62, at 6.

of conduct.[119] However, incorporating the Convention into U.S. environmental law and regulatory policy created two problems. First, there was confusion due to contradictions between the MPRSA and the Ocean Dumping Convention.[120] Secondly, national laws of the participating countries were not uniform, so that actions taken in one country would often undermine the efforts of another country. An example of this international vis-a-vis national disharmony was the unilateral decision by Canada in 1970 to exercise jurisdictional control over a 100-mile "pollution zone." At the time, creation of such a zone was criticized as a flagrant violation of international law.[121] Canada responded by asserting that the Arctic Waters Pollution Prevention Act[122] was enacted to remedy international legal weaknesses that failed to protect Canadian shores from pollution.[123] Such unilateral extensions of jurisdiction, for whatever reason, need to be discouraged since the LOS Convention addresses this type of problem.[124]

The final and perhaps most challenging goal pertains to the implementation of an international regulatory scheme. Defining what the law should be has been less difficult than agreeing on how to enforce the law and deciding who should carry out the enforcement. Regional arrangements appear to be the best means of approaching this particular problem[125]

C. *Historical Background*

1. *U.S. Legislation*

a. *General U.S. Legislation*

Substantial international regulation of ocean dumping has taken place only since the 1950's. For this reason, U.S. legislation and regulation policy as well as international regulations need to be reevaluated. There are similarities between U.S. and international law, and these similarities will be analyzed after an examination of pertinent U.S. legislation.

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119. *See Dumping Dilemma, supra* note 10, at 885-86; *Dumping Sludge, supra* note 46, at 403. The MPRSA was amended in 1974 providing that "[t]o the extent that he may do so without relaxing the requirements of this subchapter, the Administrator, in establishing or revising such criteria, shall apply the standards and criteria binding upon the United States under the Convention, including its Annexes." 33 U.S.C. § 1412(a) (1976).

120. *See* Kuersteiner, *supra* note 54, at 162-63.

121. Okidi, *Toward Regional Arrangements for Regulation of Marine Pollution: An Appraisal of Options*, 4 OCEAN DEV. & INT'L L. 1, 1 (1977) [hereinafter cited as Okidi]; *Special Claims, supra*, note 113, at 438 & n.282.

122. CAN. REV. STAT. c.2 (1st Supp. 1970), *reprinted in* 9 I.L.M. 543 (1970).

123. Okidi, *supra* note 121, at 2. Canadian authorities argued that Canada had a sovereign right and duty to enact and enforce protective measures because of the "uniqueness and fragility of the Arctic ecology." *Id.*

124. *See* LOS Convention, *supra* note 35, art. 194; *cf. id.* art. 234. Canadian claims for protecting the Arctic are now specifically covered in the LOS Convention. *Id.* art. 234.

125. *Effects of Claims, supra* note 117, at 332.

Prior to the 1970's, statutory and regulatory control exercised over ocean dumping by the U.S. government was minimal.[126] Although several federal agencies possessed authority over limited facets of dumping activities, no single agency was empowered to regulate ocean waste disposal on a comprehensive scale.[127] Under the Supervisory Harbors Act of 1888,[128] the U.S. Army Corps of Engineers (Corps) was delegated jurisdiction over the removal of materials from various ports. For activities transpiring within the territorial sea, the River and Harbors Appropriations Act of 1899[129] (Refuse Act) and the Rivers and Harbors Act of 1905[130] provided legal support for the exercise of regulatory control by the Corps.[131]

Historically, the Corps failed to utilize these acts to impose stringent pollution control regulations. The only major action taken by the Corps was to designate sites for ocean dumping. The limited use of its regulatory power was explained by the Corps' interpretation of its responsibilities as being directed toward problems concerning navigation, not pollution.[132] In addition, during the early twentieth century the assimilative capacity of the oceans was widely believed to be limitless. Public opinion and legislation were generally insensitive to ocean dumping pollution problems. Even during the growth of environmental awareness and activism in the 1950s and 1960s, the oceans were relatively ignored.[133] It was not until 1966 that Congress first ordered a comprehensive investigation of marine issues.[134]

Public concern in the United States was eventually aroused by the dumping of sewage sludge and dredge spoils in the New York Bight.[135] In response to public concern, the Governor of New Jersey recommended that: (1) sewage sludge dumping be phased out; (2) present dumpsites be immediately moved 100 miles out to sea; (3) future Corps' permits be conditioned upon a pledge for the termination of dumping; and (4) con currence with New York State be sought through agreement or congressional enactment.[136] Alarmed by the technological gap between increased wastes and ecologically safe ocean disposal methods, President Nixon directed the Council on Environmental Quality (CEQ) to work with other

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126. *Ocean Dumping Progress, supra* note 30, at 753-54.

127. *Id.* at 754.

128. 33 U.S.C. §§ 441-454 (1976).

129. 33 U.S.C. § 401 (1976).

130. 33 U.S.C. § 417 (1976).

131. Rogers, *supra* note 62, at 3.

132. Spirer, *The Ocean Dumping Deadline: Easing the Mandate Millstone*, 11 FORDHAM URB. L.J. 1, 8-9 (1982) [hereinafter cited as Spirer]. The enabling legislation was addressed to the navigational, as distinguished from the environmental, risks posed by ocean dumping. Since the Congress was concerned that disposal of wastes at harbor entrances would frustrate dredging operations, the Corps was vested with regulatory control over dumping activities. *Id.*

133. *Id.* at 12.

134. *Id.; see id.* at 12 n.67.

135. *See* Spirer, *supra* note 132, at 13.

136. *Id.*

agencies and to recommend necessary research legislation and administrative actions.[137] In 1970, the report of the CEQ was transmitted to Congress along with President Nixon's endorsement of the conclusions and legislative recommendations made by the CEQ.[138]

b. *The Marine Protection, Research, and Sanctuaries Act of 1972*

Prompted by the CEQ report, in 1972 the Congress passed the MPRSA,[139] effective April 23, 1973.[140] With enactment of Title I of the MPRSA, Congress pursued two explicit objectives: (1) to regulate, as much as possible, all disposal of wastes in ocean waters, and (2) to limit strictly or prevent any such dumping that "would adversely affect human health, welfare, or amenities, or the marine environment, ecological systems, or economic potentialities."[141]

The MPRSA attacks the problem of ocean dumping in two ways. First, the MPRSA bans all dumping of materials (without a permit) within the territorial sea (which can be 12 nautical miles) and the contiguous zone of the United States. Secondly, it prohibits all transportation of materials from the United States for the purpose of ocean dumping, unless authorized by a permit.[142] The MPRSA provides control over both the content and manner of dumping, without duplicating other environmental statutes, and it divides the power to issue permits between the EPA and the Corps. Under the MPRSA, the EPA sets criteria for evaluation of all permit applications and issues permits for the dumping of all materials except dredged spoils. The Corps issues permits for the dumping of dredged spoils using EPA's criteria.[143]

In directing the EPA to establish criteria for the review of permit applications, the MPRSA specified nine factors for EPA consideration.[144]

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137. *Id.* at 15.

138. *See* OCEAN DUMPING REPORT, *supra* note 11, at 1-11.

139. 33 U.S.C. §§ 1401-1444 (1976 & Supp. V 1981).

140. Rogers, *supra* note 62, at 4.

141. 33 U.S.C. § 1401(b) (1976).

142. Lumsdaine, *supra* note 4, at 760.

143. *Id* at 763.

144. 33 U.S.C. § 1412(a) (1976). The nine factors, which are not exclusive, include the following:

> (A) The need for the proposed dumping.
>
> (B) The effect of such dumping on human health and welfare, including economic, esthetic, and recreational values.
>
> (C) The effect of such dumping on fisheries resources, plankton, fish, shellfish, wildlife, shore lines, and beaches.
>
> (D) The effect of such dumping on marine ecosystems, particularly with respect to—
>
> (i) the transfer, concentration, and dispersion of such material and its byproducts through biological, physical, and chemical processes, (ii) potential changes in marine ecosystem diversity, productivity, and stability, and (iii) species and community population dynamics.

For substances which are not prohibitied under Title I,[145] the EPA's implementing guidelines[146] enumerated several categories of ocean dumping permits.[147]

> a. *General permits* may be issued for the dumping of small amounts of those materials which cause minimal adverse environmental impacts (*e.g.*, burial at sea involving human remains or ashes, transport and sinking of vessels by the U.S. Navy during ordnance testing, the sinking of derelict vessels posing a threat to navigational operations);[148]
>
> b. *Special permits* may be issued to dump materials which satisfy the criteria[149] for reviewing and evaluating such applications, but they may only be issued for a maximum of 3 years per permit;[150]
>
> c. *Emergency permits* may be issued to dump materials which pose a danger to human health and which admit to no other feasible solution;[151]
>
> d. *Interim permits* may be issued, not exceeding 1 year, for those materials that do not comply with dumping criteria and for which no feasible land-based alternatives exist.[152] This permit was scheduled for phaseout on December 31, 1981;
>
> e. *Research permits* may be issued to dump any materials into the ocean when the scientific advantages outweigh the potential environmental damage.[153]
>
> f. *Permits for incineration at sea* are issued as research or interim permits except where evaluations of the waste materials, incineration method, disposal location, and vessel have been conducted

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> (E) The persistence and permanence of the effects of the dumping.
>
> (F) The effect of dumping particular volumes and concentrations of such materials.
>
> (G) Appropriate locations and methods of disposal or recycling, including land-based alternatives and the probable impact of requiring use of such alternative locations or methods upon considerations affecting the public interest.
>
> (H) The effect on alternate uses of oceans, such as scientific study, fishing, and other living resource exploitation, and non-living resource exploitation.
>
> (I) In designating recommended sites, the Administrator shall utilize wherever feasible locations beyond the edge of the Continental Shelf.

Id.

145. *See id.* Radiological, chemical and biological warfare agents and high-level radioactive wastes are prohibited by the MPRSA from being dumped, and dredged material is handled separately in section 1413.

146. 40 C.F.R. §§ 220-228 (1982).

147. *Id.* at § 220.3.

148. EPA 1980 REPORT, *supra* note 93, at 3.

149. 33 U.S.C. § 1412(a) (1976).

150. 40 C.F.R. § 220.3(b) (1982).

151. *Id.* at § 220.3(c).

152. EPA 1980 REPORT, *supra* note 93, at 3; *see* 40 C.F.R. § 220.3(d) (1982).

153. EPA 1980 REPORT, *supra* note 93, at 3; 40 C.F.R. §220.3(e) (1982).

previously, and warrant a special permit.[154]

However, before permits are issued, the EPA must give notice and an opportunity for public hearings.[155]

Title I of the MPRSA empowers the Administrator of the EPA to designate areas where ocean dumping will be permitted or prohibited.[156] For violations of permit conditions, the EPA has the authority to revoke or suspend the permit[157] and to assess civil penalties.[158] In addition, criminal proceedings may be initiated by the U.S. Attorney General against persons who knowingly violate the MPRSA.[159] Under Title I, the U.S. Coast Guard is empowered to utilize surveillance and other appropriate enforcement measures to prevent unlawful transportation of dumping materials or unlawful dumping.[160]

Title II of the MPRSA requires the Secretary of Commerce to initiate a comprehensive and continuing program to monitor and research the impact of ocean dumping.[161] The research program is conducted under the auspices of the Department of Commerce—the lead agency being the National Oceanic and Atmospheric Administration (NOAA). The research is directed at: (1) the consequences of overfishing, (2) the long-range effects of pollution, and (3) the man-induced changes in ocean ecosystems.[162] Title III authorizes NOAA to establish marine sanctuaries.[163]

Although the MPRSA originally set no deadline for the termination of ocean dumping, Congress expected such activity to be reduced or eliminated expeditiously.[164] To this end, the final regulations and criteria adopted by the EPA in 1973 to evaluate dumping applications virtually ignored the mitigating factors enumerated under the MPRSA.[165] The EPA relied almost completely upon considerations involving the type of material dumped; hence, a restrictive approach was taken towards applying the criteria embodied in the MPRSA.[166] With little scientific understanding regarding the impact of particular dumping practices, the EPA cautiously elected to ban virtually all ocean disposal which could conceiv-

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154. 40 C.F.R. § 220.3(f) (1982).

155. 33 U.S.C. § 1412(a) (1976); *see* 40 C.F.R. § 222.3-222.4 (1982).

156. 33 U.S.C. § 1412(c) (1976).

157. *Id.* at § 1415(f).

158. *Id.* at § 1415(a).

159. *Id.* at § 1415(b). Criminal sanctions may also be assessed against a "person who knowingly violates this subchapter, regulations promulgated under this subchapter, or a permit issued under this subchapter shall be fined not more than $50,000, or imprisoned for not more than one year, or both." *Id.*

160. *Id.* at § 1417(c).

161. *Id.* at § 1441.

162. *Id.* at § 1442(a) (Supp. V 1981).

163. EPA 1980 REPORT, *supra* note 93, at 2.

164. *Dumping Sludge, supra* note 46, at 402.

165. Spirer, *supra* note 132, at 20.

166. *Id.* at 20-21.

ably be harmful to the environment.[167]

The EPA's regulatory program for sewage sludge, implemented pursuant to the MPRSA, was increasingly criticized as being overly protective of the ocean, especially when limited availability of alternate disposal options was considered.[168] In 1976, revised regulations and criteria were issued by the EPA.[169] While reiterating the EPA's opposition to ocean dumping, these measures followed a more pragmatic scheme for evaluating the environmental acceptability of dumping sludge.[170] This scheme did not rely on the simple presence of certain specific toxic materials; instead, it relied on the impact of the material upon marine ecosystems as measured by bioassay and bioaccumulation tests. The EPA would permit municipal sludge producers to continue dumping under interim permits even if their waste failed to meet the new criteria, as long as the municipality exercised its best efforts to meet the standards.[171] Even so, these regulations provided that interim permits would not be extended past December 31, 1981.[172]

In 1977, Congress amended the MPRSA to prohibit dumping of all sludge after 1981 which would "unreasonably degrade or endanger human health, welfare, or amenities, or the marine environment, ecological systems, and economic potentialities."[173] The congressional validation of the interim permit system and the congressional agreement with the EPA's December 31, 1981 deadline acted as motivating forces for the legislation.[174] Approximately 3 years later, in 1980, Congress again revised the MPRSA to restrict industrial waste disposal in a manner similar to that imposed on sewage sludge.[175] However, the amendment allowed narrow exceptions for research purposes and emergency situations.[176]

As 1981 began, circumstances encouraged alteration of the sludge dumping moratorium of December 31st.[177] Continued inflation, increased consumption of energy, and politicized public discontent with government spending and regulation tempered the movement to clean-up the environment.[178] Increased expenses of the ocean dumping regulatory sys-

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167. *Id.* at 21.

168. *Dumping Sludge, supra* note 46, at 395.

169. Spirer, *supra* note 132, at 25.

170. *See Dumping Sludge, supra* note 46, at 407.

171. Spirer, *supra* note 132, at 25-26. The new criteria are set forth in 40 C.F.R. § 227.4 (1982).

172. *Dumping Sludge, supra* note 46, at 408.

173. 33 U.S.C. § 1412(a)(d) (1982). The term "sewage sludge" is defined to mean "any solid, semisolid, or liquid waste generated by a municipal wastewater treatment plant the ocean dumping of which may unreasonably degrade or endanger human health, welfare, or amenities, or the maritime environment, ecological systems, and economic potentialities." *Id.*

174. *See Dumping Battle, supra* note 78, at 15,034.

175. *Id.*; 33 U.S.C. § 1412a(a) (Supp. V 1981).

176. 33 U.S.C. § 1412a(b)-(c) (Supp. V 1981).

177. Spirer, *supra* note 132, at 38.

178. *Id.* at 36.

tem generated considerable political debate.[179] A report by the General Accounting Office (GAO) recommended that the EPA consider the environmental effects of land-based alternatives to ocean dumping before banning ocean disposal.[180] This recommendation was followed by a report from the National Academy of Sciences (NAS), advocating a "multimedium view" for sewage sludge disposal.[181] The National Advisory Committee on Oceans and Atmosphere (NACOA) also endorsed the multimedia management of waste disposal.[182] Finally, President Reagan initiated a policy for obviating environmental regulations and other federal regulations in favor of greater state and local autonomy.[183]

In 1981, the City of New York successfully challenged the EPA's permit criteria in *City of New York v. U.S. Environmental Protection Agency*.[184] The Federal Court for the Southern District of New York granted a motion for summary judgment in favor of New York City.[185] Following this decision, the EPA could only enforce the 1981 dumping moratorium with regard to materials which unreasonably degraded the environment, and the EPA was ordered to revise its criteria to assess the unreasonable degradative environmental impact of each application according to the statutory factors.[186] In addition, the Court prohibited any action by the EPA which would force New York City to implement land-based alternatives "without evaluating and finding acceptable the actual and potential environmental effects of land disposal."[187] Accordingly, the

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179. *Id.* at 37.

180. *Dumping Sludge, supra* note 46, at 418.

181. *Id.*

> The NAS called for a comparison of the suitability for waste disposal of each environmental medium: ocean, land, and air. Sewage sludge, the NAS argued, should be disposed of in the medium in which it would pose the least serious environmental and public health risks. The report recommended that EPA not carry out its plan to end all ocean dumping of sewage sludge because this would exclude wastes from one environmental medium at the expense of the remaining media.

Id. at 418-19.

182. *Id.* at 419. "NACOA is convinced that part of the present problem is the medium-by-medium approach that follows from the statutory regimes enacted by Congress (Clean Air Act, the Ocean Dumping Act, the Clean Water Act, etc.) and the conflicting goals of many of the existing laws." *1981 Waste Dumping Hearings, supra* note 42, at 78-79 (statement of Dr. John A. Knauss). NACOA's 1981 recommendations included: (1) "[i]ncreased incentives for reuse, recycling, and reduction of waste products;" (2) "[a]n integrated approach to weighing different waste disposal options;" (3) "[m]ore consistent environmental criteria for disposal in different media;" (4) "[c]ontinuation of ocean disposal 'under appropriate management conditions and with adequate monitoring safeguards';" and (5) "[i]ncreased emphasis on ocean disposal research and monitoring." *1982 Ocean Dumping Hearings, supra* note 21, at 290 (statement of Dr. John A. Knauss).

183. Spirer, *supra* note 132, at 38.

184. 543 F. Supp. 1084 (S.D.N.Y. 1981). Citations are to the revised opinion issued on Aug. 26, 1981.

185. 543 F. Supp. at 1115.

186. *Id.*

187. *Id.* at 1099.

"EPA could not lawfully adopt a policy of denying all permits without examining and weighing an applicant's evidence that ocean dumping . . . [was] the most reasonable alternative."[188]

In reaching its holding, the Court emphasized the "legislative history of the MPRSA and the unreasonableness of the EPA's regulations as applied to New York City."[189] The arbitrary manner in which the EPA ordered cessation of sludge dumping concerned the Court.[190] The Court also rejected the EPA's argument that the 1977 amendment precluded the agency from relaxing its criteria.[191] According to the Court, Congress sought only to halt the EPA's prior practice which granted interim permits on the basis of good faith efforts by municipalities to comply.[192] While the propriety of the Court's interpretation of the 1977 amendment was debatable,[193] the Court made it clear that economic costs as well as relative environmental impacts must be considered.[194]

Under the Reagan Administration, the EPA modified its approach toward the regulation of ocean dumping.[195] A more flexible policy toward ocean disposal, coupled with the EPA's change of attitude (which was modified to view the ocean as a valid dumping option), weighed heavily in the EPA's decision not to appeal the *City of New York* holding.[196] Although the EPA's move generated controversy,[197] congressional attitudes toward ocean dumping were mixed.[198] Through 1982 the legislative response to the EPA's decision not to appeal the *City of New York* decision remained unsettled.[199] While some members of Congress questioned the need to ban ocean disposal of sewage sludge, other members still strongly opposed this dumping. Several unsuccessful attempts to change the ocean dumping provisions of the MPRSA were made by both sides to the

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188. *Id.* at 1086.

189. Spirer, *supra* note 132, at 41.

190. *Id.* The Court concluded that:

> (1) such cessation 'would result in no discernible improvement in the area of the ocean around the dumpsite,' (2) no 'workable plan' for a long-term alternative had been found, (3) the cost of the city's proposed interim solution would far exceed the cost of ocean dumping, and (4) implementation of the city's land-based interim solution could pose serious environmental dangers which the EPA had taken only a 'casual approach in evaluating.'

Id. at 41-42.

191. *Dumping Sludge*, *supra* note 46, at 421.

192. *Id.*

193. *See* Spirer, *supra* note 132, at 42-44.

194. *Dumping Battle*, *supra* note 78, at 15,035.

195. *Dumping Sludge*, *supra* note 46, at 422.

196. *Id.*

197. *Id.* Representative Norman D'Amours (D-N.H.) has called the EPA's "decision 'a betrayal of congressional trust' and a 'devastating blow' to efforts to end harmful dumping practices." *Id.*

198. *Id.*

199. Spirer, *supra* note 132, at 47.

controversy.[200]

Even so, Congress did amend the MPRSA relating to the ocean disposal of low-level radioactive waste by attaching a rider to the Surface Transportation Assistance Act of 1982.[201] Under the amendment, a moratorium on the issuance of permits for low-level radioactive waste dumping, except for research purposes, was to be enforced until January 6, 1985.[202] After expiration of this partial moratorium, an applicant would be required to prepare a site-specific disposal impact assessment.[203] Prior

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200. *Dumping Sludge, supra* note 46, at 422-23; *see, e.g.*, Spirer, *supra* note 132, at 47-48.

201. Pub. L. No. 97-424, § 424(a), 96 Stat. 2165-67 (1983) (to be codified at 33 U.S.C. §§ 1401, 1414).

202. Section 424(a)(h) of the Surface Transportation Assistance Act of 1982 provides that:

> Notwithstanding any provision of this subchapter to the contrary, during the two-year period beginning on January 6, 1983, no permit may be issued under this subchapter that authorizes the dumping of any low-level radioactive waste unless the Administrator of the Environmental Protection Agency determines—
>
> (1) that the proposed dumping is necessary to conduct research—
>
> (A) on new technology related to ocean dumping, or
>
> (B) to determine the degree to which the dumping of such substances will degrade the marine environment;
>
> (2) that the scale of the proposed dumping is limited to the smallest amount of such material and the shortest duration of time that is necessary to fulfill the purposes of the research, such that the dumping will have minimal adverse impact upon human health, welfare, and amenities, and the marine environment, ecological systems, economic potentialities, and other legitimate uses;
>
> (3) after consultation with the Secretary of Commerce, that the potential benefits of such research will outweigh any such adverse impact; and
>
> (4) that the proposed dumping will be preceded by appropriate baseline monitoring studies of the proposed dump site and its surrounding environment.
>
> Each permit issued pursuant to this subsection shall be subject to such conditions and restrictions as the Administrator determines to be necessary to minimize possible adverse impacts of such dumping.

Pub. L. No. 97-424, § 424(a)(h), 96 Stat. 2165 (1983) (to be codified at 33 U.S.C. § 1414).

203. Section 424(a)(i) of the Surface Transportation Assistance Act of 1982 provides that:

> (1) Two years after January 6, 1983, the Administrator may not issue a permit under this chapter for the disposal of radioactive waste material until the applicant, in addition to complying with all other requirements of this title, prepares, with respect to the site at which the disposal is proposed, a Radioactive Material Disposal Impact Assessment which shall include—
>
> (A) a listing of all radioactive materials in each container to be disposed, the number of containers to be dumped, the structural diagrams of each container, the number of curies of each material in each container, and the exposure levels in rems at the inside and outside of each container;
>
> (B) an analysis of the environmental impact of the proposed action, at the site at which the applicant desires to dispose of the material, upon human health and welfare and marine life;

to issuance of a permit to dispose of radioactive material, the amendment also required a joint resolution of both Houses of Congress to authorize the Administrator of the EPA to grant such permits.[204] Although the 1981 moratorium against dumping sewage sludge has expired, the ocean dumping of this sludge continued at an increasing rate.[205]

c. *U.S. Policy and Problems with the MPRSA*

Although the final resolution of the dilemma involving the ocean dumping of sewage sludge has remained unresolved, the focus of the debate has shifted dramatically since the MPRSA was enacted.[206] A single-minded preoccupation with the threat to the ocean environment by waste dumping[207] has been replaced by an approach balancing the full range of

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(C) any adverse environmental effects at the site which cannot be avoided should the proposal be implemented;

(D) an analysis of the resulting environmental and economic conditions if the containers fail to contain the radioactive waste material when initially deposited at the specific site;

(E) a plan for the removal or containment of the disposed nuclear material if the container leaks or decomposes;

(F) a determination by each affected State whether the proposed action is consistent with its approved Coastal Zone Management Program;

(G) an analysis of the economic impact upon other users of marine resources;

(H) alternatives to the proposed action;

(I) comments and results of consultation with State officials and public hearings held in the coastal States that are nearest to the affected areas;

(J) a comprehensive monitoring plan to be carried out by the applicant to determine the full effect of the disposal on the marine environment, living resources, or human health, which plan shall include, but not be limited to, the monitoring of exterior container radiation samples, the taking of water and sediment samples, and fish and benthic animal samples, adjacent to the containers, and the acquisition of such other information as the Administrator may require; and

(K) such other information which the Administrator may require in order to determine the full effects of such disposal.

Pub. L. No. 97-424, § 424(a)(i), 96 Stat. 2165-66 (1983) (to be codified at 33 U.S.C. § 1414).

204. *Id.* Section 424(a)(i)(4) of the Surface Transportation Assistance Act of 1982 states that:

> (B) No permit may be issued by the Administrator under this chapter for the disposal of radioactive materials in the ocean unless the Congress, by approval of a resolution described in paragraph (D) within 90 days of continuous session of the Congress beginning on the date after the date of receipt by the Senate and the House of Representatives of such recommendation, authorizes the Administrator to grant a permit to dispose of radioactive material under this chapter.

Pub. L. No. 97-424, § 424(a)(i)(4), 96 Stat. 2166 (1983) (to be codified at 33 U.S.C. § 1414).

205. Swanson & Devine, *supra* note 43, at 15.

206. *See* Spirer, *supra* note 132, at 44.

207. The concerns voiced by ocean preservationists, for the most part, have proven to be overstated. Widespread contamination of the oceans has not been detected according to a

environmental, social and fiscal implications in the U.S. policy regarding ocean disposal.[208] As noted by one commentator:

> [c]hanging environmental values, technological problems and economic pressures, scientific opinion, judicial process, and political trends converged to change the 1970s preservationist attitudes toward the oceans. The repercussions of this change will be significant and long-lasting.[209]

More knowledge has become available regarding the ocean's (1) reaction to waste dumping, (2) resiliency, and (3) assimilative capacity. There is also more evidence relating to the likelihood that dumping in certain ocean areas will directly and adversely affect human health.[210] When coupled with cost considerations and court rulings, this knowledge leads some to suggest that waste dumping decision-makers need to balance "economic tradeoffs and environmental effects of disposal on land, in the air, or in the marine environment."[211] As noted by New York's Mayor Koch, the MPRSA "is one of the few environmental statutes which recognizes that our environment is a highly complex, interrelated system and that waste disposal strategies involve difficult but necessary trade-offs."[212] In some instances, ocean dumping will become the preferred option and must be selected with a full understanding of all the consequences.[213] Ocean dumping regulators must therefore consider what materials should be dumped in quasi-containment sites, what materials should be dispersed, and what materials should not be dumped in the oceans at all.[214]

Two major problems relating to the MPRSA also need to be reviewed. The first problem involves the delimitation of authority over ocean disposal between the EPA and the Corps which has generated interagency conflict.[215] Under the bifurcated system adopted by Congress, the Corps is subjected to inherently conflicting responsibilities.[216] As the major producer of dredge spoils, the Corps regulates "activities over which its also has operational responsibility."[217] Prior to the enactment of the MPRSA, the Corps had almost absolute discretion in conducting

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1982 study sponsored by the United Nations Environment Programme. *See* CEQ 1982 REPORT, *supra* note 23, at 45.

208. Spirer, *supra* note 132, at 48.

209. Swanson & Devine, *supra* note 43, at 15.

210. *See id.* at 19.

211. Swanson & Devine, *supra* note 43, at 19. The "EPA has expressed the belief that it can begin to rework all of its disposal regulations to require cross-media balancing for all waste management decisions. NACOA supports this effort by EPA." *1982 Ocean Dumping Hearings, supra* note 21, at 295 (statement of NACOA).

212. *1982 Ocean Dumping Hearings, supra* note 21, at 202-03 (statement of Edward I. Koch).

213. Swanson & Devine, *supra* note 43, at 19.

214. *Id.*

215. *Compare* 33 U.S.C. § 1413(c) (1976), *with* 33 U.S.C. § 1413(d) and § 1413(e).

216. *Ocean Dumping Progress, supra* note 30, at 746.

217. *Id.*; *see* Lumsdaine, *supra* note 4, at 764.

dredging activities.[218] However, after passage of the MPRSA, the division of regulatory control between the EPA and the Corps allowed both agencies to shirk their new duties.[219] Since the MPRSA was enacted, the EPA has tended to promote relatively less stringent and environmentally protective criteria to govern dredged waste disposal.[220] The result has been a lax approach by the Corps toward applying the MPRSA to the ocean dumping of dredge spoils.[221]

The second problem relating to U.S. regulation of ocean dumping activities involves unresolved scientific and management issues which include: (1) the development of a comprehensive waste disposal management strategy; and (2) the resolution of technical uncertainties to insure that ocean disposal is pursued with minimal environmental risk.[222] The United States has emphasized a regulatory approach which focuses on specific disposal media and types of waste.[223] Systematic assessments of the various media (air, land, water) and of the synergistic impacts of all disposal sources have been largely ignored.[224] Furthermore, scant consideration has been paid to the concept that some wastes should be contained, others should be dispersed, and still others should be recycled.[225] To achieve a proper economic and ecological balance, the United States needs to incorporate a more comprehensive approach toward managing the overall problem of waste disposal;[226] otherwise, too much dumping, over too long a period, might be permitted based upon too many incorrect assumptions.

Internationally, there are similar problems, but while the U.S. difficulty in allocating authority between the EPA vis-a-vis the Corps has led to confusion and conflict in the United States, by comparison, the formulation of an international regulatory scheme might be unresolvable.

2. *International Agreements*

In the area of international law, the First U.N. Conference on the Law of the Sea, held in Geneva in 1958, resulted in four conventions,

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218. *Ocean Dumping Progress, supra* note 30, at 746.

219. *Id.*

220. *Id.* The formal disagreement resolution procedures contained in the MPRSA which could function to restrain Corps administration of the permit process have remained largely ignored. As noted by one commentator the "EPA has been more of a collaborator than an overseer of Corps activity: its reluctance to utilize statutory disagreement procedures and its promulgation of especially lax criteria has encouraged the Corps to continue pre-Act practices." *Id.* at 758.

221. *Id.* at 746.

222. Swanson & Devine, *supra* note 43, at 18.

223. *Id.*

224. *Id.*

225. *Id.*

226. *Id.; see 1982 Ocean Dumping Hearings, supra* note 21, at 201-02 (statement of Edward I. Koch).

namely: (1) the Convention on the High Seas,[227] (2) the Convention on the Territorial Sea and the Contiguous Zone,[228] (3) the Convention on the Continental Shelf,[229] and (4) the Convention on Fishing and Conservation of the Living Resources of the High Seas.[230] Some of these conventions addressed pollution issues, but methods of international enforcement and control were quite vague and failed to abate the problems of pollution from ocean dumping.[231] An explanation for that general ineffectiveness of the early international efforts is predicated on the fact that most of these conventions were concluded in 1958—prior to extensive scientific understanding of the actual and potential impact of dumping on the marine environment.[232]

In 1972, a significant contribution to international environmental law was developed at the United Nations Conference on the Human Environment (UNCHE) held in Stockholm (Stockholm Conference). The Stockholm Conference adopted a Declaration on the Human Environment (Environment Declaration)[233] and an Action Plan.[234] The Environment Declaration called for national and international cooperation to protect the environment and enunciated 26 basic principles.[235] The first principle of the Declaration asserted man's right to a healthy environment:

> Man has the fundamental right to freedom, equality and adequate conditions of life, in an environment of a quality that permits a life of dignity and well-being, and he bears a solemn responsibility to protect and improve the environment for present and future generations. . . .[236]

Principle 7 of the Environment Declaration urged countries to "take all possible steps to prevent pollution of the seas by substances that are liable to create hazards to human health, to harm living resources and marine life, to damage amenities or to interfere with other legitimate uses

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227. *Done* Apr. 29, 1958, [1962] 2 U.S.T. 2312, T.I.A.S. No. 5200, 450 U.N.T.S. 82 (entered into force Sept. 30, 1962).

228. *Done* Apr. 29, 1958, [1964] 2 U.S.T. 1606, T.I.A.S. No. 5639, 516 U.N.T.S. 205 (entered into force Sept. 10, 1964).

229. *Done* Apr. 29, 1958, [1964] 1 U.S.T. 471, T.I.A.S. No. 5578, 499 U.N.T.S. 311 (entered into force June 10, 1964).

230. *Done* Apr. 29, 1958, [1966] 1 U.S.T. 138, T.I.A.S. No. 5969, 559 U.N.T.S. 285 (entered into force Mar. 20, 1966).

231. Waldichuk, *supra* note 2, at 291; *see* Kuersteiner, *supra* note 54, at 160-61. "In fact, all that was accomplished by these conventions was an attempt to deal with the problems of nuclear pollutants and oil discharge, both with only limited success." Kuersteiner, *supra* note 54, at 161 n.17.

232. Kuersteiner, *supra* note 54, at 161.

233. *Stockholm Report, supra* note 1, at 3-5.

234. *Id.* at 6-28. The Action Plan recommended the establishment of a global environmental assessment program (Earthwatch) and certain management activities for environmental protection. Implementation measures to support these recommendations were also outlined. *Id.* at 6-34.

235. Kutner, *supra* note 34, at 275.

236. *Stockholm Report, supra* note 1, at 4.

of the sea."[237] Principle 6 called for the cessation of the release of heat and the discharge of toxic substances "in such quantities or concentrations as to exceed the capacity of the environment to render them harmless"[238] (including the effects of nuclear weapons). These measures were designed to ensure that serious or irreversible damages were not inflicted upon ecosystems.[239]

As a general rule, however, the issue of marine pollution was reserved for negotiators at UNCLOS III and the IMCO Conference on Marine Pollution.[240] Pursuant to this scheme, various national and international meetings and developments concerning ocean dumping led to the Ocean Dumping Conference.[241] In response to the recommendations adopted by UNCHE, delegates to the Ocean Dumping Conference met in London during October and November of 1972, and the product of this Conference was the Ocean Dumping Convention.[242]

As the most comprehensive international agreement concerning marine pollution (*i.e.*, absent worldwide acceptance of the LOS Convention),[243] the Ocean Dumping Convention has been praised for establishing a list of contraband materials and for creating criteria to evaluate materials not specifically listed.[244] Although the Ocean Dumping Convention acknowledged the ocean's ability to cope with limited amounts of waste, a provision required an environmental impact analysis of potential damage prior to dumping authorization.[245] In addition, the contracting States to the Ocean Dumping Convention were obligated to: (1) promote effective controls over all sources of marine pollution; (2) designate a permit authorization body; (3) keep records regarding the quality and quantity of dumping by vessels and aircraft registered or situated in their territories; and (4) negotiate dispute settlement procedures for resolving damages caused by ocean dumping.[246]

Criticism of the Ocean Dumping Convention has revolved primarily around the Convention's enforcement procedures.[247] Contracting States have retained authority to prevent and punish conduct which contravenes the provisions of the Convention.[248] Such an approach could conceivably lead to the creation of "pollution havens";[249] that is, a given country

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237. *Id.*

238. *Id.; see* Kutner, *supra* note 34, at 275.

239. *Stockholm Report, supra* note 1, at 4.

240. Kindt, *Prolegomenon To Marine Pollution And The Law Of The Sea: An Overview Of The Pollution Problem,* 11 ENVTL. L. 67, 79 (1980).

241. *Dumping Dilemma, supra* note 10, at 894.

242. *Id.*

243. Kuersteiner, *supra* note 54, at 162.

244. *Id.*

245. *Id.*

246. Kutner, *supra* note 34, at 273.

247. *Dumping Dilemma, supra* note 10, at 895.

248. *Id.*

249. *Id.*

could ignore illegal dumping activity or even sanction such dumping in territorial and coastal waters to further national development policies which were considered more important than controlling marine pollution. Unfortunately, no specific international enforcement agency was created by the Ocean Dumping Convention.[250] Vast expanses of the ocean, therefore, have remained outside international protective authority and are subject only to the efforts of nationally supported measures. Another weakness of the Ocean Dumping Convention involved the absence of a method for dispute resolution.[251]

Considered as a whole, the international community has taken a large step toward controlling pollution from ocean dumping.[252] Yet, these weaknesses exemplify the difficulty in creating a global regulatory scheme. Although the Ocean Dumping Convention enhanced global awareness, a comprehensive international agreement controlling all forms of marine pollution would be preferable to regulate ocean dumping activities.[253] The LOS Convention constitutes a significant advance in the right direction, but the LOS Convention has fallen short in developing global authority by generally reserving primary enforcement responsibility in the individual countries.[254] International enforcement by IMCO would be a preferred solution to the problem of global enforcement, particularly since IMCO fits almost perfectly into the regime established by the LOS Convention.

D. *Trends and Conditioning Factors*

Although pollution regulation in common law countries is based primarily on statutes and conventions, case-by-case adjudication of common law doctrines has played a limited role in the control of pollution.[255] The relevant doctrines involve court imposed tort liability and/or protection of property rights.[256] The application of common law doctrines are conditioned by a given country's attitude toward interference with property use. The resolution of conflicting values is accomplished by balancing the equities between the private uses and the public interests.[257]

The common law of nuisance, for example, has been invoked in environmental litigation, but such actions have had only limited success in

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250. *Id.* at 897.

251. *Id.* at 898. This deficiency was corrected by a protocol to the Convention adopted in 1978. Ocean Dumping Convention, *supra* note 50, art. 11 (amended) & Appendix A. Under this protocol, disputes may be submitted to the International Court of Justice (ICJ), upon consent of the parties, or to arbitration, upon request of one party to the dispute. *Id.* art. 11.

252. *Dumping Dilemma*, *supra* note 10, at 898.

253. *Id.*

254. *See* LOS Convention, *supra* note 35, arts. 194, 210.

255. *See* Spirer, *supra* note 132, at 9.

256. *See* Kuner, *supra* note 34, at 265.

257. *Id.*

abating pollution.[258] Courts called upon to decide nuisance suits have often been confronted with an *ex post facto* polluter; that is, an enterprise whose operation commenced before its effects were considered environmentally undesirable.[259] In such a situation, the equitable balance between eliminating the pre-existing operation and the recently recognized pollution has been occasionally adjudicated in favor of the polluter, particularly when the continued operation of the polluter is one in which the public has a major interest.[260] Similarly, pollution from a multiplicity of sources has not been obviated through nuisance litigation.[261] Courts have also expressed a reluctance to eliminate pollution by adopting policies which have evolved in a piecemeal fashion.[262] Protracted litigation may delay the implementation of needed public projects. Accordingly, legislation has been the preferred vehicle to regulate air, water, and noise quality standards.[263]

By comparison, litigation in the international community has played a similarly limited role in preventing and remedying transnational pollution problems. Although case law in the international environmental area has been sparse, certain principles have evolved regarding the resolution of disputes and the negotiation of conventions.

The first significant international case was the *Trail Smelter Arbitration*,[264] which was held during the 1930s to resolve a dispute over the ore smelter operations of a Canadian corporation. The operation of the smelter had produced sulphur dioxide fumes and damaged agricultural and timber interests in the United States.[265] In the *Trail Smelter Arbitration*, the tribunal held that as a matter of international law: (1) no country could use or permit the use of its territory in a manner causing serious transnational injury; and (2) the country from which the pollution originated was itself responsible even though the injury might be caused by a private company.[266]

The next important case delimiting international customary law with regard to environmental hazards was the *Corfu Channel Case*.[267] This case involved two British warships which were damaged while passing

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258. *Id.* at 266.

259. *Id.* at 266-67.

260. *See e.g.*, Powell v. Superior Portland Cement, 15 Wash.2d 14, 129 P.2d 536 (1942).

261. Kutner, *supra* note 34, at 267.

262. *See e.g.*, Boomer v. Atlantic Cement Co., 26 N.Y.2d 219, 309 N.Y.S.2d 312, 257 N.E.2d 870 (1970).

263. Kutner, *supra* note 34, at 268.

264. (United States v. Canada), 3 U.N.R.I.A.A. 1905 (1941); *see* Convention for the Settlement of Difficulties Arising From Operation of Smelter at Trail, B.C., April 15, 1935, U.S.-Canada, 49 Stat. 3245 (1935), T.S. No. 893 (effective Aug. 7, 1935). For an overview, see J. BARROS & D. JOHNSTON, THE INTERNATIONAL LAW OF POLLUTION (1974).

265. 3 U.N.R.I.A.A. 1905 (1941); Bleicher, *An Overview of International Environmental Regulation*, 2 ECOLOGY L.Q. 1, 19 (1972) [hereinafter cited as *International Regulation*].

266. *International Regulation*, *supra* note 265, at 25.

267. [1949] I.C.J. 4; *see* Wright, *The Corfu Channel Case*, 43 AM. J. INT'L L. 491 (1949).

through Albanian territorial waters in 1946. These ships unknowingly entered a minefield and struck mines, causing death and injury to crew members and damage to the ships.[268] The International Court of Justice (ICJ) stated that every country has an "obligation not to allow knowingly its territory to be used for acts contrary to the rights of other States."[269] On the basis of this statement, an argument has been made that International law prohibits transnational environmental injury and creates liability for environmental degradation of the oceans.[270]

A 1957 decision by France to divert waters from Lake Lanoux for a hydroelectric project led to the *Lake Lanoux Arbitration*.[271] Although Spain, as a lower riparian, objected to the project, France won the arbitration because the quality and quantity of the water normally available was unaltered and because Spain could not prove that the project would pollute or otherwise alter the flow of water from France to Spain.[272] Several important international legal principles were established. First, a country was not entitled to the unrestricted use of waters within its own national boundaries.[273] Secondly, the upper riparian was required to demonstrate that there were "no adverse effects" upon the lower riparian.[274] Thirdly, mere assertions by the upper riparian country that the water flow and quality would remain unchanged were insufficient, and international tribunals could properly examine the scientific validity of those claims.[275]

The principles elucidated in these international cases have expanded the reach of the traditional substantive basis for nuisance protection, which allowed "a balancing of the benefits of the defendant's activities against the damages suffered by the plaintiff."[276] The paucity of cases in this area, however, has reflected the limited utility of adjudication in establishing international regulations and securing transnational compliance with measures that are protective of the environment. Considering the magnitude of the problem involving ocean dumping and considering the concomitant pollution problems which threaten to overwhelm the earth's ocean, international litigation appears to be inadequate to regulate ocean dumping activities.

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268. *See* Corfu Channel Case, [1949] I.C.J. 4; *International Regulation, supra* note 265, at 16.

269. Corfu Channel Case, [1949] I.C.J. 4, 22.

270. *International Regulation, supra* note 265, at 16 n.50, 17.

271. (Spain v. France), 12 U.N.R.I.A.A. 281 (1963) (French version). For the text of the award in French, see 62 REVUE GÉNÉRALE DE DROIT INTERNATIONAL PUBLIC 79 (1958). For a condensed text of the award in English, see 53 AM. J. INT'L L. 156 (1959) [hereinafter cited as English Version].

272. English Version, *supra* note 271, at 156, 160-61; *International Regulation, supra* note 265, at 26.

273. *International Regulation, supra* note 265, at 27.

274. *Id.* at 28, *see* English Version, *supra* note 271, at 160-61.

275. *International Regulation, supra* note 265, at 27.

276. *Id.* at 28-29.

E. *Policy Alternatives and Recommendations*

Only limited scientific knowledge about the long-range implication of ocean pollution exists. For example, unanswered questions remain regarding where the radioactivity which leaks from canisters in North Atlantic waste dumpsites is going to migrate and whether radioactive substances are being incorporated by living organisms into the food chain.[277] With the proper legislative initiative and concomitant funding, this scientific informational gap could be bridged. Unified international efforts encouraging marine scientific research are essential. While a consensus on what the law on ocean dumping should be has emerged, a major area lacking consensus remains with respect to international regulatory and enforcement measures. Therefore, in this section three alternative approaches for international regulation and enforcement will be discussed. The approaches are: (1) unilateral, (2) global, and (3) regional.

Prior to the enactment of the LOS Convention, there was a void regarding international agreement on dumping control procedures (to which a majority of nations adhered; *e.g.*, the Ocean Dumping Convention). This situation permitted any individual country to take selective initiatives by unilaterally extending their regulatory powers into the high seas. Since the LOS Convention, unilateral extensions continue to occur (although generally with less frequency) when a country considers that its vital interests are threatened by the unregulated activities of foreign nations.[278] Canada's action in 1970 when it adopted the Arctic Waters Pollution Prevention Act[279] exemplified this type of unilateral extension.[280]

Four major criticisms are voiced by opponents to the unilateral approach. First, the oceans, as the common heritage of man, are a shared environment used extensively for navigation. Any assumption of unilateral regulatory powers under national laws might seriously infringe upon the utilization of this "flow resource" by other countries and peoples.[281] Secondly, unilateral extensions of "creeping jurisdiction" to control pollution are characterized as the most politically expedient method of extending the sovereignty of the coastal State over the high seas.[282] Thirdly, the unilateral approach is criticized because State "super programs" cannot ultimately succeed without similar efforts being exerted by neighboring countries.[283] Problems would also arise with overlapping jurisdictions and varying statutes. Finally, uses of the sea are interrelated, and each use has an impact relating to pollution. It is accepted that the aim of peaceful and efficient activities in these use areas can be realized only

277. CEQ 1980 REPORT, *supra* note 5, at 19.
278. Okidi, *supra* note 121, at 2.
279. *See* CAN. REV. STAT. c.2 (1st Supp. 1970), *reprinted in* 9 I.L.M. 543 (1970).
280. *Special Claims, supra* note 113, at 437-38.
281. Okidi, *supra* note 121, at 5.
282. *Id.* at 6.
283. *Id.* at 7.

within the framework of regional cooperative agreements or international agreements.[284]

The second alternative approach suggested for the regulation of pollution on the high seas is a single international agency empowered to take comprehensive measures of control. The rationale underlying the global system is that the high seas beyond national jurisdiction are open for use by all countries and peoples and therefore, control should be administered by the entire world community.[285]

Criticisms of this alternative revolve mainly around the centralized character and hence immobility, of this type of agency. Most ocean pollution problems have regional peculiarities, and therefore, it is not necessary or even desirable to form a global superagency. Such an agency is unlikely to achieve consensus on anything beyond general international standards. Special regional problems would also generate disagreements on the application of various detailed rules. In addition, the single global agency would probably be too large and diverse to respond to particular local needs.[286] Only IMCO would have any possibility for being successful in this capacity.

The third alternative, the regional approach, combines the best aspects of both of the other two alternatives. Its focus is international in character and yet national with regard to enforcement and implementation processes. The five major advantages of a regional approach are as follows:

a. "[D]ifferences in the degrees and kinds of pollution in the various regions require differences in approaches to be followed in pollution control."[287]

b. Regional mechanisms and organizations lead to the distribution of remedial technology in those areas where incidents may occur.[288]

c. Regionalization encourages participation by a maximum number of countries, including developing countries which might otherwise remain at the periphery in a centralized system.[289]

d. Efforts to establish and empower a single international regime have been considered futile, while unilateral measures are internationally objectionable.[290]

e. Regional organizations serve as forums for consultation and confrontation in matters involving ocean pollution.[291]

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284. *See id.* at 8.
285. Okidi, *supra* note 121, at 8.
286. *Id.* at 12.
287. *Id.* at 13.
288. *Id.* at 15.
289. *Id.* at 16.
290. *Id.* at 17.
291. *Id.*

However, the regional approach also has its problems. If a regional organization lacks an international character, it may not be able to invoke sanctions against flag States with differing ideological values.[292] Another problem area deals with the region's potential lack of a unified and coordinated effort. If the regional authority is fragmented in its scope, or self-interested in its focus, overall goals may be difficult to legislate and pursue for the good of the entire international community.

However, these problems can be overcome. The advantages of a regional system far outweigh the disadvantages. A regional approach will allow various nations the cooperative freedom to regulate and enforce legislation concerning ocean dumping, and yet, this approach will still permit coordinated domestic legislation over both coastal and international dumping in waterways, without ignoring the interests of the high seas—which fall under no one sovereign's jurisdiction.

III. THE LAW OF THE SEA PROVISIONS

> The function of the international law of the sea is constitutional: it creates the basic system of order in the oceans. It is primarily concerned with allocating rights to use the oceans, and rights to insist that one's interests be taken duly into account in the exercise of rights by others.[293]

The LOS Convention establishes and codifies new duties to protect and preserve the marine environment.[294] In general, elaborate provisions "both expand environmental rights and obligations and limit certain unilateral environmental actions"[295] which may impair other use values. Additional duties recognized by the LOS Convention focus on the promotion of marine scientific research and dissemination of scientific knowledge.[296] An analysis of the pertinent provisions follows.

Pursuant to part XII, section 1, of the LOS Convention, countries have a general obligation to: (1) "protect and preserve the marine environment";[297] (2) "take, individually or jointly as appropriate, all measures consistent with this Convention that are necessary to prevent, reduce and control pollution of the marine environment from any source, using for this purpose the best practicable means at their disposal and in accordance with their capabilities, . . .";[298] and (3) "take all measures necessary to ensure that activities under their jurisdiction or control are so conducted as not to cause damage by pollution to other States and their

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292. *See id.* at 20.

293. Oxman, *The Law Of The Sea Conference And Development: Food And Energy Resources*, 13 LAW. AM. 157, 157-58 (1981).

294. Oxman, *The New Law of the Sea*, 69 A.B.A.J. 156, 162 (1983) [hereinafter cited as *New LOS*].

295. Oxman, *Introduction: On Evaluating the Draft Convention on the Law of the Sea*, 19 SAN. DIEGO L. REV. 453, 459 (1982).

296. *New LOS*, *supra* note 294, at 162.

297. LOS Convention, *supra* note 35, art. 192.

298. *Id.* art. 194, para. 1.

environment, ..."[299] In addition, States are cautioned that their pollution control efforts should not "transfer, directly or indirectly, damage or hazards from one area to another or transform one type of pollution into another."[300] Three types of qualifications, however, limit these duties.

The first qualification of a country's legal obligations is found in the language "pursuant to their environmental policies" of article 193.[301] Although this text was designed to provide countries with flexibility regarding their environmental programs, the context of its adoption is related to the remaining qualifications.[302] The second qualification reserves to nations "the sovereign right to exploit their natural resources pursuant to their environmental policies and in accordance with their duty to protect and preserve the marine environment."[303] This text, while preserving a country's right to the flexible development and management of its resources, conditions the exercise of this right on environmental considerations.[304] This textual approach attempts to harmonize competing economic and environmental interests which may effectively undermine the latter.[305] The third qualification makes the legal obligation of countries to prevent and control pollution dependent upon their "ability to discharge that obligation" and with regard to their "stage of economic development."[306] For most developing countries, this qualification renders their obligation illusory.[307]

Part XII, section 2, of the LOS Convention obligates nations to: (1) cooperate on a global and regional basis with international organizations to formulate "international rules, standards and recommended practices and procedures . . . for the protection and preservation of the marine environment";[308] (2) cooperate in the promotion of scientific research and data exchange programs regarding marine pollution;[309] (3) cooperate "in eliminating the effects of pollution and preventing or minimizing the damage";[310] and (4) establish appropriate scientific criteria for the formulation of international environmental "rules, standards and recommended practices and procedures for the prevention, reduction and control"[311] of

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299. *Id.* art. 194, para. 2.

300. *Id.* art. 195.

301. *Id.* art. 193; *See* Stevenson & Oxman, *The Third United Nations Conference On the Law of the Sea: The 1974 Caracas Session*, 69 AM. J. INT'L L. 1, 26 (1975) [hereinafter cited as *1974 Caracas Session*].

302. *1974 Caracas Session, supra* note 301, at 26.

303. LOS Convention, *supra* note 35, art. 193; *1974 Caracas Session, supra* note 301, at 26.

304. *1974 Caracas Session, supra* note 301, at 26.

305. *See id.*

306. *1974 Caracas Session, supra* note 301, at 26-27; *see* LOS Convention, *supra* note 35, art. 194, para. 1.

307. *See 1974 Caracas Session, supra* note 301, at 27.

308. LOS Convention, *supra* note 35, art. 197.

309. *Id.* art. 200.

310. *Id.* art. 199.

311. *Id.* art. 201.

marine pollution.

Section 3 of Part XII contains broad provisions for the promotion of "scientific, educational, technical and other assistance to developing States for the protection and preservation of the marine environment and the prevention . . . of marine pollution."[312] Such assistance would be deemed essential to any global effort to reduce and regulate marine pollution problems. Under Section 4, countries are obligated "to observe, measure, evaluate and analyse, by recognized scientific methods, the risks or effects of pollution of the marine environment,"[313] and to "keep under surveillance the effects of any activities which they permit or in which they engage in order to determine whether these activities are likely to pollute the marine environment."[314] Section 5 imposes a reporting obligation on countries[315] and requires that they assess the potential effects of activities under their jurisdiction which "may cause substantial pollution of or significant and harmful changes to the marine environment."[316] The wide-ranging scope of these provisions recognizes the need for internationally binding standards and obligations regarding the marine environment. The LOS Convention also focuses on source-specific pollution in its attempt to protect and preserve the marine environment.

In addition to land-based pollution and air-borne pollution, the third major type of pollution to be minimized under article 194, paragraph 3, of the LOS Convention is dumping.[317] Land-based pollution, air-borne pollution, and dumping appear to have been grouped together in paragraph 3, subsection (a),[318] because they constitute some of the earliest forms of marine pollution and because they were already well-established types of pollution when UNCLOS III was first convened in 1974. By comparison, the newer types of marine pollution, *i.e.*, vessel-source pollution and pollution from seabed activities, have been delimited within separate subsections[319] and more provisions of the LOS Convention have been directed toward them.[320] In any event, article 194 imposes a basic duty upon countries to minimize "dumping."[321]

As previously indicated, the word "dumping" is basically defined in article 1, paragraph 1(5)(a)(i) as "any deliberate disposal of wastes or other matter from vessels, aircraft, platforms or other man-made structures at sea . . . ."[322] Thus, although the word "dumping" is used, the more popular term of "ocean dumping" is entirely appropriate, because

312. *Id.* art. 202, para. a.
313. *Id.* art. 204, para. 1.
314. *Id.* art. 204, para. 2.
315. *Id.* arts. 205, 206.
316. *Id.* art. 206.
317. *Id.* art. 194, para. 3(a).
318. *Id.*
319. *Id.* art. 194, para. 3(b)-(c).
320. *See, e.g., id.* arts. 211, 217-21 (relating to vessel-source pollution).
321. LOS Convention, *supra* note 35, art. 194, paras. 1-3(a).
322. *Id.* art. 1, para. 1(5)(a)(i).

what is meant is the deliberate disposal of wastes at sea. It should also be noted that the primary test continues to be one of "intent"—as evidenced by the use of the words "deliberate disposal."

Considerable attention has been directed toward defining what is not included within the concept of "dumping," particularly since more wordage is directed toward what does not constitute dumping vis-a-vis what does constitute dumping.[323] Article 1, paragraph 1(5)(b) excludes wastes incidental to the "normal operations of vessels, aircraft, platforms or other man-made structures . . .,"[324] from the definition of "dumping." Such incidental wastes are governed by other provisions of the LOS Convention. Similar to the intent test for what constitutes dumping, the test of what does not constitute dumping focuses on "purpose"[325] (*i.e.*, intent). It can be argued that the establishment of offshore waste disposal facilities appears to be prohibited by article 1, paragraph 1(5)(b)(i),[326] since under this provision such activities would constitute "dumping." Whether the waste disposal installations mentioned in this section are to be treated as "offshore installations" or as structures engaged in "dumping" needs to be clarified.

Within the specific provisions covering marine pollution, article 210 governs dumping.[327] Paragraphs 1 and 2 of article 210 obligate countries to adopt laws, regulations, and other measures "to prevent, reduce and control" dumping.[328] These obligations are similar to those adopted for other types of marine pollution, but paragraph 3 appears to add an additional obligation for countries to monitor their industries to ensure that illegal dumping does not occur.[329] Paragraph 4 tends to place emphasis on utilizing an international approach toward controlling dumping,[330] and the crucial problems regarding ocean dumping seem to involve areas that lie beyond coastal-State jurisdiction.[331]

Given the hypersensitive nature of certain ocean regions and of the marine environment in general, an overall prohibition against ocean dumping would intrinsically be the preferable approach. The option adopted by the Ocean Dumping Convention, however, regulates rather than prohibits waste disposal in the seas. The eventual trend toward accomplishing a regulatory scheme which protects the ocean is evidenced by the fact that coastal-State permission is a prerequisite under article 210, paragraph 5 of the LOS Convention before dumping can occur in territo-

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323. *Compare* LOS Convention, *supra* note 35, art. 1, para. 1(5)(a), *with* LOS Convention, *supra* note 35, art. 1, para. 1(5)(b).

324. LOS Convention, *supra* note 35, art. 1, para. 1(5)(b)(i).

325. *Id.* art. 1, para. 1(5)(b)(i)-(ii).

326. *Id.* art. 1, para. 1(5)(b)(i).

327. *Id.* art. 210.

328. *Id.* art. 210, paras. 1-2.

329. *Id.* art. 210, para. 3.

330. *Id.* art. 210, para. 4.

331. *See* Stevenson & Oxman, *The Preparation For The Law Of The Sea Conference*, 68 AM. J. INT'L L. 1, 23 (1974).

rial seas, in economic zones, or on the continental shelves.[332] This paragraph effectively prohibits dumping without permission in one-third of the world's oceans. By obligating countries to utilize measures which are "no less effective" than "global rules and standards,"[333] paragraph 6 affirms this viewpoint. In the interim, the practical use of a regional approach is supported by paragraph 4 and by the "geographical situation" requirement of paragraph 5.[334]

"Enforcement" with respect to dumping[335] is governed by article 216. Both national laws established in accordance with the LOS Convention and international standards established through competent international organizations (such as IMCO) shall be enforced:

> (a) by the coastal State with regard to dumping within its territorial sea or its exclusive economic zone or onto its continental shelf;
>
> (b) by the flag State with regard to vessels flying its flag or vessels or aircraft of its registry;[336]
>
> (c) by any State with regard to acts of loading of wastes or other matter occurring within its territory or at its off-shore terminals.[337]

These provisions would appear to require international acceptance of the Ocean Dumping Convention because the Convention constitutes a pre-existing, widely-accepted agreement established through a competent diplomatic conference.[338] Therefore, under the LOS Convention, coastal States would be obligated to enforce the precepts of the Ocean Dumping Convention in their territorial seas, economic zones, and continental shelf areas. As indicated earlier, the area covered by the protective umbrella of this provision only constitutes one-third of the oceans. Critics contend that the LOS Convention provisions for enforcement are decidedly vague and do not extend beyond those jurisdictional limitations to which the international community bound itself in the Ocean Dumping Convention.[339] Thus, the LOS Convention's enforcement efforts fall short of a genuine, internationally based attempt "to clean up the ocean, or prevent it from getting considerably dirtier."[340]

Even if a country absolutely prohibits ocean dumping of wastes, problems will persist. If coastal States rigidly enforce the Ocean Dumping

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332. LOS Convention, *supra* note 35, art. 210, para. 5.

333. *Id.* art. 210, para. 6.

334. *Id.* art. 210, paras. 4-5.

335. *Id.* art. 216.

336. The original text of the Informal Composite Negotiating Text Revision 2 (ICNT/Rev.2), art. 216(b), U.N. Doc. A/CONF.62/WP.10/Rev.2 (1980) was written as follows: "by the flag State with regard to vessels and aircraft registered in its territory or flying its flag." As evident from the change in language, the LOS Convention corrected an ICNT/Rev.2 technical error of modifying aircraft as fliers of State flags.

337. LOS Convention, *supra* note 35, art. 216, para. 1(a)-(c).

338. *See id.*

339. *Dumping Dilemma, supra* note 10, at 910-11.

340. *Id.* at 911.

Convention in the coastal areas, those parties wishing to continue dumping will necessarily be forced out into the high seas areas. Thus, pollution problems would be merely transferred, not remedied. Although most of the high seas areas are biological deserts, any dumping would, by definition, almost invariably result in wastes sinking below the thermocline and thereby affecting hypersensitive ecological areas. Accordingly, ocean dumping should be strictly regulated throughout the oceans—not just in the coastal areas.

IV. CONCLUSION

A prohibition on ocean dumping which is too rigid is neither wise nor practical. Studies by the scientific community have revealed that marine ecosystems can be sufficiently safeguarded from pollution if ocean dumping involves biodegradable and nonaccumulative waste materials. However, increased scientific and regulatory attention should be directed toward identifying the conditions under which other wastes can be dumped without causing environmental damage. The lack of empirical base data, when coupled with reduced funding for oceanic research, will not further an intelligent analysis of dumping disposal options.

A "multimedia approach" to waste management may avoid the transfer of pollution problems from one medium to another. The balancing of relative harms and costs appears economically attractive but may lead to the overemphasis of cost considerations. The focus on "management" considerations may lead to short-term disposal decisions which ignore the long-term consequences of ocean dumping. Those who would subsidize industrial operations by selecting the "cheapest" disposal option (*i.e.*, the ocean), "ought to bear the burden of proof that no irreversible damage will result now, or in the future."[341] A presumption against ocean dumping could further spur the development of new technologies for processing wastes.

The environmental and political vulnerability of the ocean necessitates regulatory vigilance. Caution and prudence are justified by the limited knowledge which society possesses regarding the assimilative capacity of the seas. Ocean dumped wastes know no political boundaries and represent a threat to the entire global community. Unilateral extensions of jurisdiction should be discouraged. The example of the MPRSA highlights not only the potential interaction between national and international regulatory schemes but also the sacrifice of the marine environment by a country in furtherance of political expediency. International attempts to protect and preserve the marine environment need to be more fully developed. The Ocean Dumping Convention represented a positive attempt in this direction. Although the LOS Convention did not sufficiently capitalize upon the international regulatory gains made by the

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341. *1982 Ocean Dumping Hearings, supra* note 21, at 188 (statement of Jacques-Yves Cousteau).

Ocean Dumping Convention, the LOS Convention has expanded the substantive duties of countries to guard the marine environment from damage via ocean dumping. Through the LOS Convention, more countries will become bound to the precepts of the Ocean Dumping Convention.

International enforcement mechanisms remain deficient under the LOS Convention, which generally abdicated enforcement responsibility to the individual nations. Although the jurisdictional authority of coastal States was expanded to include the economic zone (EEZ), vast expanses of the ocean theoretically remain unprotected. A single international regulatory body, such as IMCO, should not be deemed the only solution. A viable alternative would vest dumping control in regionally-based regulatory authorities. Adoption of the LOS Convention need not be interpreted to preclude regional cooperation. In fact, the regional approach appears to be the best approach for regulating ocean dumping. Even so, countries should remember that it is necessary to explore all avenues which would protect and preserve the marine environment.