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Beyond Restoration - The Case of Ecocide

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ABSTRACT

The term "ecocide" was first coined to categorize massive destruction of the environment in war. If the sheer scale of the harm done be the distinguishing feature of ecocide, it is contended that the term may justifiably be applied to peacetime activities that destroy or damage ecosystems on a massive scale. The author shows that, although ecocide has a long history, it had little impact on international law until the advent of catastrophic oil spills at sea, nuclear accidents, long-range air pollution, and the threat of global warming. Then the international community began to demonstrate a growing concern, but the measures undertaken in response may already be too little and too late. The concluding part of the article deals with the more radical legal remedies (such as treating ecocide as an international crime) that may be needed to avert the threat of ecocide.

INTRODUCTION

The term "ecocide" was first coined some two decades ago to categorize massive destruction of the environment in war and, specifically, the use of defoliants in southeast Asia.1 The word may be new, but the tactics are as old as history. They have been employed by defenders to deny attackers food, water or shelter, or by attackers to induce defenders to surrender, or as a counter-insurgency measure, to quell stubborn rebellion.2 What characterizes such activities in the modern...
world is the sheer scale of the damage done to the environment. If this be the distinguishing feature of ecocide, then it is contended that the term may justifiably be applied to peacetime activities that destroy or damage ecosystems on a massive scale.  

The ecosystem so destroyed or damaged would normally be large. It might be that of a major river, an enclosed sea, a mountain range, an aquifer, or a tract of forest, wetland, or other terrain of distinctive vegetation or soil type. The consequences of its impairment may spread to an entire large region, even the globe itself, and, hence, be disastrous for the welfare of many other ecosystems in a chain reaction. In many instances, the damage would be such that it cannot be undone and the ecosystem is beyond repair. Damage of this kind may be the result of a single nuclear disaster or the cumulative effect of unchecked toxic pollution. In fact, the end result of uncontrolled pollution could make the earth unfit for human life—an ultimate ecocide.

Because repair may be not enough to undo the damage, this article will attempt to sketch how nations have coped with ecocide. It will show that, although ecocide has a long history, it had little impact on international law until the advent of catastrophic oil spills at sea, nuclear accidents, and long-range air pollution. Then the international community began to demonstrate a growing concern, but the measures undertaken in response may already be too little and too late. The concluding part will deal with the more radical legal remedies that may be needed to avert threatening disaster.

THE RISE OF ECOCIDE

Ecocide began when human beings learned to adapt the natural environment to their needs. Even primitive societies were quite capable of methodically and heedlessly misusing their resources, generation after generation, until the bruised and battered environment would no longer support them. Who would imagine today that barren Easter Island in the Pacific once supported a lush vegetation? It seems that the inhabitants committed ecocide in two time-honored ways, first by fire and then by

& Rawlinson trans., 1936). During the 100 Years War in Europe, roving companies of *ecorcheurs* (literally "scorchers") wandered through France creating havoc by fire. 1 The Law of War: A Documentary History 775 (Friedman ed. 1972). The most famous example in more recent times was Sherman's "March to the Sea" through Georgia. See B. Catton, Never Call Retreat 415 (1965); Commager, The Blue and the Grey: The Story of the Civil War as Told by Participants 958-59 (1950).

3. That the term has already passed into general, non-military usage is suggested by the dictionary definition: "The destruction of large areas of the natural environment by such activity as nuclear warfare, overexploitation of resources or dumping of harmful chemicals." Random House Dictionary, supra note 1, at 618 (emphasis added).
over-grazing until soil erosion forced them to abandon the island altogether.\(^4\)

Fire was probably the earliest large-scale ecocidal force employed
the world over. In the beginning, its use was limited, but ancient hunters
and gatherers are believed to have purposefully started conflagrations to
open up areas for better hunting, and they were followed by farmers
whose preferred method of preparing fields for cultivation was to slash
and burn acres of forest.\(^5\) Soil erosion, from livestock grazing and
continuous cultivation, has plagued the semi-arid, hilly Mediterranean
region since remote antiquity. The barren wastelands so created were
observed with sorrow by Plato and other ancient writers.\(^6\) Bare rock and
scrub-covered hillside around the Mediterranean testify today to a
destruction of forests for lumber and shipbuilding that was noticeable
more than two and a half millennia ago.\(^7\)

Failure to maintain irrigation systems and soil fertility under
irrigation proved to be the nemesis of many of the more advanced
agricultural societies from remote Sumerian times onward, because of soil
salinity which rendered parts of Mesopotamia, the Nile delta and, later,
semi-arid areas of the Indian sub-continent an alkali desert.\(^8\) Migrating
pastoralists also brought about the downfall of both hydraulic and other
types of farming by damaging water installations and putting their sheep
to graze among the ruins. An irrigation system destroyed by nomads
implied not just a temporary dislocation, but the complete and permanent
replacement of an ecosystem supporting intensive agriculture by one
supporting only grassland and grazing animals.\(^9\).

When European colonists reached the Americas, they altered and
even destroyed to suit their own purposes the ecosystems that supported
the economy of Indian tribes.\(^10\) In the process, buffalo disappeared from

\(^5\) Stewart, Fire as the First Great Force Employed by Man, in 1 Man's Role in Changing the
Face of the Earth 115 (1956) [hereinafter Man's Role].
\(^6\) Plato, Critias, in The Collected Dialogues of Plato 1212, 1216 (Hamilton & Cairns, eds.
1961).
\(^7\) Heichelheim, Effects of Classical Antiquity on the Land, in Man's Role, supra note 5, at 165,
171; see also Cary, The Geographical Background of Greek and Roman History 22-23 (1949).
\(^8\) See Teclaff, Economic Roots of Oppression 23 (1984); Hamdan, Evolution of Irrigation
\(^9\) The Mongols wrought such devastation all around the periphery of dry Central Asia
in the 13th century, annihilating steppe-farming communities and reducing and weakening
oasis civilization. According to one authority, "the empty spaces of the Dry Belt were
terribly enlarged by the plague of nomadic migrations." Von Wissman, On the Role of Nature
and Man in Changing the Face of the Dry Belt of Asia, in Man's Role, supra note 5, at 278, 296.
\(^10\) For a survey of recent studies on the transformation of North American ecosystems
since pre-Columbian times, see Stevens, The Heavy Hand of European Settlement, N.Y. Times,
the prairies and passenger pigeons from the skies of North America, but the continent now supports millions more people and at a higher standard of living. Similarly, the much earlier disappearance of dense forests and of wolves and bison in Europe did not impede the capacity of that continent's environment to support a greater number of people at an ever-rising standard of living.

Ecocide brought destruction and suffering to many, but has not, so far, impeded the multiplication and territorial expansion of the human species. The story of humanity has been a story of success in continuously changing the natural environment (by ecocide, among other means) into one more adaptable to the satisfaction of human needs. That is why, even after the Industrial Revolution had accelerated capacity to inflict damage on the environment, there were still only a few who, like George Perkins Marsh and Henry David Thoreau, raised warning voices about the pace and consequences of such transformations. By the second half of the 20th century, however, the threat of ecocide began to assume global dimensions and could no longer be ignored.

With nuclear weapons testing, the atmosphere could become a conduit of long-lasting, perhaps permanent environmental damage to large parts of the entire globe. Devastating as some of these military

Aug. 10, 1993, at Cl. On the deliberate destruction of wildlife as a device to undermine the Indian economy in the West, see Brown, Bury My Heart at Wounded Knee: An Indian History of the American West 265 n.18 (1970) (citing Garretson, The American Bison 128 (1938) and Hornaday, The Extermination of the American Bison 496-501 (1889)).


12. So complete was the pollution of the English Midlands after little more than half a century of heavy industry that Dickens was writing of a "Coketown" with its canals black and its rivers purple with dye. Dickens, Hard Times 22 (New Oxford Illustrated Dickens ed., 1955). Germany's Ruhr region followed the same pattern until its rivers became sewers and its major cities were in danger of drowning in their own pollution. Fair, Pollution Abatement in the Ruhr District, in Comparisons in Resource Management 156 (Jarrett ed., 1961). Even the New World was getting into the same state. In 1871 an American court was obliged to restrain a municipality from actually filling up a navigable waterway with rubbish and sewage. Clark v. Peckham, 10 R.I. 35 (1871).


14. See Lee, The Legality of Nuclear Tests and Weapons, 18 Osterreichische Zeitschrift fur offentliches Recht 307 (1968). The warning and danger areas established for nuclear tests and closed off to shipping and fishing give some idea of the extent of radioactive fallout. In the Pacific atomic proving grounds of the United States, they amounted to 400,000 square miles. Id. at 314 n.31. The zone around Christmas Island was 600 by 800 miles and around Johnston Island it had a radius of 470 nautical miles at sea level. Id. From a single detonation in 1954, the immediate, documented injury to humans included exposure to radiation of a Japanese tuna trawler's crew and more than 250 people on Kwajalein Island. Id. at 312, 316 n.36. The effect of nuclear testing on ecosystems is more subtle and may last a very long time. Radioactivity from Soviet testing decades ago continues to be a problem in the Arctic because of its effects on the food chain. [Current Rep.] Int'l Envtl. Rep. (BNA)
applications have been, the direct and indirect effects of non-military development of nuclear power are no less threatening to the long-term survival of life-sustaining ecosystems. Chernobyl demonstrated this in alarming fashion, and the disclosure of a group of unsafe reactors in eastern Europe gives no grounds for confidence in the technology.

At the same time, the oceans have shown increasing signs of stress—dramatically through tanker and oil-drilling accidents, silently and insidiously through routine vessel operation, dumping of wastes at sea, and land-based pollution entering the marine environment via rivers and the atmosphere. From 1967, when the Torrey Canyon ran on the rocks off Great Britain, to 1978, when the Amoco Cadiz broke in half off the coast of France, to 1978, when the Exxon Valdez impaled itself on the rocks of Prince William Sound, the damage from oil spills escalated despite all efforts at prevention and control. These were the most sensational incidents, but in a single two-month period (December 1976—January 1977) there were no fewer than ten tanker casualties, among them the Argo Merchant grounding off Nantucket Island, Massachusetts. Some of the accidents have been in environmentally very sensitive areas and two such disasters happened in one year (1989)—the Exxon Valdez spill near Alaskan wilderness areas and the grounding of the Argentine navy ship Bahia Paraiso close to wildlife breeding sites on Torgersen Island in the Antarctic.

While this was going on, other parts of the aquatic environment suffered devastating harm. The Aral Sea was found to have very largely disappeared, losing 66 percent of its volume and dropping about 40 feet.


15. Of the vast and growing literature on the effects of Chernobyl, see Sands, The Environment, Community and International Law, 30 Harv. Int'l L.J. 393, 401-12 (1989). The impact of the accident in April 1986 was much more widespread in Europe and the former Soviet Union than was at first thought.

16. The problems with unsafe reactors in eastern Europe have only recently come to light. The Greifswald plant in former East Germany was ordered closed in 1990, but a number of these Chernobyl-type reactors are still operating. [Current Rep.] Int'l Envtl. Rep. (BNA) 260, 321-22, 333, 364 (1993).


20. Schneider, supra note 17, at 204.

since 1960, due to diversions for cotton irrigation in Soviet Central Asia. Semi-enclosed seas, such as the Baltic, the North Sea and the Black Sea, had become polluted sinks from the deposition of toxic waste of all kinds. Major rivers, such as the Rhine, the Danube, and the Elbe, were little better than sewers. The ultimate insult to the Rhine was the Sandoz fire of 1986 at Basel, Switzerland, which resulted in the release to the river of huge quantities of toxic chemicals, threatening water supplies, killing fish, and fouling the riverbed for hundreds of miles down to the sea.

Rivers and lakes were also showing widespread damage from acidification, and attention returned full circle to the atmosphere and the problem of acid rain, which was by now afflicting not only the heavily industrialized areas of Europe and North America, but also Latin America and parts of the Far East. Among the other effects of acid precipitation was forest damage. "Waldsterben" (forest death) spread alarmingly in Germany and central Europe in the 1980s, causing visible deterioration to three-quarters of all trees in some areas. Forests in eastern Europe, Scandinavia, the former USSR, the eastern states of the United States and the eastern provinces of Canada were also badly affected.

Harm to the temperate forests in recent years has been overshadowed, however, by the rapid disappearance of enormous areas of tropical forest. Despite a conservation plan to which 70 countries subscribed, nearly twice as much forest was being liquidated at the end of the 1980s

22. Vice-President Albert Gore (then Senator, D. Tenn.) described this in 1990 as an ecological disaster which has virtually passed beyond human control. [Current Rep.] Int'l Envtl. Rep. 543 (1990); see also Kotlyakov, The Aral Sea Basin: A Critical Environmental Zone, 33 Env'r't 4 (No. 1, 1991).


26. See Brunnee, Acid Rain and Ozone Layer Depletion: International Law and Regulation 11 (1988). The correlation between air pollution and acidity in rainfall was studied as long ago as mid-19th century, but the problem was perceived mainly as a local one until Sweden drew attention to it internationally in 1972. Id. at 9.


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than at the beginning of the decade. Chief concern centered on the Brazilian Amazon, which contains an estimated one-third of all remaining tropical forest and much of Earth’s biological diversity, and where an area almost the size of Kansas was burned in one year alone.

Not least of the worries about the Amazon rain forest was the effect of its destruction upon global climate. Once again, the overriding problem—rather, two problems, the disappearing ozone layer and the greenhouse effect—centered on the global commons. Ozone concentrations have shown a marked decline since the late 1970s, with holes appearing over the polar regions and, recently, over Europe as well. The greenhouse effect is a more contentious subject, not easy to measure, still less to forecast, but alarming in its implications.

RESPONSE TO THE GROWING THREAT OF ECOCIDE

Prohibitions, Penalties, and Compensation

Although the threat of ecocide in the 20th century could not be ignored, the international community’s initial response was slow, gradual, and not very effective. It was first articulated in connection with oil

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30. See Smith et al., Conserving the Tropical Cornucopia, 33 Env’t 10 (No. 6, 1991); Hildyard, Adios Amazonia? A Report from the Altimira Gathering, 19 Ecologist 53 (No. 2, 1989).

31. Brunnee, supra note 26, at 42. The ozone hole over Antarctica reached its widest extent (9.4 million sq. m.) in 1992; in 1993 it was nearly as large and the amount of ozone was the lowest ever recorded anywhere in the world. N.Y. Times, Oct. 19, 1993, at A23.

32. There is already an enormous literature on the greenhouse effect and global climate change, and much debate and confusion about the kinds of projections and models used for forecasting change. See, e.g., Kowalok, Common Threads: Research Lessons from Acid Rain, Ozone Depletion, and Global Warming, 35 Env’t 12 (No. 6, 1993); Glantz, The Use of Analogies in Forecasting Ecological and Societal Responses to Global Warming, 33 Env’t 10, 11 (No. 5, 1991); White, The Great Climate Debate, Scientific American, July 1990, at 36; Schneider, Global Warming (1989). On the potential effects of climate change on particular regions or resources, see Hulme & Kelley, Exploring the Links Between Desertification and Climate Change, 35 Env’t 4 (No. 6, 1993); Parry, Climate Change and World Agriculture (1990); Hekstra, Global Warming and Rising Sea Levels: The Policy Implications, 19 Ecologist 4 (No. 1, 1989); Teclaff, The River Basin Concept and Global Climate Change, 8 Pace Envtl. L. Rev. 355 (1991); Office of Policy, Planning and Evaluation & Office of Research and Development, U.S. Environmental Protection Agency, The Potential Effects of Global Climate Change in the United States: Report to Congress (Smith & Tirpak eds., 1989); American Association for the Advancement of Science Panel on Climatic Variability, Climate Change, & the Planning and Management of U.S. Water Resources, Climate Change and U.S. Water Resources (Waggoner ed., 1990).
pollution of the oceans which, in the 1920s, appeared to have vast powers of recuperation. When oil replaced coal as fuel for ocean-going ships, the sheen of an oil spill on the surface of the sea became a visible sign of spreading pollution which might, in time, impede the use of the oceans. To do something about this, a conference convened in 1926 produced a draft convention permitting states to establish near their coasts zones within which oil discharge would be severely limited.\textsuperscript{33} Since oil pollution was then still in its infancy, the matter was shelved for a while, but the concept of zones took hold and was enacted in the 1954 International Convention for the Prevention of Pollution of the Sea by Oil.\textsuperscript{34} In a zone 50 miles from land, tankers were forbidden to discharge oil altogether and to discharge oily mixtures containing more than 100 parts per million of oil.\textsuperscript{35} As is evident, the Convention left most of the sea unprotected and so the system of zones was extended outward generally to 100 miles by amendments in 1962.\textsuperscript{36} It was the 1969 amendments which aimed to extend protection to the entire ocean by de-emphasizing the system of zones and introducing a rate of discharge per mile, which tankers were not to exceed en route.\textsuperscript{37}

Though an improvement on the original convention, the 1969 amendments were still a long way from eliminating oil pollution.\textsuperscript{38} Meanwhile, the \textit{Torrey Canyon} spill had raised the specter of accidental


\textsuperscript{34} International Convention for the Prevention of Pollution of the Sea by Oil, May 12, 1954, 12 U.S.T. 2989 [hereinafter 1954 Convention].

\textsuperscript{35} 1954 Convention, \textit{supra} note 34, art. III(I)(a), (b) at 2993. Three years after entry into force of the Convention, ships other than tankers were also to be subject to these discharge limits. 1954 Convention, \textit{supra} note 34, art. III(2), at 2993.

\textsuperscript{36} International Convention for the Prevention of Pollution of the Sea by Oil, Apr. 4-11, 1962, 17 U.S.T. 1523 (1954 Convention Amended 1962). In addition, new ships, \textit{i.e.}, ships of more than 20,000 tons begun after the effective date of the revision, were forbidden to discharge oil and oily mixtures with an oil content higher than 100 ppm. even outside the zones, except in special circumstances. \textit{Id.} Annex A, para. 3, at 1526. Smaller ships were allowed to continue unrestricted discharge outside the zones.

\textsuperscript{37} Prevention of Pollution of the Sea by Oil, Amendments to Convention of 1954, Oct. 21, 1969, art. III(a), 28 U.S.T. 1205, 1209-10, 9 I.L.M. 1, 3. For ships other than tankers discharge was to be effected as far as possible from land and limited to a rate not more than 60 liters per mile and an oil content of 100 ppm. For tankers, discharge was forbidden within 50 miles from land and beyond that the discharge was not to exceed 1/15,000th of the total cargo-carrying capacity. \textit{Id.} art. III(b), at 1209, 9 I.L.M. at 4.

\textsuperscript{38} "A discharge standard is, after all, essentially a license to pollute: its efficacy in reducing pollution depends on accuracy of measurement and, perhaps more than any other prevention means, on the capability of detecting infringements." Teclaff, \textit{Controlling Operational Oil Pollution from Ships}, in Fordham Corporate Law Institute, Annual Proceedings, 477, 482 (1978).
damage on a hitherto unheard-of scale. Therefore, the 1973 Convention for the Prevention of Pollution from Ships and its 1978 Protocol (collectively known as MARPOL 73/78) put the emphasis on preventive measures by establishing construction and equipment requirements designed to control both operational and accidental discharges.

These conventions are penal in character. The 1954 Convention imposed on member states an obligation to provide severe penalties for oil discharge within the 50-mile prohibited zone. However, it left enforcement mostly in the hands of the flag state and coastal states were accorded limited rights of inspection only when a foreign ship was in their ports. MARPOL gave the port state the right to detain or deny entry to a foreign ship which violates technical requirements, but stopped short of giving it the right to proceed against a foreign ship for spills into sea areas outside its national jurisdiction. The 1958 Convention on the High Seas, which merely charges states with the obligation to draw up regulations for preventing the main types of ocean pollution, does not have penal provisions, but leaves enforcement to the flag state. On the other hand, the Law of the Sea (LOS) Convention of 1982, which deals extensively with pollution, considerably enhances the enforcement powers of port and coastal states. According to LOS, a state whose port an offending vessel enters may proceed against that ship even if the discharges occurred on the high seas—i.e., outside the

39. See supra note 17.
41. See MARPOL 73/78, supra note 40, Annex 1, at 550-63 (especially Regulations 13-20).
42. 1954 Convention, supra note 34, art. VI, at 2994-95.
43. Specifically charging that state to proceed against the owner or master of a flag-state ship found to have caused pollution within a prohibited zone. 1954 Convention, supra note 34, art. X, at 2998.
44. 1954 Convention, supra note 34, art. IX, at 2996-98. This inspection was limited to verification of the oil record book, and the coastal state could proceed against the violating ship only for infringement of its laws in the territorial sea. 1954 Convention, supra note 34, art. XI, at 2998.
45. MARPOL 73/78, supra note 40, art. 5(3), at 548.
46. The port state can proceed against a foreign ship for violations which have occurred within areas under its jurisdiction, in accordance with prevailing rules of international law. MARPOL 73/78, supra note 40, Annex 1, at 553-54; see Tecaff, supra note 38, at 488-91.
48. Id. at 5, at 2315.
territorial sea and the exclusive economic zone (EEZ).\footnote{50} Furthermore, a foreign vessel can be arrested while sailing in the territorial sea or EEZ,\footnote{51} and proceedings can be brought against that ship. In both cases, proceedings have to be suspended at the request of the flag state, unless there was major damage to the coastal state, or unless the flag state repeatedly disregarded its enforcement obligations.\footnote{52}

None of the conventions discussed above addresses the question of compensation for damage. This was done by the 1969 Convention on Civil Liability for Oil Pollution from Ships (CLC).\footnote{53} Since states were reluctant to accept responsibility and liability directly, the Convention made the tanker owner strictly liable for pollution damage, but put a cap on that liability.\footnote{54} The 1971 Fund Convention\footnote{55} established a special fund to pay for excess losses not covered in the CLC. Both conventions set the limits of liability too low and both have been repeatedly amended by protocol to raise those limits, most recently in 1992.\footnote{56} Since the fund was established by contributions from the oil interests,\footnote{57} total liability under both conventions was split between the carriers and their insurers and the shippers (cargo owners).

Both conventions provide compensation when damage occurs in the territories, territorial seas, and exclusive economic zones of contracting states,\footnote{58} or, if a contracting state has not established an EEZ, to an area extending not more than 200 nautical miles from the baseline of its territorial sea.\footnote{59} Damage claims may be brought only in the courts of

\begin{footnotes}
\item 50. LOS Convention, \textit{supra} note 49, art. 218(1), at 1312.
\item 51. LOS Convention, \textit{supra} note 49, art. 220(6), at 1313.
\item 52. LOS Convention, \textit{supra} note 49, art. 228, at 1314.
\item 53. Convention on Civil Liability for Oil Pollution from Ships, Nov. 29, 1969, 9 I.L.M. 45.
\item 54. \textit{Id.} art. V, at 48-51.
\item 57. Fund Consolidated Text, \textit{supra} note 56, art. X, at 21:1704.
\item 58. CLC Consolidated Text, \textit{supra} note 56, art. II, at 21:1501; Fund Consolidated Text, \textit{supra} note 56, art. 3, at 21:1702.
\item 59. CLC Consolidated Text, \textit{supra} note 56, art. II(a)(ii), at 21:1501; Fund Consolidated Text, \textit{supra} note 56, art. 3 (a)(ii), at 21:1702.
\end{footnotes}
member states in whose territory, territorial sea, or EEZ the damage occurred or where preventive measures were taken. The CLC and Fund Conventions apply only to parties and have had to be supplemented on the part of shipping and oil interests by voluntary agreements which can apply in jurisdictions where CLC is not in force. These voluntary agreements parallel the conventions, TOVALOP being similar to the CLC in channeling liability to the ship owners, and CRISTAL to the Fund in providing supplemental compensation when liability exceeds the TOVALOP limits.

The conventions and arrangements for liability for oil pollution damage apply only after the damage has occurred. They do not deal with prevention. The 1969 Convention on Intervention on the High Seas made some attempt to cope with that problem by empowering coastal states to take immediate preventive measures, but only when an oil spill threatened substantial damage to their coasts and coastal waters. The 1990 Preparedness Convention, also aims at prevention and minimization of future losses, but is broader in scope. It is addressed not only to coastal states that are actually threatened, but also to all state parties whose ships and offshore installations can cause pollution. It charges states with the duty of requiring their flag ships to have an oil pollution emergency plan, as required by and in accordance with the provisions adopted by the International Maritime Organization (IMO), and their offshore facilities to have oil pollution emergency plans in accordance with national emergency systems. States have a duty to establish a

60. CLC Consolidated Text, supra note 56, art. IX(l), at 21:1504; Fund Consolidated Text, supra note 56, art. 7(1), at 21:1703.


63. Contract Regarding an Interim Supplement to Tanker Liability for Oil Pollution (CRISTAL), Jan. 14, 1971, 10 I.L.M. 137.

64. Both agreements have since been revised as to limits of liability and geographical application. See Cohen, supra note 61, at 529-37. For a description and analysis of the original TOVALOP and CRISTAL, see Becker, A Short Cruise on the Good Ships TOVALOP and CRISTAL, 5 J. Mar. L. & Com. 609 (1974).


68. Id. art. 1, at 736.

69. Id. art. 3(a), at 737.

70. Id.
national emergency system as detailed in the Convention. They also have a duty to cooperate in response to oil pollution incidents when the severity of such incident so justifies, upon request of any party affected or likely to be affected, as well as in research and development, and in providing support for those parties which request technical assistance.

While oil spills have caused spectacular incidents of ecocide, the potential for damage inherent in nuclear ship operations is many times greater. To take account of this, the Nuclear Ships Convention was adopted in 1962, defining the liability for damage from pollution of the marine environment by nuclear materials. The Convention also confines liability to the operator of the nuclear ship and makes it absolute, which means that the operator cannot be relieved from liability even if the incident was caused by an act of God. The operator is required to maintain insurance or other financial security covering his liability (which, though absolute, is limited), and if this proves to be inadequate, the licensing state is obliged to ensure that claims be paid. Jurisdiction over claims for damage is confined either to the courts of the licensing state or the state in whose territory nuclear injury has been sustained.

Nuclear ships are only one potential cause of radioactive pollution. Nuclear installations are another, and the Nuclear Damage Convention of 1963 deals with liability for what may be devastating harm to ecosystems. It makes the operator liable for damage caused by a nuclear incident in the installation, or originating in the installation and occurring elsewhere, except when the damage is caused by a nuclear incident directly due to an act of armed conflict, hostilities, civil war or insurrection, or (except insofar as the law of the installation state may provide to the contrary) is directly due to a grave natural disaster of an exceptional character. The liability may be limited by the installation

71. Id. art. 6, at 739-40.
72. Id. art. 7, at 740.
73. Id. art. 8, at 740-41.
74. Id. art. 9, at 741.
75. See supra note 14.
77. Id. art. 2., at 269.
78. Id. art. 3, at 270.
81. Id. art. IV(0), at 269, 2 I.L.M. at 733.
82. Id. art. IV(2), (3), at 268-69, 2 I.L.M. at 730-33.
state and if the insurance or other financial security of the operator is inadequate to satisfy claims, the installation state has to ensure payment. With certain exceptions, jurisdiction over claims lies with the courts of the contracting party within whose territory the damage-causing nuclear incident occurred.

A little earlier, the Organization for Economic Cooperation and Development (OECD) countries concluded an agreement establishing on a regional basis a similar scheme of compensation for nuclear damage. The operator is strictly liable for damage caused by an incident involving either nuclear fuel or radioactive products or waste in, or nuclear substances coming from, a nuclear installation. The operator must maintain insurance or other financial security of the prescribed amount and of such type and terms as the public authority shall specify. Jurisdiction over claims for compensation lies only with the courts of the contracting party in whose territory the nuclear incident occurred.

**STATE LIABILITY**

An absence in conventions of provisions spelling out state liability for damage to the environment does not mean that such liability does not exist. Rather it means that state liability and its scope must be sought in the cumulative effect of obligations assumed directly or indirectly by states. Thus, the Nuclear Damage Convention of 1963 charges the installation state with the duty to ensure that there are sufficient funds to satisfy claims against operators of nuclear installations. The 1986 Nuclear Assistance Convention attempts to mitigate the

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83. Id. art. V, at 270, 2 I.L.M. at 735.
84. Id. art. VII, at 271-72, 2 I.L.M. at 737.
85. Id. art. XI(2), (3), at 272-73, 2 I.L.M. at 739.
86. Id. art. XI(1), at 272, 2 I.L.M. at 739.
88. Id. art. 3, at 22-23.
89. Id. art. 10, at 28-29.
90. Id. art. 13, at 29.
91. The Nuclear Damage Convention provides that:
   The Installation State shall ensure the payment of claims for compensation for nuclear damage which have been established against the operator by providing the necessary funds to the extent that the yield of insurance or other financial security is inadequate to satisfy such claims . . . .
   Supra note 80, at 271, 2 I.L.M. at 737.
consequences of any kind of nuclear damage by imposing on parties the
duty to cooperate between themselves and the International Atomic
Energy Agency in facilitating prompt assistance in the event of a nuclear
accident or radiological emergency, including assistance to protect the
environment. The 1962 Convention on Nuclear Ships\textsuperscript{93} requires each
contracting state to take all measures necessary to prevent a nuclear ship
flying its flag from being operated without that state's license or
authority. The 1958 Geneva Convention on the High Seas\textsuperscript{94} obligates flag
states to ensure that their ships comply with international safety
standards and regulations, and charges states generally with drawing up
regulations for the prevention of ocean pollution.\textsuperscript{95}

The duties of flag states are elaborated in more detail in the 1982
Law of the Sea (LOS) Convention.\textsuperscript{96} LOS also establishes a general
obligation on the part of states to protect and preserve the marine
environment.\textsuperscript{97} It charges them with formulating international rules and
standards to that end,\textsuperscript{98} and devotes a whole section to details of these
rules and standards.\textsuperscript{99} Thus, states are required to control pollution from
land-based sources,\textsuperscript{100} from seabed activities under their jurisdiction,\textsuperscript{101}
from dumping,\textsuperscript{102} from vessels,\textsuperscript{103} and from or through the atmo-
sphere.\textsuperscript{104} Regional seas conventions, such as the Barcelona Convention
for the Protection of the Mediterranean,\textsuperscript{105} or the Convention for the
Protection and Development of the Marine Environment of the Wider
Caribbean Region,\textsuperscript{106} also impose obligations to protect and preserve the
marine environment. Both conventions require parties to formulate
procedures to determine liability and compensation for damage from
pollution of the marine environment.\textsuperscript{107} In the 1972 (London) Conven-

\textsuperscript{93} Supra note 76, art. XV, at 275.
\textsuperscript{94} Supra note 47, Annex II, art. 10(2), at 2316.
\textsuperscript{95} Supra note 47, Annex II, art. 24, at 2319.
\textsuperscript{96} LOS Convention, supra note 49, art. 94, at 1287-88.
\textsuperscript{97} LOS Convention, supra note 49, art. 192, at 1308.
\textsuperscript{98} LOS Convention, supra note 49, art. 197, at 1308.
\textsuperscript{99} LOS Convention, supra note 49, Part XII, Section 5, at 1310-11.
\textsuperscript{100} LOS Convention, supra note 49, art. 207, at 1310.
\textsuperscript{101} LOS Convention, supra note 49, art. 208, at 1310.
\textsuperscript{102} LOS Convention, supra note 49, art. 210, at 1310.
\textsuperscript{103} LOS Convention, supra note 49, art. 211, at 1310-11.
\textsuperscript{104} LOS Convention, supra note 49, art. 212, at 1311.
\textsuperscript{105} Convention for the Protection of the Mediterranean Sea Against Pollution, Feb. 16,
\textsuperscript{106} Convention for the Protection and Development of the Marine Environment of the
Wider Caribbean Region, Mar. 24, 1983, arts. 5-8, 22 I.L.M. 227, 229 [hereinafter Wider
Caribbean Convention].
\textsuperscript{107} Barcelona Convention, supra note 105, art. 12, at 293; Wider Caribbean Convention,
supra note 106, art. 14, at 231.
tion on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter,\textsuperscript{108} parties undertake to promote the effective control of all sources of pollution of the marine environment and pledge to take all practicable steps to prevent the pollution of the sea by dumping.\textsuperscript{109} They must prohibit the dumping of certain enumerated substances altogether and see to it that other material is dumped only under a general permit.\textsuperscript{110} Each party undertakes to punish contravention.\textsuperscript{111}

Some activities are considered so dangerous and destructive that they are altogether prohibited, or prohibited in certain regions. The Seabed Arms Control Treaty of 1971\textsuperscript{112} forbids the emplacement of nuclear and other weapons of mass destruction on the seabed and ocean floor and subsoil thereof.\textsuperscript{113} The 1963 Nuclear Test Ban treaty\textsuperscript{114} bans tests under water, in the atmosphere, and in outer space.\textsuperscript{115} By the Outer Space Treaty of 1967,\textsuperscript{116} parties undertook not to place in orbit around the earth any objects carrying nuclear or other weapons of mass destruction, and not to install such weapons on celestial bodies or station them in outer space in any other manner.\textsuperscript{117} Here, exceptionally, states parties explicitly assume liability for national activities in outer space, including the moon and other celestial bodies (whether such activities are carried on by government agencies or non-governmental entities), and for assuring that national activities are carried out in conformity with the provisions set forth in the treaty.\textsuperscript{118} This liability is clearly stated and elaborated in the 1972 Convention on International Liability for Damage Caused by Space Objects,\textsuperscript{119} according to which a launching state is

\begin{flushright}
\begin{itemize}
\item \textsuperscript{109.} Id. art. 1, at 2406, 11 I.L.M. at 1295.
\item \textsuperscript{110.} Id. art. 4, at 2408, 11 I.L.M.. at 1297.
\item \textsuperscript{111.} Id. art. 7(2), at 2410, 11 I.L.M. at 1300-01; see also Convention for the Prevention of Marine Pollution by Dumping from Ships and Aircraft (Oslo Convention), Feb. 15, 1972, 11 I.L.M. 262.
\item \textsuperscript{112.} Treaty on the Prohibition of the Emplacement of Nuclear Weapons and Other Weapons of Mass Destruction on the Seabed and the Ocean Floor and in the Subsoil Thereof (Seabed Arms Control Treaty), Feb. 11, 1971, 23 U.S.T. 701, 10 I.L.M. 146.
\item \textsuperscript{113.} Id. art. 1, at 704, 10 I.L.M. at 146-47.
\item \textsuperscript{115.} Nuclear Test Ban Treaty, supra note 114, art. I, at 1316-17, 2 I.L.M. at 887.
\item \textsuperscript{117.} Id. art. IV, at 2411-12, 610 U.N.T.S. at 208.
\item \textsuperscript{118.} Id. art. VI, at 2411, 610 U.N.T.S. at 208; see also Agreement Governing the Activities of States on the Moon and Other Celestial Bodies, Dec. 5, 1979, arts. 3, 14, 18 I.L.M. 1434.
\item \textsuperscript{119.} Convention on International Liability for Damage Caused by Space Objects, Nov. 29,
absolutely liable to pay compensation for damage caused by its space object on the surface of the earth or to aircraft in flight. However, when damage is caused to a space vehicle outside the surface of the earth, the launching state is liable only if the damage was due to its fault or the fault of persons for whom it is responsible.

In the Convention on Long-Range Transboundary Air Pollution, states merely endeavor to limit and, as far as possible, gradually reduce and prevent air pollution, including long-range transboundary air pollution. This is a more cautious formulation than that, for example, with respect to pollution of the marine environment in the LOS Convention. Nevertheless, parties do undertake to use the best available technology which is economically feasible for control purposes. In the 1985 Vienna Convention for the Protection of the Ozone Layer, parties agree to cooperate in legal, scientific and technological fields, and to take appropriate measures to protect human health and the environment from the adverse effects of human activities which modify or are likely to modify the ozone layer. The Montreal Protocol is considerably more specific, in that the parties have agreed on a timetable and percentages for the reduction of ozone-depleting substances.

That states have the duty to control pollution of and through watercourses is assumed by a number of international organizations. For example, the Helsinki Rules of the International Law Association make a distinction between new forms of water pollution, which must be prevented, and existing pollution, which should be abated by all reasonable measures. Both obligations are somewhat weakened by the

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120. Id. art. 2, at 2392, 10 I.L.M. at 966.
121. Id. art. 3, at 2392, 10 I.L.M. at 966.
123. Id. art. 2, at 3046, 18 I.L.M. at 1443.
124. See LOS Convention, supra note 49, art. 212, at 1311.
125. Long-Range Transboundary Air Pollution Convention, supra note 122, art. 6, at 3047, 18 I.L.M. at 1444.
127. Id. art. 4, at 1530-31.
128. Id. art. 2, at 1529-30.
fact that they do not apply when pollution is consistent with the principle of equitable utilization. They were repeated in the ILA Rules on Water Pollution in an International Drainage Basin, which were intended to elaborate the Helsinki Rules on this topic. The duty not to cause damage to other states through watercourse pollution is included in the Athens Resolution of the International Law Institute, and an Economic Commission for Europe task force recently endorsed such a duty explicitly for transboundary water pollution.

The International Law Commission's Draft Articles on the Law of the Nonnavigational Uses of International Watercourses contains the obligation, stated unequivocally, that:

> Watercourse states shall, individually or jointly, prevent, reduce and control pollution of an international watercourse (system) that may cause appreciable harm to other watercourse States or to their environment...

The Commission strongly proclaimed also that:

> Watercourse states shall, individually or jointly, take all measures with respect to an international watercourse (system) that are necessary to protect and preserve the marine environment, including estuaries, taking into account generally accepted rules and standards.

This survey of obligations assumed by states in conventions and the restatements of the law by international bodies of experts strongly supports the view that there exists a general obligation for all states to ensure that activities under their jurisdiction or control do not cause substantial damage to the environment of other states and the com-

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131. *Id.* at 499 (comment to art. 10).
136. *Id.* art. 21, para. 2.
137. *Id.* art. 23.
This theory would base state liability on fault, and yet there is a lot in favor of strict liability as a general rule of international law. It is simple and certain. All that is required to trigger it is evidence of substantial transboundary damage and no questions asked as to whether there had been an infringement of specific international obligations. In this respect, it should have considerable deterrent effect on the behavior of states. It has won numerous adherents, at least for ultra-hazardous activities, among academic writers and members of the International Law Commission. But the Commission remains divided on the topic.

Quentin-Baxter, its First Special Rapporteur on international liability for injurious consequences arising out of acts not prohibited by international law, limited the application of strict liability to conventional regimes or to instances when the building of a conventional regime failed or injury was unforeseen. A change in the special rapporteurs

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140. See Report of the International Law Commission on the Work of Its Thirty-Ninth Session, 42 U.N. GAOR, Supp. No. 10, at 112, U.N. Doc. A/42/10 (1987) in which it was reported that, while discussing international liability for injurious acts not prohibited by international law, some members disagreed with the assertion that the concept of strict liability did not exist in international law, pointing out that:

It was incorporated, as a concept if not as a term, in a number of multilateral treaties. The principle was recognized in the Trail Smelter arbitration, the Gut Dam Claims, and in many other forms of State practice referred to in the Secretariat study on the topic. Strict liability was the basis on which a solution to the fundamental problems under this topic should be approached.

Id. at 112 (citations omitted).

141. See, e.g., id. at 111.

142. In his Third Report, Special Rapporteur Quentin-Baxter states that:

[There can be no doubt at all that strict liability is a very important and
brought no change in the attitude toward strict liability. In his Sixth Report, Second Special Rapporteur Barboza submitted 33 draft articles on the same topic, in which he advocates negotiations to determine reparation. But vestiges of strict liability linger in his insistence that injury must be compensated. It would seem that the ghost of strict liability is hard to exorcise entirely.

**TOWARD AN ADEQUATE RESPONSE TO THE THREAT OF ECOCIDE**

The aim of any measures for protection of the environment should be to prevent damage and to repair damage once it has occurred. Penal measures and liability, especially strict liability providing for sufficiently high compensation, ought to be part of all environmental protection programs. However, where there exists a realistic threat of ecocide on a global scale, the only adequate response may be prohibition, as in the 1963 Nuclear Test Ban Treaty.

In the case of activities which are part of economically beneficial processes, prohibition may be politically and economically impractical. So, having downplayed strict liability, Quentin-Baxter, the International Law Commission’s First Special Rapporteur on International Liability for Injurious consequences Arising Out of Acts Not Prohibited by International Law, strove to emphasize prevention by exhorting states to keep channels of communication open, as befits an age of communication.

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frequent ingredient in the construction of conventional regimes . . . . It is equally clear that no automatic commitment to a strict liability standard would be generally acceptable . . . .


At the very end of the day, when all the opportunities of regime building have been set aside—or, alternatively, when a loss or injury has occurred that nobody foresaw—there is a commitment, in the nature of strict liability, to make good the loss.

*Id.* at 60, para. 41.


145. *Id.*


This would be achieved by the "soft" duty or law of information,148 including cooperation in providing it, and by negotiation.149 These duties, though allowing no right of action when transgressed,150 would induce states to institute preventive regimes or measures jointly or unilaterally.151 Problems of compensation would come after injury occurred and would be a matter for negotiation in the light of shared expectations and balancing of interests.152 Second Special Rapporteur Barboza continued the soft-law approach,153 though he seems to have been aware of its doubtful value for prevention.154 However, he was also aware that changing soft into hard law would bring the topic (liability for injury from acts not prohibited by international law) into the ambit of responsibility for the consequences of wrongful acts.155 This may be the direction in which the practice of states is leading anyway.156

Whereas soft law would do little to make prevention work, elevating the consequences of some activities to the level of an international crime may make it at least more plausible. This is what the International Law Commission has done. It identified as an international crime the violation of "an obligation of essential importance for the preservation of the human environment, such as those prohibiting massive pollution of the atmosphere or of the seas."157 The definition is

148. Id. at 62-63.
149. Id. at 63.
150. Id. at 63.
151. Id.
152. Id. at 63-64.
155. Id. para. 504, at 268.
156. See supra note 138.
not free of ambiguity, but the essence of the examples given is that an international crime may be committed by massive pollution of the environment. Such pollution in itself is a violation of an obligation essential for the preservation of the human environment, and there is no need to point to specifically articulated and clearly accepted obligations, such as not to detonate nuclear devices in the atmosphere. It is the massiveness of the destruction which transforms impairment of the environment (i.e., pollution) into a crime and distinguishes it from a delict. There is considerable evidence, as stated above, that states have an obligation not to impair the environment. If so, then impairment at a certain level (substantial) constitutes a delict, and when the impairment is above that level states commit an international crime.

The idea of state international crime met with opposition from a number of states and remains controversial. It has been suggested, therefore, that the opposition might lessen if no state acts were branded with the stigma of crime and only some acts would entail more severe consequences. This may be especially appropriate for ecocide, since environmental international crime was specifically singled out by some states. Ecocide could be considered as an aggravated tort or delict, instead of as a crime. Such a supertort would still be an offense erga omnes, and all states should not only have standing to bring charges

158. Nuclear Test Ban Treaty, supra note 114.
161. See Dupuy, Implications of Institutionalization of International Crimes of States, in International Crimes of State Analysis, supra note 160, at 170, 184; see also Graefrath, Responsibility and Damages Caused: Relationship Between Responsibility and Damages, 185 Recueil des Cours 9, 58-61 (1984-II); Spinedi, supra note 160, at 52-54.
162. For example, the Federal Republic of Germany, see 1981 II Y.B. Int’l L. Comm’n pt. 1, at 75; see also Spinedi, supra note 160, at 61.
164. After reviewing the declarations of the International Court of Justice, United Nations organs and expert bodies, Schachter concluded that he sees “distinct advantages” in applying the concept of obligations erga omnes to the limited category of principles
in appropriate tribunals, but should also be permitted to take countermeasures short of use of force (unless the offense amounted to an aggressive use of force). To make prosecution more effective, standing to sue should be given to international organizations and non-governmental organizations (NGOs).

CONCLUSIONS

Incidents of ecocide and the threat of more and worse to come have steadily increased since the middle of the present century. The response of the international community has been two-pronged: providing and tightening liability, and searching for preventive measures. Liability is channeled through operators of risky, damage-causing enterprises, while states have endeavored to minimize their responsi-
bility-cum-liability. Because liability comes into play only after damage, perhaps irretrievable, has been done, it was hoped to induce states to act before disaster occurred, by adopting and following preventive measures. Reliance here was on strengthening communication among states in order to create liability regimes voluntarily. At the same time, the concept of international environmental crime began to gain ground. If accepted, this concept of criminal responsibility, or its equivalent under a different name, would strengthen prevention and, perhaps, would speed up the movement toward strengthening enforcement, which remains weak. The U.N. Security Council is empowered to issue recommendations for the settling of disputes affecting peace and security, as well as binding decisions backed by military and non-military sanctions when peace has been broken, or such breach threatens. It could act effectively in environmental matters if its powers were extended to identifying actual or potential cases of ecocide and giving binding orders backed by sanctions, but it would have to be unhampered by the veto if it were not to repeat the impotence it has exhibited in the maintenance of peace.

There are proposals to either revamp the Security Council, or create an entirely new body with similar competence, but confined to environmental matters. Proposals which rely on expanding the competence of existing organizations may have an edge. But how effective would an enhancement of powers of existing international bodies be, given such attitudes as an official United States finding that

169. For example, the Convention on Long-Range Transboundary Air Pollution states: "The present convention does not contain rules on liability as to damage." Convention on Long-Range Transboundary Air Pollution, supra note 122, art. 8(f), at 3048, 18 I.L.M. at 1445.

170. See supra, notes 147-152 and accompanying text.

171. See supra notes 157-160 and accompanying text.

172. U.N. Charter, arts. 34, 36.


174. U.N. Charter art. 27. Veto means that no binding (valid) decision can be made by the U.N. Security Council as against a negative vote of one of the permanent members of the Council.


176. On institutional reorganization within the U.N., see e.g., Declaration of The Hague, Mar. 11, 1989, reprinted in Sands, supra note 166, at 417, 419.

177. At the U.N. ECOSOC meeting of May 8-10, 1989, the British Permanent Representative to the United Nations warned that time does not allow us the luxury of creating new institutions. See supra, note 175.
the existing international dispute resolution system is adequate for the purpose, or the United Kingdom's unwillingness to extend more than recommended powers of the Security Council to environmental matters. An effective international regime is an essential prerequisite to a world free of the fear of ecocide, but, if and when it is installed, it may give no more than a breathing space unless it is built upon a reconciliation of the twin needs for economic development and environmental preservation.